Draft Report

Soil RCRA Facility Investigation/Remedial Investigation Work Plan

PG&E Topock Compressor Station, Needles, California

Prepared for

California Environmental Protection Agency, Department of Toxic Substances Control, and United States Department of the Interior

May 2011

On behalf of

Pacific Gas and Electric Company

CH2MHILL

155 Grand Avenue, Suite 800
Oakland, CA 94612

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This work plan was prepared under supervision of a California Professional Geologist:

KEITH R. SHEETS
No. 6888
4/30/12

Keith Sheets, P.G. No. 6888
Project Geologist
CH2M HILL

and:

Susanne von Rosenberg, P.E. No. CH5055
Gaia Consulting, Inc.

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
BNSF	Burlington Northern Santa Fe Railway
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMS/FS	corrective measures study/feasibility study
DOI	United States Department of the Interior
DQO	data quality objective
DTSC	Department of Toxic Substance Control
EIR	Environmental Impact Report
EM	electromagnetic induction
ESA	Endangered Species Act
GPR	ground-penetrating radar
HNWR	Havasu National Wildlife Refuge
IDW	investigation-derived waste
NHPA	National Historic Preservation Act
PBA	programmatic biological assessment
PG&E	Pacific Gas and Electric Company
PST	planned sampling table
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI/RI	Soil RCRA facility investigation/remedial investigation
SHPO	State Historic Preservation Office
SOP	standard operating procedure
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons

UA	Undesignated Area
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VMG	vertical magnetic gradient
VOC	volatile organic compound
XRF	x-ray fluorescence

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is conducting investigative and remedial activities at the Topock Compressor Station in Needles, California. Investigative and remedial activities at the Topock site are being performed under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), pursuant to agreements with the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and United States Department of the Interior (DOI), respectively. The Topock Compressor Station is located in San Bernardino County, approximately 15 miles to the southeast of Needles, California. Figure 1-1 presents the site location map. (All figures are located at the end of this main report.)

This Soil RCRA Facility Investigation/Remedial Investigation (RFI/RI) Work Plan (Work Plan) presents the proposed soil and related investigation activities for all areas of the site. It is comprised of two geographically adjacent areas: Part A (areas outside the compressor station fence line) and Part B (areas inside the compressor station fence line). The perimeter areas adjacent to the compressor station fence line and the storm drains leading from the compressor station to areas outside the fence line are also included in this Work Plan. A DTSC letter dated January 4, 2011 (DTSC, 2011a) provided direction for preparing a combined Part A and Part B work plan.

1.1 History of the Soil Investigation Program

The *Revised Final RFI/RI Volume 1, PG&E Topock Compressor Station, Needles, California* (Revised Final RFI/RI Volume 1) (CH2M HILL, 2007a) identified 19 Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and other undesignated areas (UAs) at the Topock Compressor Station to be carried forward in the soil RFI/RI. These areas included:

- SWMU 1 – Former Percolation Bed
- AOC 1 – Area Around Former Percolation Bed
- AOC 4 – Debris Ravine
- AOC 5 – Cooling Tower A
- AOC 6 – Cooling Tower B
- AOC 7 – Hazardous Materials Storage Area
- AOC 8 – Paint Lockers
- AOC 9 – Southeast Fence Line (Outside Visitor Parking Area)
- AOC 10 – East Ravine
- AOC 11 - Topographic Low Area
- AOC 12 – Fill Area
- AOC 13 – Unpaved Areas within the Compressor Station
- AOC 14 – Railroad Debris Site
- AOC 15 – Auxiliary Jacket Water Cooling Pumps

- AOC 16 – Sandblast Shelter
- AOC 17 – Onsite Septic System
- AOC 19 – Former Cooling Liquid Mixing Area
- AOC 20 – Industrial Floor Drains
- UA-1 – Potential Pipe Disposal Area

The Revised Final RFI/RI Volume 1 also identified eight additional units and one UA (UA-2) requiring further investigation. These eight units consist of five units associated with the former hazardous waste management system (SWMUs 5, 6, 8, and 9, and AOC 18) that were closed by DTSC in 1995, and three units associated with the former oily water treatment system (Units 4.3, 4.4, and 4.5) that were also closed by DTSC in 1995. In a letter dated July 13, 2006, DTSC requested that additional sampling be conducted at these units. Similarly, UA-2, the Former 300B Pipeline Liquids Tank, was also previously closed, and DTSC requested additional sampling for this area in the same July 13, 2006 letter.

An addendum to the Revised Final RFI/FI Volume 1 will be prepared to document the new units (SWMU 11 and AOCs 21 through 26) that have been added to the investigation program since the Revised Final RFI/FI Volume 1 was prepared. These units were added at the direction of DTSC and DOI.

Two draft work plans were prepared to describe collection of additional soil data to complete site characterization activities at the SWMUs, AOCs, and UAs identified in the Revised Final RFI/RI Volume 1. Investigation areas outside the compressor station fence line were addressed in the *Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A, PG&E Topock Compressor Station, Needles, California* (Draft Soil Part A Work Plan) (CH2M HILL, 2006). Investigation areas within the compressor station fence line were addressed in the *Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part B, PG&E Topock Compressor Station, Needles, California* (Draft Part B Work Plan) (CH2M HILL, 2007b). To minimize the number of samples and disturbances to sensitive resources, the Part A and Part B investigation programs are being conducted in two phases. The objective of Phase 1 is to collect supplemental soil data, and the objective of Phase 2 is to fill data gaps identified in the Phase 1 data. Phase 2 sampling will only be necessary where data gaps are identified after evaluation of the combined soil data set (existing data and supplemental Phase 1 data).

1.1.1 Soil Part A Investigation History

DTSC and DOI conditionally approved the Draft Soil Part A Work Plan on August 10, 2007 (DTSC, 2007) and June 4, 2008 (DOI, 2008), respectively. Clarification of DTSC's conditional approval was documented in an email containing the table titled "Clarification to Responses to PG&E Topock Compressor Station Soil Investigation Part A Work Plan August 10, 2007 Conditional Approval Letter" (CH2M HILL, 2007c).

DTSC's conditional approval letter specifically rejected the data quality objectives (DQOs) and associated data gaps evaluation process presented in Sections 3.0 and 4.0 of the Draft Soil Part A Work Plan, while directing PG&E to implement Phase 1 of soil sampling. In August 2008, the Draft Soil Part A Work Plan was implemented. Items of note for the Part A field implementation include:

- At DOI’s direction, no intrusive sampling was performed at UA-1 (Potential Pipe Disposal Area).
- Two areas located near UA-1, called UA-1B and UA-1C Alternate, were identified by PG&E as a potential alternate locations for the Potential Pipe Disposal Area.
- Investigation work at AOC 4 was not conducted in 2008 due to the then-pending AOC 4 time-critical removal action, which was completed in December 2010. Subsequently, the AOC 4 time-critical removal action confirmation soil samples were used to conduct a data gaps evaluation; the results of the evaluation are included in Appendix A of this document.

From June 2008 to February 2010, DTSC, DOI, and PG&E convened a series of meetings to draft the DQO Steps 1 through 5 for the Soil Part A investigation. The steps are presented in the technical memorandum *Data Quality Objectives – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2010a) (referred to as the Soil Part A DQO Tech Memo, which is included in Appendix A). Between May 2009 and January 2010, through additional employee interviews and site reconnaissance after a major storm event, two new investigation areas were identified near AOC 11, along with a new investigation area, the MW-24 Bench. These new areas were added to Part A data gaps evaluation.

A data gaps evaluation was conducted for each of the Part A investigation areas using the Part A DQO process to ensure that data collected are of sufficient quantity and quality to enable the specified decisions to be made. The data gaps evaluation was initially completed through Step 5 of the DQO process. DQO Steps 6 and 7 were completed through a series of meetings with DTSC, DOI, Tribes, other stakeholders, and PG&E in 2010. Specifically, two meetings were held at the Topock Compressor Station on October 6 and 7, 2010 and November 2 and 3, 2010. In these meetings, data were reviewed with stakeholders, the AOCs were visited, and preliminary data gaps evaluations were discussed. A meeting was held on December 7, 2010 between DOI, DTSC, and Tribes to discuss UA-1/UA-1 Alternate and sampling at the mouth of Bat Cave Wash. On December 13, 2010, DTSC issued direction to PG&E on UA-1 and UA-1 Alternate (DTSC, 2010a). On December 15, 2010, DOI issued direction to PG&E on sampling at the mouth of Bat Cave Wash (DOI, 2010). On January 13, 2011, a meeting was held to discuss Tribes’ comments on the preliminary data gaps evaluation. Additional direction to PG&E on the Part A data gaps evaluation was issued in a joint letter from DTSC and DOI dated February 25, 2011 (included in Appendix A; Attachment 1). The Soil Part A Phase 1 Data Gaps Evaluation Report (providing the agreed-upon Phase 2 sample locations) is included as Appendix A of this document.

Based on the Part A data gaps evaluation, no further investigations are needed at two areas (AOC 12, Fill Areas and UA-2 – Former 300B Pipeline Liquids Tank). Nine investigation areas located outside of the compressor station fence line are proposed for further investigation in this work plan and are shown on Figure 1-2. The Part A investigation areas are:

- SWMU 1 – Former Percolation Bed
- AOC 1 – Area Around Former Percolation Bed
- AOC 4 – Debris Ravine

- AOC 9 – Southeast Fence Line
- AOC 10 – East Ravine
- AOC 11 – Topographic Low Areas, including the two new areas
- AOC 14 – Railroad Debris Area
- UA-1 – Potential Pipeline Disposal Area
- MW-24 Bench Area

The identified data gaps for these areas and Soil Part A Phase 2 Soil sample locations are presented in Appendix A of this report.

1.1.2 Soil Part B Investigation History

DTSC and DOI provided comments on the Draft Part B Work Plan in March 2008. PG&E requested clarification of several of the agencies' comments on April 21, 2008. DTSC and DOI provided clarification and direction on March 10, 2010 (DTSC and DOI, 2010b). DTSC's letter informed PG&E that no responses were necessary to DTSC's previous comments on the DQOs for the Draft Part B Work Plan, but it did require responses to all other comments to the Draft Part B Work Plan, as summarized in DTSC's March 26, 2008 letter. DOI's letter requested that PG&E not respond to DOI's previous comments on the Draft Part B Work Plan. Both DTSC and DOI letters directed PG&E to develop a Soil Part B DQO Technical Memorandum (similar to the Soil Part A DQO Tech Memo) and, once the Soil Part B DQO Tech Memo had been prepared and approved by DTSC and DOI, to develop a new Part B Work Plan.

The Soil Part B DQO Steps 1 through 5 are presented in the technical memorandum *Data Quality Objectives – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (Soil Part B DQO Tech Memo) (CH2M HILL, 2011). DTSC and DOI provided comments on initial drafts of the data gaps evaluation flow charts and the draft of the Tech Memo, and final Tech Memo was revised in accordance with the agencies' input. Steps 6 and 7 will be completed once the initial Part B data have been collected. The Soil Part B DQO Tech Memo, the Soil Part B Investigation Program (Soil Part B Work Plan), and responses to DTSC comments on the 2007 Draft Part B Work Plan are included as Appendix B of this document.

In DTSC's July 20, 2010 comments on PG&E's "Response to Comments to the Draft Soil Part B Work Plan"(DTSC, 2010c), DTSC requested the addition of seven additional areas located inside the compressor station fence line, including one new SWMU and six new AOCs.

Twenty-five investigation areas inside the compressor station fence line are proposed for further investigation in this Work Plan, as shown on Figure 1-3. Two new areas of potential concern were identified recently based on employee interviews. These new investigation areas are the Teapot Dome Restaurant oil pit and a potential burn area near AOC 17, shown in Figure 1-3. The Teapot Dome Restaurant oil pit will be investigated in conjunction with the Perimeter Area (discussed in Section 2.4.2), and the potential burn area will be evaluated in conjunction with AOC 13. The Part B investigation areas are:

- AOC 5 – Cooling Tower A
- AOC 6 – Cooling Tower B

- AOC 7 – Hazardous Materials Storage Area
- AOC 8 – Paint Locker
- AOC 13 – Unpaved Areas within the Compressor Station
- AOC 15 – Auxiliary Jacket Water Cooling Pumps
- AOC 16 – Sand Blast Shelter
- AOC 17 – Onsite Septic System
- AOC 18 – Combined Waste Water Transference Pipelines
- AOC 19 – Former Cooling Liquid Mixing Area
- AOC 20 – Industrial Floor Drains
- AOC 21 – Round Depression near Sludge-drying Beds
- AOC 22 – Unidentified Three-sided Structure (in the upper yard)
- AOC 23 – Former Water Conditioning Building (now used as a storage building)
- AOC 24 – Stained Area Associated with a Potential Former Oil/Water Separator (in lower yard near northern bank of scrubbers)
- AOC 25 – Station Compressor and Auxiliary Engines and Associated Basements
- AOC 26 – Former Scrubber Sump
- SWMU 5 – Sludge Drying Beds
- SWMU 6 – Chromate Reduction Tank
- SWMU 8 – Process Pump Tank
- SWMU 9 – Transfer Sump
- SWMU 11 – Former/Current Sulfuric Acid Tanks (associated with the cooling towers)
- Units 4.3 – Oil/Water Holding Tank
- Unit 4.4 – Oil/Water Separator, and
- Unit 4.5 – Portable Oil Storage Tank

The Soil Part B Phase 1 sampling program, including sample locations, are provided in Appendix B of this report.

1.1.3 Other Investigation Areas

In addition to the specific units described above, two other investigation program components are identified: the Perimeter Area and the storm drain system. The Soil Part A and Part B investigations overlap in the Perimeter Area and are also potentially connected through the storm drains that discharge into SWMU 1, AOC 1, AOC 10, and AOC 11. The

Perimeter Area is defined as the area outside the immediate fence line of the compressor station to the bottom of the slope. The storm drain system consists of active and abandoned storm drain lines within the compressor station and outfalls from the system outside the fence line.

Table 1-1 lists investigation areas, whether the area is inside or outside the compressor station fence line, approximate size, and where to find additional information for the area in this work plan.

TABLE 1-1
SWMUs, AOCs, and Other Undesignated Areas
Soil RCRA Facility Investigation/Remedial Investigation Work Plan
PG&E Topock Compressor Station, Needles, California

SWMU/AOC/Units/ Undesignated Areas	**Location Inside or Outside of the Fence Line at Topock Compressor Station**	**Size of Investigation Area (ft^2)**	**Additional Information**
SWMU 1 – Former Percolation Bed	Outside	19,000	Appendix A; sub-Appendix C1
SWMU 5 – Sludge-Drying Beds	Inside	2,000	sub-Appendix B1
SWMU 6 – Chromate Reduction Tank	Inside	31	sub-Appendix B2
SWMU 8 – Process Pump Tank	Inside	110	sub-Appendix B3
SWMU 9 – Transfer Sump	Inside	24	sub-Appendix B4
SWMU 11 – Sulfuric Acid Tanks	Inside	780	sub-Appendix B5
AOC 1 – Area Around Former Percolation Bed	Outside	182,000	Appendix A; sub-Appendix C2
AOC 4 – Debris Ravine	Outside	69,000	Appendix A; sub-Appendix C10
AOC 5 – Cooling Tower A	Inside	15,000	sub-Appendix B6
AOC 6 – Cooling Tower B	Inside	14,000	sub-Appendix B7
AOC 7 – Hazardous Materials Storage Area	Inside	740	sub-Appendix B8
AOC 8 – Paint Locker	Inside	120	sub-Appendix B9
AOC 9 – Southeast Fence Line (Outside Visitor Parking Area)	Outside	3,400	Appendix A; sub-Appendix C3
AOC 10 – East Ravine	Outside	1,400	Appendix A; sub-Appendix C4
AOC 11 – Topographic Low Areas	Outside	14,400	Appendix A; sub-Appendix C5
AOC 12 – Fill Area	Outside	4,900	Appendix A; sub-Appendix C6
AOC 13 – Unpaved Areas within the Compressor Station	Inside	NA	sub-Appendix B10

TABLE 1-1
SWMUs, AOCs, and Other Undesignated Areas
Soil RCRA Facility Investigation/Remedial Investigation Work Plan
PG&E Topock Compressor Station, Needles, California

SWMU/AOC/Units/ Undesignated Areas	**Location Inside or Outside of the Fence Line at Topock Compressor Station**	**Size of Investigation Area (ft^2)**	**Additional Information**
AOC 14 – Railroad Debris Site	Outside	79,000	Appendix A; sub-Appendix C7
AOC 15 – Auxiliary Jacket Water Cooling Pumps	Inside	810	sub-Appendix B11
AOC 16 – Sand Blast Shelter	Inside	880	sub-Appendix B12
AOC 17 – Onsite Septic System	Inside	2,500	sub-Appendix B13
AOC 18 – Pipelines connect Cooling Towers to Wastewater System	Inside	N/A	sub-Appendix B14
AOC 19 – Former Cooling Liquid Mixing Area	Inside	1,100	sub-Appendix B15
AOC 20 – Industrial Floor Drains	Inside	N/A	sub-Appendix B16
AOC 21 – Storage area for the Sludge Drying Bed	Inside	1,800	sub-Appendix B17
AOC 22 – Round Depression near Sludge Drying Beds	Inside	757	sub-Appendix B18
AOC 23 – Water Conditioning Building	Inside	1,000	sub-Appendix B19
AOC 24 – Stained area near the former oil/water separator	Inside	580	sub-Appendix B20
AOC 25 – Compressor Building, Engines, Basements and Auxiliary Building	Inside	18,000	sub-Appendix B21
AOC 26 – Scrubber Oil Sump	Inside	1646	sub-Appendix B22
Unit 4.3 – Oil/Water Holding Tank	Inside	44	sub-Appendix B23
Unit 4.4 – OWS	Inside	28	sub-Appendix B24
Unit 4.5 – Portable Waste Oil Storage Tank	Inside	3	sub-Appendix B25
UA 1 – Potential Pipe Disposal Area	Outside	8,225	Appendix A; sub-Appendix C8
UA 2 – Former 300B Pipeline Liquids Tank	Outside	829	Appendix A; sub-Appendix C9
Storm Drain	Outside	N/A	Appendix D
Perimeter Area	Outside	N/A	Appendix C

1.1.4 Perimeter Area Investigation

Previous investigations have not been conducted within the Perimeter Area. The DTSC identified the Perimeter Area as a potential concern during the development of the Draft Part B Work Plan in 2007. On October 18, 2007, DTSC and PG&E conducted a site walk to identify appropriate perimeter sampling locations. Fifteen perimeter sample locations were identified and incorporated into the Draft Part B Soil Work Plan and are incorporated into this combined investigation program. The proposed Perimeter Area investigation program is included as Appendix C of this document. The following is a summary of the Perimeter Area investigation program.

The Perimeter Area investigation program was developed to evaluate the potential effects from contamination at SWMUs and AOCs inside the facility on areas outside the fence line. Soil samples will be collected along the perimeter of the compressor station just outside the fence line; the need for step-out samples further downslope will be based on initial perimeter sample results that will be evaluated during the data gaps evaluation. Perimeter sample locations, sample depths, and the analytical suite are presented in Appendix C.

The Perimeter Area investigation data will be used to help evaluate whether human receptors outside the fence line could be exposed to surface soil impacted by chemicals originating within the fence line of the compressor station through the offsite migration pathway. The specific pathways through which receptors outside the fence line could be exposed to constituents that have migrated outside the facility fence line are defined in the *Remedial Action Work Plan, PG&E Topock Compressor Station Needles, California* (ARCADIS, 2008) and the Soil Part A DQO Tech Memo (CH2MHILL, 2010a). The decision process for the offsite migration evaluation is described in the Soil Part B DQO Tech Memo (CH2M HILL, 2011).

1.1.5 Storm Drain System Investigation

DTSC directed PG&E to conduct a comprehensive evaluation of the facility storm drain system in its October 5, 2010 comments on the Draft Soil Part B DQO Tech Memo (DTSC 2010d). DTSC directed PG&E to conduct a storm drain investigation program because no physical investigation has been conducted to specifically target the storm drains at the Topock Compressor Station.

Prior investigation associated with the storm drain system has been limited to investigation conducted at AOC 9, AOC 10a, and low areas that would receive stormwater runoff outside the fence line. A records review for storm drain locations was conducted for the Revised Final RFI/RI Volume 1 and during subsequent phases of soil investigation work plan preparation. The proposed storm drain system investigation program is included as Appendix D of this document. This subsection is a summary of the storm drain system investigation.

Two types of information will be generated by the storm drain investigation: information on the alignments of various storm drain lines and soil sample information outside the fence line. Information on storm drain line alignments is required to satisfy Decision 4 of the Part B DQOs (CH2M HILL, 2011). Because storm drains provide a potential transport pathway for constituents released within the fence line to areas outside fence lines, the potential for constituents in soil and spilled liquids to migrate to areas outside the fence line is better addressed with information regarding which catch basins discharge to the various outfalls.

In addition, to satisfy Part A and Part B DQO Decision 1, data are needed to characterize potential discharges from storm drains to soil. Finally, both types of information are required to satisfy Part A Decision 4 and Part B DQO Decision 5 (i.e., to ensure that there is sufficient information to proceed with the development of the corrective measures study/feasibility study [CMS/FS], remedial design, and/or interim measures). The primary transport pathway associated with the storm drain system would be discharge of contaminants into the storm drains, followed by runoff from the storm drains to areas outside the fence line. Consequently, a consideration in the storm drain alignment investigation is not only the physical location of the storm drains, but the drainage pathways; that is, assessing which storm drains discharge to specific outfalls. The storm drain investigation process, proposed storm drain outfall sample locations, sample depths, and analytical suite are presented in Appendix D.

1.2 Objectives

Data collected from implementation of this Work Plan will be combined with the existing data set to use as inputs to DQO decisions or confirm unit closure. The combined data set will be presented in the Final RFI/RI Volume 3 (Soil). The objectives of the Soil Part A and Part B investigation programs are presented in the Soil Part A DQO Tech Memo (Appendix A) and Soil Part B DQO Tech Memo (Appendix B).

1.3 Report Organization

This Soil RFI/RI Work Plan is organized as follows:

- **Section 1.0, Introduction**, contains background information, objectives, and report organization.
- **Section 2.0, Field Investigation Activities**, provides an overview of various field activities including site preparation, access and staging, standard operating procedures, site restoration, and investigation program.
- **Section 3.0, Quality Control, Data Management, and Data Validation**, presents the sampling and analysis plan, analytical methods and associated quality control samples, summary of the data management process, and data validation.
- **Section 4.0, Data Evaluation**, presents summary of the overall data evaluation process for those investigation areas in Part A and Part B, as well as for the Perimeter Area and storm drain system investigation programs.
- **Section 5.0, Approvals and Authorizations**, presents the anticipated approvals needed to implement this work plan, as well as the biological evaluation and archeological surveys, reviews, and consultations.
- **Section 6.0, References,** presents a list of works cited when preparing this document.

- **Appendix A, Part A Data Gaps Investigation Program,** contains the Part A data gaps investigation program, which presents identified data gaps and additional samples needed to resolve the data gaps and the Soil Part A DQO Tech Memo.
- **Appendix B, Part B Data Gaps Investigation Program,** contains the Part B data gaps investigation program, which describes additional data needs and proposed sample locations and the Soil Part B DQO Tech Memo.
- **Appendix C, Perimeter Area Investigation Program**, presents the proposed sampling approach to evaluate soil conditions along the perimeter of the compressor station.
- **Appendix D, Storm Drain Investigation Program**, presents the proposed evaluation and sampling approach for the storm drain system at the compressor station.
- **Appendix E, Preliminary Implementation Schedule for Complete Soil Work Plan**, contains the preliminary implementation schedule for completing the Soil RFI/RI Work Plan.
- **Appendix F, Summary of Proposed Sampling Program (Planned Sampling Table)**, contains the planned sample table for Part A, Part B, Perimeter Area, and storm drain system samples.
- **Appendix G, Standard Operating Procedures**, contains standard operating procedures (SOPs). This appendix is provided on CD only.
- **Appendix H, PG&E Program Quality Assurance Project Plan and Quality Assurance Program Plan Addendum**, contains the PG&E Program Quality Assurance Project Plan (QAPP) and QAPP Addendum. This appendix is provided on CD only.

1.4 Schedule

The preliminary implementation schedule for the complete soil work plan is presented in Appendix E.

2.0 Field Investigation Activities

This section describes the field investigation activities associated with implementation of the Part A, Part B, Perimeter Area, and storm drain system investigation programs. Topics addressed in this section include site preparation, access, and staging; applicable SOPs; site restoration activities; and the investigation programs. Detailed discussions of the Part A and Part B investigation programs, including sampling locations, are provided in Appendices A and B, respectively. The Perimeter Area and storm drain system investigation programs are provided in Appendices C and D, respectively. Specific sample information for all proposed sample locations (e.g., sample depth, analytical suites, etc.) is provided in the planned sampling table (PST) included as Appendix F.

2.1 Pre-construction Activities

This section presents activities to be conducted prior to intrusive work.

2.1.1 Project Initiation Meeting

Consistent with other phases of work conducted at the Topock site, PG&E will invite agency representatives and other stakeholders (including representatives of Native American Indian tribes involved with the Topock project) to the site for a project initiation meeting. This meeting will be scheduled to occur prior to the start of intrusive activities; however, it is anticipated that various site preparation activities will be conducted prior to this meeting. During the meeting, PG&E will present an overview of the activities that will be conducted as part of this work plan, discuss various cultural and biological sensitivities associated with the project, introduce key project team members (including subcontractors), identify certifications required for site visitors, describe applicable site safety and communication protocols, and review plans for project communications with the agency and stakeholders during work.

2.1.2 Surveys

In accordance with the programmatic biological assessment (PBA), a qualified biologist will conduct a pre-construction biological survey of all work areas prior to ground-disturbing activities. Prior to beginning of site preparation, a survey of aboveground and underground utilities will be conducted within all work areas. An asbestos survey will be performed by State of California-certified asbestos professional in the MW-24 Bench Area. The survey will include a visual inspection of surface materials and debris and collection of material and debris samples to determine asbestos content and friability.

In addition, pre-project archeological survey field verification will be conducted prior to ground-disturbing activities. Areas covered with vegetation will be surveyed after the vegetation is cleared for access.

2.1.3 Site Access and Demarcation

The proposed access routes and drilling sites will be field-checked and will be clearly delineated before equipment mobilization. Minor road improvements and/or minor grading might be necessary to access a few sample locations in AOC 1 and the lower check berm in AOC 11. Topographic low areas modified during the 2008 Part A Field Sampling event may require further modifications to access proposed samples in the upper reaches of AOC 11. Access to the area at the mouth of Bat Cave Wash within AOC 1 will require extensive pruning of the vegetation in this area to allow access for sampling equipment. Detailed discussions of site-specific access restrictions are presented Appendices A and B. Access routes for the Part A investigation are shown on the sampling figures; access for the Part B investigation will be to the compressor station via the plant access road.

2.1.4 Staging Areas

Staging areas previously used for other projects will be used for this soil investigation. Staging areas for the Part A investigation are shown on the sampling figures for the individual units. The proposed equipment decontamination area and primary staging area for drilling equipment and investigation-derived waste (IDW) management will be on PG&E property, as shown on Figure 2-1; all staging areas for the Part B investigation are also shown on Figure 2-1.

Drill rigs will be cleaned before mobilization to the site and following completion of drilling at the site if visible grease, oil, or other contamination is present on the equipment. After the drill rigs have been mobilized into place, the localized staging areas will be established in the drilling work area. Plastic sheeting will be laid on the ground surface in the staging areas to keep the drilling materials and equipment clean and to minimize impacts to the ground surface from the drilling materials and equipment. In accordance with Occupational Safety and Health Administration requirements, the exclusion zones for the drilling sites will be demarcated.

Drilling will conform to state and local regulations. PG&E will obtain all necessary authorizations required for drilling. The specific drilling locations within the areas indicated on individual investigation areas figures in Appendices A, B, C, and D will be based on the results of utility clearance surveys, including hand-digging where needed to ensure safe working distances from overhead and underground utility hazards. Approvals and authorizations are discussed in Section 4.0. Additional site-specific access restrictions, site preparation (e.g., embankment modifications), and access routes are presented in Appendices A and B.

2.2 Standard Operating Procedures

Soil sample collection and handling activities will follow SOPs from the *Topock Program Sampling, Analysis, and Field Procedures Manual, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2005). The SOPs relevant for the investigation activities for this project are included in Appendix G. The methods, equipment, and procedures for borehole drilling requirements, surface soil sampling, subsurface soil sampling, debris sampling, geophysical surveys, potholing/trenching and sampling, surveying, vegetation removal, waste management, and decontamination are briefly described in the following subsections.

2.2.1 Installation of Boreholes and Soil Sample Collection

Four methods of subsurface soil collection may be used during implementation of this work plan. Methods for collecting soil samples include drilling, potholing/trenching, hydrovac potholing, and hand sampling.

2.2.1.1 Drilling

The drilling and core/borehole logging will be performed under the supervision of a California Professional Geologist. The methods, equipment, and procedures for drilling and core logging are described in the following subsections.

Drilling Requirements. The drilling methods used may vary depending on the conditions encountered. The preferred drilling method is rotosonic (SOP-B9, *Drilling – Sonic Method*). Rotosonic methods are preferred for drilling through unconsolidated materials above bedrock. This method involves advancing a rotating and vibrating drill casing or core barrel through the subsurface. Rotosonic drilling can produce a continuous core from the ground surface to the target drilling depths; generates minimal drilling wastes; and typically can drill through gravel, cobble, and softer bedrock formations. Rotosonic boreholes drilled for sample collection will be a minimum of 4 inches in diameter but may go up to 6 inches in diameter, as necessary. Alternative drilling methods, including GeoProbe and hollow-stem auger, have been attempted in the past and are generally not effective in the rocky soils encountered at Topock.

Rotosonic drilling activities will be conducted using either standard truck-mounted or a track-mounted rotosonic drilling rig. A tracked or balloon-tired vehicle will be used to support the drilling rig by transporting cuttings, tools, and excess core generated from the drilling sites to the staging area. Given the proximity of most drilling locations to National Trails Highway, one or more standard highway vehicles or small all-terrain vehicles may be used to transport crew, equipment, and materials from the staging area to the drill site. Disposal procedures for IDW are discussed in Section 2.2.9.2.

Core Logging and Preservation. Lithologic descriptions of each borehole will be logged based on visual inspection of the retrieved core under the supervision of a California Professional Geologist and will follow the SOPs for Topock drilling investigations (SOP-B2, *Borehole Sampling and Logging of Soil Borings*). At a minimum, the field log will document the information listed below.

General

- Unique boring identification
- Purpose of the boring (e.g., soil sample collection)
- Location in relation to an easily identifiable landmark
- Names of the drilling subcontractor and logger
- Start and finish dates and times
- Drilling method
- Drilling rate and rig reactions, such as chatter, rod drops, and bouncing

Soil Core Logging

- Lithologic descriptions (based on the Unified Soil Classification System)
- Sampling interval depths

- Zones of caving or heaving
- Depth at which saturated conditions were first encountered (if applicable)
- Debris or staining

The results of the continuous core logging of the boreholes will be summarized in boring logs, which will be included in the RFI/RI Volume 3.

Soil Sample Collection for Laboratory Analysis. Soil samples will be collected from drilled boreholes at pre-designated depth intervals (see Appendix F, Planned Sampling Table) in accordance with sample collection and handling procedures described in Section 2.2.5. Once drilling and sampling activities are complete, the boreholes will be filled and site will be restored, as discussed in Section 2.3.

2.2.1.2 Potholing/Trenching

An excavator or backhoe will be used to install potholes to evaluate the presence, nature, and extent of white powder material in certain investigation areas and to collect soil samples in areas where site conditions are unsuitable for drilling (e.g., on steep slopes). Potholes/trenches will be deepened gradually so that subtle changes in lithology and/or white powder material can be documented in the logs.

Soil samples will be collected directly from the excavator or backhoe bucket at pre-designated depth intervals (see Appendix F, Planned Sampling Table) in accordance with sample collection and handling procedures described in Section 2.2.5. Excavated material will be used to backfill the excavation from which it originated.

2.2.1.3 HydroVac Potholing

Hydrovac excavation consists of using a vacuum truck to suction soil from a small diameter pothole directly into the vacuum truck. If necessary, soil may be wetted to loosen it. Soil samples will be collected at the pre-designated depth intervals from undisturbed soil by hand or by using a decontaminated hand auger. All potholes will be backfilled following sample collection. Bentonite chips will be used to seal the each pothole. The surface will be repaired to match existing surface, for example, potholes installed in asphalt will be repaired with asphalt patch; potholes in concrete will be repaired with pre-mix concrete. The hydrovac process can only be used for unconsolidated materials; utility of this method is likely to be limited in many areas due to the presence of bedrock or large gravel.

2.2.1.4 Hand Tools

Hand tools, which include stainless-steel trowels, slide hammers, and hand augers, will be used for samples collected between 0 and 3 feet below ground surface (bgs) in areas that cannot be accessed by drilling or potholing equipment. Soil samples collected in the depth interval from 0 to 1 foot bgs may be collected using a stainless-steel trowel. Soil samples collected in the depth interval from 1 to 3 feet bgs may be collected using a hand auger or a slide hammer to drive a core sampler into the undisturbed soil to the desired sampling depth. In areas where pre-excavation is required to provide adequate utility clearance, soil samples may be collected with hand tools up to 6 feet bgs. Soil samples will be collected at pre-designated depth intervals (see Appendix F, Planned Sampling Table) in accordance with the sample collection and handling procedures described in Section 2.2.5.

Each hole created using hand tools will be backfilled using the material removed from that hole. Pavement will be restored where needed.

2.2.2 X-ray Fluorescence Field Screening

In an effort to reduce intrusive sampling, a portable X-ray fluorescence (XRF) analyzer will be used to assist with identifying possible sample locations in debris areas located in AOC 10 and AOC 14. Up to 20 XRF samples will be collected from each of the debris areas in AOC 10 and AOC 14 and in the MW-24 bench area one XRF sample will be collected from each grid cell of a 50-foot grid. Figures C4-10 and C7-7 in Appendix A show the AOC 10 and AOC 14 debris areas and the MW-24 area grid. All XRF analyses will be performed in accordance SOP-B16, *Field-portable X-Ray Fluorescence Soil Sampling*. Corrected XRF results will be compared to applicable screening levels on Appendix A Table 3-1 on a point-by-point basis. (For field screening purposes, XRF concentration readings will be adjusted using least square regression equations calculated from the RFI/RI samples analyzed in the lab and by the XRF.) If the applicable screening levels are not exceeded, no further sampling will occur at that location. However, if applicable screening levels are exceeded, soil samples are planned to be collected at 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs at that location and will be submitted to the laboratory for analysis for inorganic and organics.

2.2.3 Sample Collection and Handling

This section describes the procedures for the collection and handling of soil, debris, and white powder material samples.

2.2.3.1 Soil, White Powder Material, and Debris Sample Collection for Inorganic, Semivolatile Organic Compounds, Total Petroleum Hydrocarbons-diesel/-motor-oil, Pesticides, and Polychlorinated Biphenyls Analyses

Soil and white powder samples requiring inorganic, semivolatile organic compounds, total petroleum hydrocarbons (TPH)-diesel/-motor-oil, pesticides, and polychlorinated biphenyls analyses will be collected directly from the drilling core or backhoe/excavator bucket or surface soil using stainless-steel trowels. The collected material will then be put through a stainless-steel sieve to remove any rocks and other debris prior to being homogenized in a stainless-steel bowl (SOP-B7, *Homogenization of Sediment and Soil Samples)*. After homogenization, the soil will be transferred to unpreserved glass sample jars and labeled. Samples of white powder material will not be homogenized.

Debris (e.g., wood) samples will be collected using stainless-steel trowels, as appropriate, and depending on the size of the debris, either placed into glass sample jars or large plastic zip-top bags.

2.2.3.2 Soil Sample Collection for Volatile Organic Compounds and Total Petroleum Hydrocarbons-gasoline Analyses

Soil sample aliquots designated for volatile organic compounds (VOCs) and TPH-gasoline analyses will be collected immediately upon opening the relatively undisturbed drilling core or recovery from a pothole (i.e., before geologic logging or the collection of other soil sample aliquots) to minimize the potential for volatilization of compounds to the atmosphere. VOC and TPH-gasoline aliquots will be collected using dedicated plastic syringes (SOP-B16, *VOC Soil Sampling Protocols)*. Using the syringes, a specific volume of sample, which correlates to an approximate target mass, will be transferred directly from the drilling core or backhoe/excavator bucket into pre-preserved sample vials. The sample vials will be chilled prior to use to minimize evaporation of the preservative when opened. Syringes cannot be used to collect sample from soils consisting of loose sand and gravel. In this case, stainless-steel trowels will be used to transfer the soil into the vials for volume measurement prior to preservation.

2.2.3.3 Sample Management and Storage

Samples will be placed immediately into field coolers with ice; VOC and TPH-gasoline containers will be arranged in the sample cooler standing upright. The field coolers will be taken to the sample management area, where the samples will be transferred into a refrigerator and/or freezer. If transport of a sample to the laboratory is scheduled for a pickup more than 24 hours after sampling, samples will be stored in the freezer.

2.2.3.4 Shipping

Samples collected for chemical analysis will be transported to the laboratory via courier, generally daily. Samples collected for geotechnical analyses will be shipped via Federal Express or a similar carrier. Chains-of-custody will accompany all samples to the laboratory.

2.2.4 Geophysical Surveying

Geophysical surveys will be conducted at three investigation areas to identify potential buried pipe at UA-1, buried debris at MW-24 Area, and septic system leach field in AOC 17. For these investigation areas, geophysical surveying will be conducted using ground-penetrating radar (GPR), electromagnetic induction (EM), and vertical magnetic gradient (VMG) scans. There are likely to be some surface obstructions to the geophysical survey. The survey will avoid areas where access or other conditions (e.g., sparks) could create a hazard.

A survey grid will be established first to provide horizontal control for data acquisition. The grid size will be determined based on the size of the area being surveyed, presence of surface obstructions, and expected density of all subsurface utilities. Potential buried pipes, debris, and leach fields will be identified using VMG and EM scans and may be confirmed using GPR.

VMG surveys are used to determine the presence of buried ferrous objects. VMGs provide better resolution of near-surface objects and are less affected by surface objects than those than measure only the total field magnetometers that measure only total magnetic intensity. The distribution and configuration of VMG contours depict the distribution and intensity of VMG values within the surveyed area. Areas where contours are closely spaced indicate steep magnetic gradients caused by buried objects. If the source of a steep gradient is linear, then the contours tend to parallel the linear feature; if a buried object is localized (tank, drum, etc.) the contours tend to enclose the object. Lower values may indicate the presence of non-ferrous buried objects.

EM scans are used to delineate variations in the electrical conductivity of the shallow subsurface. These variations can be caused by variations in lithology or moisture content as well as buried metallic objects. EM scans also provide contour maps that are analyzed to identify magnetic anomalies that may be due to buried ferrous metal. Contours take similar forms as VMG scans. The larger the object and closer it is to the instrument (i.e., ground surface), the more contours are present in the area.

GPR is used to locate the depth and position of metallic and non-metallic objects. The system works by sending a small pulse of energy from an antenna into the surveyed material and recording the strength and the time required for the return of any reflected signal. The strength, or amplitude, of the reflection is determined by the contrast in the dielectric constants of the two materials. Antenna frequency is a major factor in depth penetration. The higher the frequency of the antenna, the shallower into the ground it will penetrate. A higher frequency antenna will also identify smaller targets. GPR data are used to provide a plan view through the area scanned.

GPR and magnetometry equipment are relatively portable; all of the equipment can fit into the back of a pickup truck. Both proposed methods are capable of rapidly locating underground anomalies such as pipes. Using a magnetometer or GPR requires establishing survey stations at relatively close intervals of 5- to 50-foot spacing along closely spaced (10- to 50-foot) parallel lines.

Geophysical investigation will also be conducted within the fence line of the compressor station in an effort to locate storm drain system pipes. The geophysical survey for the storm drain system is described in Appendix D.

2.2.5 Surveying

Following sample collection, the horizontal location and elevation of each sample location will be documented using an industry-standard (Trimble or similar), resource-grade, handheld global positioning system unit capable of 1-meter accuracy. A sketch of the sampling location will also be entered into the logbook, with any reference points labeled including distances to the sampling location.

2.2.6 Vegetation Removal

Due to the thick vegetation in the tamarisk thicket area near the mouth of Bat Cave Wash in AOC 1, a path will need to be cut through the vegetation to allow passage of necessary sampling equipment. The vegetation removal will be completed using small excavators (i.e., Bobcat or similar) fitted with rubber tracks to minimize soil disturbance. The vegetation will be cut above the roots as close to the ground surface as possible to establish an even path for the drilling equipment and crew and allow for vegetation regrowth. Chainsaws or similar equipment may be used to cut larger limbs, however, every effort will be made to preserve large tree species and species of interest during the vegetation removal. How the removed vegetation will be handled and/or disposed will be discussed and agreed upon in advance with the property owner and stakeholders.

2.2.7 Waste Management and Decontamination

The project approach for IDW management and equipment decontamination is presented in the following subsections.

2.2.7.1 Equipment Decontamination

Downhole drilling tools, excavator and backhoe buckets, tracks on track rigs, and the back ends of the drilling rigs will be decontaminated prior to arrival at the site and will be cleaned between investigation areas as determined necessary by the field team leader. Decontamination will be accomplished by steam-cleaning or pressure washing the core barrel, drill stem, drive casing, and back of the drilling rig. Equipment may also be cleaned using dry methods prior to leaving an excavation area to prevent the tracking of material out of the area.

The steam-cleaning will be conducted on a temporary decontamination pad (lined with plastic sheeting) located on PG&E compressor station property, shown on Figure 2-1. Rinsate from the decontamination operation will be collected on the containment pad and will be transferred to the cuttings bin/drum or portable storage tank. Decontamination is described in SOP-B5, *Decontamination of Personnel and Equipment, Well Drilling and Subsurface Sampling and Investigation.*

2.2.7.2 Investigation-derived Waste Management

Several types of waste materials will be generated during the drilling and sampling of soil borings, excavation of potholes, and hand excavation for utility clearance. IDW materials that will be generated include drill cuttings, incidental trash, equipment decontamination water, and possibly small quantities of soil from pothole or hand excavation areas.

Drill cuttings include the fragments of rock and soil that are removed to create the borehole. The cuttings will be contained in lined roll-off bins at the staging areas during the drilling and sampling activities. After sampling and characterization, the cuttings bins will be removed from the staging areas. It is estimated that the soil IDW bins temporarily stored in the staging area(s) will not remain longer than 45 days. If cuttings or soil are free from contaminants every effort will be made to repatriate the material. Also, cuttings may be placed onsite if acceptable to the property owner and in compliance with applicable laws and regulations. Cuttings and any soil from excavation areas that are contaminated will be transported to a permitted offsite disposal facility.

Incidental trash will be collected at the end of each drilling shift and will be hauled from the drill site to an appropriate offsite disposal facility.

Water generated during equipment decontamination will be collected in bins or portable storage tanks temporarily located in staging areas near the drilling sites or at the PG&E Topock Compressor Station as needed. Secondary containment will be set up at the drilling area for the portable storage tanks or bins.

IDW disposal is described in SOP-B6, *Disposal of Waste Fluids and Solids*.

2.3 Post-construction Activities

Post-construction activities will consist of survey, site restoration, and reporting.

In accordance with the PBA, a post-construction survey will be conducted by a qualified biologist. The Proposed Part A Phase 2 sample locations are located on federal and PG&E property. Federal property consists of a portion of the Havasu National Wildlife Refuge (HNWR) managed by United States Fish and Wildlife Service (USFWS) and Bureau of Reclamation lands. Proposed Part B and Perimeter Area sample locations are located on PG&E property. All but one storm drain investigation soil sample locations are on PG&E property. With the exception of the proposed sampling near the mouth of Bat Cave Wash, all areas have been previously disturbed and contain limited to no vegetation. No more than two acres of vegetation are proposed to be removed in the tamarisk area near the mouth of Bat Cave Wash. Given the proposed limited impacts to vegetation near the mouth of Bat Cave Wash, vigorous growth habit of the tamarisk vegetation in this area, and sparse vegetation in the other proposed work areas, no formal site restoration and revegetation plan is needed. Temporary signage or other items that may be put in place during borehole drilling, or pothole or hand excavation activities will be removed upon completion of the sampling activities. After sampling activities at the sites located on federal property are completed, PG&E will work with DOI to evaluate the need for any additional restoration activities.

3.0 Quality Control, Data Management, and Data Validation

3.1 Sampling and Analysis Plan

Before each field sampling event, the Project Manager or designated representative will coordinate the organization of field personnel and preparations for field activities. The Project Chemist will notify the laboratory of the pending sampling event and arrange for the appropriate type and number of sample containers. A planned sampling table (PST) listing each location to be sampled and the analysis to be performed at each location included is provided in Appendix F. The frequency of field duplicates and equipment blanks and with other quality assurance/quality control requirements will follow the *PG&E Program Quality Assurance Project Plan, Revision 1* (CH2M HILL, 2008a) or the *Addendum to the Topock Quality Assurance Project Plan (*CH2M HILL, 2008b), provided as Appendix H. Field duplicates are listed in the PST. Field sampling instruction will be given to the field teams and will include the PST; number, size, and type of containers required for each sample location; map of sample locations; SOPs; chain-of-custody forms; soil sampling logs; brief summary of the purpose of the sampling; and any special protocols required for this sampling event.

3.2 Analytical Methods

Soil samples collected during this effort will be analyzed for parameters listed in the PST using the methods specified in Appendix H. All field quality control measures data will follow the *PG&E Program Quality Assurance Project Plan, Revision 1* (CH2M HILL, 2008a) and the *Addendum to the Topock Quality Assurance Project Plan* (Appendix H).

The *PG&E Program Quality Assurance Project Plan, Revision 1* (CH2M HILL 2008a) and the *Addendum to the Topock Quality Assurance Project Plan* also outline quality control requirements for laboratory analyses to be conducted for all PG&E Topock projects. The QAPP addresses DQOs; method detection limits, reporting limits, and instrument calibration requirements; laboratory quality control samples; laboratory data management procedures; performance evaluations; preventive maintenance; corrective action; and quality assurance reports. Project chemists will review laboratory analytical data generated from soil sampling to assess data quality and identify deviations from analytical requirements.

3.3 Data Management

The electronic data will be used to generate validation reports, data summary tables, and figures. Management of data generated from soil sampling will be conducted in accordance with the *PG&E Program Data Management Plan* (CH2M HILL 2004). The Data Management Plan outlines standardized procedures for field data collection and review, analytical data loading into the information system (environmental database), verification of uploaded data, quality assurance/quality control procedures associated with data management, and reporting formats.

This program will follow standard procedures for environmental data collection listed in the *PG&E Program Data Management Plan* (CH2M HILL, 2004) and the *PG&E Program Quality Assurance Project Plan, Revision 1 (*CH2M HILL, 2008*)*. These provide procedures that give data users rapid access to stored data; provide methods of data entry with known accuracy and efficiency; apply well documented validation procedures to an electronic database; manage sample data using unique sample identification numbers; establish a sample inventory of new data collected and provide methods of sample inventory reconciliation; store and provide sample-specific attributes, including location identifiers, sample type and media, and sample date; and provide reporting and delivery formats to support data analysis and reduction.

3.4 Data Validation

Data validation will be performed when data packages and electrical data deliverables are received from the laboratory using a combination of manual review and automated software. Validation will be performed on an analytical batch basis, using the summary results of calibration and laboratory quality control, as well as those of associated field samples. Data packages will be reviewed for all analytes. Data validation will include:

- Review of the data package for completeness.
- Review of chain-of-custody records for discrepancies that might degrade data quality.
- Review for compliance with holding time and quality control frequency requirements.
- Evaluation of all calibration and quality control summary results against project requirements.
- Verification of analyte identification and calculations for at least 10 percent of the data.
- Qualification of data using appropriate qualifier flags, as necessary, to reflect data usability limitations.
- Initiation of corrective actions, as necessary, based on data review findings.

Data validation will be patterned after the United States Environmental Protection Agency (USEPA) *Contract Laboratory National Functional Guidelines for Inorganic Data Review* (USEPA, 2002) and *Contract Laboratory National Functional Guidelines for Organic Data Review* (USEPA, 1999), substituting the qualifiers, the calibration and quality control requirements specified in the *PG&E Program Quality Assurance Project Plan, Revision 1* (CH2M HILL, 2008a), the Addendum to the QAPP (Appendix H), and the *PG&E Program Quality Assurance Project Plan for Dioxins and Furans* (CH2M HILL, 2010b).

4.0 Data Gaps Evaluation

The Soil Part A and B investigation programs employ the DQO process to ensure that data collected at each stage of the investigation process are of sufficient quantity and quality to enable the specified decisions to be made. The DQO process is a recognized procedure for defining project objectives and decisions and for optimizing sampling and other information-gathering programs to balance uncertainty, site disturbances, and cost in an acceptable manner.

The data evaluation process is designed to determine whether the sampling objectives outlined in the Part A DQO Tech Memo (CH2M HILL, 2010a) and Part B DQO Tech Memo (CH2M HILL, 2010b) have been met. The sampling objectives will have been met if the decision rules for all problem statements presented in the Soil Part A DQO Tech Memo (Appendix A) and Soil Part B DQO Tech Memo (Appendix B) indicate that no further sampling is required, and the previously identified Part A and B data gaps have been satisfied. If sampling objectives have not been met (i.e., data gaps have been identified) or previously-identified data gaps have not been resolved, additional sampling will be conducted, if feasible. If sampling is not feasible, remaining uncertainties will be addressed in the risk assessment and/or CMS/FS or interim measures.

The following subsections summarize the results of the data gaps evaluation process for Part A and the forthcoming data gaps evaluation process for Part B data.

4.1 Soil Part A Data Evaluation Process

After implementation of the Soil Part A Investigation Program (see Appendix A), the new validated data meeting the criteria set forth in the QAPP will be combined with existing Soil Part A data (all of which is considered Category 1 and can therefore be used for all DQO decisions). The combined data set will be used to assess if the data are sufficient to resolve the Part A Phase 1 data gaps. Summaries of the Part A Phase 1 data gaps by Part A DQO decision are presented in Table 4-1; complete lists of data gaps for each investigation area for each decision are presented in Appendix C of the Part A Data Gaps Report, included as Appendix A of this report.

TABLE 4-1
Summary Part A Phase 1 Data Gaps
Soil RCRA Facility Investigation/Remedial Investigation Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

	Summary of Data Gaps			
Unit	**Decision 1 – Nature and Extent**	**Decision 2 – Data Sufficiency to Calculate EPCs**	**Decision 3 – Potential Impacts to Groundwater**	**Decision 4 – Data Sufficiency for CMS/FS**
SWMU 1	• Vertical extent of contamination within the SWMU 1 boundary. • Lateral extent of white powder upslope from white powder area to the compressor station boundary.	None	• Vertical extent of contamination of information to support refinement of the vadose leaching zone model	• Soil physical parameters to support the CMS/FS.
AOC 1	• Lateral and vertical extent of contamination in the bottom of Bat Cave Wash (within the portion of AOC 1 surrounding the SWMU 1 boundary and between the northern boundary of SWMU 1 and Interstate 40). • Extent of constituents associated with the discharge from the Debris Ravine (AOC 4), including polychlorinated biphenyls and dioxins and furans. • Chemical concentrations soil and sediment in the tamarisk area at the mouth of Bat Cave Wash and at potential impoundment areas (i.e., culvert under railroad tracks and at Interim Measures No. 3 road crossing). • Characteristics of the potential white powder material on the eastern slope of Bat Cave Wash	None	None	• Soil physical parameters to support the CMS/FS.
AOC 4	• Lateral extent of various metals, PAHs, PCBs, and dioxins/furans to the east and near the south-southeastern corner of the AOC. • Vertical extent of contamination across the AOC; however, given the shallow depth to bedrock, additional sampling is limited to the northern portion of AOC, where bedrock is not near the surface. • Lateral and vertical extent of contamination at the mouth of the ravine near and in Bat Cave Wash.	None	None	• Soil physical parameters to support the CMS/FS.

AOC 9	• Vertical extent of contamination in and downslope of the previous stained soil removal area. • Lateral and vertical extents of contamination near the western (downslope portion of AOC 9) and along the bottom of the ravine.	None	• Vertical extent of contamination of information to support refinement of the vadose leaching zone model	• Soil physical parameters to support the CMS/FS.
AOC 10	• Lateral and vertical extent of contamination in the western portion of AOC 10 (Subarea AOC 10a, downslope from AOC 9, and downslope from the outfall of the former trench drain). • Nature and extent of contamination associated with runoff from station access road to the low point north of Subarea 10d and in and between drainage depression subareas. • Nature and extent of contamination associated with the newly identified white powder areas (on the slope below the station access road) and the newly identified debris areas (on the slopes of AOC 10)	None	• Vertical extent of contamination of information to support refinement of the vadose leaching zone model	• Soil physical parameters to support the CMS/FS.
AOC 11	• Lateral and vertical extent of contamination within AOC 11c. • Nature and extent of contamination associated with New Investigation Areas 1 and 2, the newly identified burn area (near the location of the current decontamination pad and Transwestern Meter Station), and the white powder area (upslope of AOC 11e).		• Vertical extent of contamination of information to support refinement of the vadose leaching zone model	• Soil physical parameters to support the CMS/FS. • Volume and extent of debris in New Investigation Areas 1 and 2 and volume and extent of white powder material on the upper slope of AOC 11, if applicable.
AOC 12	None	None	None	None
AOC 14	• Western extent of benzo(a)pyrene, metals, and pesticides contamination in the southwestern corner of AOC 14. • Nature and extent of contamination in the newly identified burn area west of AOC 14 and the newly identified debris area east of AOC 14. • Nature and extent of contamination in the newly identified debris area in the MW-24 bench area.	None	None	• Soil physical parameters to support the CMS/FS.
UA 1	Not applicable	Not applicable	Not applicable	Not applicable
UA 2	None	None	None	None

4.2 Soil Part B Data Evaluation Process

After implementation of the Soil Part B Investigation Program (see Appendix B), the new validated data meeting the criteria set forth in the QAPP will be combined with existing Category 1 and 2 Soil Part B data. Category 1 and 2 data will be used to delineate the nature and extent of contamination (Decision 1), potential threat to groundwater from residual soil concentrations (Decision 3), and to assess whether sufficient information is available to complete the CMS/FS and remedial design and/or interim measures (Decision 5). However, only Category 1 data can be used for risk assessment (Decision 2) and for the evaluation of potential offsite migration (Decision 4).

The following evaluations will be completed for each of the five DQO decisions:

- **Decision 1**. The nature and extent of contamination at the Part B investigation areas will be described and evaluated to determine whether the nature and extent of contamination are adequately understood. The evaluation will follow the Decision 1 rules outlined in Part B DQO Tech Memo Figure 2 (see Appendix B).
- **Decision 2**. A data sufficiency evaluation will be conducted to determine if sufficient data exist for within the fence line to calculate representative exposure point concentrations for each applicable exposure interval for human health receptors. The evaluation will follow the Decision 2 Rules outlined in Part B DQO Tech Memo Figure 3 (see Appendix B).
- **Decision 3**. Soil screening levels (SSLs) will be calculated for any metal exceeding background concentrations at one or more locations within the individual Part B investigation areas. For constituents where the detected concentrations exceed the SSLs, vadose zone modeling will be conducted to further evaluate the potential threat to groundwater. If organic compounds are detected in one or more locations within the investigation areas, vadose zone modeling will be conducted to evaluate the potential threat to groundwater from detected organic compounds. The evaluation will follow the Decision 3 rules outlined in Part B DQO Tech Memo Figure 4 (see Appendix B).
- **Decision 4**. An offsite migration evaluation will be conducted to estimate potential risks to offsite receptors due to potential migration of contaminants, in a surface migration pathway, from areas within the fence line to areas outside the fence line. This evaluation will use Category 1 soil concentrations in shallow soil in areas where soil may be transported to areas outside the fence line; soil physical and chemical property information; potential mechanisms, directions, and rates of migration; information on structures; and other features that may prevent or facilitate offsite migration. The evaluation will follow the Decision 4 rules outlined in Part B DQO Tech Memo Figure 5 (see Appendix B).
- **Decision 5**. A data sufficiency evaluation will be conducted to determine whether sufficient data exist at the Part A Investigation Areas to support the CMS/FS (specifically, remedial technology feasibility assessment and estimation of soil and debris volumes potentially requiring remediation). The evaluation will follow the Decision 5 rules outlined in Part B DQO Tech Memo Figure 6 (see Appendix B).

Data generated from the Perimeter Area and storm drain system investigation programs will first be reviewed to determine whether any constituents exceed background or applicable screening levels for organic compounds. Areas with exceedances of background concentrations and/or applicable screening levels for organic compounds will be assigned to the applicable Part A or Part B unit(s), and the data evaluation process for these areas will follow the applicable process for the assigned unit. A detailed description of the data evaluation process for the Perimeter Area and the storm drain system investigation is provided in Appendices C and D, respectively.

5.0 Approvals and Authorizations

5.1 Anticipated Approvals

Implementation of work plan activities will require prior approval from DTSC and DOI pursuant to their authority under RCRA and CERCLA, respectively. Anticipated approvals and authorizations for implementation of the soil investigation outlined in this work plan are listed in Table 5-1.

TABLE 5-1
Approvals and Authorizations for Drilling
Soil RCRA Facility Investigation/Remedial Investigation Work Plan,
PG&E Topock Compressor Station, Needles, California

Agency/Organization	Approvals and Authorizations
DOI/HNWR	Approval letter from DOI/HNWR anticipated. Approval subject to National Historic Preservation Act (NHPA) Section 106 and Endangered Species Act (ESA) Section 7 consultations (see below).
DTSC	As state lead agency, approval letter from DTSC is required. DTSC will comply with California Environmental Quality Act prior to workplan approval.
California Department of Fish and Game	Project activities have been previously authorized by Streambed Alteration Agreement No. 1600-2005-0140-R6.
U. S. Bureau of Land Management	DOI lead with Section 7 ESA requirements. Guides work plan compliance within the scope of the PBA (CH2M HILL, 2007d) and conducts associated Section 7 consultation.
State Historic Preservation Office	USFWS HNWR approval subject to NHPA Section 106 process involving a minimum 30-day Tribal consultation followed by a minimum 30-day State Historic Preservation Office consultation.
California Department of Transportation	Project activities within I-40 right-of-way (MW-24 Bench) will require a permit. A separate permit is needed if I-40 lane closure is required.
Burlington Northern Santa Fe Railway (BNSF)	Project activities (AOC 14 and AOC 1) require a permit to cross BNSF railroad tracks and to pass through a BNSF railroad culvert.
Private Pipeline Companies	As needed, activities located in the right-of-way of any pipelines will be subject to prior coordination with the owner/manager of the associated facilities.

Portions of the proposed activities are located on the HNWR, which is managed by the USFWS. DOI is the parent agency of the USFWS; the anticipated approval mechanism is an approval letter from DOI. It is expected that the DOI's approval letter will address CERCLA approval, and conditions imposed to comply with Section 7 of the Endangered Species Act (ESA) and Section 106 of the National Historic Preservation Act (NHPA).

As discussed further in Section 5.3, Biological Evaluation, the proposed work plan activities will be conducted in a manner consistent with the PBA (CH2M HILL, 2007d) and therefore will be in compliance with ESA requirements. Compliance with Section 106 of the NHPA is expected to involve a minimum 30-day consultation with local Native American tribes and a minimum 30-day consultation with the State Historic Preservation Office.

Approval from the DTSC is subject to compliance with the California Environmental Quality Act (CEQA).

Portions of the work plan activities are within the jurisdiction of the California Department of Fish and Game, pursuant to Section 1600 et seq. of the Fish and Game Code. Compliance with Section 1600 requirements is provided via the existing California Department of Fish and Game Streambed Alteration Agreement No. 1600-2005—0140-R6, as amended in January 2007.

Portions of the work plan activities are within the right-of-way maintained by the California Department of Transportation (Caltrans). Caltrans approval is required for work in AOC 14 and in the MW-24 bench area. Given the limited access to AOC 14, drilling equipment (i.e., drill rig) may need to be lifted by crane onto AOC 14. If lifting this equipment is necessary, a lane of Interstate 40 will need to be closed. Lane closure will require Caltrans approval and coordination with the California Highway Patrol, and may require coordination with the Arizona Department of Transportation.

To access AOC 14, personnel and equipment will need to cross the Burlington Northern Santa Fe (BNSF) railroad tracks. To access the area of Bat Cave Wash between the Interstate 40 and BNSF railroad culverts, a drill rig will need to pass through the BNSF culvert. The crossing of the railroad tracks and passing through the BNSF culvert will require a permit from BNSF.

Pipeline infrastructure owned and/or maintained by private entities is located at and near the project site; approximate locations are shown on Figure 2-1. Prior to field work, the precise right-of-way associated with any nearby pipelines will be determined. Coordination with the affected pipeline company will occur as needed to obtain prior approval and comply with applicable requirements. In addition, prior to implementation of the subject activities, Underground Service Alert notifications will be made so that utility companies can locate and mark the locations of their underground facilities.

5.2 Environmental Impact Report Mitigation Measures

In January 2011, DTSC issued the *Topock Compressor Station Environmental Impact Report* (EIR), which documented the proposed remedy for groundwater contamination at Topock Compressor Station (DTSC, 2011b). Some of the remedy implementation impacts were found to be significant, and DTSC has adopted mitigation measures to avoid or reduce those impacts to less-than-significant levels (DTSC, 2011b) to the extent possible.

5.3 Biological Evaluation

5.3.1 Introduction

The PBA addresses a variety of PG&E Topock remedial and investigative actions, including those identified in the soil investigation work plan, within the Area of Potential Effect

(APE). The intent of the PBA is to provide programmatic coverage of these actions up to the final remedy expected by 2012 and avoid the need for individual project-specific consultations under the federal Endangered Species Act (FESA). The purpose of this biological evaluation is to outline the soil investigation activities as they relate to federally listed species in the area and determine if the actions are within the context and boundaries of the PBA as requested by the U.S. Bureau of Land Management (BLM). The following topics are outlined in this section: project timing, project location and habitat sensitivity, habitat loss, conservation measures, listed species determinations, and conclusion. The federally listed species being considered and evaluated include the southwestern willow flycatcher (*Empidonax traillii extimus*), Yuma clapper rail (*Rallus longirostris yumanensis*), Mojave desert tortoise (*Gopherus agassizii*), bonytail chub (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*).

5.3.2 Project Timing

The soil investigation activities are anticipated to be conducted between November 2011 and January 2012. The start date is dependent upon receipt of necessary approvals and authorizations. The anticipated start of the avian nesting season is defined as March 15 to September 30 in the PBA. Additionally, May 1 has been identified as the start of the southwestern willow flycatcher nesting season. It is anticipated that the work activities will be completed prior to these dates; thus, the investigation will not disturb nesting habitat of southwestern willow flycatcher and Yuma clapper rail during nesting season. However, the activities will take place within potential roosting and foraging habitats in the tamarisk thicket located near the mouth of Bat Cave Wash. However, necessary approvals and authorizations may prolong the start date. Should the activities be delayed and take place within the avian migration or nesting season, the required measures outlined in the PBA will be implemented for any upland migratory or nesting birds.

5.3.3 Project Location and Habitat Sensitivity

The soil investigation sites within the compressor station are in an industrialized area which located upland from the Colorado River floodplain and which does not include any sensitive biological habitat. Most of the soil investigation sites outside the compressor station are primarily located within either creosote bush scrub or Mojave wash scrub habitats. The tamarisk thicket area near the mouth of Bat Cave Wash includes habitat that is suitable for birds and other wildlife. , including the federally listed southwestern willow flycatcher, as well as other migratory bird species protected by the Migratory Bird Treaty Act may occur in the tamarisk habitat. Because southwestern willow flycatchers may potentially use the tamarisk habitat for roosting and foraging during the spring and fall migration seasons, it is possible that operational activities and loss of tamarisk could alter the behavior of migrating individuals. The tamarisk thicket within Bat Cave Wash and adjacent to the National Trails Highway is considered potential habitat for this species and is surveyed annually per U.S. Fish and Wildlife Service (USFWS) protocol as required per the PBA. The soil investigation will involve cutting a 25-foot wide access road and sampling within the thicket and some vegetation will be impacted by the proposed activity.

The desert tortoise is the only federally listed species that may occur within the creosote bush scrub or Mojave wash scrub habitat types at the proposed soil investigation sites. Desert tortoise critical habitat does not exist within the APE. Additionally, the habitat in the area is considered marginal due to limited suitable plants and soils for forage and cover sites, past habitat disturbance and fragmentation, and natural and man-made barriers that deter this species from entering the site.

Other listed species that may potentially occur or are known to occur within the APE include the Yuma clapper rail, bonytail chub, and razorback sucker. Project activities will not take place within the floodplain, Topock Marsh, or Colorado River where these species reside. However, several tamarisk thickets within the APE have been identified as potential habitat for the southwestern willow flycatcher. The soil investigation activities will disturb less than 2.5 acres of tamarisk habitat and will be below the threshold disturbance established in the PBA. The remaining sites are not within or directly adjacent to any sensitive habitat for the southwestern willow flycatcher or desert tortoise. Therefore, no impacts to sensitive habitats will occur as a result of the soil investigation activities.

5.3.4 Habitat Loss

Other than the disruption to the tamarisk habitat near the mouth of Bat Cave Wash, very little, if any, additional habitat loss will occur during the soil investigation activities. Any vegetation removal will be coordinated with the project biologist and documented as outlined in the PBA. The biologist will ensure that the 3.0 acre upland vegetation loss threshold and that the 2.5 acre threshold for disturbance in tamarisk is not met or exceeded. It is expected that some vegetation may need to be pruned or crushed for equipment access to some sites. The pruning or crushing of vegetation is not considered habitat loss as defined in the PBA. Any pruned or crushed vegetation is expected to recover.

5.3.5 Conservation Measures

The conservation measures identified in the PBA for listed species and habitat will be implemented. Any habitat loss is expected to be well below the 3.0 acre upland threshold and the 2.5-acre disturbance threshold for tamarisk established in the PBA. The project biologist will perform pre- and post-activity surveys to document any habitat loss and ensure the sites are clear of desert tortoises and any nesting birds as deemed necessary. Revegetation of the soil investigation sites is considered unnecessary in the context of the PBA.

5.3.6 Listed Species Determinations

Southwestern willow flycatcher: This action will have no effect upon this species based on the planned schedule during the winter season and minimizing disturbance of habitat at the soil investigation sites. However, any proposed drilling activities that may occur after May 1 near suitable habitat for this species “may affect, but is not likely to adversely affect” the species. The rationale for this determination accounts for the species expected arrival in the area in May. The behavior of this species may be affected by project-related activities during the spring migration. Indirect effects such as habitat loss may occur as a result of the soil investigation activities. However, the project will stay below the 2.5-acre disturbance threshold. In addition, USFWS protocol surveys were performed in 2005 - 2009 that resulted in no positive confirmation of species nesting within the APE. Therefore, any potential direct and indirect effects during the nesting season will not be adverse. This determination is within the context of the PBA.

Yuma clapper rail: This action will have no effect upon this species. The project will not occur within the Topock Marsh or the Colorado River. Therefore, any potential direct and indirect effects to this species will be avoided. This determination is within the context of the PBA.

Desert tortoise: This action will have no direct effect upon this species based on the planned schedule during the winter season and implementation of the measures identified in the PBA. Additionally, USFWS protocol surveys were performed in 2004 - 2009 that resulted in no recent evidence of species presence within the APE. Therefore, any potential direct effects will be avoided. However, indirect effects such as habitat loss may occur as a result of the soil investigation activities. The habitat within the APE is considered marginal and any loss would be minor and well below the 3.0 acre upland threshold as established in the PBA. This determination is within the context of the PBA.

Razorback sucker: This action will have no effect upon this species. The project will not occur within the Colorado River or affect the bed and bank of the river. Therefore, any potential direct and indirect effects to this species will be avoided. This determination is within the context of the PBA.

Bonytail chub: This action will have no effect upon this species. The project will not occur within the Colorado River or affect the bed and bank of the river. Therefore, any potential direct and indirect effects to this species will be avoided. This determination is within the context of the PBA.

5.3.7 Conclusion

The soil investigation activities proposed in the work plan are within the context and boundaries outlined in the PBA. Therefore, this action will be compliant with FESA as long as the measures identified in the PBA are implemented. No additional consultation with the USFWS is required.

5.4 Archeological Surveys and Reviews

The area subject to activities described in this work plan was included in an archaeological survey of the Area of Potential Effect (Applied Earthworks, 2007). Only one significant archaeological resource was found in this area—a small portion of historic Route 66 (CA-SBR-2910H) is located along an existing gas pipeline (Line 300B) and road alignments in this area. The Former 300B Pipeline Liquids Tank (UA-2) is the closest to this section of Route 66. This portion of Route 66 has been greatly disturbed by the construction of Line 300B. A recent examination of this area indicated that only a very small portion of the original Route 66 pavement is intact. Although deteriorated, the original Route 66 guardrail is still in place at a majority of this location. The narrow roadbed and guardrail at this portion of Route 66 provides this National Register of Historic Places property with integrity of location and feel. Because of the past disturbance to this portion of the Route 66 roadbed, restrictions on temporary vehicle use are not deemed necessary. The general configuration and historic guardrail at the section of Route 66 will be protected so as to not impact the integrity of location and feel of this National Register of Historic Places historic property.

Sites within Part A were previously surveyed in 2007, and soil sampling was conducted in 2008. These historic sites will be assessed prior to drilling activities. Part A sites not included in that survey included two new sites near AOC 11 and the recently added MW-24 Bench. Sites within Part B were also previously surveyed in 2007, and soil sampling was conducted in 2008. Part B sites that were not previously included in the 2007 survey include the Teapot Dome Restaurant oil pit and the potential burn area near AOC 17. In addition, areas previously not included in the 2008 soil sampling include a debris area near AOC 10 and AOC 14, tamarisk area, and the lower end of the Bat Cave Wash. The historic sites will be protected from work activities and will be monitored during the course of work. The PG&E FCR will be responsible for providing archaeological sensitivity training to the workers implementing this work plan and for ensuring compliance with all applicable archaeological measures during drilling activities.

The Topock site and adjacent lands are contained within a larger geographic area that is considered sacred by the Fort Mojave Indian Tribe and by other Native American tribes. In recognition of this, work activities will be conducted in a manner that recognizes and respects these resources and the spiritual values of the surrounding lands. PG&E understands that the environmental, cultural, and spiritual resources may not be physically perceptible. To this end, site orientation will stress that all site activities must be conducted in a respectful manner that is conscious of this context.

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Figures

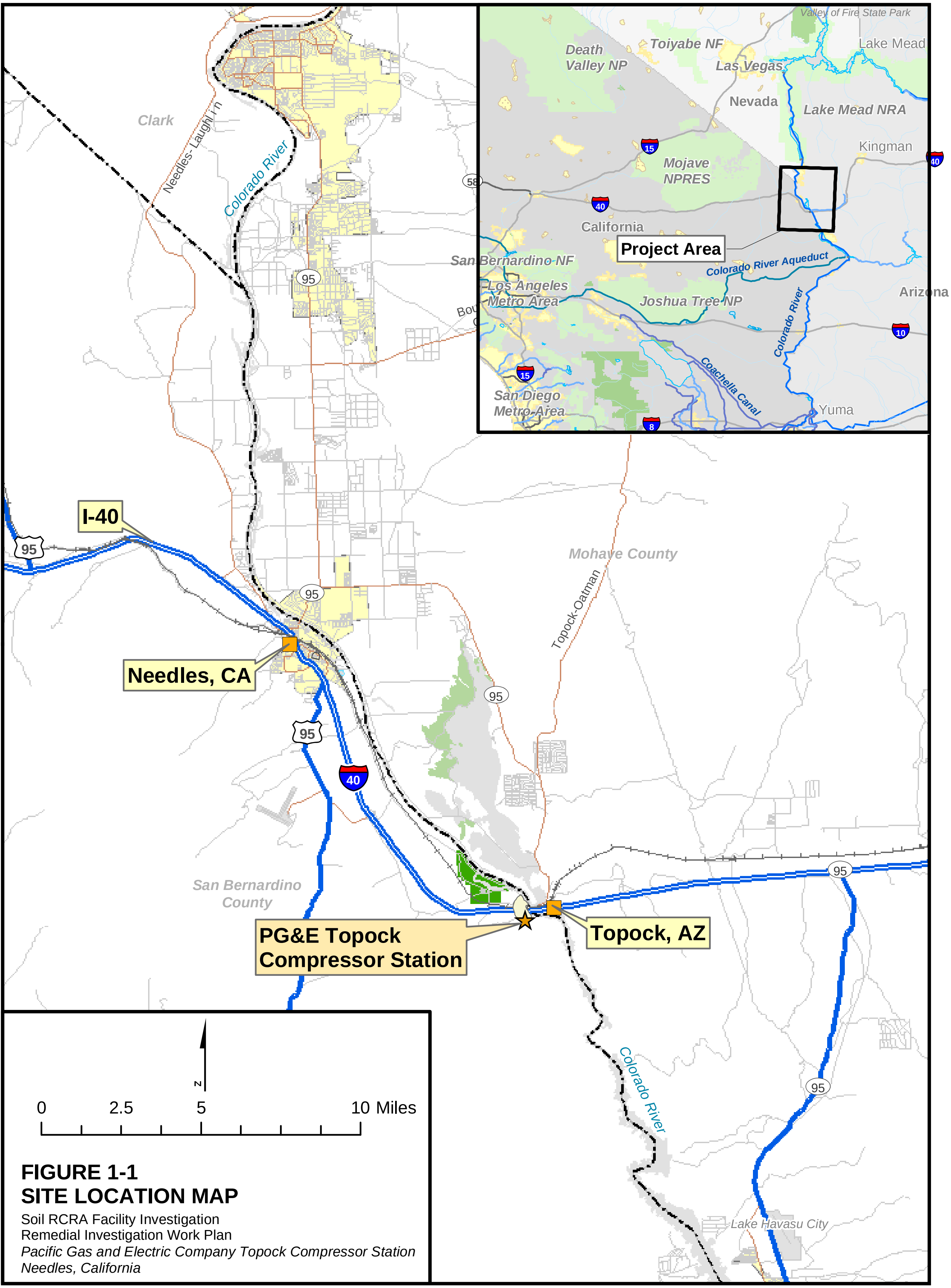

FIGURE 1-1
SITE LOCATION MAP

Soil RCRA Facility Investigation
Remedial Investigation Work Plan
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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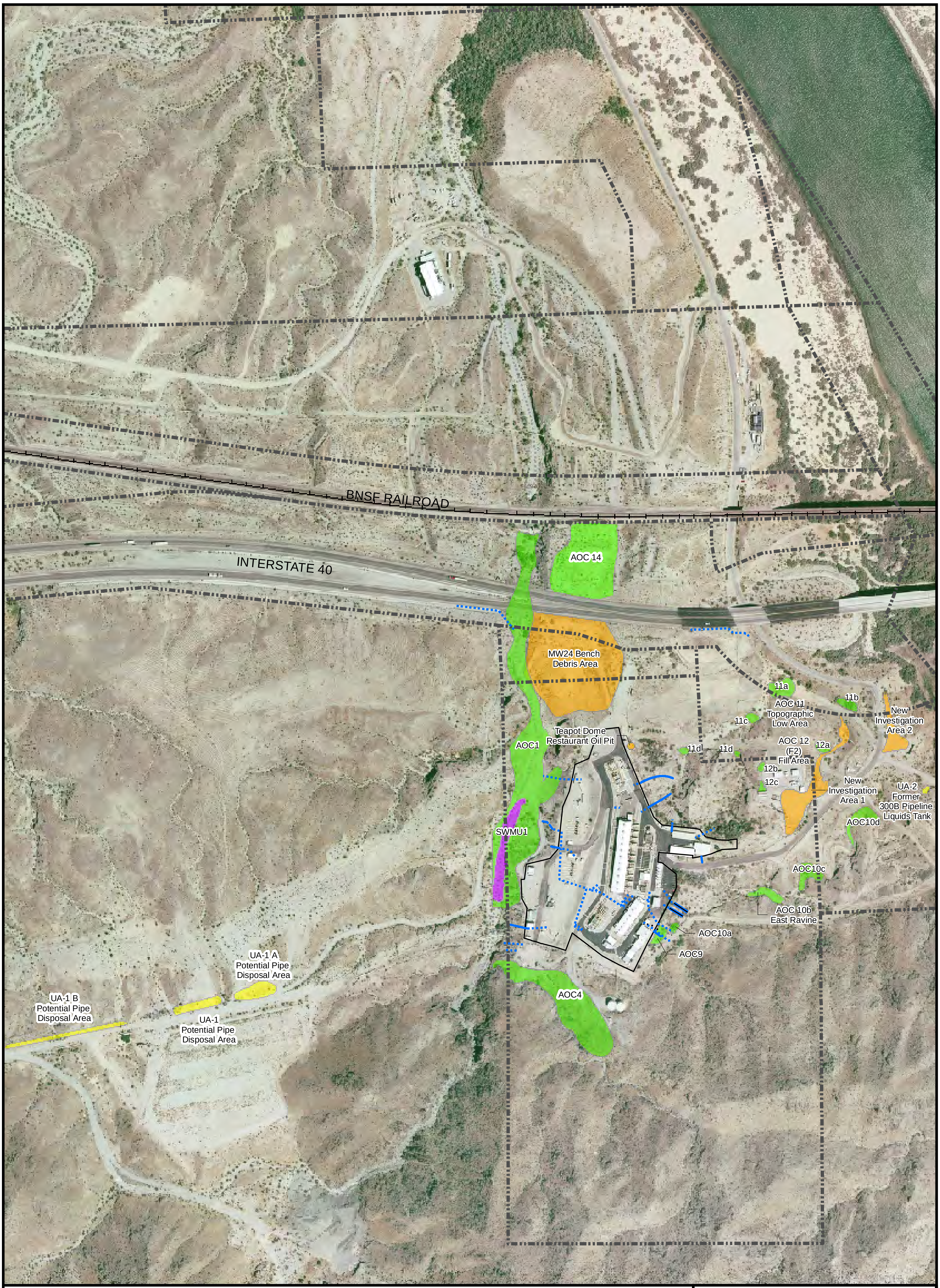

LEGEND

🟪	Soild Waste Management Unit (SWMU)
🟩	Area of Concern (AOC)
🟧	Other Areas
—	Site Fence Boundary
━	Former Stormwater Pipeline
—	Stormwater Piping Above Ground (Approximate Location)
⋯	Stormwater Piping Below Ground (Approximate Location)
• • • •	Alternate Stormwater Piping Below Ground (Approximate Location)

N

0 500 1,000 Feet

FIGURE 1-2
PART A INVESTIGATION AREAS

SOIL RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION WORK PLAN,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL

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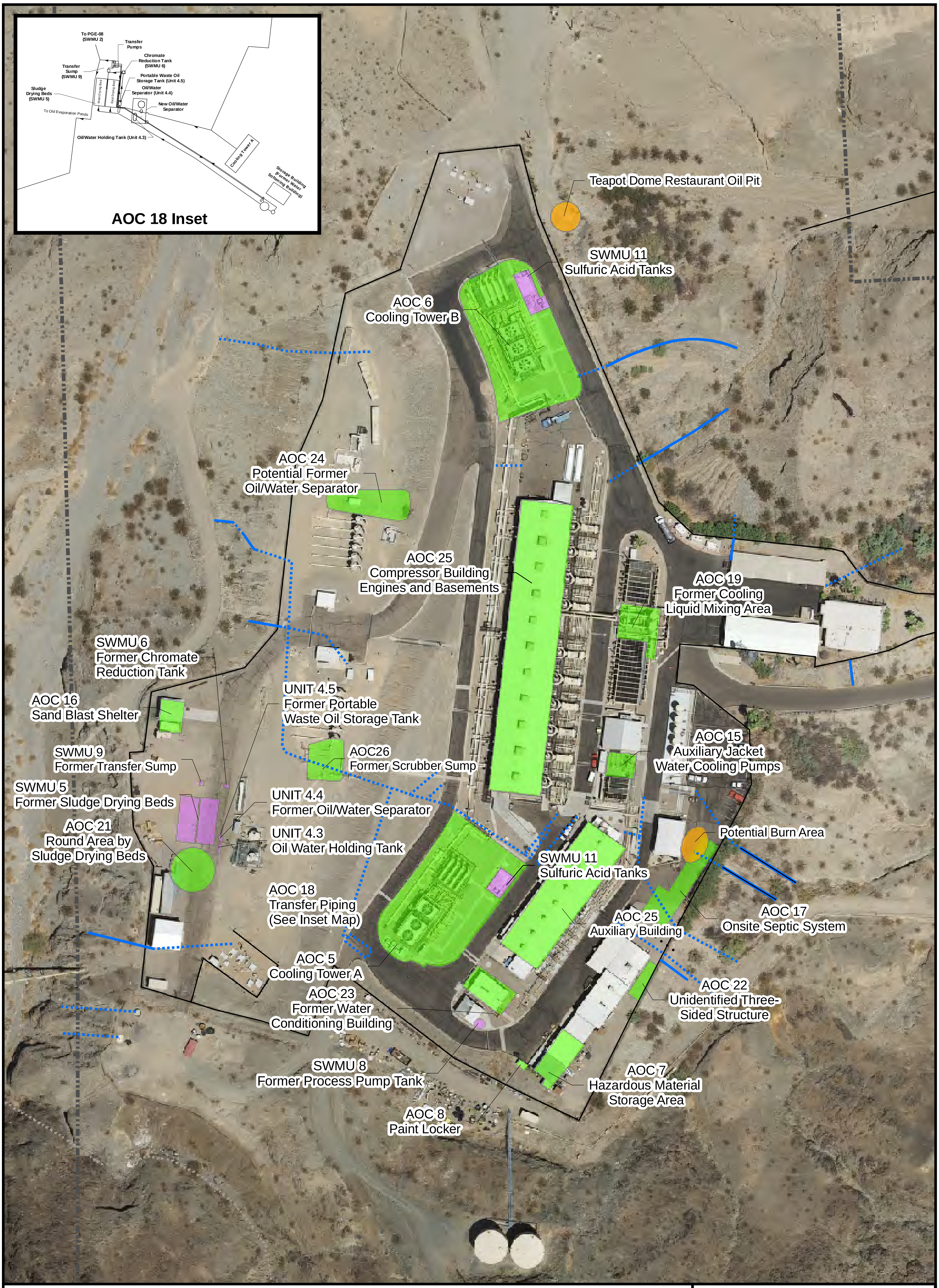

LEGEND

🟪 Soild Waste Management Unit (SWMU)

🟩 Area of Concern (AOC)

🟧 Other Areas

— Site Fence Boundary

━ Former Stormwater Pipeline

— Stormwater Piping Above Ground (Approximate Location)

┅ Stormwater Piping Below Ground (Approximate Location)

• • • • Alternate Stormwater Piping Below Ground (Approximate Location)

Notes:
1) AOC 13 is not depicted on this figure. It consists of the unpaved areas within the compressor station.

2) AOC 20 is not depicted on this figure. It consists of industrial floor drains within the compressor station.

3) Boundaries of all SWMUs, AOCs, and Other Areas are approximate.

N

0 100 200 Feet

FIGURE 1-3
PART B INVESTIGATION AREAS

SOIL RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION WORK PLAN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL

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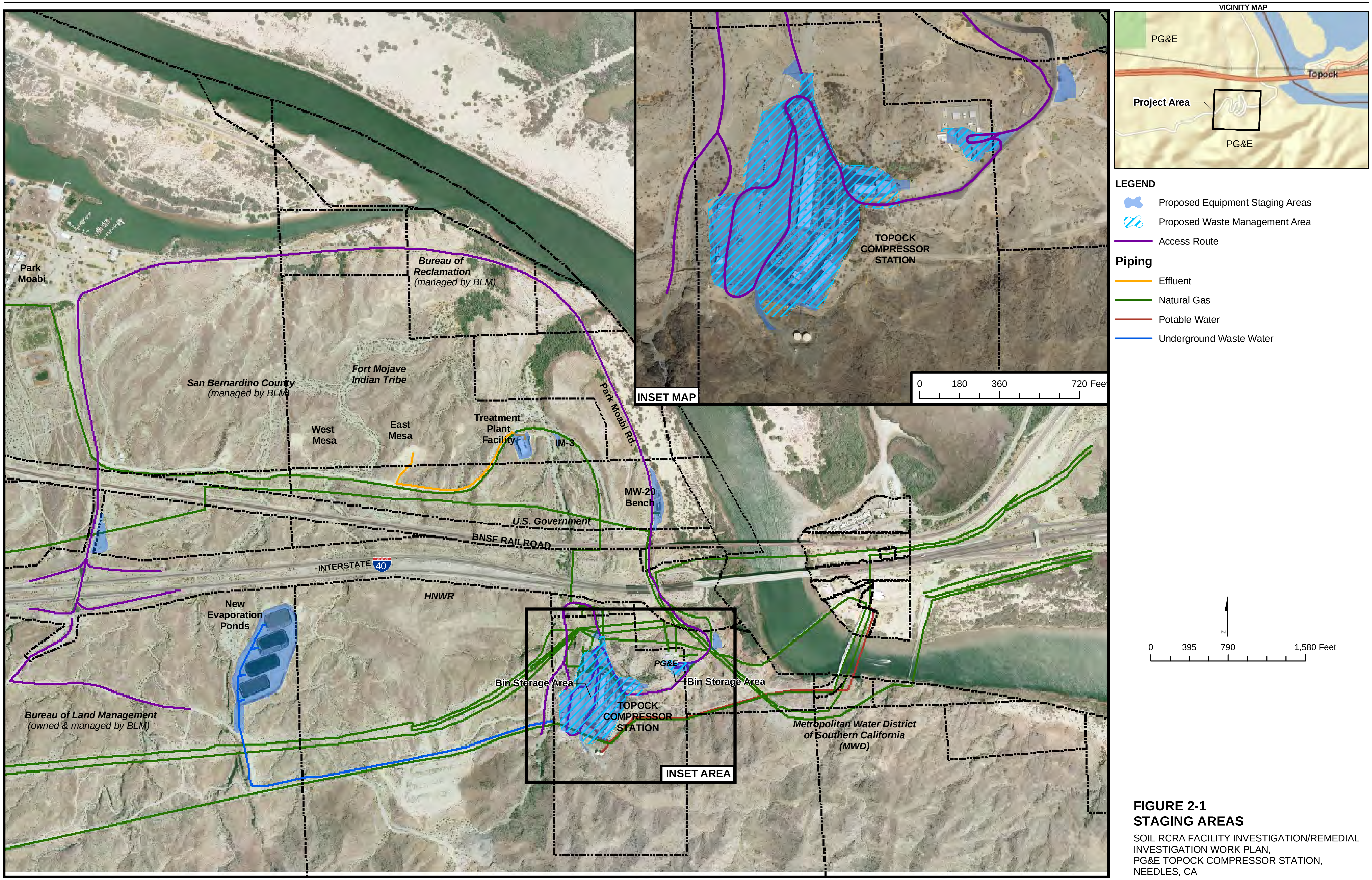

FIGURE 2-1
STAGING AREAS

SOIL RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION WORK PLAN,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CA

D:\GIS\Projects\Topock\MapFiles\2011\SWP_B\Proposed_Staging

Appendix A
Part A Data Gaps Investigation Program

Draft Final Report

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,

PG&E Topock Compressor Station, Needles, California

Prepared for

California Environmental Protection Agency,
Department of Toxic Substances Control
and
United States Department of the Interior

On Behalf of

Pacific Gas and Electric Company

May 2011

CH2MHILL
155 Grand Avenue, Suite 800
Oakland, CA 94612

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

PG&E Topock Compressor Station, Needles, California

Prepared for

California Environmental Protection Agency,
Department of Toxic Substances Control

and

United States Department of the Interior

On Behalf of

Pacific Gas and Electric Company

May 2011

This report was prepared under the supervision of a California Professional Geologist

K Sheets

Keith Sheets, P.G. No. 6888
Senior Hydrogeologist

Jamie J Eby

Jamie Eby
Project Manager

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Appendices

A *Data Quality Objectives Technical Memorandum – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (on CD only)
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Acronyms and Abbreviations

95%UCL	95 percent upper confidence limit of the mean
AOC	Area of Concern
ARAR	applicable or relevant and appropriate requirement
bss	below sediment surface
BTV	background threshold value
CERCLA	Comprehensive Environmental Response, Compensation, Liability Act
CHHSL	California human health screening level
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CMS/FS	corrective measures study/feasibility study
CSM	conceptual site model
DOI	United States Department of the Interior
DQO	data quality objective
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ECV	ecological comparison value
EPC	exposure point concentration
HERD	Human Ecological Risk Department
mg/kg	milligrams per kilogram
PG&E	Pacific Gas and Electric Company
RAWP	risk assessment work plan
RCRA	Resource Conservation and Recovery Act of 1976
RFI/RI	RCRA facility investigation/remedial investigation
RSL	regional screening level
SSL	soil screening level
STLC	soluble threshold limit concentrations
SWMU	Solid Waste Management Unit

TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TEC	threshold effects concentration
TEQ	toxicity equivalence quotient
TTLC	total threshold limit concentration
UA	unidentified area
USEPA	United States Environmental Protection Agency
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is conducting investigative and remedial activities at the Topock Compressor Station in Needles, California. The Topock Compressor Station is located in San Bernardino County approximately 15 miles to the southeast of Needles, California, as shown in Figure 1-1. Investigative and remedial activities at the Topock site are being performed under the Resource Conservation and Recovery Act (RCRA), as well as the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA), pursuant to agreements with the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and United States Department of the Interior (DOI), respectively.

Two draft work plans, Soil Part A Work Plan and Soil Part B Work Plan, have been prepared to address supplemental soil characterization activities at the Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and other undesignated areas (UAs) identified in the *Revised Final RCRA Facility Investigation/Remedial Investigation Report, Volume 1 – Site Background and History* (referred to as the RFI/RI Volume 1) (CH2M HILL, 2007a). Investigation areas outside the compressor station fence line are addressed in the *Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A, PG&E Topock Compressor Station, Needles California* (CH2M HILL, 2006), (referred to as the Soil Part A Work Plan). Investigation areas within the compressor station fence line are addressed in the Draft Soil Part B Work Plan (CH2M HILL, 2007b).

To minimize the number of samples and disturbances to sensitive resources, the Part A supplemental soil investigation program is being conducted in two phases. Phase 1 was conducted in 2008. Phase 2 will be conducted to fill data gaps identified in the Phase 1 data. Phase 2 sampling will only be necessary where data gaps are identified after evaluation of the combined soil data set (existing data and supplemental Phase 1 data) for the identified SWMUs, AOCs, and UAs.

DTSC and DOI conditionally approved the Soil Part A Work Plan on August 10, 2007 (DTSC, 2007) and June 4, 2008 (DOI, 2008a), respectively. Clarification of DTSC's conditional approval was documented in an email containing the table titled "Clarification to Responses to PG&E Topock Compressor Station Soil Investigation Part A Work Plan August 10, 2007 Conditional Approval Letter" (CH2M HILL, 2007b).

DTSC's conditional approval letter specifically rejected the data quality objectives (DQOs) and associated data gaps evaluation process presented in the Soil Part A Work Plan (Sections 3.0 and 4.0 of the Work Plan) while directing PG&E to implement the first phase of soil sampling (Phase 1). Between June 2008 and February 2010, DTSC, DOI, and PG&E convened a series of meetings to draft the Soil Part A DQOs Steps 1 through 5. These first five DQO steps are used to evaluate the combined soil data (Phase 1 data and previously collected data [referred to as existing data in this document]) and to identify sampling needs for Phase 2. The Soil Part A DQO Steps 1 through 5 are presented in the technical memorandum *Data Quality Objectives – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2010) (referred to as the

Soil Part A DQO Tech Memo). The Soil Part A DQO Tech Memo is included as Appendix A to this report. Appendix B of this report describes Investigation Procedures, Field Methodology and White Powder/Debris Mapping Results as a result of the Part A soil investigation. Step 6 was drafted during a meeting with DTSC, DOI, and PG&E on August 30 and 31, 2010. PG&E provided Step 7, proposed Phase 2 sampling locations in the September 2010 Draft Topock Part A Phase 1 Data Gaps Report (CH2M HILL, 2010). The Phase 1 data gaps and the proposed Phase 2 sampling plan were presented at two meetings with DOI, DTSC, and Tribes held at the Topock Compressor Station on October 6 and 7, 2010 and November 2 and 3, 2010. During the meeting, soil data were reviewed with stakeholders, each AOC was visited, and preliminary data gaps evaluations were discussed. A subsequent meeting was held on December 7, 2010 between DOI, DTSC, and Tribes to discuss UA-1/UA-1 Alternate and sampling at the mouth of Bat Cave wash.

On December 13, 2010, DTSC issued direction to PG&E on UA-1 and UA-1A alternate location (DTSC, 2010). On December 15, 2010, DOI issued direction to PG&E on sampling at the mouth of Bat Cave wash (DOI, 2010). On January 13, 2011, a meeting was held to discuss Tribes' comments on the preliminary data gaps evaluation.

In response to concerns raised by the Tribes through letters provided by the Fort Mohave Indian Tribe consultant (Hargis + Associates, November 22, 2010) and the Hualapai Department of Cultural Resources (December 3, 2010), and as a result of the tribal meetings held December 7, 2010, and January 13, 2011, DOI and DTSC evaluated the possibility of reducing the number of Phase 2 samples. In order to reduce the number of samples and disturbances to sensitive cultural resources, the agencies evaluated each sample location to determine which, if any, sample locations could be eliminated based on several criteria. DOI and DTSC issued in a joint letter dated February 25, 2011 (included in Attachment 1) with a revised Phase 2 sampling plan. The resulting Phase 2 sample locations are presented in this document.

AOC 4, Debris Ravine, was not included in the September 2010 version of the Draft Part A Phase 1 Data Gaps Evaluation Report (CH2M HILL, 2010) because the AOC 4 time-critical removal action was being conducted during the preparation of the previous report and AOC 4 soil data were not yet available. The AOC 4 time-critical removal action was completed in December 2010, and AOC 4 soil data representing current conditions have been included in this report and are provided Appendix C10.

1.1 Soil Part A Phase 1 Investigation (August – November 2008)

Field activities for the Soil Part A Phase 1 soil investigation were implemented between August and November 2008. The Part A Phase 1 soil investigation encompassed the following 10 investigation areas outside of the compressor station fence line:

- SWMU 1 – Former Percolation Bed
- AOC 1 – Area Around Former Percolation Bed
- AOC 4 – Debris Ravine
- AOC 9 – Southeast Fence Line
- AOC 10 – East Ravine

- AOC 11 – Topographic Low Areas
- AOC 12 – Fill Areas
- AOC 14 – Railroad Debris Area
- UA 1 – Pipeline Disposal Area
- UA 2 – Former 300B Pipeline Liquids Tank Area

These 10 areas are shown in Figure 1-2. Boundaries shown for the SWMUs, AOC, and UA are from the RFI/RI Volume 1.

Field activities included soil boring installation, embankment modifications at AOC 10, sample collection, white powder material and debris mapping, geophysical surveys, and trenching. A summary of these activities is included in Appendix B. Six hundred fifty-nine soil samples, seven white powder material samples, and four debris/wood samples were collected (sample counts do not include duplicate samples collected for quality control purposes). Two samples were also collected from one location in an area of Bat Cave Wash where soil is transitioning into sediment near the mouth of Bat Cave Wash. The DTSC also collected three soil samples of white powder at locations in AOC 10.

It is important to note that while geophysical investigation was conducted at UA 1, no intrusive sampling was performed. During field implementation of the Phase 1 investigation, DOI directed PG&E to stop planned investigation in this area (DOI, 2008b).

1.2 Newly Identified Debris, Historic Burn, and White Powder Areas (May 2009 to January 2010)

In 2009, at DTSC's direction, PG&E conducted additional interviews with current and former employees to collect new anecdotal information pertaining to historic compressor station practices. To confirm the new anecdotal information collected, additional site walks, including debris mapping, were conducted. The information gathered was provided in letters dated August 14, 2009 (PG&E, 2009a), October 15, 2009 (PG&E, 2009b), January 15, 2010 (PG&E, 2010a), and January 29, 2010 (PG&E, 2010b). In addition, a major storm event in January 2010 exposed new white powder areas on the hillsides above Bat Cave Wash, AOC 10, and AOC 11. The newly-identified area in Bat Cave Wash was shown to representatives of DTSC, DOI, Fort Mojave Indian Tribe, and the Hualapai Indian Tribe during a site visit on January 26, 2010. The new area in AOC 10 was discussed with the agencies in e-mails dated February 22, 2010 and February 24, 2010. The new area in AOC 11 was discovered during a site reconnaissance on February 10, 2010.

At the agencies' direction, these new areas will be incorporated for evaluation in this data gaps evaluation effort. Available information regarding these new areas is provided in the Appendix C sub-appendices.

1.3 Purpose of Soil Part A Phase 1 Data Gaps Evaluation Report

This Soil Part A Phase 1 Data Gaps Evaluation Report has been prepared to:

- Present the combined soil data collected to date for the identified SWMU, AOCs, and UAs outside of the compressor station fence line.
- Present the results of the data gaps evaluation using the decision and criteria described in the Soil Part A DQO Steps 1 through 5.
- Present Phase 2 sampling recommendations.

This document identifies proposed sample locations based on specific DQO rules as developed at the direction of DTSC and DOI, input from stakeholders during the October and November 2010 workshops, and the joint DTSC and DOI February 2011 direction letter. The Soil Part A Phase 2 proposed sample locations shown on figures and tables in Appendix C of this report are considered the Soil Part A Phase 2 sampling program for the Soil RFI/RI Work Plan. These additional data are needed to fill quantitative data gaps, meet agency requirements, and make further progress toward remedial decision-making.

1.4 Report Organization

This Soil Part A Phase 1 Data Gaps Evaluation Report is organized into eight sections and six appendices, as follows:

- **Section 1.0, Introduction**, contains background information, objectives, and report organization.
- **Section 2.0, Overview of Data Gaps Evaluation Process**, provides an overview of the data gaps evaluation process and the four DQO decisions applicable to the Soil Part A investigation.
- **Section 3.0, Decision 1 – Nature and Extent**, presents the inputs and process for evaluating nature and extent of contamination.
- **Section 4.0, Decision 2 – Data Sufficiency to Calculate Exposure Point Concentrations**, presents the inputs and process for the data sufficiency evaluation with regard to calculation of exposure point concentrations (EPCs) for use in the risk assessment.
- **Section 5.0, Decision 3 – Threat to Groundwater from Residual Soil Concentrations**, presents the inputs and process for assessing the potential for residual soil to impact groundwater.
- **Section 6.0, Decision 4 – Data Sufficiency to Support Corrective Measures Study/ Feasibility Study**, presents the inputs and process for the data sufficiency evaluation with regard to preparation of the corrective measures study/feasibility study (CMS/FS).
- **Section 7.0, Data Gaps Evaluation Summary**, provides a summary of the data gaps evaluation, including the proposed Phase 2 sampling.
- **Section 8, References,** presents a list of works cited when preparing this document.
- **Attachment 1**, DOI Direction Letter. PG&E Topock Compressor Station Remediation Site – *Topock Soil Investigation Part A Phase 1 Data Gaps Evaluation Report – Proposed Sample Locations, PG&E Topock Compressor Station, Needles, California*

- **Appendix A,** ***Data Quality Objectives Technical Memorandum – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California*,** contains the Soil Part A DQO Tech Memo.
- **Appendix B, Investigation Procedures, Field Methodology and White Powder/Debris Mapping Results**, summarizes field methodology, debris and white powder material mapping, trenching observations, and deviations from the Soil Part A Work Plan.
- **Appendix C, Part A Phase 1 Soil Investigation Data Gaps Evaluation Results**, presents the results of the data gaps evaluation and proposed Phase 2 sample locations.
- **Appendix D, Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station**, presents the data quality evaluation of the analytical results from sampled collected as part of the 2006 Soil Part A Work Plan.
- **Appendix E, Additional Inorganic Compounds**, summarizes the data evaluation and calculation of representative background concentrations for detected inorganics.
- **Appendix F, Documentation of Compliance and Response to California Department of Toxic Substances Control and United States Department of the Interior Comments,** contains responses to DTSC's comments and conditional approval of the Soil Part A Work Plan and DOI's directions on the Soil Part A Work Plan (DOI, 2008a-b).

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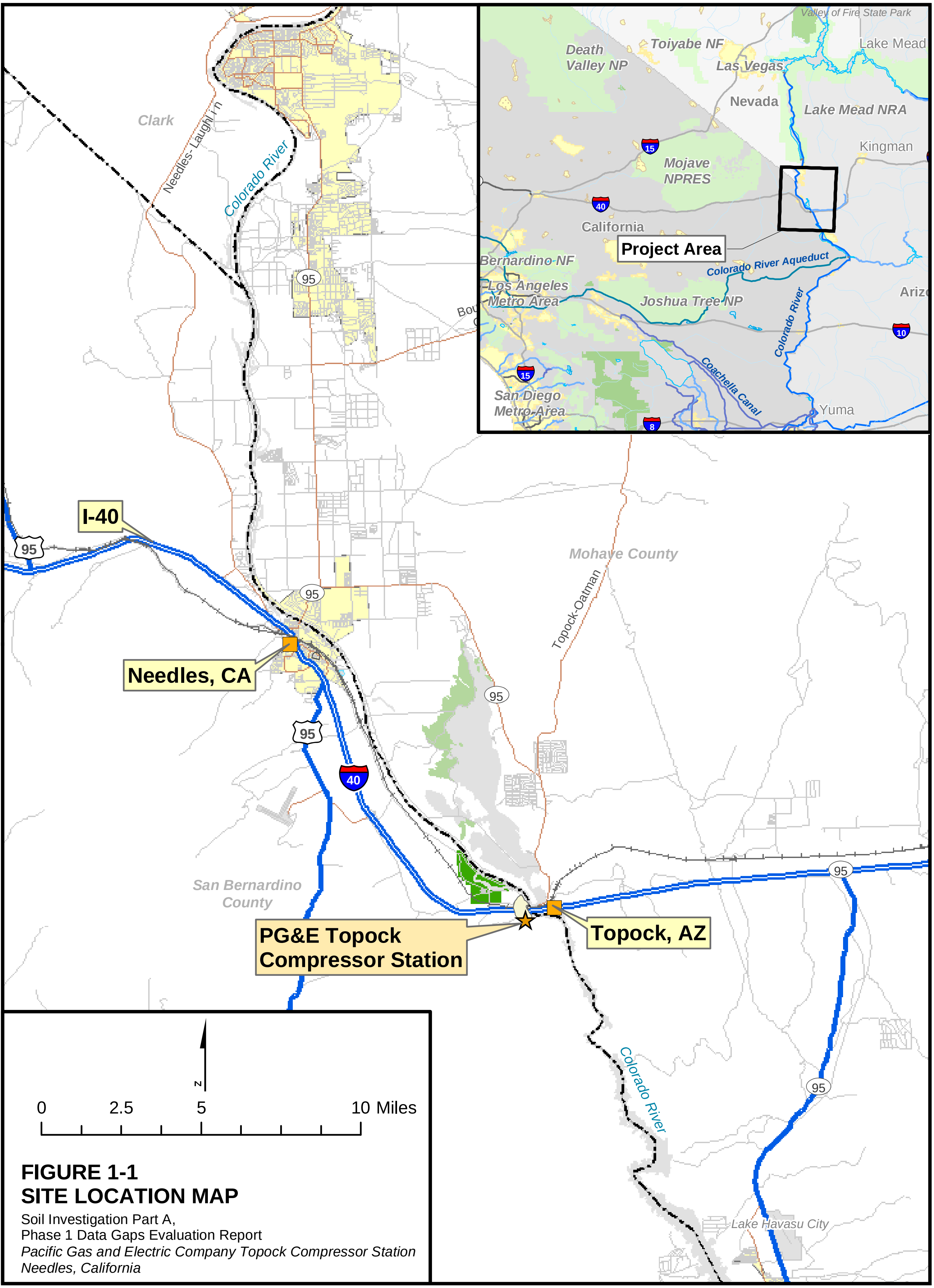
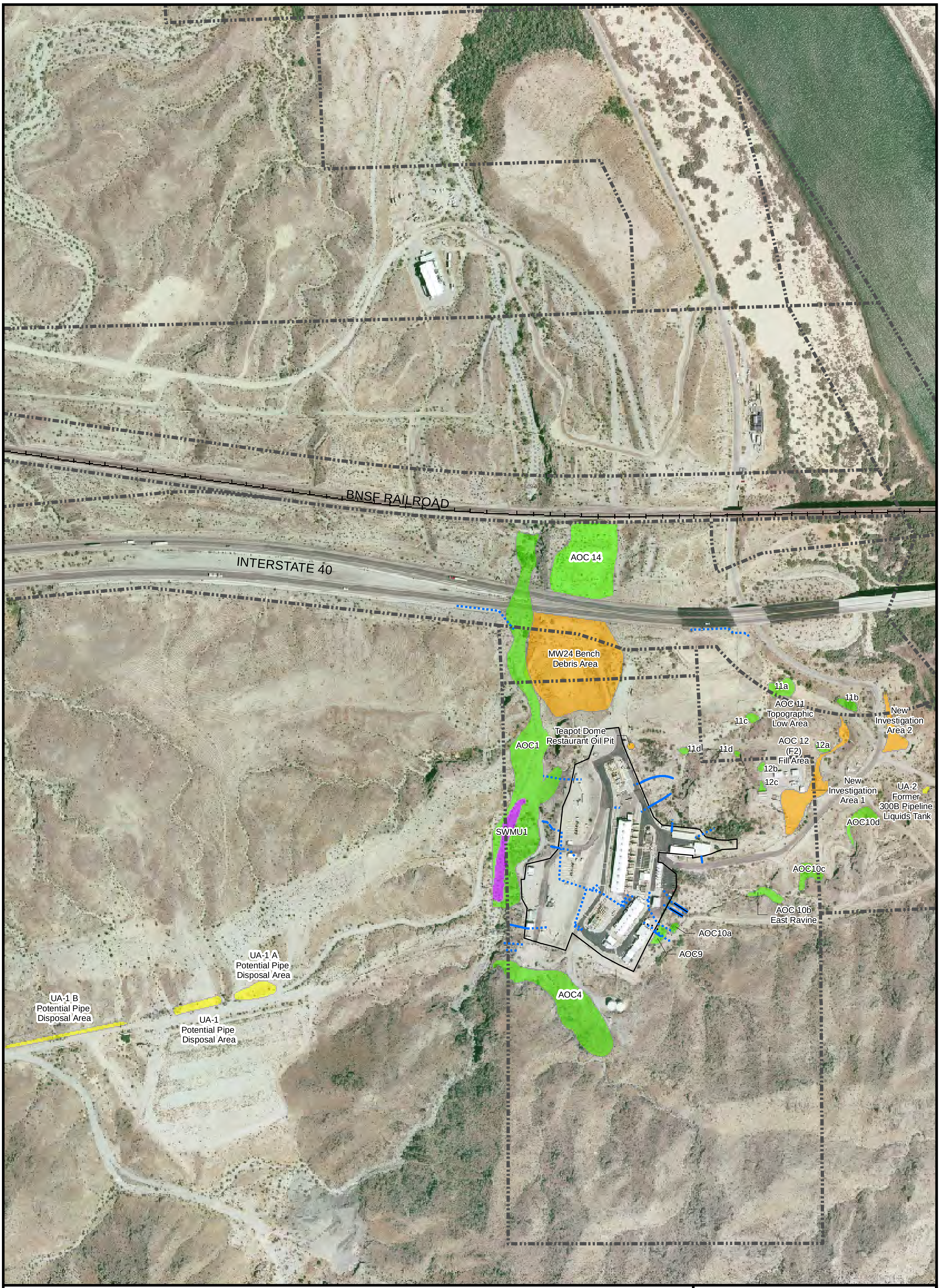


FIGURE 1-1
SITE LOCATION MAP

Soil Investigation Part A,
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



LEGEND

🟪 Soild Waste Management Unit (SWMU)

🟩 Area of Concern (AOC)

🟧 Other Areas

— Site Fence Boundary

— Former Stormwater Pipeline

— Stormwater Piping Above Ground (Approximate Location)

⋯ Stormwater Piping Below Ground (Approximate Location)

• • • • Alternate Stormwater Piping Below Ground (Approximate Location)

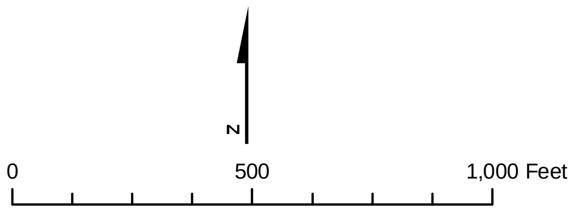


FIGURE 1-2
SOLID WASTE MANAGEMENT UNITS AREAS OF CONCERN, AND OTHER UNDESIGNATED AREAS TO BE INVESTIGATED UNDER PART A

SOIL INVESTIGATION PART A PHASE 1
DATA GAPS EVALUATION REPORT
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL

\\D\Projects\Topock\MAPFILES\2011\SWP_B\All_SWMU_AOC_Locs11X17

2.0 Overview of Data Gaps Evaluation Process

The Part A supplemental soil investigation program employs the DQO process to ensure that data collected at each stage of the investigation process are of sufficient quantity and quality to enable the specified decisions to be made. The DQO process is a recognized procedure for defining project objectives and decisions and for optimizing sampling and other information-gathering programs to balance uncertainty, site disturbances, and cost in an acceptable manner. The United States Environmental Protection Agency (USEPA) has issued detailed guidance for the seven-step DQO process (USEPA, 2000, 2006a-b):

- Step 1 – State the Problem
- Step 2 – Identify the Decision(s)
- Step 3 – Identify the Inputs to the Decision
- Step 4 – Define the Study Boundaries
- Step 5 – Develop a Decision Rule
- Step 6 – Specify Tolerable Limits on Decision Errors
- Step 7 – Optimize the Design

Between June 2008 and February 2010, DTSC, DOI, and PG&E drafted Steps 1 through 5 of the Soil Part A DQOs, which are used in this report to evaluate combined soil data and identify data gaps. DQO Steps 6 and 7 are presented in this report have been modified, as appropriate, based on stakeholder input. The Soil Part A DQO Steps 1 through 5 are summarized in the Soil Part A DQO Tech Memo (CH2M HILL, 2010), which is included as Appendix A to this report. DQO Steps 6 and 7 are summarized in Section 7.0.

Below are the four Part A DQO decisions to be made using the combined soil data collected to date and the decision process results for each decision for each of the investigation areas:

- **Decision 1.** Determine the nature and extent of residual soil and/or sediment concentrations resulting from historic compressor station practices. If determination of the full nature and extent of contamination based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment or CMS/FS.

- **Decision 2 (Data Sufficiency Evaluation).** Determine representative EPCs for residual soil and/or sediment contamination resulting from historic compressor station practices that may pose unacceptable risks to current or future human or ecological receptors. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment or CMS/FS.

- **Decision 3.** Determine whether residual soil concentrations resulting from historic compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address threat to groundwater.

- **Decision 4 (Data Sufficiency Evaluation).** Determine the site-specific soil property and contaminant distribution information necessary to support the CMS/FS decisions and remedial action design. If full determination of site-specific soil property and contaminant distribution information based on sample data is not feasible, address uncertainties in the CMS/FS and remedial design.

The following evaluations were completed for each of the four DQO decisions:

- **Decision 1**. The nature and extent of contamination at Part A SWMU, AOCs, and UAs are described and evaluated to determine whether the nature and extent of contamination are adequately understood. The evaluation followed the Decision 1 rules outlined in the Part A DQO Tech Memo Figure 6 (see Appendix A).
- **Decision 2**. A data sufficiency evaluation was conducted to determine if sufficient data exist for Part A SWMU, AOCs, and UAs to calculate representative EPCs for each applicable exposure interval for human health and ecological receptors. The evaluation followed the Decision 2 Rules outlined in the Part A DQO Tech Memo Figure 7 (see Appendix A).
- **Decision 3**. Groundwater soil screening levels (SSLs) were calculated for any metal exceeding background concentrations at one or more locations within Part A SWMU, AOCs, and UAs. For constituents where the detected concentrations exceeded the SSLs, vadose zone modeling was conducted to further evaluate the potential threat to groundwater. Vadose zone modeling was also conducted evaluate the potential threat to groundwater from all detected organic compounds, with the exception of PCBs and dioxins/furans, which were evaluated based on a worst-case scenario where the lowest Kd was used in combination with the highest concentration observed at each depth interval. The evaluation followed the Decision 3 rules outlined in the Part A DQO Tech Memo Figure 8 (see Appendix A).
- **Decision 4**. A data sufficiency evaluation was conducted to determine whether sufficient data exist at Part A SWMU, AOCs, and UAs to support the CMS/FS (specifically, remedial technology feasibility assessment and estimation of soil and debris volumes potentially requiring remediation). The evaluation followed the Decision 4 rules outlined in the Part A DQO Tech Memo Figure 9 (see Appendix A).

The following sections summarize the process used to evaluate the four DQO decisions. Results of the evaluation for the nine Part A SWMU, AOCs, and UAs, including proposed Phase 2 sample locations if recommended, are provided in Appendix C.

3.0 Decision 1 – Nature and Extent

This section presents the inputs and process used to evaluate Decision 1 – Nature and Extent for the Part A SWMU, AOCs, and UAs. Results of the Decision 1 – Nature and Extent evaluation by SWMU/AOC/UA, including proposed Phase 2 sample locations if recommended, are provided in Appendix C.

3.1 Inputs to Decision 1

The following three types of information are needed and considered when assessing whether the nature and extent of contamination at a site are adequately understood: (1) usable and appropriate chemicals of potential concern (COPCs) and chemicals of potential ecological concern (COPECs) concentration data, (2) potential fate and transport mechanisms, and (3) preliminary screening comparison values, as described in the Soil Part A DQO Tech Memo provided as Appendix A. The following subsections describe the inputs required to evaluate Decision 1 – Nature and Extent.

3.1.1 Data Usability

The data collected during the Part A Phase 1 Soil Investigation were validated as described in the *Draft PG&E Quality Assurance Project Plan* (CH2M HILL, 2008a) and the *Draft Soil Addendum for the Topock Compressor Station, RCRA Facility Investigation/Remedial Investigation (*CH2M HILL, 2008b*)*. Appendix D presents the results of the data validation and data quality evaluation of Phase 1 data. The validated Part A Phase 1 data were combined with existing data. Existing data were evaluated in the *Final Soil and Sediment Data Usability Technical Memorandum, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2008c). All data meeting Category 1 data quality standards were included in the combined data set.

The existing Category 1 data were also reviewed to assess whether they are still considered reliable due to changing site conditions. If site conditions had changed substantially (e.g., as in Bat Cave Wash following 2006 and 2010 storm events with high runoff), the data were assessed to determine whether it is likely that the changes have altered the conditions at particular locations. This data assessment process was limited to surface and near-surface samples, as deeper samples would not be expected to be affected by storm event erosion and deposition.

The Soil Investigation Part A Work Plan acknowledged that both deposition and erosion occurs in Bat Cave Wash after significant storm events; however, the precise nature of erosion and deposition patterns are difficult to assess. A significant storm event in 2006 resulted in erosion and deposition in many areas of SWMU 1 and, as such, the reliability of the shallow samples from pre-2006 data is suspect. Consequently, at the direction of DTSC, the Part A Phase 1 investigation included six sample transects, containing at least three sample locations each, across the wash perpendicular to the direction of flow to characterize the wash at the time of the Part A Phase 1 investigation. The Part A Phase 1 investigation conducted in 2008 provided data to develop an accurate assessment of conditions in the wash following the last major runoff event that occurred in 2006. Another significant storm event occurred in early January 2010. A site reconnaissance was performed on February 10 and 11, 2010 to evaluate whether the existing Part A Phase 1 data were still considered reliable. Based on the site reconnaissance, the Part A Phase 1 data are considered reliable. Deposition of large amounts of material occurred in the southern reaches of Bat Cave Wash near the confluence of AOC 4-debris ravine, but erosion and deposition appeared to be limited in SWMU 1 and AOC 1, as most sample location stakes were still present.

3.1.2 Potential Fate and Transport Mechanisms

Conceptual site models (CSMs) were developed for the *Human Health and Ecological Risk Assessment Work Plan* [RAWP], *Topock Compressor Station, Needles, California* (ARCADIS, 2008a) and RAWP Addendum (ARCADIS, 2009a) and were updated in the *Human and Ecological Risk Assessment of Groundwater Impacted by Activities at Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1, and SWMU 2, Topock Compressor Station, Needles, California* (ARCADIS, 2009b). The updated CSMs are shown in Figures 2 through 5 of the Soil Part A DQO Tech Memo in Appendix A. The CSMs focus on evaluation of potential exposure pathways to human and to human and ecological receptors. Site-specific CSMs, providing a more detailed assessment of contaminant fate and transport mechanisms at each unit, were also developed and are presented in Appendix C.

The CSMs rely on the detailed information on the physical characteristics and setting of each unit, including surface features, topography, meteorology, site geology, surface water hydrology, site hydrogeology, land use, cultural resources, and ecology. Potential transport mechanisms and fate of COPCs and COPECs potentially released into the environment outside the fence line of Topock Compressor Station are presented in the CSMs.

3.1.3 Comparison Values

Six types of comparison values identified for this evaluation include:

- Soil background threshold values (BTVs) for metals and inorganic compounds, which are discussed in the *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2009a) and in Appendix E to this report.
- Ecological comparison values (ECVs), which are calculated to be protective of the species potentially present in the area outside the fence line (ARCADIS, 2008b, 2009a-b).
- Threshold effect concentrations (TECs) that were obtained from MacDonald, et al. (2000) for comparison with sediment results, in accordance with the approved RAWP (ARCADIS, 2008a).
- DTSC California human health screening levels (CHHSLs) for residential use (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, 2005).
- USEPA regional screening levels (RSLs) for residential use for those compounds for which CHHSLs are unavailable or for which the existing CHHSLs are based on outdated toxicity factors (USEPA, 2009a).

- California Regional Water Quality Control Board, San Francisco Bay Region (Water Board, 2008) environmental screening levels for total petroleum hydrocarbons in the gasoline, diesel, and motor oil ranges for a residential exposure scenario for human health based on a hazard index of 1.0.
- Project-specific screening levels developed for COPCs/COPECs identified from Target Analyte List and Target Compound List (TAL/TCL) data, to be developed as needed.

The comparison values were used to assess the extent of contamination. The extent of contamination was defined to the lowest of the applicable comparison values, defined as the interim screening level. The soil interim screening level for most metals is equal to the corresponding BTV. Certain ECVs, USEPA RSLs, or DTSC CHHSLs for metals are lower than the BTV; in these cases, the BTV was used in lieu of the ECVs, USEPA RSLs, or DTSC CHHSLs when determining whether delineation is adequate. If a BTV is not available, then the interim screening value is usually the lesser of the DTSC CHHSLs or soil ECVs. As stated above, the USEPA RSL is used instead of the CHHSL in those instances where a CHHSL does not exist or where the toxicity values used in the CHHSL are outdated. The interim sediment screening level for most metals was the TEC. Where sediment TECs were not available for a given compound, the soil BTV was used as the interim screening level in a conservative estimate of sediment background values since background concentrations of metals in upland soil would be expected to be lower than background concentrations in sediment. The comparison values are shown in Tables 3-1 through 3-8. Exceedance of any comparison values does not indicate the presence or absence of unacceptable risk (potential site-related risks will be evaluated in the baseline risk assessment).

To assess dioxin/furan results, dioxin toxicity equivalence quotients (TEQs) were calculated and compared to the DTSC/Human Ecological Risk Department (HERD) dioxin TEQs remedial goals presented in *Remedial Goals for Dioxins and Dioxin-like Compounds for Consideration at California Hazardous Waste Site* (DTSC, 2009). The DTSC/HERD guidance provides the following dioxin TEQ remedial goals for sites in California:

- 50 nanograms per kilogram: residential exposure scenario (based on 10^{-6} risk level and adjusted by a factor of 10 to account for minimal contribution of soil and dust to dioxin body burden in a University of Michigan dioxin study).
- 200 to 1,000 nanograms per kilogram: commercial/industrial exposure scenario (a range is proposed from a concentration based on 10^{-6} cancer risk [adjusted by a factor of 10 as with the residential value] to a concentration based on a hazard index of 1).

For completeness, the data were also compared to commercial/industrial DTSC CHHSLs or USEPA RSLs. This comparison is for informational purposes only; the nature and extent delineation was not based on comparison to the commercial use values.

3.2 Nature and Extent Evaluation

As outlined in the decision process for Decision 1 in the Soil Part A DQO Tech Memo, the nature and extent evaluation consisted of:

- Identifying newly detected compounds (note that these constituents have not been formally designated as COPCs or COPECs).
- Conducting a point-by-point comparison of all detected compounds to the comparison values.
- Assessing lateral and vertical extent of detected compounds, as well as spatial concentration trends of detected compounds (i.e., changes in concentration laterally and vertically).
- Conducting a central tendency comparison between site and background data sets.

These steps are discussed in more detail below.

3.2.1 Identification of Newly Detected Compounds

The full inorganic and organic suite analyses included in the CERCLA TAL/TCL includes compounds that have not typically been included in analytical suites for the areas outside the fence line. At the request of DOI, 10 percent of all samples collected during the Soil Part A Phase 1 investigation were analyzed for the full TAL/TCL suite. The Part A Phase 1 data and existing data were combined and reviewed to assess whether, as a result of the full TAL/TCL analysis, any new compounds that qualify as COPCs/COPECs have been identified in the areas outside the compressor station. An evaluation of detected Part A CERCLA TAL/TCL constituents is included in Appendix C.

3.2.2 Point-by-Point Comparison with Comparison Values

The initial comparison of COPCs/COPECs was conducted on a point-by-point basis for all depths (i.e., a simultaneous lateral and vertical assessment). All data for a given area were compared to the comparison values described in Section 3.1.3. (Data tables by constituent group by individual unit are included in Appendix C.) Detected concentrations of a given chemical were flagged for each occurrence of a COPC or COPEC exceeding the interim screening level. It should be noted that the results from this point-by-point comparison were used in conjunction with the spatial trends analysis and central tendency comparison to assess whether a data gap existed at locations with one or more constituents exceeding the applicable BTV or risk-based comparison values. Other considerations included:

- The frequency and extent to which the lowest applicable comparison value was exceeded and, in the case of comparison to BTVs, the degree of exceedance of the lowest applicable risk-based comparison value (typically the ECV).
- The influence of topography on both the likely direction of COPC or COPEC movement and the ability to collect additional samples.
- The proximity of other relevant sample locations to the sample location exceeding the interim screening level.

For example, at AOC 9, copper was detected in samples at concentrations exceeding the BTV. One of these samples is located at the perimeter of the sampling area. However, none of the detected concentrations exceeded ECV and residential or commercial/industrial

CHHSLs (20.6 milligrams per kilogram [mg/kg], 3,000 mg/kg, and 38,000 mg/kg, respectively). Consequently, no further sampling for copper was recommended for AOC 9.

Statistical summary tables were also created for each area and are included in the Appendix C sub-appendices. The statistical summary tables present the frequency of detection for each COPC and COPEC detected in soil, the maximum detected concentration, and the number of exceedances of each comparison value described in Section 3.1.3. Soil sample counts presented in the statistical summary tables do not include duplicate (quality control) soil samples. At locations where duplicate samples were collected, the higher of the two values were included in the statistical summary tables. The number of exceedances is the number of detections that are equal to or exceed the respective screening/comparison values. For the BTV, exceedances are the number of detections exceeding the BTV (i.e., if a detected concentration is equal to the BTV, it is considered to be within background).

Eight metals (antimony, beryllium, cadmium, mercury, molybdenum, silver, selenium, and thallium) were commonly not detected in Part A Phase 1 soil samples at concentrations above laboratory reporting limits; however, the respective reporting limits were higher than the respective ECVs and/or BTVs. The laboratory reporting limits are equal to the laboratory's practical quantitation levels—the minimum concentration at which a laboratory can accurately determine the concentration of a substance. For these eight metals, the practical quantitation levels are at or below the USEPA Superfund Analytical Services/ Contract Laboratory Program required quantitation limits and are the lowest concentration the laboratory can accurately achieve.

The fact that reporting limits for these metals exceeded the respective ECVs and/or BTVs is not considered a data gap because of the following reasons:

- Antimony was not detected in background samples; therefore, a BTV was not calculated for antimony. The reporting limits for background samples are similar to the reporting limits for Part A Phase 1. Although the reporting limits exceeded the ECV, the limits are well below the residential CHHSL of 30 mg/kg , and no known source of antimony exists at Topock Compressor Station.
- The reporting limits for beryllium exceeded the BTV but were well below the ECV and residential CHHSL. The reporting limits were generally only two to three times the BTV, indicating that beryllium was not highly elevated above the BTV in any of the samples, and no known source of beryllium exists at Topock Compressor Station.
- The reporting limits for cadmium, silver, selenium, and thallium rarely exceeded ECVs and/or BTVs. The majority of the reporting limits for these metals were below or equal to the applicable comparison values.
- The reporting limits for mercury exceeded the ECV but were well below the residential CHHSL. Mercury was not detected in the background samples; therefore, a BTV was not calculated. The reporting limits for the background samples were similar to the reporting limits for the Part A Phase 1 soil investigation. The ECV is below the capability of laboratory instrumentation to detect mercury, which is a recognized common issue with mercury analyses in ecological risk assessment. Furthermore, the ECV developed for the Part A soil investigation is intentionally very conservative (i.e., the lowest value).

Ecological risk from mercury and the uncertainty associated with the reporting limits will be addressed during the ecological risk assessment.

- The reporting limits for molybdenum sometimes exceeded the BTV but rarely exceeded the ECV. All reporting limits were well below the residential CHHSL. The reporting limits were typically no more than two times the BTV, indicating that molybdenum was not highly elevated above the BTV in any of the samples.

3.2.3 Evaluation of Lateral and Vertical Extents and Spatial Trends

The lateral and vertical extents of each COPC/COPEC were evaluated by assessing whether constituent concentrations in the samples were below the applicable interim screening level toward the edge of the unit or affected area. Potential hot spots, if any, were identified through the presence of clusters of elevated concentrations of COPCs/COPECs.

In addition, spatial trends were evaluated for those COPCs/COPECs identified by the point-by-point comparison as having concentrations exceeding the interim screening level. Figures with posted concentrations were created for those COPCs/COPECs that were detected four or more times above respective interim screening levels to assist with the evaluation of lateral and vertical extents and spatial trends. These figures are presented for each unit in the Appendix C sub-appendices.

Spatial trends were evaluated both laterally and vertically. For lateral delineation, concentration trends toward the perimeter of each area were reviewed to ensure that concentrations are generally decreasing toward the perimeter. Vertical concentration trends were also reviewed for each boring showing concentrations of COPCs/ COPECs. Evaluation of spatial trends included:

- Lateral concentration trends toward the edge of a unit or affected area (i.e., potential hot spot) within a unit.
- Vertical concentration trends in each boring and throughout a given unit or area.
- Distribution of detections and non-detections of each constituent within a unit.
- Where applicable, concentrations trends at an upstream/upslope unit or area.

The specific areas where COPC/COPEC lateral or vertical boundaries are not adequately defined or where concentration trends are not decreasing were identified as locations where data gaps exist. The identified data gaps provided the basis for further sampling recommendations for Decision 1. If additional data collection was feasible (i.e., no structures, topography, or cultural resources preventing step-out sampling or deeper sampling vertically), then additional sampling locations, depths, and/or analytical suites were proposed for Phase 2 soil based on Step 7 of the DQO process. The additional sampling recommendations for each unit are included in the Appendix C sub-appendices.

3.2.4 Central Tendency Comparison

A population (central tendency) comparison was conducted for those metals detected in soil at concentrations exceeding the respective BTVs. The central tendency comparison assesses whether there is an overall shift of concentrations between the site data versus the background data (i.e., if the site concentrations are higher relative to the background concentrations than random variability could explain). The comparison helps to determine whether an overall shift exists between the background and the combined soil data set for each area.

The comparison was conducted using the approved *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California Technical Memorandum* (CH2M HILL, 2009a). Because comparison to the BTV offers information only on the upper tail of the site concentration distribution, in cases where single point exceedances of the BTV exist, the central tendency comparison offers an opportunity to statistically address whether there is an overall shift of site concentrations relative to background concentrations. This overall shift may be identified as a data gap, and additional sampling may be proposed, if appropriate.

The Gehan test and Wilcoxon Rank Sum test are commonly used to conduct central tendency comparisons. These central tendency tests are discussed both in USEPA and Navy literature (USEPA, 2009b; Navy, 2002). These central tendency tests provide a calculated probability, which was compared to a significance level of 0.05. If the probability was below 0.05, it was concluded that a significant exceedance over background is present.

Both tests are nonparametric approaches based upon the ranks of the data; however, they handle ties in these ranks differently. For that reason, the Gehan test is recommended when the percent of nondetects is greater than 40 percent or when multiple detection limits exist for a given metal, both of which were frequently the case. These joint reasons led to the use of the Gehan test for all cases. (Using these rules, the Wilcoxon Rank Sum test could have been performed for one case, but the calculated probability only differed by a single thousandth between the two tests, thus not impacting the conclusion of the test and allowing use of the Gehan test to be a more consistent approach.)

The central tendency test was not performed if a metal was infrequently detected (less than five detects) in either the unit data or background data set or had a limited number of results (less than eight). Using these rules, a central tendency comparison for hexavalent chromium could not be conducted at any unit because there were insufficient detections of hexavalent chromium in the background data set.

Central tendency comparison box-and-whisker and scatter plots are shown in Figure 3-1, and results for each area are discussed in detail in the Appendix C sub-appendices.

TABLE 3-1

Soil Analyte Comparison Table - Metals and Cyanide

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (mg/kg)	DTSC CHHSL		EPA Regional SL (December 2009)		Background Levels (mg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (mg/kg)	Does RL Exceed ECV Level?	Interim Screening Level[1] (mg/kg)	Does RL Exceed Screening Level?
				Residential (mg/kg)	Commercial (mg/kg)	Residential (mg/kg)	Commercial (mg/kg)					
x	Aluminum	7429-90-5	10	NE	NE	77,000	990,000	16,400	NC	---	16,400	No
	Antimony	7440-36-0	2	30	380	31	410	---	0.285	Yes	0.285	Yes
	Arsenic	7440-38-2	0.5	0.07	0.24	0.062 *	0.25 *	11	11.4	No	11	No
	Barium	7440-39-3	1	5,200	63,000	15,000	190,000	410	330	No	410	No
	Beryllium	7440-41-7	0.5	16	190	160	2,000	0.672	23.3	No	0.672	No
	Cadmium	7440-43-9	0.5	39	500	70	800	1.1	0.0151	Yes	1.1	No
x	Calcium	7440-70-2	100	NE	NE	NE	NE	66,500	NC	---	66,500	No
2	Chromium	7440-47-3	1	NE	NE	280	1,400	39.8	36.3	No	39.8	No
2	Chromium, Hexavalent	18540-29-9	0.4	17	37	230	1,400	0.83	139.6	No	0.83	No
	Cobalt	7440-48-4	1	660	3,200	23	300	12.7	13	No	12.7	No
	Copper	7440-50-8	1	3,000	38,000	3,100	41,000	16.8	20.6	No	16.8	No
x	Cyanide	57-12-5	0.25	NE	NE	1,600	20,000	---	0.9	No	0.9	No
x	Iron	7439-89-6	10	NE	NE	55,000	720,000	---	NC	---	55,000	No
	Lead	7439-92-1	1	80	320	400	800	8.39	0.0166	Yes	8.39	No
x	Magnesium	7439-95-4	100	NE	NE	NE	NE	12,100	NC	---	12,100	No
x	Manganese	7439-96-5	1	NE	NE	1,800	23,000	402	220	No	402	No
3	Mercury	NA	0.1	18	180	23	310	---	0.0125	Yes	0.0125	Yes
	Molybdenum	7439-98-7	1	380	4,800	390	5,100	1.37	2.25	No	1.37	No
	Nickel	7440-02-0	1	1,600	16,000	1,500	20,000	27.3	0.607	Yes	27.3	No
x	Potassium	7440-09-7	100	NE	NE	NE	NE	4,400	NC	---	4,400	No
	Selenium	7782-49-2	1	380	4,800	390	5,100	1.47	0.177	Yes	1.47	No
	Silver	7440-22-4	1	380	4,800	390	5,100	---	5.15	No	5.15	No
x	Sodium	7440-23-5	100	NE	NE	NE	NE	2,070	NC	---	2,070	No
2	Thallium	7440-28-0	0.5	5.0	63	5.1	66	---	2.32	No	2.32	No
4	Vanadium	NA	1	530	6,700	390	5,200	52.2	13.9	No	52.2	No
	Zinc	7440-66-6	2	23,000	100,000	23,000	310,000	58	0.164	Yes	58	No

Notes:

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA residential regional screening level from April 2009 is used.

[3] Mercury: mercury, inorganic salts

[4] The oral reference dose (RfD) used for the vanadium screening level is derived from the IRIS oral RfD for vanadium pentoxide by factoring out the molecular weight of the oxide ion.

QAPP RL = quality assurance procedures plan reporting limit
DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)
Background = CH2M HILL. 2009. "Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.
--- = data not collected, available or applicable
x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)
USEPA = United States Environmental Protection Agency

SL = USEPA regional screening level (USEPA, December 2009)
mg/kg = milligrams per kilogram
NE = regulatory standard not established
NC = not calculated
NA = not available
* = California modified preliminary remediation goal (USEPA 2004)

TABLE 3-2

Sediment Analyte Comparison Table - Metals

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Analyte	CAS	QAPP RL (mg/kg)	Soil Background Levels (mg/kg)	Consensus-based Concentration Threshold (mg/kg)	Consensus-based Concentration Probable (mg/kg)	Interim Screening Level[1] (mg/kg)	Does RL Exceed Screening Level?
Antimony	7440-36-0	2	---	NE	NE	NE	---
Arsenic	7440-38-2	0.5	11	9.79	33	9.79	No
Barium	7440-39-3	1	410	NE	NE	410	No
Beryllium	7440-41-7	0.5	0.672	NE	NE	0.672	No
Cadmium	7440-43-9	0.5	1.1	0.99	4.98	0.99	No
[2] Chromium	7440-47-3	1	39.8	43.4	111	43.4	No
[2] Chromium, Hexavalent	18540-29-9	0.4	0.83	NE	NE	0.83	No
Cobalt	7440-48-4	1	12.7	NE	NE	12.7	No
Copper	7440-50-8	1	16.8	31.6	149	31.6	No
Lead	7439-92-1	1	8.39	35.8	128	35.8	No
[3] Mercury	NA	0.1	---	0.18	1.06	0.18	No
Molybdenum	7439-98-7	1	1.37	NE	NE	1.37	No
Nickel	7440-02-0	1	27.3	22.7	48.6	22.7	No
Selenium	7782-49-2	1	1.47	NE	NE	1.47	No
Silver	7440-22-4	1	---	NE	NE	NE	---
[2] Thallium	7440-28-0	0.5	---	NE	NE	NE	---
[4] Vanadium	NA	1	52.2	NE	NE	52.2	No
Zinc	7440-66-6	2	58	121	459	121	No

Notes:

[1] Interim screening level is equal to the to the lower value between the TEC and PEC. If neither is available, the soil background value is used.

[2] Mercury: mercury, inorganic salts

[3] The oral reference dose (RfD) used for the thallium screening level is derived from the IRIS oral RfD for thallium sulfate by factoring out the molecular weight of the sulfate ion.

[4] The oral reference dose (RfD) used for the vanadium screening level is derived from the IRIS oral RfD for vanadium pentoxide by factoring out the molecular weight of the oxide ion.

QAPP RL = quality assurance procedures plan reporting limit

Background = CH2M HILL. 2009. "Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

--- = data not collected, available or applicable

USEPA = United States Environmental Protection Agency

mg/kg = milligrams per kilogram

NE = regulatory standard not established

NA = not available

TABLE 3-3

Soil Analyte Comparison Table - Polycyclic Aromatic Hydrocarbon (PAH) - SW8270SIM

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

			DTSC CHHSL		EPA Regional SL (December 2009)		Background Levels (µg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level [1] (µg/kg)	Does RL Exceed Screening Level?
Analyte	CAS	QAPP RL (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)					
1-Methyl naphthalene	90-12-0	5	NE	NE	22,000	99,000	---	NE	No	22,000	No
2-Methyl naphthalene	91-57-6	5	NE	NE	310,000	4,100,000 (sat)	---	NE	No	310,000	No
[s] Acena phthylene	208-96-8	5	NE	NE	1,700,000	17,000,000	---	NE	No	1,700,000	No
Acenaphthene	83-32-9	5	NE	NE	3,400,000	33,000,000	---	NE	No	3,400,000	No
Anthracene	120-12-7	5	NE	NE	17,000,000	170,000,000	---	NE	No	17,000,000	No
[2] Benzo (a) anthracene	56-55-3	5	NE	NE	380	1,300	---	NE	No	380	No
Benzo (a) pyrene	50-32-8	5	38	130	15	210	---	NE	No	38	No
[2] Benzo (b) fluoranthene	205-99-2	5	NE	NE	380	1,300	---	NE	No	380	No
[s] Benzo (ghi) perylene	191-24-2	5	NE	NE	1,700,000	17,000,000	---	NE	No	1,700,000	No
Benzo (k) fluoranthene	207-08-9	5	NE	NE	380 *	1,300 *	---	NE	No	380	No
Chrysene	218-01-9	5	NE	NE	3,800 *	13,000 *	---	NE	No	3,800	No
[2] Dibenzo (a,h) anthracene	53-70-3	5	NE	NE	110	380	---	NE	No	110	No
Fluoranthene	206-44-0	5	NE	NE	2,300,000	22,000,000	---	NE	No	2,300,000	No
Fluorene	86-73-7	5	NE	NE	2,300,000	22,000,000	---	NE	No	2,300,000	No
[2] Indeno (1,2,3-cd) pyrene	193-39-5	5	NE	NE	380	1,300	---	NE	No	380	No
Naphthalene	91-20-3	5	NE	NE	3,600	18,000	---	NE	No	3,600	No
[s] Phenanthrene	85-01-8	5	NE	NE	1,700,000	17,000,000	---	NE	No	1,700,000	No
Pyrene	129-00-0	5	NE	NE	1,700,000	17,000,000	---	NE	No	1,700,000	No
PAH Low molecular weight	NA	5	NE	NE	NE	NE	---	10,000	No	10,000	No
PAH High molecular weight	NA	5	NE	NE	NE	NE	---	1,160	No	1,160	No
B(a)P Equivalent	50-32-8	5	38	130	15	210	---	NE	No	38	No

Notes:

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] Calculated using California toxicity values. The EPA Regional SL for Benzo(a)anthracene, Benzo(b)fluoranthene and Indeno (1,2,3-c,d)pyrene residential is 150 µg/kg, commercial is 2100 µg/kg; Dibenzo(a,h)anthracene residential is 15 µg/kg, commercial is 210 µg/kg.

[S] Pyrene is used as a surrogate

QAPP RL = quality assurance procedures plan reporting limit

DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)

SL = USEPA regional screening level, (USEPA, December 2009)

µg/kg = micrograms per kilogram

NE = regulatory standard not established

--- = background concentration could not be established because all background samples were non-detect for this constituent

(sat) = concentration may exceed saturation value

* = California modified preliminary remediation goal (USEPA 2004)

NA = not available

USEPA = United States Environmental Protection Agency

TABLE 3-4

Soil Analyte Comparison Table - Semivolatile Organic Compounds - SW8270C

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)						
	Analyte	CAS	QAPP RL (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Background Levels (µg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level [1] (µg/kg)	Does RL Exceed Screening Level?
x	1,1´-Biphenyl	92-52-4	700	NE	NE	3,900,000 (sat)	51,000,000 (sat)	---	See note 2	No	3,900,000	No
x	1,2,4,5-Tetrachlorobenzene	95-94-3	700	NE	NE	18,000	180,000	---	See note 2	No	18,000	No
	1,2,4-Trichlorobenzene	120-82-1	330	NE	NE	22,000	99,000	---	See note 2	No	22,000	No
	1,2-Dichlorobenzene	95-50-1	330	NE	NE	1,900,000 (sat)	9,800,000 (sat)	---	See note 2	No	1,900,000	No
	1,3-Dichlorobenzene	541-73-1	330	NE	NE	530,000 ^	600,000 ^	---	See note 2	No	530,000	No
	1,4-Dichlorobenzene	106-46-7	330	NE	NE	2,400	12,000	---	See note 2	No	2,400	No
x	1,4-Dioxane	123-91-1	500	18,000	64,000	44,000	160,000	---	See note 2	No	18,000	No
x	2,3,4,6-Tetrachlorophenol	58-90-2	700	NE	NE	1,800,000	18,000,000	---	See note 2	No	1,800,000	No
	2,4,5-Trichlorophenol	95-95-4	700	NE	NE	6,100,000	62,000,000	---	See note 2	No	6,100,000	No
	2,4,6-Trichlorophenol	88-06-2	330	NE	NE	6,900 *	25,000 *	---	See note 2	No	6,900	No
	2,4-Dichlorophenol	120-83-2	330	NE	NE	180,000	1,800,000	---	See note 2	No	180,000	No
	2,4-Dimethylphenol	105-67-9	330	NE	NE	1,200,000	12,000,000	---	See note 2	No	1,200,000	No
	2,4-Dinitrophenol	51-28-5	330	NE	NE	120,000	1,200,000	---	See note 2	No	120,000	No
	2,4-Dinitrotoluene	121-14-2	330	NE	NE	1,600	5,500	---	See note 2	No	1,600	No
	2,6-Dinitrotoluene	606-20-2	330	NE	NE	61,000	620,000	---	See note 2	No	61,000	No
	2-Chloro naphthalene	91-58-7	330	NE	NE	6,300,000 (sat)	82,000,000 (sat)	---	See note 2	No	6,300,000	No
	2-Chlorophenol	95-57-8	330	NE	NE	63,000 ^	240,000 ^	---	See note 2	No	63,000	No
	2-Methyl naphthalene	91-57-6	330 [3]	NE	NE	310,000	4,100,000 (sat)	---	See note 2	No	310,000	No
	2-Methylphenol	95-48-7	330	NE	NE	3,100,000	31,000,000	---	See note 2	No	3,100,000	No
	2-Nitroaniline	88-74-4	700	NE	NE	180,000 ^	1,800,000 ^	---	See note 2	No	180,000	No
	2-Nitrophenol	88-75-5	700	NE	NE	NE	NE	---	See note 2	No	NE	---
	3,3-Dichlorobenzidene	91-94-1	1,300	NE	NE	1,100	3,800	---	See note 2	No	1,100	Yes
	3-Nitroaniline	99-09-2	700	NE	NE	18,000 ^	82,000 ^	---	See note 2	No	18,000	No
	4,6-Dinitro-2-methylphenol	534-52-1	1,600	NE	NE	6,100	62,000	---	See note 2	No	6,100	No
	4-Bromophenyl phenyl ether	101-55-3	330	NE	NE	NE	NE	---	See note 2	No	NE	---
	4-Chloro-3-methylphenol	59-50-7	600	NE	NE	6,100,000	62,000,000	---	See note 2	No	6,100,000	No
	4-Chloroaniline	106-47-8	700	NE	NE	2,400	8,600	---	See note 2	No	2,400	No
	4-Chlorophenyl phenyl ether	7005-72-3	330	NE	NE	NE	NE	---	See note 2	No	NE	---
	4-Methylphenol	106-44-5	330	NE	NE	310,000	3,100,000	---	500	No	500	No
	4-Nitroaniline	100-01-6	700	NE	NE	24,000	86,000	---	See note 2	No	24,000	No
	4-Nitrophenol	100-02-7	700	NE	NE	NE	NE	---	See note 2	No	NE	---
s1	Acena phthylene	208-96-8	330 [3]	NE	NE	1,700,000	17,000,000	---	See note 2	No	1,700,000	No

TABLE 3-4

Soil Analyte Comparison Table - Semivolatile Organic Compounds - SW8270C

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (µg/kg)	DTSC CHHSL		EPA Regional SL (December 2009)		Background Levels (µg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level [1] (µg/kg)	Does RL Exceed Screening Level?
				Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)					
	Acenaphthene	83-32-9	330 [3]	NE	NE	3,400,000	33,000,000	---	See note 2	No	3,400,000	No
x	Acetophenone	98-86-2	700	NE	NE	7,800,000 (sat)	100,000,000 (sat)	---	See note 2	No	7,800,000	No
	Anthracene	120-12-7	330 [3]	NE	NE	17,000,000	170,000,000	---	See note 2	No	17,000,000	No
x	Atrazine	1912-24-9	700	NE	NE	2,100	7,500	---	See note 2	No	2,100	No
x	Benzaldehyde	100-52-7	700	NE	NE	7,800,000 (sat)	100,000,000 (sat)	---	See note 2	No	7,800,000	No
4	Benzo (a) anthracene	56-55-3	330 [3]	NE	NE	380	1,300	---	See note 2	No	380	No
	Benzo (a) pyrene	50-32-8	330 [3]	38	130	15	210	---	See note 2	No	38	Yes
4	Benzo (b) fluoranthene	205-99-2	330 [3]	NE	NE	380	1,300	---	See note 2	No	380	No
s1	Benzo (ghi) perylene	191-24-2	330 [3]	NE	NE	1,700,000	17,000,000	---	See note 2	No	1,700,000	No
	Benzo (k) fluoranthene	207-08-9	330 [3]	NE	NE	380 *	1,300 *	---	See note 2	No	380	No
	Benzoic acid	65-85-0	5,000	NE	NE	240,000,000	2,500,000,000	---	See note 2	No	240,000,000	No
	Benzyl alcohol	100516	600	NE	NE	6,100,000	62,000,000	---	See note 2	No	6,100,000	No
	Bis (2-chloroethoxy) methane	111-91-1	330	NE	NE	180,000	1,800,000	---	See note 2	No	180,000	No
	Bis (2-chloroethyl) ether	111-44-4	330	NE	NE	210	1,000	---	See note 2	No	210	Yes
	Bis (2-chloroisopropyl) ether	108-60-1	330	NE	NE	4,600	22,000	---	See note 2	No	4,600	No
	Bis (2-ethylhexyl) phthalate	117-81-7	700	NE	NE	35,000	120,000	---	2900	No	2,900	No
	Butyl benzyl phthalate	85-68-7	1,000	NE	NE	260,000	910,000	---	See note 2	No	260,000	No
x	Caprolactam	105-60-2	700	NE	NE	31,000,000	310,000,000	---	See note 2	No	31,000,000	No
x	Carbazole	86-74-8	700	NE	NE	24,000 ^	86,000 ^	---	2800000	No	24,000	No
	Chrysene	218-01-9	330 [3]	NE	NE	3,800 *	13,000 *	---	See note 2	No	3,800	No
4	Dibenzo (a,h) anthracene	53-70-3	330 [3]	NE	NE	110	380	---	See note 2	No	110	Yes
	Dibenzofuran	132-64-9	330	NE	NE	150,000 ^	1,600,000 ^	---	See note 2	No	150,000	No
	Diethyl phthalate	84-66-2	330	NE	NE	49,000,000	490,000,000	---	See note 2	No	49,000,000	No
	Dimethyl phthalate	131-11-3	330	NE	NE	100,000,000 ^(max)	100,000,000 ^(max)	---	See note 2	No	100,000,000	No
	Di-N-butyl phthalate	84-74-2	330	NE	NE	6,100,000	62,000,000	---	47	Yes	47	Yes
	Di-N-octyl phthalate	117-84-0	1,000	NE	NE	2,400,000 ^	25,000,000 ^	---	See note 2	No	2,400,000	No
	Fluoranthene	206-44-0	330 [3]	NE	NE	2,300,000	22,000,000	---	See note 2	No	2,300,000	No
	Fluorene	86-73-7	330 [3]	NE	NE	2,300,000	22,000,000	---	See note 2	No	2,300,000	No
	Hexachlorobenzene	118-74-1	330	NE	NE	300	1,100	---	See note 2	No	300	Yes
	Hexachlorobutadiene	87-68-3	330	NE	NE	6,200	22,000	---	See note 2	No	6,200	No
x	Hexachlorocyclopentadiene	77-47-4	700	NE	NE	370,000	3,700,000	---	See note 2	No	370,000	No
	Hexachloroethane	67-72-1	330	NE	NE	35,000	120,000	---	See note 2	No	35,000	No

TABLE 3-4

Soil Analyte Comparison Table - Semivolatile Organic Compounds - SW8270C

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

			DTSC CHHSL		EPA Regional SL (December 2009)						
Analyte	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Background Levels (µg/kg)**	**Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)**	**Does RL Exceed ECV Level?**	**Interim Screening Level[1] (µg/kg)**	**Does RL Exceed Screening Level?**
[4] Indeno (1,2,3-cd) pyrene	193-39-5	330[3]	NE	NE	380	1,300	---	See note 2	No	380	No
Isophorone	78-59-1	330	NE	NE	510,000	1,800,000	---	See note 2	No	510,000	No
Naphthalene	91-20-3	330	NE	NE	3,600	18,000	---	See note 2	No	3,600	No
Nitrobenzene	98-95-3	330	NE	NE	4,800	24,000	---	See note 2	No	4,800	No
N-Nitroso-di-n-propylamine	621-64-7	330	NE	NE	69	250	---	See note 2	No	69	Yes
N-nitrosodiphenylamine	86-30-6	330	NE	NE	99,000	350,000	---	See note 2	No	99,000	No
Pentachloro phenol	87-86-5	700	4,400	13,000	3,000	9,000	---	2500	No	2,500	No
s1 Phenanthrene	85-01-8	330[3]	NE	NE	1,700,000	17,000,000	---	See note 2	No	1,700,000	No
Phenol	108-95-2	330	NE	NE	18,000,000	180,000,000	---	See note 2	No	18,000,000	No
Pyrene	129-00-0	330[3]	NE	NE	1,700,000	17,000,000	---	See note 2	No	1,700,000	No

Notes:

All soil sample results will be reported in dry weight unless otherwise specified in the SAP.

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] ECVs were calculated as needed for constituents detected during the Part A Phase 1 sampling.

[3] Analytes were analyzed by SW8270SIM to achieve a lower reporting limit.

[4] Calculated using California toxicity values. The EPA Regional SL for Benzo(a)anthracene, Benzo(b)fluoranthene and Indeno (1,2,3-c,d)pyrene residential is 150 µg/kg, commercial is 2100 µg/kg; Dibenzo(a,h)anthracene residential is 15 µg/kg, commercial is 210 µg/kg.

QAPP RL = quality assurance procedures plan reporting limit
DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)
µg/kg = micrograms per kilogram
SL = USEPA regional screening level, (USEPA, December 2009)
NE = regulatory standard not established
(sat) = concentration may exceed saturation value
s1 = pyrene is used as a surrogate.
(max) = ceiling limit, not a risk-based value
^ = preliminary remediation goal, (USEPA, 2004)
--- = data not collected, available or applicable
x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)
* = California modified preliminary remediation goal, (USEPA, 2004)
USEPA = United States Environmental Protection Agency

TABLE 3-5

Soil Analyte Comparison Table - Volatile Organic Compounds - SW8260B

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level [1] (µg/kg)	Does RL Exceed Screening Level?
	Analyte	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**				
	1,1,1,2-Tetrachloroethane	630-20-6	5	NE	NE	1,900	9,300	See note 2	No	1,900	No
	1,1,1-Trichloroethane	71-55-6	5	NE	NE	8,700,000 (sat)	38,000,000 (sat)	See note 2	No	8,700,000	No
	1,1,2,2-Tetrachloroethane	79-34-5	5	NE	NE	560	2,800	See note 2	No	560	No
	1,1,2-Trichloroethane	79-00-5	5	NE	NE	1,100	5,300	See note 2	No	1,100	No
	1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	5	NE	NE	43,000,000 (sat)	180,000,000 (sat)	See note 2	No	43,000,000	No
	1,1-Dichloroethane	75-34-3	5	NE	NE	3,300	17,000	See note 2	No	3,300	No
	1,1-Dichloroethene	75-35-4	5	NE	NE	240,000	1,100,000	See note 2	No	240,000	No
s1	1,1-Dichloropropene	563-58-6	5	NE	NE	1,700	8,100	See note 2	No	1,700	No
	1,2,3-Trichlorobenzene	87-61-6	5	NE	NE	49,000	490,000 (sat)	See note 2	No	49,000	No
	1,2,3-Trichloropropane	96-18-4	5	NE	NE	5.0	95	See note 2	No	5.0	No
	1,2,4-Trichlorobenzene	120-82-1	5	NE	NE	22,000	99,000	See note 2	No	22,000	No
	1,2,4-Trimethylbenzene	95-63-6	6	NE	NE	62,000	260,000 (sat)	See note 2	No	62,000	No
	1,2-Dibromo-3-chloropropane	96-12-8	5	NE	NE	5.4	69	See note 2	No	5.4	No
	1,2-Dibromoethane	106-93-4	5	NE	NE	34	170	See note 2	No	34	No
	1,2-Dichlorobenzene	95-50-1	5	NE	NE	1,900,000 (sat)	9,800,000 (sat)	See note 2	No	1,900,000	No
	1,2-Dichloroethane	107-06-2	5	NE	NE	430	2,200	See note 2	No	430	No
	1,2-Dichloropropane	78-87-5	5	NE	NE	890	4,500	See note 2	No	890	No
	1,3,5-Trimethylbenzene	108-67-8	5	NE	NE	780,000 (sat)	10,000,000 (sat)	See note 2	No	780,000	No
	1,3-Dichlorobenzene	541-73-1	5	NE	NE	530,000 ^	600,000 ^	See note 2	No	530,000	No
	1,3-Dichloropropane	142-28-9	5	NE	NE	1,600,000	20,000,000 (sat)	See note 2	No	1,600,000	No
	1,4-Dichlorobenzene	106-46-7	5	NE	NE	2,400	12,000	See note 2	No	2,400	No
s2	2,2-Dichloropropane	594-20-7	5	NE	NE	890	4,500	See note 2	No	890	No
	2-Chlorotoluene	95-49-8	5	NE	NE	160,000 ^	560,000 ^	See note 2	No	160,000	No
x	2-Hexanone	591-78-6	10	NE	NE	210,000	1,400,000	See note 2	No	210,000	No
s3	4-Isopropyltoluene	99-87-6	6	NE	NE	2,100,000 (sat)	11,000,000 (sat)	See note 2	No	2,100,000	No
	Acetone	67-64-1	50	NE	NE	61,000,000	630,000,000 (sat)	See note 2	No	61,000,000	No
	Acrolein	107-02-8	100	NE	NE	150	650	See note 2	No	150	No
	Acrylonitrile	107-13-1	50	NE	NE	55 ^	120 ^	See note 2	No	55	No
	Benzene	71-43-2	5	NE	NE	1,100	5,400	See note 2	No	1,100	No
	Bromobenzene	108-86-1	5	NE	NE	300,000	1,800,000 (sat)	See note 2	No	300,000	No
s4	Bromochloromethane	74-97-5	5	NE	NE	270	1,400	See note 2	No	270	No
	Bromodichloromethane	75-27-4	5	NE	NE	270	1,400	See note 2	No	270	No
	Bromoform	75-25-2	5	NE	NE	61,000	220,000	See note 2	No	61,000	No
	Bromomethane	74-83-9	5	NE	NE	7,300	32,000	See note 2	No	7,300	No

TABLE 3-5

Soil Analyte Comparison Table - Volatile Organic Compounds - SW8260B

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

	Analyte	**CAS**	**QAPP RL (µg/kg)**	**DTSC CHHSL**		**EPA Regional SL (December 2009)**		**Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)**	**Does RL Exceed ECV Level?**	**Interim Screening Level [1] (µg/kg)**	**Does RL Exceed Screening Level?**
				Residential (µg/kg)	**Commercial (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**				
	Carbon disulfide	75-15-0	5	NE	NE	820,000 (sat)	3,700,000 (sat)	See note 2	No	820,000	No
	Carbon tetrachloride	56-23-5	5	NE	NE	250	1,200	See note 2	No	250	No
	Chloro benzene	108-90-7	5	NE	NE	290,000	1,400,000 (sat)	See note 2	No	290,000	No
	Chloroethane	75-00-3	5	NE	NE	15,000,000 (sat)	61,000,000 (sat)	See note 2	No	15,000,000	No
	Chloroform	67-66-3	5	NE	NE	290	1,500	See note 2	No	290	No
	Chloromethane	74-87-3	5	NE	NE	120,000	500,000	See note 2	No	120,000	No
	cis-1,2-Dichloro ethene	156-59-2	5	NE	NE	780,000	10,000,000 (sat)	See note 2	No	780,000	No
s1	cis-1,3-Dichloropropene	10061-01-5	5	NE	NE	1,700	8,100	See note 2	No	1,700	No
x	Cyclohexane	110-82-7	5	NE	NE	7,000,000 (sat)	29,000,000 (sat)	See note 2	No	7,000,000	No
	Dibromochloromethane	124-48-1	3	NE	NE	680	3,300	See note 2	No	680	No
	Dibromomethane	74-95-3	5	NE	NE	25,000	110,000	See note 2	No	25,000	No
	Dichlorodifluoromethane	75-71-8	5	NE	NE	180,000	780,000	See note 2	No	180,000	No
	Ethylbenzene	100-41-4	5	NE	NE	5,400	27,000	See note 2	No	5,400	No
	Hexachlorobutadiene	87-68-3	5	NE	NE	6,200	22,000	See note 2	No	6,200	No
	Isopropylbenzene	98-82-8	5	NE	NE	2,100,000 (sat)	11,000,000 (sat)	See note 2	No	2,100,000	No
s5	m+p-Xylenes	17261-72-7	10	NE	NE	3,400,000 (sat)	17,000,000 (sat)	See note 2	No	3,400,000	No
x	Methyl acetate	79-20-9	5	NE	NE	22,000,000 ^	92,000,000 ^	See note 2	No	22,000,000	No
	Methyl ethyl ketone	78-93-3	5	NE	NE	28,000,000 (sat)	200,000,000 (sat)	See note 2	No	28,000,000	No
	Methyl isobutyl ketone	108-10-1	50	NE	NE	5,300,000 (sat)	53,000,000 (sat)	See note 2	No	5,300,000	No
	Methyl tert-butyl ether (MTBE)	1634-04-4	20	NE	NE	43,000	220,000	See note 2	No	43,000	No
x	Methylcyclohexane	108-87-2	5	NE	NE	2,600,000 ^	8,700,000 ^	See note 2	No	2,600,000	No
	Methylene chloride	75-09-2	5	NE	NE	11,000	53,000	See note 2	No	11,000	No
	Naphthalene	91-20-3	5	NE	NE	3,600	18,000	See note 2	No	3,600	No
	N-Butylbenzene	104-51-8	5	NE	NE	240,000 ^(sat)	240,000 ^(sat)	See note 2	No	240,000	No
	N-Propylbenzene	103-65-1	5	NE	NE	240,000 ^(sat)	240,000 ^(sat)	See note 2	No	240,000	No
	o-Xylene	95-47-6	5	NE	NE	3,800,000 (sat)	19,000,000 (sat)	See note 2	No	3,800,000	No
	p-Chlorotoluene	106-43-4	5	NE	NE	5,500,000 (sat)	72,000,000 (sat)	See note 2	No	5,500,000	No
	sec-Butylbenzene	135-98-8	5	NE	NE	220,000 ^(sat)	220,000 ^(sat)	See note 2	No	220,000	No
	Styrene	100-42-5	5	NE	NE	6,300,000 (sat)	36,000,000 (sat)	See note 2	No	6,300,000	No
	tert-Butylbenzene	98-06-6	5	NE	NE	390,000 ^(sat)	390,000 ^(sat)	See note 2	No	390,000	No
	Tetrachloroethene	127-18-4	5	NE	NE	550	2,600	See note 2	No	550	No
	Toluene	108-88-3	5	NE	NE	5,000,000 (sat)	45,000,000 (sat)	See note 2	No	5,000,000	No
	trans-1,2-Dichloroethene	156-60-5	5	NE	NE	150,000	690,000	See note 2	No	150,000	No
s1	trans-1,3-Dichloropropene	10061-02-6	5	NE	NE	1,700	8,100	See note 2	No	1,700	No

TABLE 3-5

Soil Analyte Comparison Table - Volatile Organic Compounds - SW8260B

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level [1] (µg/kg)	Does RL Exceed Screening Level?
	Analyte	CAS	QAPP RL (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)				
	Trichloroethene	79-01-6	5	NE	NE	2,800	14,000	See note 2	No	2,800	No
x	Trichlorofluoromethane (Freon 11)	75-69-4	5	NE	NE	790,000	3,400,000 (sat)	See note 2	No	790,000	No
	Vinyl chloride	75-01-4	5	NE	NE	60	1,700	See note 2	No	60	No
	Xylenes, total	1330-20-7	15	NE	NE	630,000 (sat)	2,700,000 (sat)	See note 2	No	630,000	No

Notes:

All soil samples are reported in dry weight unless otherwise specified.

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] ECVs to be calculated as needed based on analytical results from Part A Phase 1 soil sampling.

QAPP RL = quality assurance procedures plan reporting limit

DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)

µg/kg = micrograms per kilogram

SL = USEPA regional screening level, (USEPA, December 2009)

s1 = 1,3-dichloropropene is used as a surrogate

s2 = 1,2-dichloropropane is used as a surrogate

s3 = isoproylbenzene is used as a surrogate

s4 = bromodichloromethane is used as a surrogate

s5 = m-xylene is used as a surrogate

* = California modified preliminary remediation goal (USEPA, 2004)

x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)

NE = regulatory standard not established

(sat) = concentration may exceed saturated value

^(sat) = preliminary remediation goal, (UPEPA 2004); saturation concentration, not a risk based value

^ = preliminary remediation goal, (UPEPA 2004)

USEPA = United States Environmental Protection Agency

TABLE 3-6
Soil Analyte Comparison Table - Pesticides – SW8081A
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (µg/kg)	DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level[1] (µg/kg)	Does RL Exceed Screening Level?
				Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)				
	4,4-DDD	72-54-8	4	2,300	9,000	2,000	7,200	2.1	Yes	2.1	Yes
	4,4-DDE	72-55-9	4	1,600	6,300	1,400	5,100	2.1	Yes	2.1	Yes
	4,4-DDT	50-29-3	4	1,600	6,300	1,700	7,000	2.1	Yes	2.1	Yes
	Aldrin	309-00-2	4	33	130	29	100	See note 2	No	33	No
	alpha-BHC	319-84-6	4	NE	NE	77	270	See note 2	No	77	No
s1	alpha-Chlordane	5103-71-9	4	430	1,700	1,600	6,500	470	No	430	No
	beta-BHC	319-85-7	4	NE	NE	270	960	See note 2	No	270	No
	delta-BHC	319-84-8	4	NE	NE	77	270	See note 2	No	77	No
	Dieldrin	60-57-1	4	35	130	30	110	5	No	5.0	No
s3	Endo sulfan I	959-98-8	4	NE	NE	370,000	3,700,000	See note 2	No	370,000	No
s3	Endo sulfan II	33213-65-9	4	NE	NE	370,000	3,700,000	See note 2	No	370,000	No
s3	Endosulfan sulfate	1031-07-8	4	NE	NE	370,000	3,700,000	See note 2	No	370,000	No
	Endrin	72-20-8	4	21,000	230,000	18,000	180,000	See note 2	No	21,000	No
s4	Endrin aldehyde	7421-93-4	4	21,000	230,000	18,000	180,000	See note 2	No	21,000	No
x s4	Endrin ketone	53494-70-5	4	21,000	230,000	18,000	180,000	See note 2	No	21,000	No
	gamma-BHC	58-89-9	4	500	2,000	520	2,100	See note 2	No	500	No
s1	gamma-Chlordane	5103-74-2	4	430	1,700	1,600	6,500	470	No	430	No
	Heptachlor	76-44-8	4	130	520	110	380	See note 2	No	130	No
	Heptachlor Epoxide	1024-57-3	4	NE	NE	53	190	See note 2	No	53	No
	Methoxy chlor	72-43-5	20	340,000	3,800,000	310,000	3,100,000	See note 2	No	340,000	No
	Toxaphene	8001-35-2	100	460	1,800	440	1,600	See note 2	No	460	No

Notes:

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] ECVs were calculated as needed for constituents detected during the Part A Phase 1 sampling.

QAPP RL = quality assurance procedures plan reporting limit
DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)
SL = USEPA regional screening level, (USEPA, December 2009)
µg/kg = micrograms per kilogram
x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)
s1 = chlordane is used as a surrogate
s2 = alpha BHC is used as a surrogate
s3 = endolsulfan is used as a surrogate
s4 = endrin is used as a surrogate
NE = regulatory standard not established
USEPA = United States Environmental Protection Agency

TABLE 3-7

Soil Analyte Comparison Table - Polychlorinated Biphenyls - SW8082

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (µg/kg)	DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level [1] (µg/kg)	Does RL Exceed Screening Level?
				Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)				
	Aroclor 1016	12674-11-2	50	89	300	3,900	21,000	See note 2	No	3900	No
	Aroclor 1221	11104-28-2	50	89	300	140	540	See note 2	No	140	No
	Aroclor 1232	11141-16-5	50	89	300	140	540	See note 2	No	140	No
	Aroclor 1242	53469-21-9	50	89	300	220	740	See note 2	No	220	No
	Aroclor 1248	12672-29-6	50	89	300	220	740	See note 2	No	220	No
	Aroclor 1254	11097-69-1	50	89	300	220	740	See note 2	No	220	No
	Aroclor 1260	11096-82-5	50	89	300	220	740	See note 2	No	220	No
x s	Aroclor 1262	37324-23-5	50	89	300	220	740	See note 2	No	220	No
x s	Aroclor 1268	11100-14-4	50	89	300	220	740	See note 2	No	220	No
	Total PCBs	PCBT	50	NE	NE	NE	NE	204	No	204	No

Notes:

[1] Interim screening level is the USEPA residential regional screening level.

[2] ECVs to be calculated as needed based on analytical results from Part A Phase 1 soil sampling.

QAPP RL = quality assurance procedures plan reporting limit

DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)

SL = USEPA regional screening level, (USEPA, December 2009)

µg/kg = micrograms per kilogram

NE = not established

s = PCB 1260 is used as a surrogate

x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)

TABLE 3-8

Soil Analyte Comparison Table - Total Petroleum Hydrocarbons - SW8015M

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Analyte	CAS	QAPP RL (mg/kg)	RWQCB ESL (mg/kg)	Interim Screening Level [1] (mg/kg)	Does RL Exceed Screening Level?
TPH as diesel	NA	10	540	540	No
TPH as gasoline	NA	1	540	540	No
TPH as motor oil	NA	10	1,800	1,800	No

Notes:

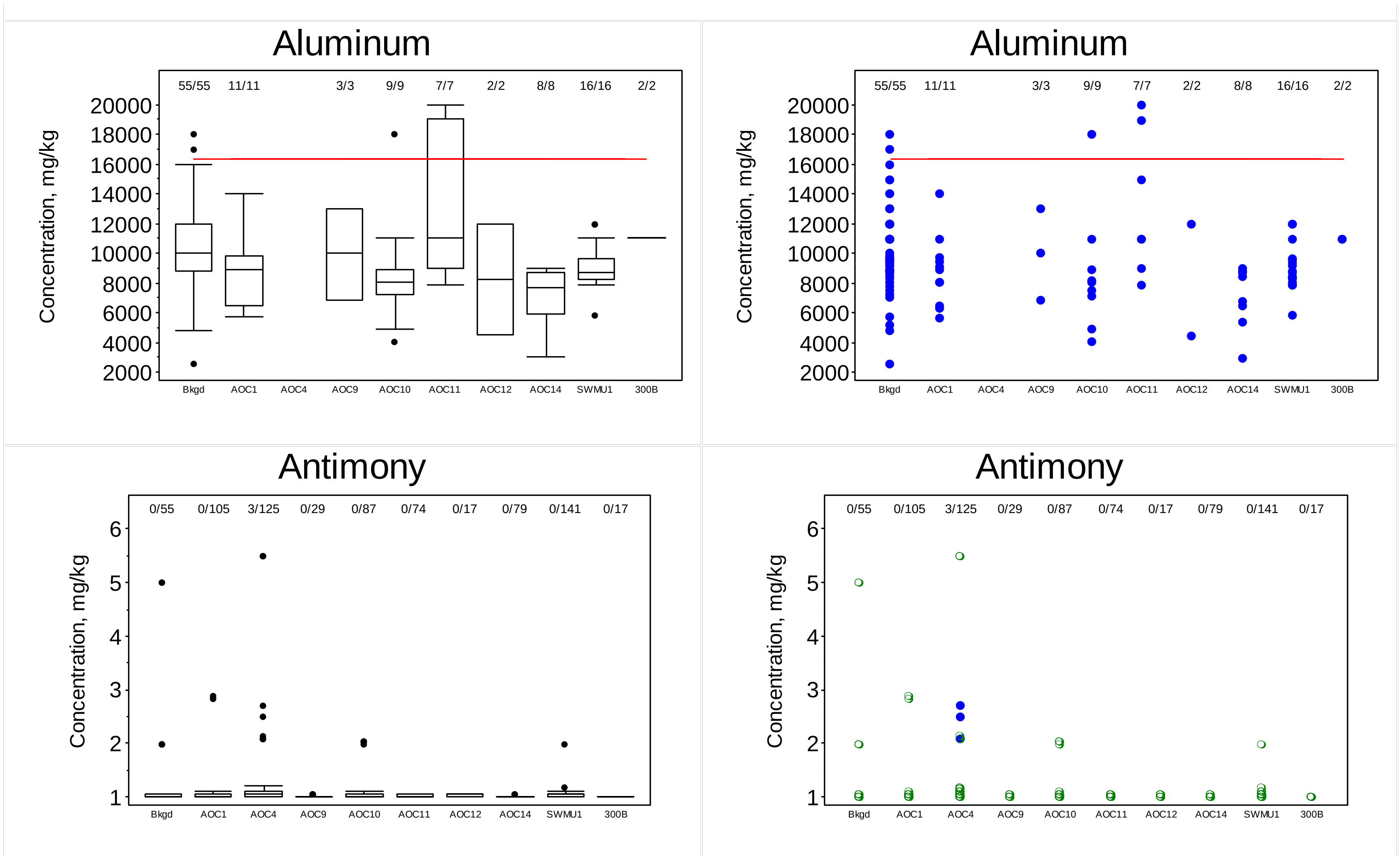
[1] Interim screening level is the Regional Water Quality Control Board environmental screening level.

QAPP RL = quality assurance procedures plan reporting limit

RWQCB ESL = "San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27, 2008

mg/kg = milligrams per kilogram

TPH = total petroleum hydrocarbons



LEGEND

AOC = Area of Concern
Bkgd = Background
SWMU = Solid Waste Management Unit
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value
◯ Identified outliers
— Background threshold value (when defined)

FIGURE 3-1
CENTRAL TENDENCY COMPARISON BOX AND WHISKER / SCATTER PLOTS BY SITE

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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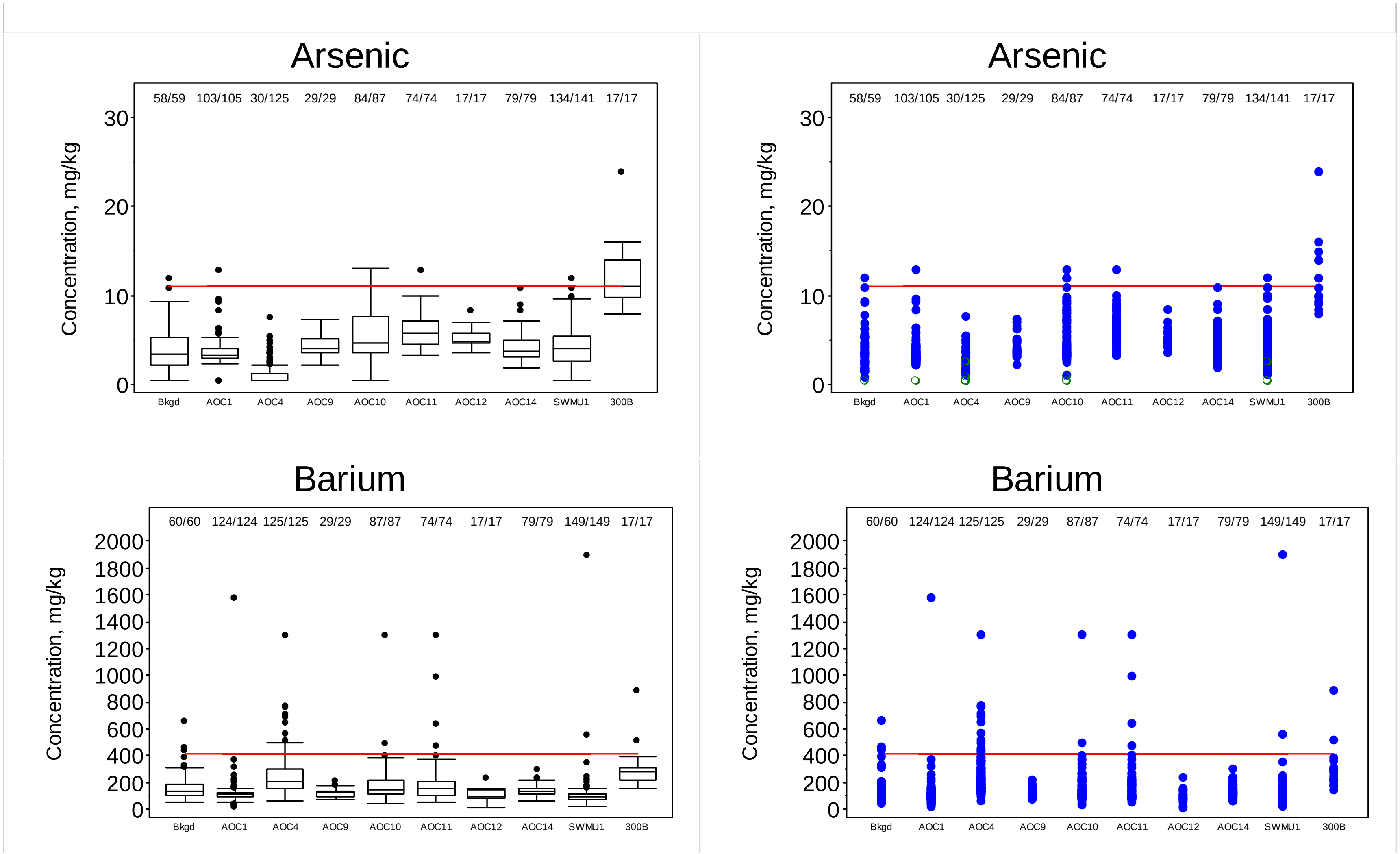

LEGEND

AOC = Area of Concern
Bkgd = Background
SWMU = Solid Waste Management Unit
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
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◯ Identified outliers
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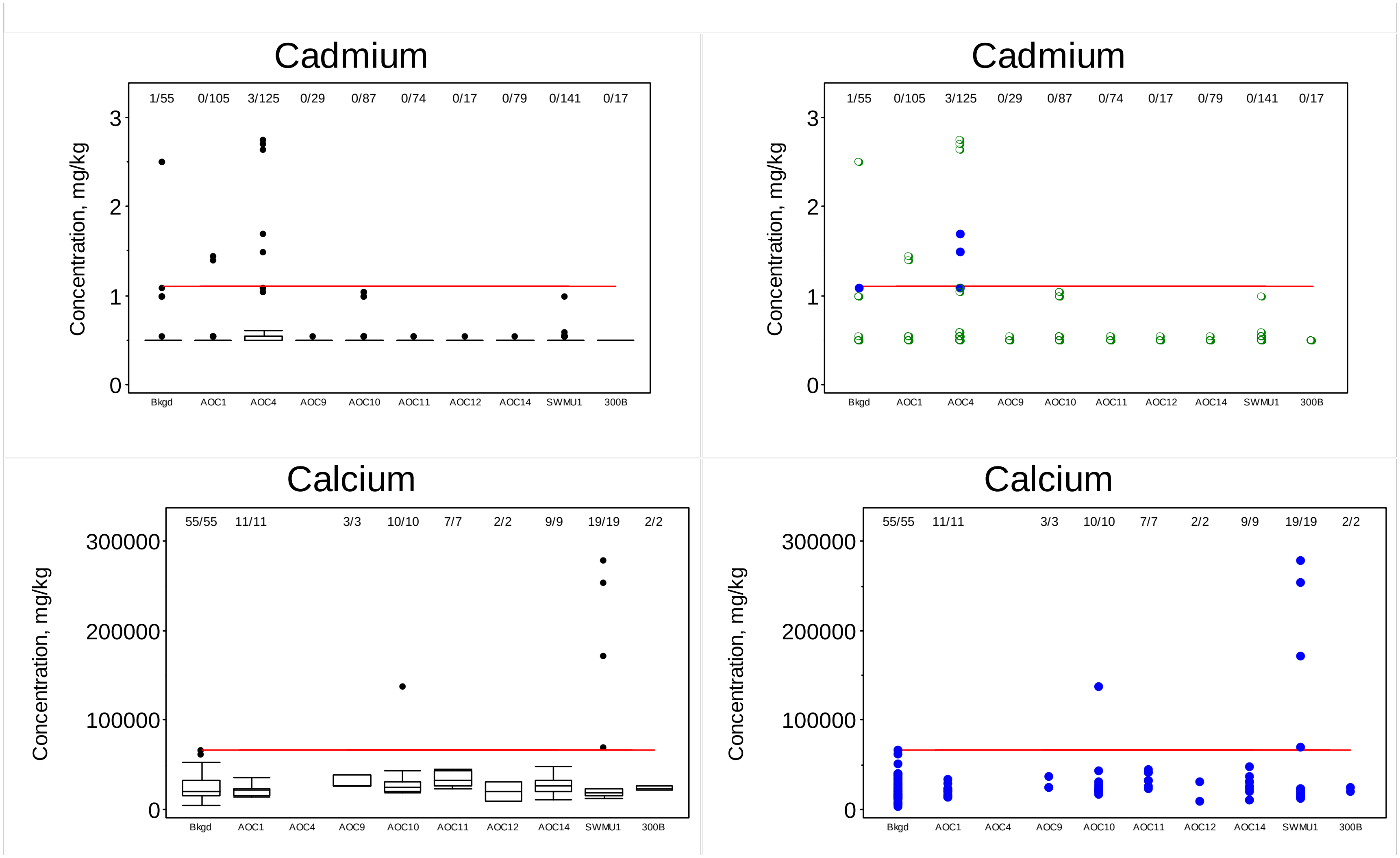
FIGURE 3-1
CENTRAL TENDENCY COMPARISON BOX AND WHISKER / SCATTER PLOTS BY SITE

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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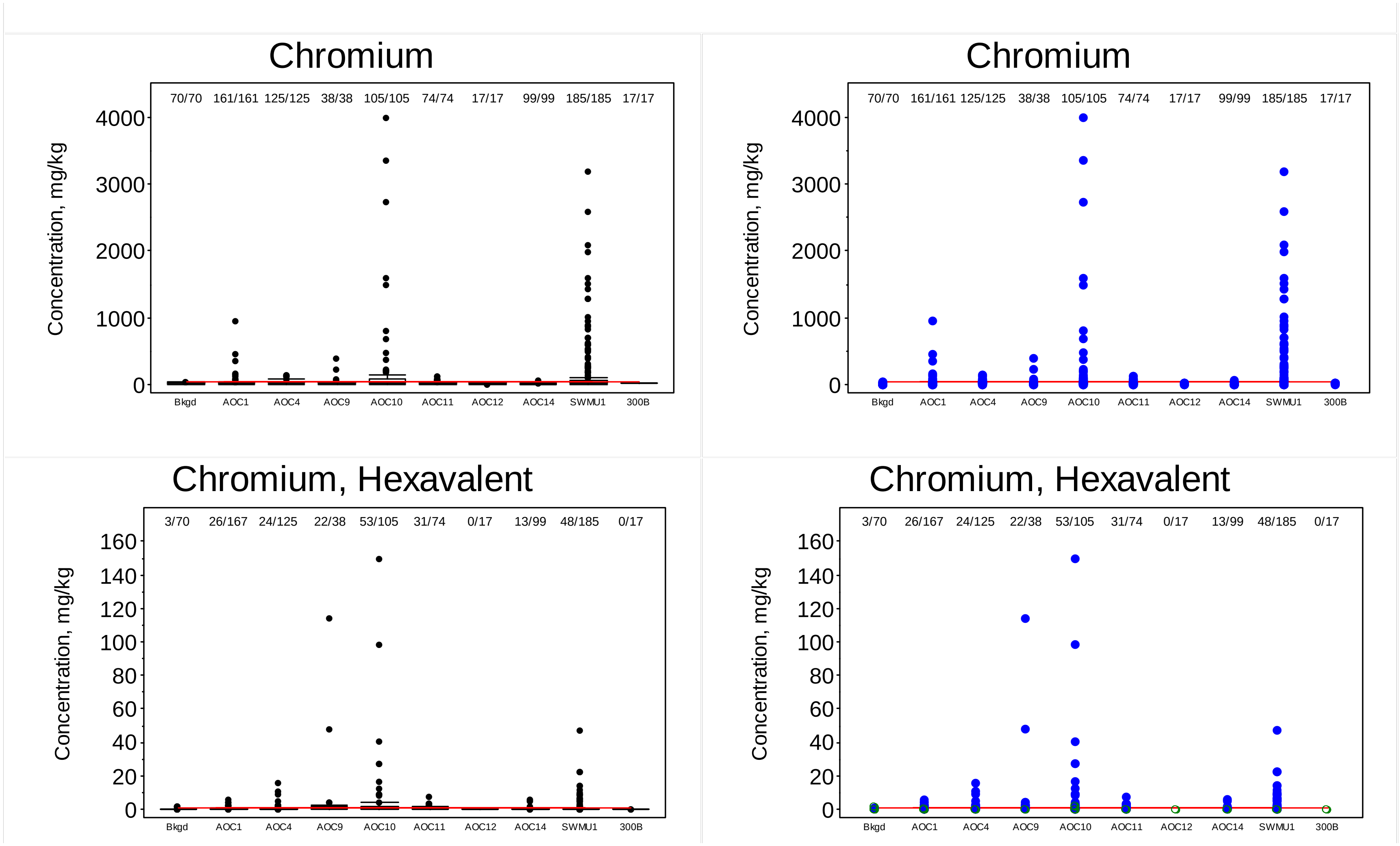

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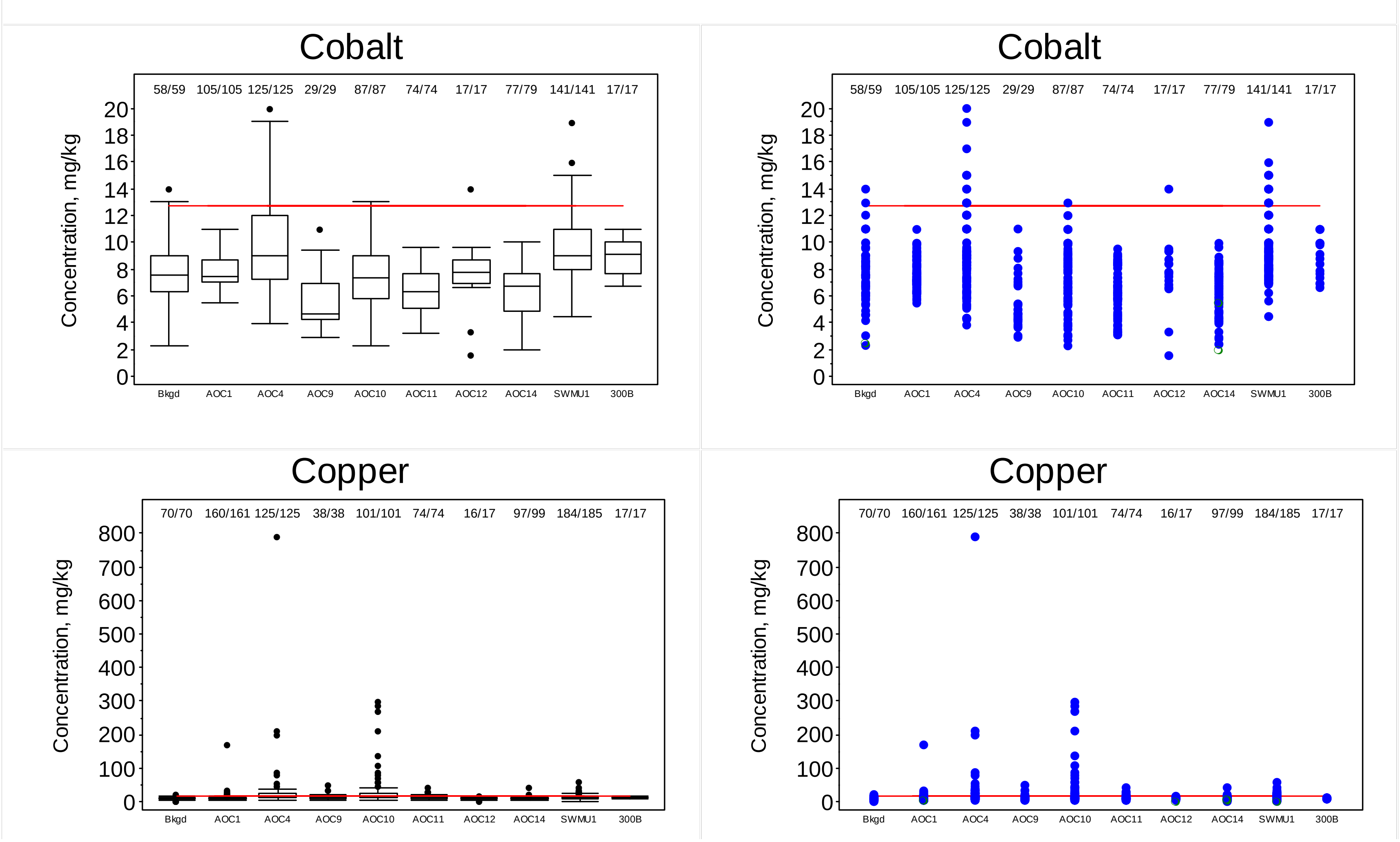

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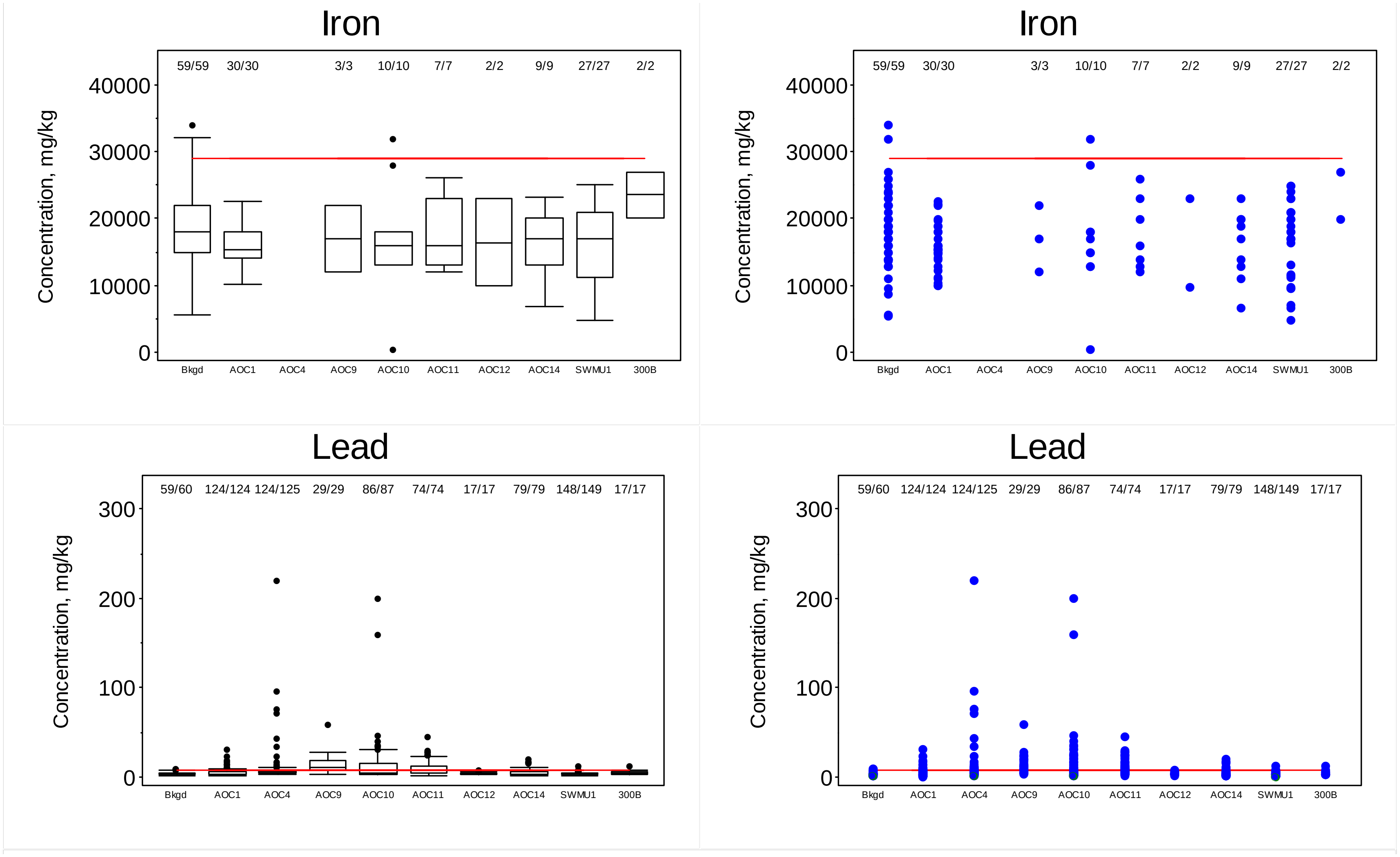

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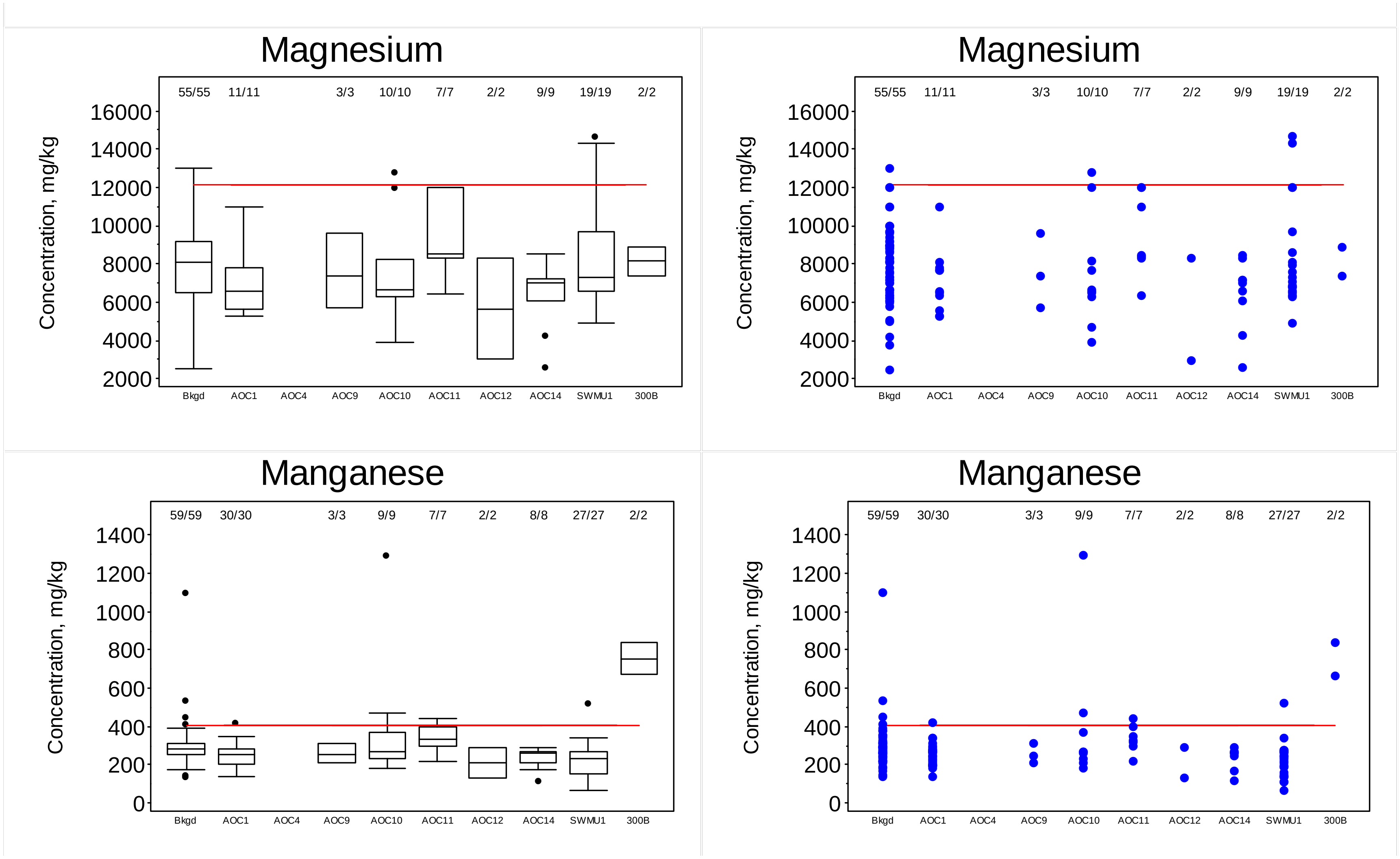

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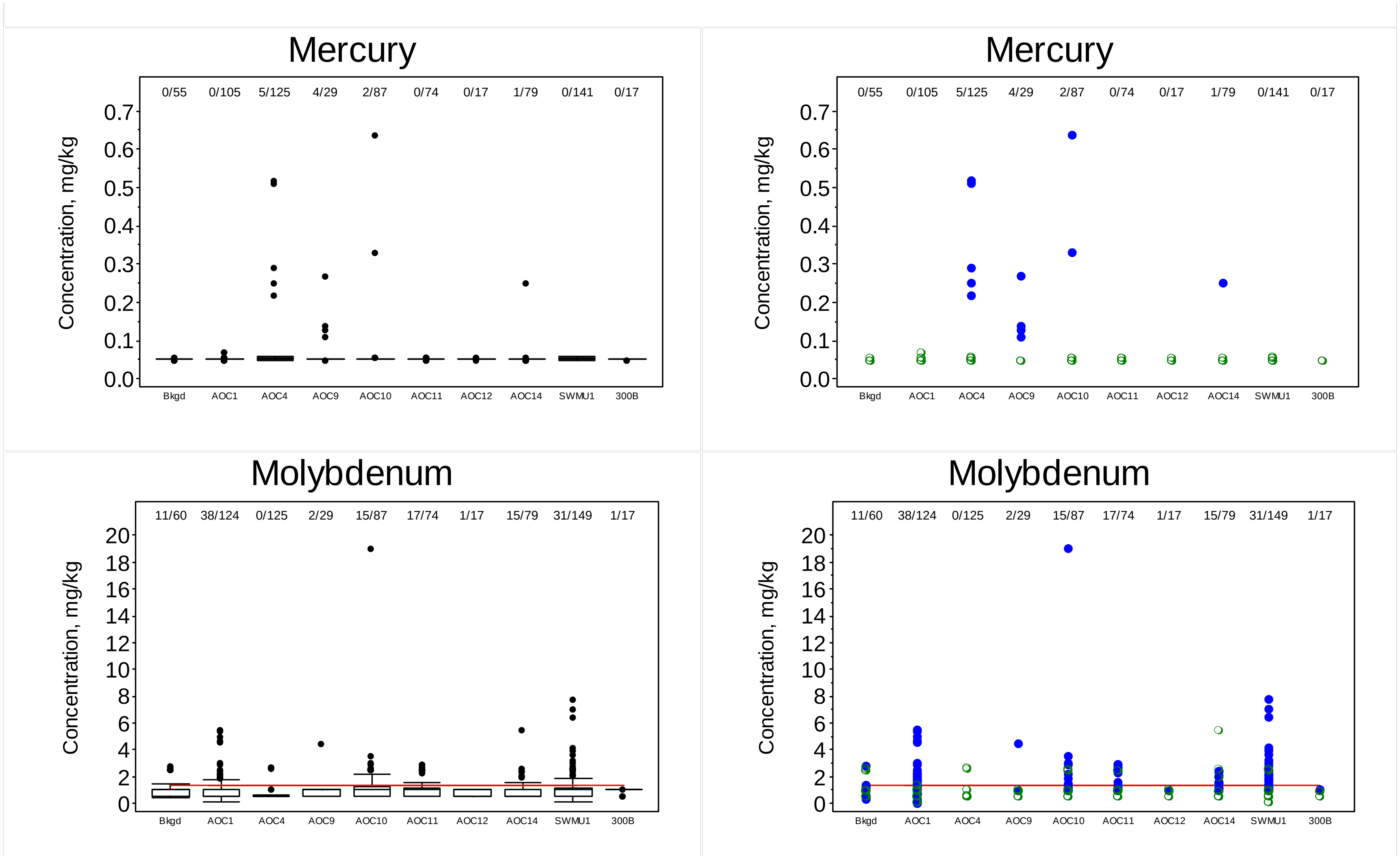

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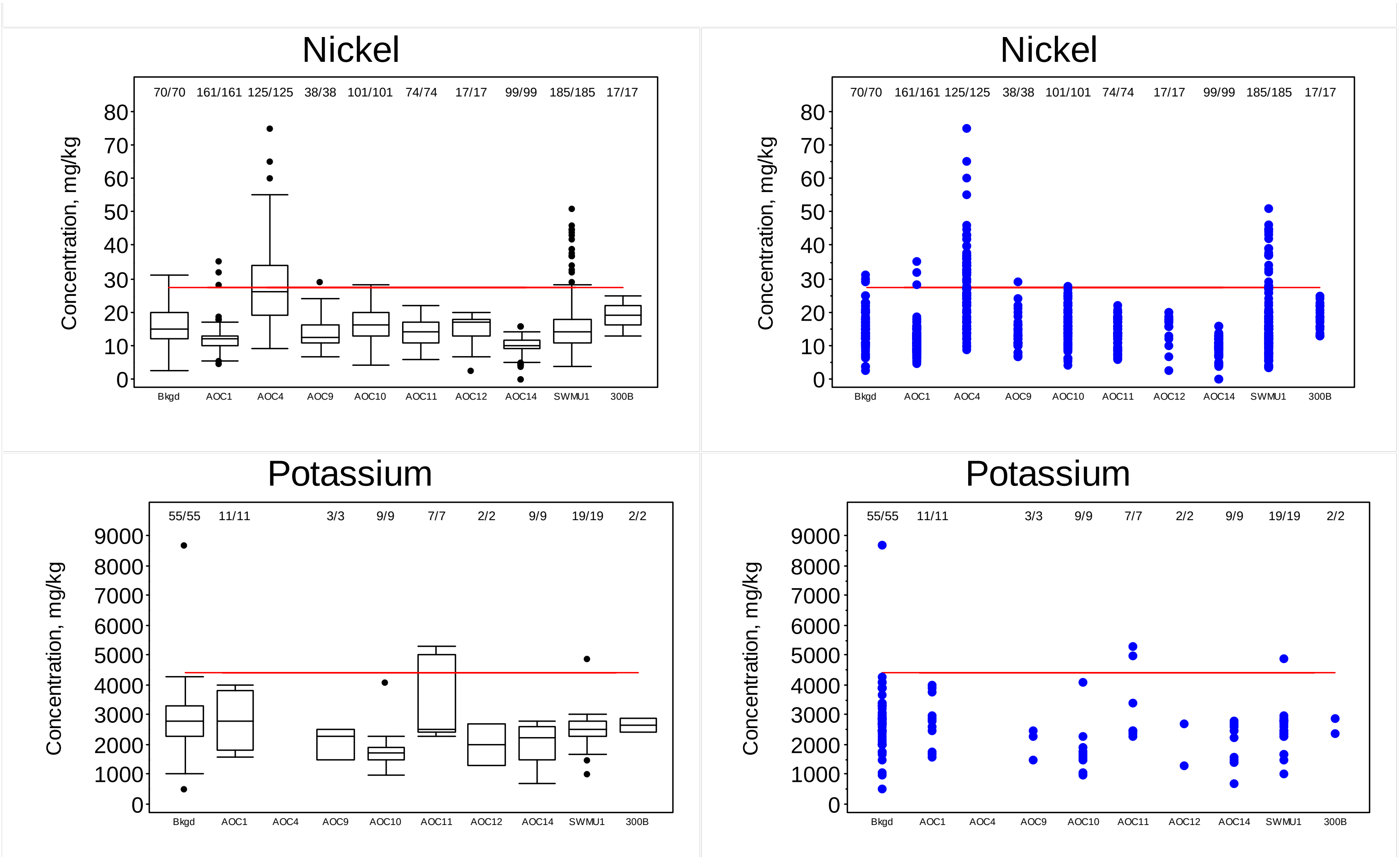

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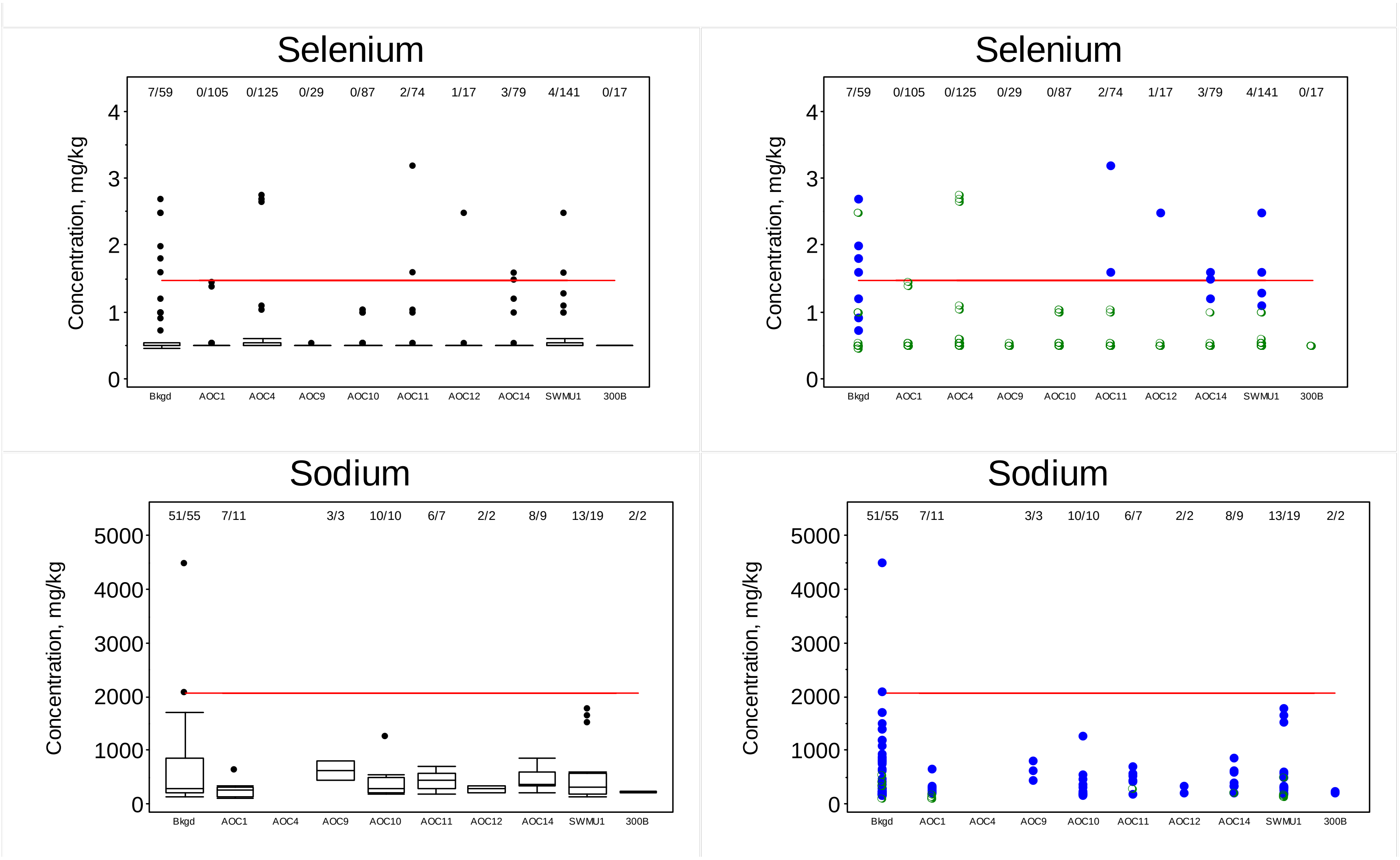

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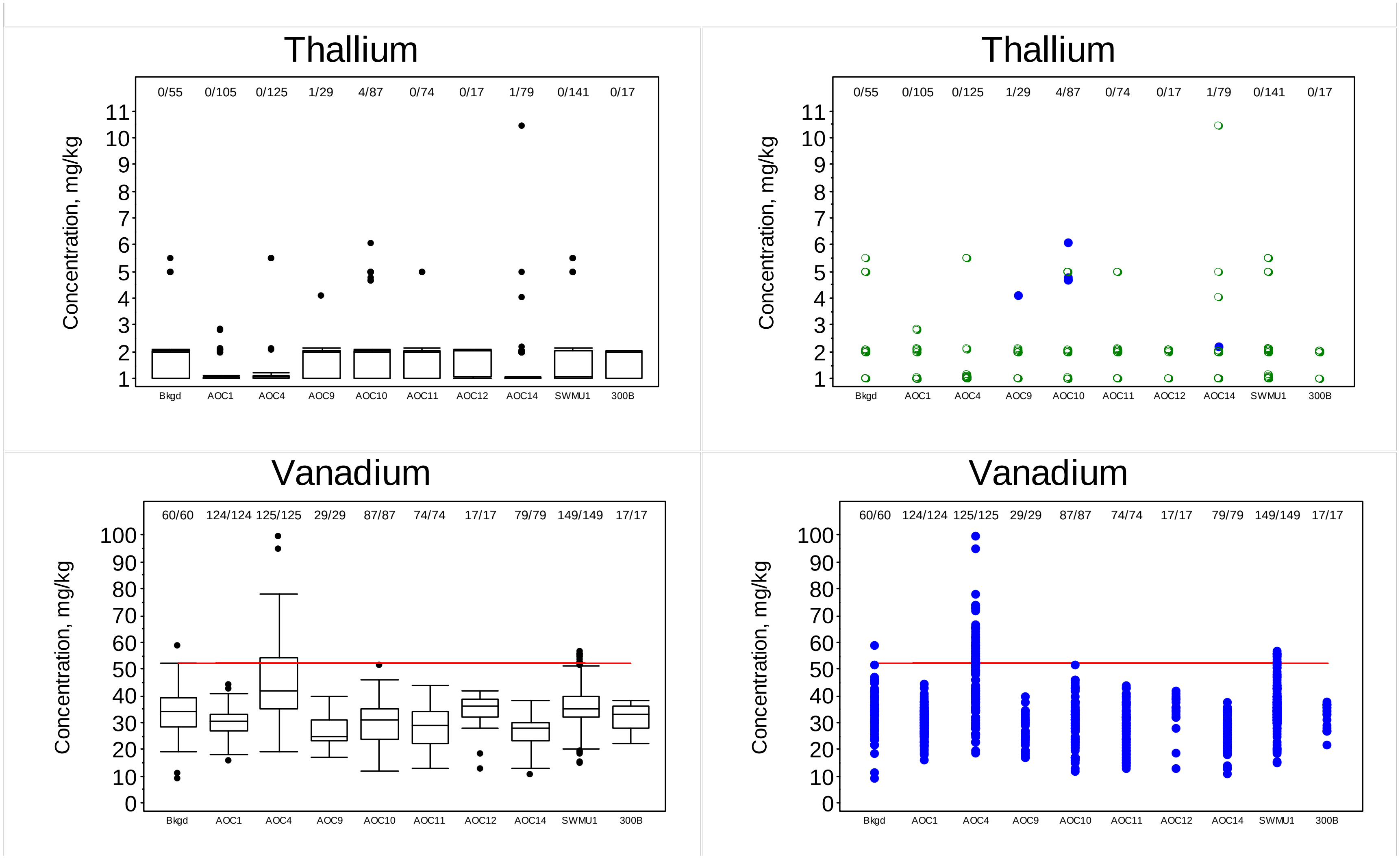

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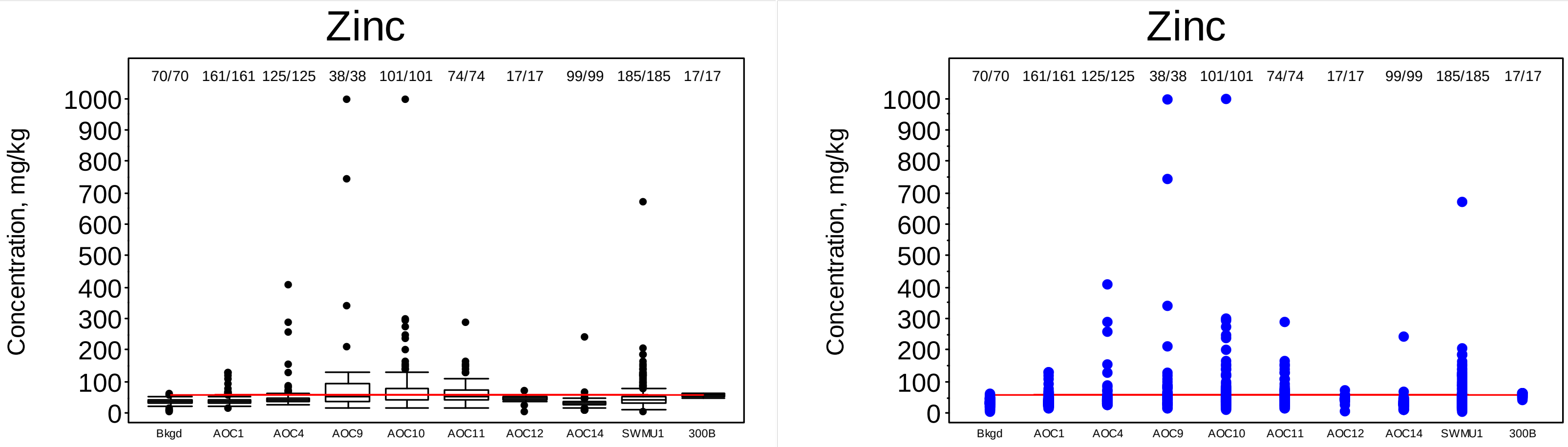

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4.0 Decision 2 – Data Sufficiency to Estimate Representative Exposure Point Concentrations

This section presents the process used to evaluate Decision 2 – Data Sufficiency to Calculate Exposure Point Concentrations at the Part A SWMU, AOCs, and UAs. Results of the Decision 2 – Data Sufficiency to Calculate Exposure Point Concentrations by individual unit, including proposed Phase 2 sample locations if recommended, are provided in the Appendix C sub-appendices.

4.1 Inputs to Decision 2

The inputs required for Decision 2 include COPC and COPEC concentrations in soil within the exposure areas and depth categories defined in the RAWP (ARCADIS, 2008a). In addition, COPEC concentrations in sediment were evaluated using the following preliminary ecological exposure intervals: 0 to 0.5 foot below sediment surface (bss), 0 to 2 feet bss, and 0 to 3 feet bss. Only COPC and COPEC data meeting data quality Category 1 standards will be used for the risk assessment. A Data Usability Matrix for Soil Risk Assessment was developed to aid in evaluating data usability and adequacy for risk assessment purposes and was used as a Decision 2 input tool (the matrix is provided in Appendix A, Table A-1). The matrix lists the total number of existing and newly collected samples per AOC and sub-AOC areas, identifying horizontal and vertical coverage, exposure depths as defined in the RAWP, analytical suites, data quality, representativeness, and comparability. The inputs to Decision 2 also include comparison values described in Section 3.1.3.

4.2 Data Sufficiency to Estimate Representative Exposure Point Concentrations Evaluation

Existing soil and sediment data were evaluated for sufficiency to estimate a representative EPC by:

- Detected compound
- SWMU, AOCs, or UA
- Exposure depth interval

The evaluation assumes the existing data adequately represent the nature and extent of contamination; this assumption will be verified after Phase 2 data have been collected. Additional sampling was recommended if data were insufficient estimate a representative EPC for any constituent in any defined exposure interval at each unit. The technical approach used to evaluate the data to address Decision 2 is described below.

All soil Category 1 data were evaluated for each of the exposure intervals defined in the RAWP (ARCADIS, 2008a) and RAWP Addendum (ARCADIS, 2009a) for potential contact by both human populations and ecological receptors. In addition, as stated above, Category 1 data from sediment were evaluated using the following preliminary ecological exposure intervals: 0 to 0.5 foot bss, 0 to 2 feet bss, and 0 to 3 feet bss. The sediment exposure area defined for this evaluation extends from the east margin of the Tamarisk thicket near the mouth of Bat Cave Wash to the easternmost end of the wash. Samples from both the west and east side of National Trails Highway at the mouth of Bat Cave Wash were included. Data for each detected compound in each AOC-specific exposure interval were evaluated for:

- Frequency of detection.
- Maximum result.
- Number of detections above comparison values.
- Human health comparison values—residential criteria or background, whichever is higher.
- Soil ECVs previously submitted in technical memoranda (ARCADIS, 2008b 2009a-b) or background, whichever is higher.
- Sediment TECs from MacDonald, et. al. (2000) or soil background (as a conservative estimate of sediment background) if sediment TECs are not available.

Frequency of detections and maximum results were evaluated to understand whether the minimum data necessary are available to calculate a representative EPC to be used in the human and ecological risk assessment. A representative EPC could be either: (1) a 95 percent upper confidence limit of the mean (95%UCL) where at least eight results were reported with a minimum of five detections or (2) the maximum concentration reported, if data were not adequate for a 95%UCL and the following criteria were met:

- The maximum was less than or equal to approximately two times the comparison value for human health or ecological risk screening, and/or
- Additional data collection appeared unlikely to yield additional detections to support the calculation of a 95%UCL.

The Appendix C sub-appendices present data tables that summarize key information for each detected COPC/COPEC in each unit. For each detected COPC/COPEC, the tables in Appendix C indicate, for each relevant exposure depth interval, the total number of samples collected, the number of detections, the maximum detected value, and whether there is sufficient information to calculate a representative EPC for that particular COPC/COPEC at that particular unit.

As described in detail in Appendix C, in general the soil and sediment data for each COPC/COPEC detected at the individual units are adequate to support the calculation of an EPC for use in the human health and ecological risk assessment.

5.0 Decision 3 – Threat to Groundwater from Residual Soil Concentrations

This section presents the inputs and process used to evaluate Decision 3 – Threat to Groundwater from Residual Soil Concentrations at the Part A SWMU, AOCs, and UAs. Results of the Decision 3 evaluation, including proposed Phase 2 sample locations if recommended, are provided in Appendix C.

5.1 Inputs to Decision 3

The inputs required for Decision 3 consist of the nature and extent of soil data from Decision 1, site-specific information required to calculate SSLs protective of groundwater, and screening-level groundwater modeling results, where necessary.

Existing and new soil data provide information on the nature and extent of COPCs. Key site-specific information required to calculate the SSLs include:

- Soil BTVs for metals and inorganic compounds, discussed in the *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2009a) and in Appendix E to this report.
- Groundwater background values for inorganics, calculated as 95 percent upper tolerance limits and presented in *Groundwater Background Study Steps 3 and 4: Revised Final Report of Results, PG&E Topock Compressor Station* (CH2M HILL, 2009b). For organics, groundwater maximum contaminant levels and/or applicable drinking water standards were used.
- Volume and cross-sectional area of the potential source (i.e., unit or area).
- Site-specific recharge and groundwater flow characteristics at each unit.
- Depth to groundwater, geochemical, and hydraulic characteristics of the vadose zone soil.

Inputs required for the screening-level groundwater modeling are the same as those for the SSL calculation, with the addition of transport parameters (dispersion, soil-water partition coefficients). USEPA literature and other technical literature served as the source for these parameters (USEPA, 2005; Xu M. and Y. Eckstein, 1995).

5.2 Threat to Groundwater from Residual Soil Concentrations Evaluation

A preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, is needed to resolve Decision 3. Data collected to satisfy Decision 1 – Nature and

Extent Evaluation – will provide the representative data set that will be used to assess the threat to groundwater. Additional evaluations will be performed as appropriate as data are collected to resolve Decision 1.

A conservative, three-tiered approach was used in the evaluation to assess which units may present a potential current or future threat to groundwater from COPCs in the vadose zone. The approach was presented in technical memorandum entitled *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station* (CH2M HILL, 2008d) and includes:

- **Step 1.** The initial step in the evaluation process was to compare the metals concentrations in soil samples from each investigation area to the soil BTV to assess whether the concentrations are at or below background. If no individual COPC concentration from samples collected within a unit is greater than the BTV, or if the central tendency comparison evaluation concluded the COPC concentration in the sample population within a unit is not statistically greater than the COPC concentration in the background population, then no further analysis was required to assess the potential for leaching into groundwater for that COPC within the unit. This evaluation was completed for all metals detected in a given unit. If the deepest sample(s) in a boring or area exceeded the BTV, a data gap may have been identified for Decision 3.[1]

  Because organic compounds (polychlorinated biphenyls, pesticides, volatile organic compounds, semivolatile organic compounds) do not have a soil BTV to compare to, all organic compounds were evaluated in Step 3 (see detailed discussion in Appendix C).

- **Step 2.** For detected COPCs with concentrations above BTVs, the detected concentrations were compared to the unit-specific SSL. The SSLs were calculated in accordance with USEPA (1996) and New Mexico Environment Department (2006) guidance, among others. A detailed example SSL calculation was provided in the technical memorandum entitled *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station* (CH2M HILL, 2008d). The SSLs were calculated using highly conservative assumptions so that COPCs that are eliminated from further consideration in this step are eliminated with high confidence. If sample concentrations are at or below the SSL, then no further analysis is required to assess the potential for leaching into groundwater for those COPCs.

  If samples concentrations were above SSLs, the data were evaluated to assess whether the sample results indicated a potential current threat to groundwater. A potential current threat to groundwater was identified if one or both of the following conditions existed:

  - Vertical concentration trends of COPC increased with depth.
  - Soil data indicated elevated concentrations of compounds (as compared to the BTVs) in samples throughout the boring <u>*and*</u> at the depth of the soil/groundwater interface.

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[1] Note that this may also represent a data gap for Decision 1. However, if concentrations are declining with depth and/or the concentration detected in the lowest sample collected is near the BTV, the available data may be considered adequate for Decision 1.

If the evaluation did not indicate a potential current threat to groundwater, then the evaluation continued with Step 3.

- **Step 3.** If sample concentrations exceeded the SSL but did not indicate a potential current threat to groundwater, a vadose zone flow and transport model was used to evaluate the potential for leaching into groundwater. Modeling was performed using the HYDRUS-1D software package (Simunek et al., 1998) and is intended as a screening process using highly conservative assumptions. If the modeling results showed no exceedance of the groundwater background values, then no further evaluation was required. If the modeling results showed a COPC in groundwater at a concentration exceeding groundwater background values, the need for model refinement and possible additional data collection and/or development of a plan for a groundwater assessment was evaluated

The Step 3 modeling approach, model inputs, and assumptions provided in Appendix C. Results of the modeling evaluation, and data gaps identified with regard to Decision 3 are discussed in detail in the Appendix C sub-appendices.

Additional modeling and model refinement, if needed, will be performed after new Phase 2 soil data are collected.

6.0 Decision 4 – Data Sufficiency to Support Corrective Measures Study/Feasibility Study

6.1 Inputs to Decision 4

Inputs to Decision 4 consist of soil property and contaminant distribution data (validated Phase 1 data and existing Category 1 data) and other information needed to support the CMS/FS decisions and remedial design. Inputs to Decision 4 include volumes of debris; specific soil physical and chemical properties that could influence the performance of certain remedial technologies (e.g., porosity, grain size, density, organic carbon content, soil chemical properties); waste characterization parameters for any soils that may need to be transported and disposed of offsite; and potential physical limitations on implementation of various technologies (surface or subsurface structures).

6.2 Data Sufficiency to Support Corrective Measures Study/Feasibility Study Evaluation

A preliminary assessment of potential remedial technologies and presumptive remedies guided identification of the data needs to support the CMS/FS and remedial design. An initial list of suitable remedial technologies was presented in the approved *Final Corrective Measures/Feasibility Study Work Plan, Topock Compressor Station, Needles, California* (CH2M HILL, 2008e), referred to as the CMS/FS Work Plan. The following is a summary of the initial technologies presented in the CMS/FS Work Plan:

- **Excavation and Offsite Disposal:** involves excavation, transportation, and disposal of contaminated material from the Topock site to a permitted offsite disposal facility. Pretreatment may be required to meet disposal requirements of the offsite facility.
- **Excavation and Onsite Treatment:** is an *ex-situ* method that involves excavation of contaminated soil and treatment onsite by either soil washing or chemical reduction.
- **Soil Flushing:** is an *in-situ* method that involves application of water or additive-containing water to soil to enhance contaminant solubility. Soil flushing is used in combination with a groundwater remedial method. Contaminants are leached from soil into the groundwater, which is then remediated.
- **Solidification/Stabilization:** can be either *ex-situ* or *in-situ* and involves use of various chemical additives to physically bind or enclose contaminants within a stabilized mass (solidification) or to chemically reduce the contaminants' mobility by inducing chemical reaction between the stabilizing agent and the contaminants (stabilization).
- ***In-Situ* Chemical Reduction:** involves addition of reagents to react with targeted constituents in soil to chemically convert hazardous contaminants to non-hazardous or

less toxic compounds that are more stable, less mobile, and/or inert. Reductants could be applied to soil by infiltrating a liquid reductant from the surface, injecting a liquid reductant through wells, or injecting a gaseous reductant through wells.

- **Phytoremediation**: involves planting vegetation on contaminated soils. Contaminants are removed from soil through geochemical reactions in the root zone or through uptake by the roots and incorporation into the plant tissue. If contaminants become incorporated into the plants, the plant material may be periodically harvested and removed to a hazardous waste disposal facility. Phytoremediation is generally effective only for contaminants that are soluble in water and located at shallow depths that can be reached by the plant roots, or in combination with other measures, where it is used to reduce the amount of surface water infiltration to a deeper contaminated zone or to lower local groundwater levels to prevent contact with contaminated soils.
- **Capping in Place:** involves construction of a capping system on top of the contaminated area to contain and minimize exposure of the contaminants to the environment.
- **Soil Vapor Extraction:** involves application of a vacuum through a network of wells to remove contaminated vapor from the soil. Volatile contaminants are removed with the vapor stream. A treatment system is typically incorporated to remove the contaminants before the soil vapor is vented to the atmosphere.
- **Thermal Desorption:** involves heating the subsurface to accelerate the movement of contaminants from the soil into the soil vapor. It is typically combined with soil vapor extraction to remove the contaminants from the subsurface. By heating the subsurface, soil vapor extraction can be used for a wider range of contaminants with lower volatility. Heating can also speed up the removal of volatile contaminants, particularly if contaminants are present in the form of non-aqueous phase liquids. Heating can be accomplished by injection of hot air or steam, or through use of electric current.
- ***In-situ* Vitrification**: involves intensive heating of the subsurface to completely melt the soil, which then cools into a glassy, vitrified block. Most organic contaminants are driven off or broken down during the heating. Inorganic contaminants are driven off or incorporated into the vitrified block and sequestered from the surrounding soil or groundwater.
- **Incineration:** involves burning excavated soil at high temperatures in a kiln or furnace. Incinerators are carefully designed to capture and treat the gases generated during combustion. Due to difficulties in permitting incinerators, most incineration is accomplished in offsite hazardous waste treatment facilities rather than with onsite incinerators. Depending on the contaminants present, the ash remaining may require disposal as a hazardous waste.

Treatability studies to collect data on technologies identified during the alternative development process are conducted, as appropriate, to provide additional information for evaluating technologies during the preparation of the CMS/FS.

The evaluation of data sufficiency to support the CMS/FS (i.e., data requirements for the initial list of suitable remedial technologies listed above) was conducted by assessing the following for each individual unit:

- Lateral and vertical extents of COPCs and COPECs potentially posing an excess human health and/or ecological risk. The lateral and vertical extent information will be used to estimate required remediation volumes to determine the most appropriate and cost-effective remedial approach for each area potentially requiring remediation. This step cannot be completed until the baseline risk assessment is completed; however, if the nature and extent of contamination are sufficiently defined to satisfy Decision 1, sufficient data would be expected to be available to allow the completion of this portion of the evaluation for Decision 4 once the risk assessment has been completed.
- Waste characterization parameters for any soils that may be transported offsite for disposal (i.e., total threshold limit concentrations [TTLC], soluble threshold limit concentrations [STLC], and toxicity characteristic leaching procedure [TCLP]). The TTLC and STLC are waste characterization criteria in the State of California. The TTLC simply requires standard chemical analysis of samples to determine total concentrations of COPCs using published USEPA methods. The detected concentrations are compared to the TTLCs to determine whether total COPC concentrations exceed the hazardous waste criteria. Total chemical concentrations are also compared to a concentration of 10 times the STLC (10 x STLC) and 20 times the TCLP (20 x TCLP) to determine whether leachability testing is required to determine if leachable concentrations of COPCs may exceed hazardous waste criteria. To evaluate COPC leachability relative to the SLTC, samples are subjected to the Waste Extraction Test specified in the Title 26 of the California Code of Regulations. The TCLP determination is a federal criterion for RCRA waste; leachable concentrations of COPCs using the TCLP are compared to applicable RCRA criteria. The Waste Extraction Test uses a tenfold dilution/extraction of the sample, and the TCLP uses a twentyfold dilution/extraction. Consequently, total sample concentrations below 10 times STLC and 20 times TLCP cannot exceed the applicable hazardous waste criteria.
- Specific soil physical properties that may affect the performance of the various technologies (i.e., porosity, grain size, density, organic carbon content). Table 6-1 provides specific soil physical properties that are needed for applicable remedial technologies.
- Existing surface and subsurface features (i.e., vegetation, nearby roads and road structures, culverts, subsurface utilities, bedrock, topography) that may affect the implementability of various technologies.
- White powder and debris mapping to estimate the extent, volumes, and type of debris. This information will be used to estimate required removal and/or remediation volumes to determine the most appropriate and cost-effective approach for each area containing white powder or debris.

The evaluation of data sufficiency to support the CMS/FS for each area was completed by evaluating the data summary for Decision 1 (presented in Appendix C) and by comparing the available data to the list presented above and in Table 6-1 to determine if any data gaps exist. The data gaps and additional sampling recommendations for each unit are included in the Appendix C sub-appendices.

TABLE 6-1
Additional Data Needs by Applicable Remedial Technologies
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles, California

	Excavation and Offsite Treatment/ Disposal	**Excavation and Onsite Treatment**	**Soil Flushing**	**Solidification/ Stabilization**	***In-situ* Chemical Reduction**	**Phytoremediation**	**Capping in Place**
Waste Characterization, Offsite Disposal [a]	Yes	No	No	No	No	No	No
Soil Physical Properties	Soil Classification	pH Particle Size Distribution Soil Classification	pH Particle Size Distribution Soil Classification	pH Soil Classification	Alkalinity pH Cation Exchange Capacity Particle Size Distribution Soil Classification	Soil Texture	Soil Classification Relative Compaction Atterberg Limits

[a] Waste Characterization Parameters Include:

Total Threshold Limit Concentration (TTLC) – SW-846 6010B/7471A/7470A

Soluble Threshold Limit Concentration (STLC) – Title 22, Division 4.5, Chapter 11, Article 5, Appendix II, Waste Extraction Test (WET)

Toxicity Characteristic Leaching Procedure – for metals (TCLP) – SW-846 1311/SW-846 6010B/7470A

If organic compounds are suspected or “solvent like” odors are encountered additional analysis may be warranted. These may include but are not limited to or specifically required for any sample and will be determined on case by case bases.

- TCLP SW-846 1311 (organic)
- Reactivity - Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.23
- Ignitability - SW-846 1010/1020
- Corrosivity - SW-846 9040

7.0 Data Quality Objectives Steps 6 and 7

This section summarizes DQO Steps 6 and 7. The completed DQO Steps 1 through 7 for the 10 Part A SWMU, AOCs, and UAs included in this report are presented in Table 7-1.

7.1 Step 6: Acceptable Limits on Decision Error

Step 6 is intended to define acceptable limits on decision errors. A decision error would occur if, based on the available data, the project team chooses the wrong response action in the sense that a different response action would have been chosen if the project team had access "perfect data" or absolute truth. COPC concentrations are estimated using data that are subject to different variabilities at different stages of development, from field collection to sample analysis. The combination of all these errors is called "total study error." In some cases, total study error may lead to a decision error. Total study error is composed of two main components:

- **Sampling design error**. This error (variability) is influenced by the sample collection design, the number of samples, and the actual variability of the COPC concentration over space and time. Sampling must necessarily be limited to specific locations within a potentially impacted area, and this limited sampling may miss some features of the existing variation of the constituent concentration levels. Sampling design error occurs when the data collection design does not capture the complete variability within the media to the extent appropriate for the decision of interest.
- **Measurement error**. This error (variability) is influenced by imperfections in the measurement and analysis system. Random and systematic measurement errors may be introduced in the measurement process during physical sample collection, sample handling, sample preparation, sample analysis, and data reduction.

Potential decision errors can be evaluated quantitatively or qualitatively. For sites such as Topock, where the most appropriate sampling design is non-probabilistic, potential decision errors are evaluated qualitatively. Sample design errors are controlled through use of the CSM. Measurement error is controlled to an acceptable level by implementation of the Quality Assurance Project Plan and by rejection of data that do not meet the criteria specified in the Quality Assurance Project Plan.

Limits on decision error for the Part A soil investigation were reduced by ensuring with the highest level of confidence feasible that the Part A soil investigation sample locations were located in the appropriate areas. Appropriate areas consist of areas with known impacts or areas likely to have been impacted. These areas were identified based on site history information and current site conditions (i.e., to identify the release point) and transport pathways (to identify likely contaminant locations). Site-specific CSMs were developed for each of the SWMU, AOCs, and UAs to assess whether or not the Part A soil investigation samples are located in the areas of impact or likely to have been impacted. During the development of the CSMs and completion of Step 6, uncertainties at each individual unit were assessed for:

- Source of contamination, including release point.
- Potential release mechanisms and transport pathways.
- Topographic conditions and constraints.

Site-specific CSMs are presented in Appendix C. The completed DQO Step 6 for the AOCs included in this report are presented in Table 7-1.

7.1.1 Step 7: Optimize the Sampling Design for Obtaining Data

The purpose of Step 7 is to "identify a resource-effective data collection design for generating data that are expected to satisfy the DQOs" (USEPA, 2000) in the context of site-specific constraints. The output of this step is the Phase 2 sampling design discussed with the stakeholders during the Part A Phase 1 data gaps evaluation process. This step documents the applicable activities of the sample design process to describe the reasons for selecting a sampling scheme, the reasons for selecting specific sampling locations, and the expected performance of the data collection design with respect to qualitative DQOs only, as was done for the Part A Phase 1 soil investigation.

Phase 2 sample locations were chosen to address specific data gaps identified based on specific DQO rules. The Phase 2 locations also reflect input from stakeholders during the two-day workshops and the joint DTSC and DOI February 2011 direction letter. In order to reduce the number of samples and disturbances to sensitive cultural resources, DOI and DTSC evaluated each originally proposed Phase 2 sample location to determine which, if any, sample locations could be eliminated. Approximately 50 sample locations were eliminated based on the following assumptions:

- Defining edges or detailed distribution of contamination in the wash channels is not necessary for technology assessment or risk evaluation. It is assumed that known contaminant concentrations measured at previous sample points extend between the points and to the wash boundaries.

- It is unlikely that significantly higher concentrations of contaminants exist in the areas that have not been sampled.

- It is unlikely that different types of contaminants exist in the areas that have not been sampled.

- Where vertical extent of contamination is defined, sufficient data are available to support modeling.

The Soil Part A Phase 2 proposed sample locations shown on figures and tables in Appendix C of this report are considered the Soil Part A Phase 2 sampling program for the Soil RFI/RI Work Plan.

TABLE 7-1
Data Quality Objectives – Part A Soil Investigation
PG&E Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision[1]**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
Contaminants in soil in AOCs/UAs outside the compressor station fence line resulting from historical compressor station practices may pose an unacceptable risk to humans or the environment, or threaten groundwater. Site-specific information is needed to: • Determine the nature and extent of soil and sediment contamination. • Estimate representative EPCs to support human health and ecological risk assessment being conducted separately from the Part A soil study. • Determine whether residual soil concentrations pose a threat to groundwater. • Estimate soil properties and contaminant distribution in support of the CMS/FS and/or remedial design.	**<u>Decision 1</u>** Determine the nature and extent of residual soil and/or sediment concentrations resulting from historic compressor station practices. If determination of the full nature and extent of contamination based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment or CMS/FS.	COPCs and COPECs by AOC/SWMU/UA Part A and representative Category 1 and 2 historic RFI/RI COPC and COPEC data grouped by AOC/SWMU/UA and medium Data Usability Matrix for Soil and/or sediment (Appendix A) Comparison/screening values (background, risk-based, and regulatory screening values) CSMs Geologic/hydrogeologic/hydrologic information Topographic information Soil physical and chemical property information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	**Lateral Extent** Initially the same as the currently defined boundaries of each SWMU, AOC, and UA: • SWMU1/AOC 1: Within Bat Cave Wash from mouth of Debris Ravine north to the riparian area at mouth of bat cave wash. • AOC 4: Within the ravine from a point directly south of the water tanks to the junction with Bat Cave Wash; north slope of ravine directly south from end of small access road west to west side of storage area. • AOC 9: Within the potential drainage path to the East Ravine from the break in the former storm drain; initially estimated to be from facility fence line 2/3 of the way east down the slope to the East Ravine; approximately 100 feet north to south centered on the alignment of the former storm drain. • AOC 10: Within the East Ravine from its head at the compressor station to its downstream mouth. Low areas, former discharge and outfall locations (where known), and/or former retention areas (as indicated by presence of vegetation or sedimentation) are of particular emphasis. • AOC 11: Within the drainage from its head at the compressor station to the low areas and/or former retention areas (as indicated by presence of vegetation or sedimentation) northwest of the compressor station access road, south of I-40, and east of the compressor station fence line. • AOC 12: Areas indicated by former employees as sites of potential waste disposal. • AOC 14: The area north of I-40 bounded by Bat Cave Wash to the west, the former plant road to the east, and the railroad tracks to the north. • UA-1 (Potential Pipeline Disposal Area): An area approximately 20 feet wide by 100 feet long, encompassing an area indicated by a former employee as the site for burial of asbestos-wrapped pipes. • UA-2 (Former 300B Pipeline Liquids Tank):Area immediately surrounding the former location of a 900-gallon-capacity aboveground drip tank located southeast of the compressor station on a shelf in the hill next to a section of old Route 66. **Vertical Extent** Vertical study area boundaries extend from the ground surface to the water table. **Analytical Parameters [a]** *Chemical Parameters* (COPCs and COPECs) Title 22 metals, hexavalent chromium, total petroleum hydrocarbons, volatile organic compounds, semivolatile organic compounds, and PAHs for all areas outside the fence line except UA-2. Volatile organic compounds and total petroleum hydrocarbons-purgeable will not be analyzed in the surface (0.0 to 0.5 foot) soil samples. Dioxins and furans are COPCs/COPECs at AOC-4. Asbestos is a COPC for AOC 4, AOC-14, and UA-1. COPCs/COPECs at UA-2 are limited to total petroleum hydrocarbons and PAHs. Dioxins/furans, asbestos, and PCBs will be analyzed in samples collected from the upper end of AOC 1 where AOC 4 enters AOC 1. Ten percent of the samples collected in all AOCs will be analyzed for the full inorganic and organic analysis suites per the CERCLA Target Analyte List and Target Compound List. During Phase 1, select samples were analyzed to characterize the soluble fraction of compounds present at concentrations exceeding 10 x TTLC or 20 x TCLP values. Samples were selected after Title 22 metals data had been received. PG&E performed SPLP on approximately two soil samples per AOC and analyzed the samples for Cr(VI) and Cr(T). These data were validated. **Temporal Boundaries** Validated Part A soil sampling data and representative Category 1 and Category 2 historic RFI/RI data (based on the final Data Usability Assessment).	See Figure A-1 in Appendix A for the Decision 1 decision rule.

TABLE 7-1
Data Quality Objectives – Part A Soil Investigation
PG&E Topock Compressor Station, Needles, California

STEP 1 Problem Statement	STEP 2 Decision Statement	STEP 3 Inputs to the Decision[1]	STEP 4 Study Area Boundaries	STEP 5 Decision Rules
	Decision 2 Determine representative EPCs for residual soil and/or sediment contamination resulting from historic compressor station practices. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment or CMS/FS.	Nature and extent of contamination assessment from Decision 1 Part A and representative Category 1 historic RFI/RI COPC and COPEC data grouped by exposure area and depth interval Data Usability Matrix for soil and/or sediment (Appendix A) RAWP CSMs Geologic/hydrogeologic/hydrologic information Topographic information Soil physical and chemical property information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	**Lateral Extent** Same as for Decision 1. **Vertical Extent** Vertical study area boundaries for Decision 2 are defined by potential maximum exposure depths. For human health risk assessment, the maximum exposure depth is 10 feet for all AOCs/SWMUs/UAs except for Bat Cave Wash (SWMU 1/AOC 1), which is 15 feet to account for possible scouring of the surface during runoff events. For ecological risk assessment, the maximum depth is 6 feet, except in Bat Cave Wash, where the maximum exposure depth for ecological receptors is 11 feet to account for possible scouring during run-off events. **Analytical Parameters** Same as for Decision 1. **Temporal Boundaries** Validated Part A soil sampling data and representative Category 1 historic RFI/RI data (based on the final Data Usability Assessment).	See Figure A-2 in Appendix A for the Decision 2 decision rule.
	Decision 3 Determine whether residual soil concentrations resulting from historic compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat, or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address threat to groundwater.	Nature and extent of contamination assessment from Decision 1 COPCs by AOC/SWMU/UA Part A and representative Category 1 and 2 historic RFI/RI COPC and COPEC data grouped by AOC/SWMU/UA Data Usability Matrix for soil and/or sediment (Appendix A) Comparison/screening values (SSLs and groundwater/ drinking water ARARs) CSMs Geologic/hydrogeologic/hydrologic information Topographic information Soil physical and chemical property information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	**Lateral Extent** Those portions of each AOC/SWMU/UA where COPC concentrations exceed SSLs. **Vertical Extent** Same as for Decision 1. **Analytical Parameters** *Chemical Parameters (COPCs/COPECs)* Same as for Decision 1. *Soil Characteristics* (to support modeling) Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes. **Temporal Boundaries** Same as for Decision 1.	See Figure A-3in Appendix A for the Decision 3 decision rule.
	Decision 4 Determine the site-specific soil property and contaminant distribution information necessary to support the CMS/FS decisions and remedial action design. If full determination of site-specific soil property and contaminant distribution information based on sample data is not feasible, address uncertainties in the CMS/FS and remedial design.	Nature and extent of contamination assessment from Decision 1 COCs from human health and ecological risk assessments Remedial action objectives and ARARs Risk-based and regulatory soil and/or sediment cleanup levels Estimated soil and debris volumes Waste classification testing results for soil, sediment, and/or debris as required	**Lateral Extent** Initially same as for Decision 1, to be refined based on results of risk assessments and threat to groundwater assessments. **Vertical Extent** Initially same as for Decision 1, to be refined based on results of risk assessments, threat to groundwater assessments, and remedial alternative practical constraints. **Analytical Parameters** *Chemical Parameters (COCs)* Initially same as COPCs/COPECs for Decision 1, to be refined to specific COCs based on results of risk	See Figure A-4 in Appendix A for the Decision 4 decision rule.

TABLE 7-1
Data Quality Objectives – Part A Soil Investigation
PG&E Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**[1]	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
		Waste comparison/screening levels (TTLC, STLC, RCRA toxicity) Soil physical and chemical property information Geologic/hydrogeologic/hydrologic information Topographic information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	assessments and threat to groundwater assessments. *Soil Characteristics* (to support remedial technology selection and feasibility evaluation) Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes. **Temporal Boundaries** Same as for Decision 1.	

Notes:

[a] A comprehensive planned sample table, specifying analytes for all proposed samples, was provided in Appendix B of the Part A Soil Work Plan.

The list of analytical parameters is based on CSM and will be refined after each round of investigation/data evaluation. COCs will be selected based on the risk assessment.

ARARs = applicable or relevant and appropriate requirements.
PAH = polycyclic aromatic hydrocarbon.

8.0 Data Gaps Evaluation Summary

This section presents a summary of the data gaps evaluation described in Appendix C for SWMU1, AOC 1, AOC 4, AOC 9, AOC 10, AOC 11, AOC 12, AOC 14, UA 1, and UA 2. As described above, the combined Category 1 historical data and validated Part A Phase 1 data were used in evaluating whether sufficient data exist to make each of the four decisions. The data gaps evaluation concluded:

- **Decision 1**. Additional sampling to more precisely delineate the nature and extent of COPCs/COPECs and/or newly-identified compounds is proposed at SWMU 1, AOC 1, AOCs 4, 9, 10, 11, and 14. In addition, sampling is proposed to characterize the newly identified areas (debris, historic burn, and white powder areas) as part of AOCs 10 and 14.
- **Decision 2**. No further data are required to calculate EPCs for COPCs/COPECs and newly identified compounds exceeding interim screening levels.
- **Decision 3**. The initial conservative screening evaluation indicated that certain metals in soil could not be eliminated as a potential threat to groundwater at two AOCs 9 and 10. Additional sampling is proposed at these AOCs; in addition, more refined modeling is proposed at these two units. Additional vertical extent data collected in the remaining areas (SWMU 1, AOCs 1, 4, and AOC 11) for Decision 1 will also be used to refine modeling.
- **Decision 4**. As described in Section 6.0, certain waste characterization data and soil physical properties data are needed at all units. To minimize additional borings, soil physical property data are proposed to be collected only at those locations where borings are proposed for other purposes (two to three samples from each unit to be sampled during the Phase 2 investigation). The remaining information will be collected after the risk assessment has been completed, and the precise areas potentially requiring remediation have been defined.

Table 8-1 provides a summary of the proposed additional sampling to address the data gaps identified during this evaluation.

After collection of the Phase 2 samples presented in Appendix C, the data will be evaluated to assess if the data gaps have been resolved and identify remaining uncertainties to be addressed in the risk assessment or CMS/FS.

TABLE 8-1
Proposed Phase 2 Sampling Summary
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles, California

	Additional Number of Samples and Locations Proposed to Address Data Gaps			
Unit	**Decision 1 – Nature and Extent**	**Decision 2 – Data Sufficiency to Calculate EPCs**	**Decision 3 – Potential Impacts to Groundwater**	**Decision 4 – Data Sufficiency for CMS/FS**
SWMU 1	Seven additional locations (Appendix C1 Table C1-14)	None	Additional vertical extent data will be provided by locations defined for Decision 1, and refined modeling will be conducted	Three samples total from various depths interval to evaluate soil physical properties
AOC 1	Thirty-three (two are contingent locations) additional locations (Appendix C2 Table C2-19)	None	Additional vertical extent data will be provided by locations defined for Decision 1, and refined modeling will be conducted	Three samples total from various depths interval to evaluate soil physical properties
AOC 4	Eighteen additional samples (Appendix C10 Table C10-15)	None	Additional vertical extent data will be provided by locations defined for Decision 1, and refined modeling will be conducted	None
AOC 9	Six additional locations (Appendix C3 Table C3-16)	None	Additional vertical extent data will be provided by locations defined for Decision 1, and refined modeling will be conducted	Two samples total from various depths interval to evaluate soil physical properties
AOC 10	Twelve additional locations (Appendix C4 Table C4-18)	None	Additional vertical extent data will be provided by locations defined for Decision 1, and refined modeling will be conducted	Three samples total from various depths interval to evaluate soil physical properties
AOC 11	Fifteen (two are contingent sample locations) additional locations (Appendix C5 Table C5-19)	None	Additional vertical extent data will be provided by locations defined for Decision 1, and refined modeling will be conducted	Two samples total from various depths interval to evaluate soil physical properties
AOC 12	None	None	None	None
AOC 14	Thirty (18 are contingent sample locations) additional locations (Appendix C7 Table C7-15)	None	Additional vertical extent data will be provided by locations defined for Decision 1, and refined modeling will be conducted	Two samples total from various depths interval to evaluate soil physical properties
UA 1	Not applicable	Not applicable	Not applicable	Not applicable
UA 2	None	None	None	None

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Attachment 1

DOI Direction Letter. PG&E Topock Compressor Station Remediation Site – *Topock Soil Investigation Part A Phase 1 Data Gaps Evaluation Report – Proposed Sample Locations, PG&E Topock Compressor Station, Needles, California*

United States Department of the Interior

MARCH 3, 1849

BUREAU OF LAND MANAGEMENT
FISH AND WILDLIFE SERVICE
BUREAU OF RECLAMATION

ELECTRONIC SUBMISSION

February 25, 2011

Ms. Yvonne Meeks
Manager – Environmental Remediation
Pacific Gas and Electric Company
4325 South Higuera Street
San Luis Obispo, CA   93401

Dear Ms. Meeks:

Subject: PG&E Topock Compressor Station Remediation Site – *Topock Soil Investigation Part A Phase 1 Data Gaps Evaluation Report – Proposed Sample Locations, PG&E Topock Compressor Station, Needles, California*.

The Department of the Interior, on behalf of itself and the Bureau of Land Management, the U.S. Fish and Wildlife Service, and the Bureau of Reclamation (collectively referred to as "DOI") and the California Department of Toxic Substances Control (DTSC) are providing direction to Pacific Gas and Electric (PG&E) regarding the Topock Soil Investigation Part A Phase 1 Data Gaps Evaluation Report and the proposed sampling locations provided therein.

The Data Gaps Evaluation Report was prepared to address supplemental soil characterization activities at the Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and other undesignated areas (UAs) identified in the Revised Final RCRA Facility Investigation/Remedial Investigation Report, Volume 1 – Site Background and History (referred to as the RFI/RI Volume 1) located outside the compressor station fence line. Through a series of meetings held with the agencies, Tribes, PG&E, and other stakeholders in 2010, sample locations were identified to address data gaps in the SWMUs and AOCs.

In response to concerns raised by the Tribes through letters provided by the Fort Mohave Indian Tribe (FMIT) consultant (Hargis + Associates, November 22, 2010) and the Hualapai Department of Cultural Resources (December 3, 2010) and as a result of tribal meetings held December 7, 2010, and January 13, 2011, DOI and DTSC have had several discussions regarding the possibility of reducing the number of samples proposed at the various SWMUs and AOCs. To reduce the number of samples and disturbances to sensitive cultural resources, the agencies evaluated each sample location to determine which, if any, sample locations could be eliminated based on the following factors:

- Is future evaluation of the nature and extent of contamination necessary to assess the risk to human health and the environment, assess the threat to groundwater and/or evaluate and select a remedy?
- Is further data collection necessary to capture maximum concentrations or additional contaminants that could drive risk, threat to groundwater, or remedy technology assessment?
- Are contaminants of a type or concentration that could pose a potential threat to groundwater present?
- Are additional data needed to evaluate technology screening or assessment?

Based on this evaluation, the agencies have identified sample locations that we believe should be eliminated or relocated from those presented in the Data Gaps Analysis and carried forward in the development of the Soil Work Plan.

Our willingness to eliminate these sample locations is based on evaluation of existing data and some basic assumptions applicable to the SWMUs/AOCs identified in the attached table:

- Defining edges or detailed distribution of contamination in the wash channels is not necessary for technology assessment or risk evaluation. It is assumed that known contaminant concentrations measured at previous sample points extend between the points and to the wash boundaries.
- It is unlikely that significantly higher concentrations of contaminants exist in the areas that have not been sampled.
- It is unlikely that different types of contaminants exist in the areas that have not been sampled.
- Where vertical extent of contamination is defined, sufficient data are available to support modeling.

A major premise of this approach is that the nature and extent of contamination, where not currently fully defined, can and will be further defined, as necessary, during remedial design and/or remedial action implementation. Therefore, the decision to exclude an area from additional sampling at this time is not to be construed as a determination that the area is not contaminated or that the full extent of contamination is precisely defined.

The agencies also note that the focus was on reducing numbers of samples. PG&E should carefully review the proposed reduced sample set and evaluate whether revisions, beyond those specified here, are necessary to meet previously defined data quality objectives. Examples of the potential data gaps include whether the elimination of certain points has inadvertently eliminated necessary sampling for TAL/TCL-related characterization data or collection of samples for physical parameter data that may be necessary to assess the overall threat to groundwater or for remedy assessment. For efficiency, PG&E should also determine if a groundwater well should be installed at any of the planned deep soil boring locations in support of the groundwater remedy.

During the series of data gap evaluation meetings between the Tribes, agencies, PG&E and stakeholders in October and November 2010 and January 2011, revisions were discussed, proposed, and agreed upon for the various investigation areas. PG&E should incorporate these revisions into the Soil Work Plan. These include, but are not limited to, relocating sample locations based on field observations (e.g., AOC 9, AOC-11, etc.) and a proposal to investigate AOC 14 south of Interstate 40 (MW-24 Bench). PG&E should also incorporate the grid-based sampling of the mouth of Bat Cave Wash as proposed by DOI in our December 15, 2010 email to PG&E.

As part of our evaluation, we are also proposing the use of an X-ray fluorescence (XRF) analyzer in debris areas to screen for the presence of metal contamination associated with the debris. This method is a non-intrusive method that can provide chemical data in debris areas to help guide the need for actions or further investigation. As part of the Soil Work Plan, PG&E should propose an evaluation of debris areas using non-intrusive XRF technology.

Ultimately, it is PG&E's responsibility to ensure that the necessary data are collected in order to move forward with assessing risk and the development of a corrective measures study/feasibility study. PG&E should, therefore, carefully evaluate the proposals described in this letter and submit a comprehensive Soil Work Plan that will satisfy the data quality objectives (DQOs) specified in the Soil Part A and Part B DQO documents and the stipulations described in the 1996 Corrective Action Consent Agreement between DTSC and PG&E.

If you have any questions, please contact me at (303) 445-2502 or Jose Marcos (DTSC) at (714) 484-5492, at your convenience.

Sincerely,

Pamela S. Innis

Pamela S. Innis
DOI Topock Remedial Project Manager

Karen Baker

Karen Baker, CHG, CEG
Performance Manager, Office of Geology
California Department of Toxic Substances Control

Attachment: DOI & DTSC Data Gap Summary Table

Cc: PG&E Topock Consultative Workgroup (CWG) Members

FINAL DOI-DTSC REVISIONS TO SOIL PART A DATA GAP TABLE

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
SWMU 1				
SWMU1-18	0, 2, 5, 9, 14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gaps #1, #3, and #4 - Define lateral and vertical extent in southern part of AOC 1 and support CMS/FS	Hexavalent chromium, Title 22 metals, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Defining the vertical extent of contamination in this primary source area is a critical data gap. This location is retained to define the vertical extent of contamination in the southern portion of the former percolation beds area. Move this location due east approximately 25 feet so that it is located within the boundaries of the white powder area. Significantly elevated chromium concentrations are detected in this former impoundment area and is noted more often in aerial photos than the "blue line" impoundment.
SWMU1-19	0, 2, 5, 9, 14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gap #1, #3, and #4 - Define lateral and vertical extent in bottom of Bat Cave Wash	Hexavalent chromium, Title 22 metals, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Defining the vertical extent of contamination in this primary source area is a critical data gap. This location is retained to define the vertical extent of contamination in the central portion of the former percolation beds area.
SWMU1-20	14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gaps #1 and #3 - Define vertical extent at previous sample location SWU1-2	Hexavalent chromium, Title 22 metals, PCBs[a]	Defining the vertical extent of contamination in this primary source area is a critical data gap. This location is retained to define the vertical extent of contamination in the northern portion of the former percolation beds area.
SWMU1-21	14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gaps #1 and #3 - Define vertical extent at previous sample location SWU1-1	Hexavalent chromium, Title 22 metals, PCBs[a]	Defining the vertical extent of contamination in this primary source area is a critical data gap. This location is retained to define the vertical extent of contamination in the northern portion of the former percolation beds area.
SWMU1-22	None – pothole sample location	To resolve Data Gap #2 – Define lateral extent of white powder area and collect a sample of the white powder material and soil	Hexavalent chromium, Title 22 metals, PCBs[a], SPLP[b] and general chemistry analyses[b]	This location is retained to address the nature and extent of contamination associated with a previously uncharacterized potential pathway for site-related contamination to have migrated to Bat Cave Wash.
SWMU1-23	None – pothole sample location	To resolve Data Gap #2 – Define lateral extent of white powder area and collect a sample of the white powder material and soil	Hexavalent chromium, Title 22 metals, PCBs[a], SPLP[b] and general chemistry analyses[b]	This location is retained to address the nature and extent of contamination associated with a previously uncharacterized potential pathway for site-related contamination to have migrated to Bat Cave Wash.
SWMU1-24	None – pothole sample location	To resolve Data Gap #2 – Define lateral extent of white powder area and collect a sample of the white powder material and soil	Hexavalent chromium, Title 22 metals, PCBs[a], SPLP[b] and general chemistry analyses[b]	This location is retained to address the nature and extent of contamination associated with a previously uncharacterized potential pathway for site-related contamination to have migrated to Bat Cave Wash.

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
AOC 1				
~~AOC1-BCW7~~	~~0, 2, 5, and 9~~	~~To resolve Data Gaps #3- Define lateral extent at AOC1-BCW2~~	**~~Hexavalent chromium, Title 22 metals, PCBs[a]~~**	Replaced with DOI-specified tamarisk area sampling grid approach testing for hexavalent chromium, Title 22 metals, and PCBs
~~AOC1-BCW8~~	~~0, 2, and 5~~	~~To resolve Data Gaps #3- Define lateral extent at AOC1-BCW6~~	**~~Hexavalent chromium, Title 22 metals, PCBs[a]~~**	
~~AOC1-BCW9~~	~~0, 2, and 5~~	~~To resolve Data Gaps #3- Define lateral extent at AOC1-BCW6~~	**~~Hexavalent chromium, Title 22 metals, PCBs[a]~~**	
~~AOC1-BCW10~~	~~0~~	~~To resolve Data Gaps #3- To confirm detections of certain metals at previous sample location AOC1-BCW6~~	**~~Hexavalent chromium, Title 22 metals, PCBs[a]~~**	
~~AOC1-BCW11~~	~~0, 2, and 5~~	~~To resolve Data Gaps #3,and #5- Define lateral extent at AOC1-BCW4 and support CMS/FS~~	~~Hexavalent chromium, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring~~	
~~AOC1-BCW12~~	~~0 and 2~~	~~To resolve Data Gaps #3- Define lateral and vertical extent at AOC1-BCW6~~	~~Hexavalent chromium, Title 22 metals, PCBs[a]~~	
~~AOC1-1~~	~~0, 2, 5, 9, 14, 20, and 30~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PCBsa~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination to the west of SWMU 1
~~AOC1-2~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PCBsa~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination to the west of SWMU 1
~~AOC1-3~~	~~0, 2, 5, 9, 14, and 20~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PCBsa~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination to the west of SWMU 1
~~AOC1-4~~	~~0, 2, 5, 9, 14, and 20~~	~~To resolve Data Gaps #1 and #3 - Define lateral extent in bottom of Bat Cave Wash and support CMS/FS~~	~~Hexavalent chromium, Title 22 metals, PCBsa ; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination to the west of SWMU 1
~~AOC1-5~~	~~0, 2, 5, 9, 14, 20, and 30~~	~~To resolve Data Gap #1 - Define lateral and vertical extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PAHs, pH, PCBsa~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination to the west of SWMU 1

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
~~AOC1-6~~	~~0, 2, 5, 9, 14, 20, and 30~~	~~To resolve Data Gap #1 - Define lateral and vertical extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PAHs, pH, PCBsa~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination in wash east of SWMU 1
~~AOC1-7~~	~~0, 2, 5, 9, 14, 20, and 30~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PAHs, pH, PCBsa~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination in wash east of SWMU 1
~~AOC1-8~~	~~0, 2, 5, 9, 14, 20, and 30~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination in wash east of SWMU 1
AOC1-9 (contingent)	0, 2, 5, 9, 14, 20, and 30	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	These points are retained to characterize this uncharacterized slope area. Contingent upon AOC1-10 and AOC1-13
AOC1-10	0, 2, 5, 9, 14, 20, and 30	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash	Hexavalent chromium, molybdenum, total chromium, PCBs[a]	These points are retained to characterize this uncharacterized slope area.
~~AOC1-11~~	~~0, 2, 5, 9, 14, 20, 30, 40, 50, 60, 70, and 80~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination to the west of SWMU 1
~~AOC1-12~~	~~0, 2, 5, 9, 14, 20, and 30~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]~~	Existing data and streambed configuration adequately define and constrain lateral extent of contamination to the west of SWMU 1
AOC1-13	0, 2, 5, 9, 14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	These points are retained to characterize this uncharacterized slope area.
AOC1-14 (contingent)	0, 2, 5, 9, 14, 20, and 30	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	These points are retained to characterize this uncharacterized slope area. Contingent upon AOC1-10 and AOC1-13
~~AOC1-15~~	~~0, 2, 5, 9, 14, 20, and 30~~	~~To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash~~	~~Hexavalent chromium, Title 22 metals, PCBs[a]~~	Existing data adequately define southern extent of contamination
AOC1-T1e	0, 2, 5, 9, and 14	To resolve Data Gap #1 - Define lateral extent at AOC1-T1c.	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	This point is retained to characterize this uncharacterized flood area.
~~AOC1-T1f~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent at AOC1-T1b and at AOC1-T1c.~~	~~Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.
AOC1-T1g	0, 2, 5, 9, and 14	To resolve Data Gap #1 - Define lateral extent at AOC1-T1c.	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	This point is retained to characterize this uncharacterized flood area.

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
~~AOC1-T2f~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent near sample transect AOC1-T2.~~	~~Title 22 metals, PCBs[a]~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.
~~AOC1-T2g~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent near sample transect AOC1-T2.~~	~~Molybdenum, PCBs[a]~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.
~~AOC1-T2h~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent near sample transect AOC1-T2.~~	~~Title 22 metals, PCBs[a]~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.
AOC1-T2i	0, 2	To resolve Data Gap #4 - Evaluate potential white powder	Title 22 metals, hexavalent chromium, pH, PCBs[a]	This point is retained to characterize this uncharacterized white powder area.
~~AOC1-T3d~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent near sample transect AOC1-T3.~~	~~Hexavalent chromium, Title 22 metals, PCBs[a]~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.
~~AOC1-T4d~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent near sample transect AOC1-T4.~~	~~Hexavalent chromium, Title 22 metals, PCBs[a] PAHs~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.
~~AOC1-T4e~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent near sample transect AOC1-T4.~~	~~Hexavalent chromium, Title 22 metals, PAHs, PCBs[a]~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.
AOC1-T5d	0, 2, 5, 9, 14, and 20	To resolve Data Gaps #1 and #5- Define lateral extent near sample transect AOC1-T5 and support CMS/FS	Hexavalent chromium, Title 22 metals, PAHs, PCBs[a] ; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	This location is retained to characterize this long-term terminal endpoint for sediment deposition.
~~AOC1-T5e~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #1 - Define lateral extent near sample transect AOC1-T5.~~	~~Copper, PAHs, PCBs[a]~~	Existing data for this portion of wash are adequate for remedial action decision making. It is unlikely that significantly higher concentrations exist in this portion of the wash.

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
New Point	0, 2, 5, 9, 14, and 20	Located at potential impoundment area where flow enters the culvert under the railroad bridge	Hexavalent chromium, Title 22 metals, PAHs, PCBs[a] ; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	This location is retained to characterize this potential long-term terminal endpoint for sediment deposition.
New Point	0, 2, 5, 9, 14, and 20	Located at potential impoundment area at IM-3 road crossing	Hexavalent chromium, Title 22 metals, PAHs, PCBsa ; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	This location is retained to characterize this potential long-term terminal endpoint for sediment deposition.
AOC 4				
AOC4-BCW1	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs and dioxins/furans	This data point is necessary to address the down stream extent of contamination potentially migrating into Bat Cave Wash from the Debris Ravine.
~~AOC4-BCW2~~	~~0, 2, 5, and 9~~	~~To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).~~	~~Title 22 metals, hexavalent chromium , PCBs and dioxins/furans~~	This data point is not critical to remedial action decision making for this portion of the wash
AOC4-BCW3	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs and dioxins/furans	These data points are retained as two transects to assess the potential for contamination migrating into Bat Cave Wash from the Debris Ravine. The specific migration pathway of contaminants emanating from the Debris Ravine is unknown.
AOC4-BCW4	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs and dioxins/furans	

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
AOC4-BCW5	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs and dioxins/furans	
AOC4-BCW6	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs and dioxins/furans, asbestos (surface soil sample only)	
AOC4-BCW7	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs and dioxins/furans	This data point is retained to assess the influence of upstream conditions to distinguish Debris Ravine effects on soil in Bat Cave Wash.
AOC 9				
AOC10a-2	0, 2, 5 and 9	To resolve Data Gaps #3 and #4 - Define lateral and vertical extent downslope of AOC 9 and Subarea AOC 10a and support model refinement for Decision 3	Hexavalent chromium, Title 22 metals, PAHs, PCBs, pesticides	This data point is retained to assess the nature and extent of contamination within the surface drainage leading from the base of the slope at the primary pipe break release area.
AOC10a-3	0, 2, 5 and 9	To resolve Data Gap #3 - Define lateral and vertical extent downslope of AOC 9 and Subarea AOC 10a	Hexavalent chromium, Titl2 22, PAHs, PCBs, pesticides	This data point is retained to assess the downstream nature and extent of contamination within the surface drainage leading from AOC 9, and other surface discharges along the slope east of AOC 9.
AOC9-15	0, 2, 5 and 9	To resolve Data Gap #3 - Define lateral extent downslope of AOC 9	Hexavalent chromium, Title 22 metals, PAHs, PCBs, pesticides	This data point is retained to assess the nature and extent of contamination at a runoff pathway across the dirt road at the base of the slope beneath the primary pipe break release area.
AOC9-16	0, 2, 5 and 9	To resolve Data Gaps #3 and #5 - Define lateral extent and support CMS/FS	Hexavalent chromium, Title 22 metals, PAHs, PCBs, pesticides; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	This data point is retained to assess the nature and extent of contamination at the base of the slope at the primary pipe break release area.

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
AOC9-17	9 and 14	To resolve Data Gaps #1 and #4 - Define vertical extent at cluster of previous sample locations (#4 through #9 and AOC9-8) and support model refinement for Decision 3	Hexavalent chromium	This data point is retained to verify the efficacy of the previous removal action and assess the vertical extent of contamination at the primary pipe break release area.
AOC9-18	5, 9, and 14	To resolve Data Gaps # 2 and 4 - Define vertical extent at previous sample location AOC9-5, and support model refinement for Decision 3	Hexavalent chromium, Title 22 metals, PAHs	This data point is retained to assess the vertical extent of contamination where the vertical extent was undefined based on previous sampling.
~~AOC9-19~~	~~5, 9, and 14~~	~~To resolve Data Gaps #3 and 4 - Define vertical extent at previous sample location AOC9-3 and support modeling for Decision 3~~	~~Lead, zinc~~	Lead and zinc are unlikely to result in groundwater contamination or drive risk
~~AOC9-20~~	~~5, 9, and 14~~	~~To resolve Data Gaps #2 and 4 - Define vertical extent at previous sample location AOC9-10~~	~~Title 22 metals, PAHs~~	This location is in close proximity to AOC 9-18, which is adequate to define the vertical extent of contamination
AOC9-21	0, 2, 5 and 9	To resolve Data Gaps #3 and #5 - Define lateral and vertical extent and support CMS/FS	Title 22 metals, PAHs, pesticides, PCBs; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	This data point is retained to assess the nature and extent of contamination downslope of the primary pipe break release area.
AOC9-22	0, 2, 5 and 9	To resolve Data Gap #3 - Define lateral extent associated with AOC9-13	Mercury, lead, PAHs, pesticides, PCBs	This data point is retained to assess the influence of upstream conditions to distinguish AOC 9 effects on soil in surface drainage.
AOC 10				
AOC10-9	0, 2, 5,and 9	To resolve data gap #2 – Assess nature and extent associated with runoff from station access road to the low point north of Subarea 10d	Hexavalent chromium, Title 22 metals, PAHs	This point is retained to assess the potential for contamination entering the East Ravine from runoff
AOC10-10	0, 2, 5, and 9	To resolve data gap #1- Assess lateral extent associated with PS-21and nature and extent of potential impact from soil down slope from the outfall	Hexavalent chromium, Title 22 metals	This data point is retained to assess the potential for contaminated surface runoff entering the East Ravine from an outfall from the facility

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
~~AOC10-11~~	~~0, 2, 5, and 9~~	~~To resolve data gap #3 -Assess lateral extent between Subareas 10c and 10d~~	~~Hexavalent chromium, Title 22 metals, PAHs~~	Existing data and stream configuration adequately define and constrain lateral extent of contamination for remedial action decision making purposes
~~AOC10-12~~	~~0, 2, 5, and 9~~	~~To resolve data gap #4 - Assess potential impact from debris on northern slope (may not be technically feasible to get to proposed depth)~~	~~Hexavalent chromium, Title 22 metals, PAHs~~	This location is in close proximity to AOC 10-20
AOC10-13	0, 2, 5, 9~~ and 14~~	~~To resolve data gaps #1, 4, and 7 -~~ Assess potential impacts from debris on south slope~~ and support CMS/FS, and the lateral extent between Subareas 10b and 10c~~	Hexavalent chromium, Title 22 metals, PAHs; pH, TPH, SVOCs, dioxins and furans (if burn material present), PCBs, soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution))	Move this location to immediately adjacent to debris pile to assess potential impact from debris. This is an unknown debris site and should be tested for all potential contaminants. Existing data are adequate to define the lateral extent of contamination in the main part of the wash. May want to consider another location for soil physical parameter data sample.
AOC10-14	0, 2, 5, and 9	To resolve data gap #4 -Assess potential impacts from debris on south slope (may not be technically feasible to get to proposed depth)	Hexavalent chromium, Title 22 metals, PAHs	This data point is retained to assess the potential for contamination entering the East Ravine from a debris pile
AOC10-15	~~0, 2, 5, and 9~~ White Powder Only	To resolve data gap #4 - Assess white powder material on north slope ~~(may not be technically feasible to get to proposed depth)~~	Hexavalent chromium, PAHs, pH, Title 22 metals,	Insufficient basis on which to drill boring at this location pending determination if white powder is contaminated
AOC10-16	~~0 and 2[a]~~ White Powder ~~Only~~ and discolored soil	To resolve data gap #4 -Assess white powder material and discolored soil on north slope ~~(may not be technically feasible to get to proposed depth)~~	Hexavalent chromium, PAHs, pH, Title 22 metals	Insufficient basis on which to drill boring at this location pending determination if white powder is contaminated
AOC10-17	0, 2, 5, and 9	To resolve data gap #4 – Assess potential impact from debris (dirt pile with green-colored wood)	Hexavalent chromium, pH, Title 22 metals	This data point is retained to assess potential contamination from the debris, including green-colored wood possibly indicative of chromium contamination
AOC10-18	0 and 2[a]	To resolve data gap #1 – Assess nature and extent of soil down slope from the potential outfall of the former trench drain	Hexavalent chromium, Title 22 metals, PAHs	This data point is retained to assess the potential for contaminated surface runoff entering the East Ravine from an outfall from the facility

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
AOC10-19	0, 2, 5, and 9	To resolve data gap #4 - Assess debris on north slope (may not be technically feasible to get to proposed depth)	Hexavalent chromium, Title 22 metals, PAHs, pH, TPH, SVOCs, dioxins and furans (if burn material present), PCBs	This is an unknown debris site and should be tested for all potential contaminants
AOC10-20	~~0, 2, 5, and 9~~ White Powder and discolored soil	To resolve data gap #4 -Assess white powder material and discolored soil on north slope (may not be technically feasible to get to proposed depth)	Hexavalent chromium, PAHs, pH, Title 22 metals	Insufficient basis on which to drill boring at this location pending determination if white powder is contaminated
AOC10a-2	0, 2, 5, and 9	To resolve data gaps # 1 and 6 - Assess vertical and lateral extent and collect data to assess current threat to groundwater.	Hexavalent chromium, Title 22 metals, PAHs	This data point is retained to assess the potential for contaminated surface runoff in the surface drainage leading from the compressor station and AOC 9.
AOC10a-3	0, 2, 5, and 9	To resolve data gap #1 -Assess lateral extent (down slope of AOC9 and Subarea 10a)	Hexavalent chromium, Title 22 metals, PAHs	This data point is retained to assess the potential for contaminated surface runoff in the surface drainage leading from the compressor station and AOC 9.
~~AOC10b-5~~	~~0, 2, 5, and 9~~	~~To resolve data gap # 3 - Assess lateral extent up slope from AOC 10b-3~~	~~Hexavalent chromium, Title 22 metals~~	Existing data and stream configuration adequately define and constrain lateral extent of contamination for remedial action decision making purposes
~~AOC10c-6~~	~~14 To Groundwater~~	~~To resolve data gaps # 3 and 6 - Assess vertical extent at previous sample location AOC10c-1 and assess current threat to groundwater~~	~~Hexavalent chromium, total chromium~~	Dropping this sample location is contingent on the sampling of East Ravine Well Site H.
~~AOC10c-7~~	~~14~~	~~To resolve data gap #3 - Assess vertical extent at previous sample location AOC10c-4~~	~~Title 22 metals, PAHs~~	In close proximity to MW-58BR that adequately defined vertical extent of contamination.
AOC10d-9	0, 2, 5, and 9	To resolve data gap #3 -Assess lateral extent associated with AOC 10d-3 and L-3	Hexavalent chromium, Title 22 metals, PAHs	This data point is retained to assess the potential for contaminated surface runoff into the East Ravine.
~~AOC10d-10~~	~~0, 2, 5, 9 and 14~~	~~To resolve data gaps #3 and 7 - Assess lateral and vertical (Zinc only) extent collect soil parameter information to support CMS/FS~~	~~Hexavalent chromium, Title 22 metals, PAHs; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring~~	Existing data and stream configuration adequately define and constrain lateral extent of contamination for remedial action decision making purposes. May want to consider another location for soil physical parameter data sample.

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Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
Assorted debris locations		To resolve data gap #4 - Sampling of debris for ACM	ACM, XRF screen	XRF screen to assess potential for contamination in debris areas
AOC 11				
~~AOC11a-6~~	~~9, 14, and 19~~	~~To resolve Data Gaps #1 and #6 - Define vertical extent at AOC11a-1. Recollect at 9 feet verifying hexavalent chromium concentration. Collect data to assess current threat to groundwater.~~	~~Hexavalent chromium, lead~~	Existing data are adequate for remedial action decision making for this area
~~AOC11a-7~~	~~14 and 19~~	~~To resolve Data Gap #1 - Define vertical extent at AOC11a-5.~~	~~Title 22 metals~~	Existing data are adequate for remedial action decision making for this area
AOC11c-3	~~14, 19~~ To groundwater	~~To resolve Data Gaps #2 and #6 - Define vertical extent at previous sample location AOC11c-SS2.~~ Collect data to assess current threat to groundwater.	Hexavalent chromium, Title 22 metals, PCBs	This data point is retained to assess the vertical extent of contamination at this location
~~AOC11c-4~~	~~0, 2, 5, 9 and 14, 19~~	~~To resolve Data Gaps # 2 and #7 - Define lateral and vertical extent in AOC11c and support CMS/FS~~	~~Hexavalent chromium, Title 22 metals, PAHs, PCBs; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring~~	In close proximity to AOC 11c-5
AOC11c-5	0, 2, 5, 9 and 14, 19	To resolve Data Gaps #2 and #6 - Define lateral and vertical extent in AOC11c. Collect data to assess current threat to groundwater.	Hexavalent chromium, Title 22 metals, PAHs, PCBs, soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution)	This data point is retained to assess the vertical extent of contamination in this former retention basin
AOC11e-3	0, 2, 5, 9, and 14	To resolve Data Gap #3 - Define lateral and vertical extent upslope of AOC 11e (may not be technically feasible to get to depth)	Hexavalent chromium, Title 22 metals, PAHs, PCBs	Data point retained to assess potential for contamination associated with outfall

FINAL DOI-DTSC REVISIONS TO SOIL PART A DATA GAP TABLE

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
~~AOC11e-4~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #3 - Define lateral and vertical extent upslope of AOC 11e (may not be technically feasible to get to depth)~~	~~Hexavalent chromium, Title 22 metals, PAHs, PCBs~~	Data to be collected at AOC 11e5 will be adequate to assess this pathway for remedial action decision making purposes
AOC11e-5	0, 2, 5, 9, and 14	To resolve Data Gaps #3 and #7- Define lateral and vertical extent upslope of AOC 11e (may not be technically feasible to get to depth)) and support CMS/FS.	Hexavalent chromium, Title 22 metals, PAHs, PCBs; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	This data point is retained to assess the nature and extent of contamination in this former retention basin Move in field if location fails depth.
AOC11e-6	~~14~~ To groundwater	To resolve Data Gap #4 - Define vertical extent in AOC 11e. Refine vadose zone leaching model.	Hexavalent chromium, Title 22 metals, PAHs, PCBs	This boring must extend to the water table, if technically feasible, to achieve objective of supporting vadose zone leaching model.
~~AOC11e-7~~	~~0, 2, 5, 9, and 14~~	~~To resolve Data Gap #3 - Define lateral and vertical extent upslope of AOC 11c (may not be technically feasible to get to depth)~~	~~Hexavalent chromium, Title 22 metals, PAHs, PCBs~~	Existing data and stream configuration adequately define and constrain lateral extent of contamination for remedial action decision making purposes
AOC11e-8	0	To resolve Data Gaps #5 and #8– Assess white powder material in newly identified white powder area	Title 22 metals, hexavalent chromium, general chemistry, pH	This data point is retain to assess the nature of the white powder
AOC11-1	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	This data point is retained to assess the potential for contaminated surface runoff in the surface drainage leading from the compressor station .
~~AOC11-2~~	~~0, 2, 5, and 9~~	~~To resolve Data Gaps #5 and #8–Assess newly identified area (burn area)~~	~~Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs, dioxins and furans~~	Data to be collected at AOC 11-1 and AOC 11-3 will be adequate to characterize this area
AOC11-3	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area (burn area)	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs, dioxins and furans, PCBs	PCBs could be associated with waste oil burning
AOC11-4	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area (burn area)	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs , dioxins and furans, PCBs	PCBs could be associated with waste oil burning

FINAL DOI-DTSC REVISIONS TO SOIL PART A DATA GAP TABLE

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
~~AOC11-5~~	~~0, 2, 5, and 9~~	~~To resolve Data Gaps #5 and #8–Assess newly identified area~~	~~Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs~~	Data to be collected upstream and downstream at other locations and configuration of drainage will adequately define lateral extent of contamination for remedial action decision making purposes
AOC11-6	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs, dioxins and furans	This data point is retained to assess the potential for contaminated surface runoff in the surface drainage leading from the compressor station and fire training area.
~~AOC11-7~~	~~0, 2, 5, and 9~~	~~To resolve Data Gaps #5 and #8–Assess newly identified area~~	~~Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs~~	Data to be collected upstream and downstream at other locations and configuration of drainage will adequately define lateral extent of contamination for remedial action decision making purposes
AOC11-8	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs, dioxins and furans	This data point is retained to assess the potential for contaminated surface runoff in the terminal deposition area of the surface drainage leading from the compressor station and fire training area.
~~AOC11-9~~	~~0, 2, 5, and 9~~	~~To resolve Data Gaps #5 and #8–Assess newly identified area~~	~~Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs~~	Extraneous location?
~~AOC11-10~~	~~0, 2, 5, and 9~~	~~To resolve Data Gaps #5 and #8–Assess newly identified area~~	~~Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs~~	This location is dropped based on co-location with AOC 11-8. PG&E shall base the location of AOC 11-8 on accessibility to the lowest point.
~~AOC11-11~~	~~0, 2, 5, and 9~~	~~To resolve Data Gaps #5 and #8–Assess newly identified area~~	~~Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs~~	AOC 11-11 and AOC 11-12 are adequate for initial characterization of this area. These two locations should be located at the lowest points along the road. Two additional sample locations are to be located in the outfalls below the bench area contingent upon the results of AOC 11-11 and AOC 11-12.
AOC11-12 (contingent)	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	
AOC11-13 (contingent)	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	
AOC11-14	0, 2, 5, and 9	To resolve Data Gaps #5 and #8–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	
~~AOC 11-15~~	~~0, 2, 5, and 10~~	~~To resolve Data Gaps #5 and #8–Assess newly identified area~~	~~Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs~~	
AOC 14				
~~AOC14-14~~	~~0, 2, 5, 9, and 14~~	~~To resolve data gap #2 -Assess possible drainage from AOC14 (location may be relocated after field assessment) and the newly identified potential burn area west of AOC14~~	~~Dioxin and furans, hexavalent chromium, molybdenum, total chromium~~	AOC 1 data will be utilized to assess the bottom of the adjacent drainage.

FINAL DOI-DTSC REVISIONS TO SOIL PART A DATA GAP TABLE

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
~~AOC14-15~~[a]	~~0 and 2~~	~~To resolve data gap #2 - Assess the newly identified debris area (accessible area at bottom of slope)~~	~~Hexavalent chromium, Title 22 metals, asbestos~~	To be screened with XRF.
~~AOC14-16~~[a]	~~0 and 2~~	~~To resolve data gap #2 - Assess the newly identified debris area (area adjacent to debris) east of AOC14~~	~~Hexavalent chromium, pesticides PAHs, PCBs, pH, SVOCs, Title 22 metals, TPH, VOCs, asbestos, dioxin and furans~~	To be screened with XRF.
~~AOC14-17~~	~~0 and 2~~	~~To resolve data gap #2 - Assess debris area (accessible area at bottom of slope)~~	~~Hexavalent chromium, pesticides, PAHs, PCBs, pH, SVOCs, Title 22 metals, TPH, VOCs, asbestos, dioxin and furans~~	To be screened with XRF.
~~AOC14-18~~	~~0 and 2~~	~~To resolve data gap #2 - Assess the newly identified debris area (area adjacent to debris) east of AOC14~~	~~Hexavalent chromium, pesticides, PAHs, PCBs, pH, SVOCs, Title 22 metals, TPH, VOCs, asbestos, dioxin and furans~~	To be screened with XRF.
~~AOC14-19~~	~~0 and 2~~	~~Define lateral and vertical extent in debris area~~	~~Hexavalent chromium, PAHs, PCBs, pH, SVOCs, Title 22 metals, TPH, VOCs, asbestos~~	To be screened with XRF.
AOC14-20	0, 2, 5, 9, and 14	Evaluate newly identified potential burn area	Dioxin and furans	This sample point is retained to assess potential contamination associated with a small pocket of burn waste debris observed at this location
AOC14-21	0, 2, 5, 9, and 14	To resolve data gaps #1 and #2 - Define lateral and vertical extent of exceedences in southwestern corner and assess the newly identified potential burn area west of AOC14	Dioxin and furans, pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH , soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Select locations based on waste observations. Sample locations 0-10 feet.
AOC14-22	0, 2, 5, 9, and 14	To resolve data gap #2 - Assess the newly identified potential burn area west of AOC14	Dioxin and furans, pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	
AOC14-23	0, 2, 5, 9, and 14	To resolve data gap #2 - Assess the newly identified potential burn area west of AOC14	Dioxin and furans, pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	

FINAL DOI-DTSC REVISIONS TO SOIL PART A DATA GAP TABLE

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Rationale/Comments
~~AOC14-24~~	~~0, 2, 5, 9, and 14~~	~~To resolve data gap #4 - Assess lateral (for vadose zone model refinement) and vertical extent of hexavalent chromium in vicinity of existing boring S4-4~~	~~Hexavalent chromium, soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) — three samples from boring~~	Data collection at these locations will not significantly alter groundwater assessment (PG&E to verify).
~~AOC14-25~~	~~0, 2, 5, 9, and 14~~	~~To resolve data gap #4 - Assess lateral (for vadose zone model refinement) and vertical extent of hexavalent chromium in vicinity of existing boring S4-4 (accessible area at bottom of slope)~~	~~Hexavalent chromium~~	Data collection at these locations will not significantly alter groundwater assessment (PG&E to verify).
Assorted debris locations			XRF screen	XRF screen to assess potential for metals-contamination in debris areas
MW-24 Bench Area	Surface Geophysical survey	To resolve data gap #3 - Obtain initial information	N/A	Sampling plan as discussed at TWG meeting in fall 2010 .

Appendix A

Data Quality Objectives Technical Memorandum – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California (on CD only)

Pacific Gas and Electric Company

Yvonne J. Meeks
Manager

Environmental Remediation
Gas Transmission & Distribution

Mailing Address
4325 South Higuera Street
San Luis Obispo, CA 93401

Location
6588 Ontario Road
San Luis Obispo, CA 93405

805.234.2257
Fax: 805.546.5232
E-Mail: yjm1@pge.com

March 12, 2010

Jose Marcos
California Department of Toxic Substances Control
Geology Permitting and Corrective Action Branch
5796 Corporate Ave
Cypress, CA 90630

Pam Innis
DOI Topock Remedial Project Manager
Office of Environmental Policy and Compliance
U.S. Department of Interior
P.O. Box 25007 (D-108)
Denver, CO 80225-0007

Subject: RCRA Facility Investigation/Remedial Investigation
Soil Investigation Work Plan, Part A, Data Quality Objectives Steps 1 through 5
Technical Memorandum
PG&E Topock Compressor Station, Needles, California

Dear Mr. Marcos, Ms. Innis:

This letter transmits the Final Data Quality Objectives (DQOs) – Part A Soil Investigation Technical Memorandum (TM) for the PG&E Topock Compressor Station RCRA Facility Investigation/Remedial Investigation (RFI/RI). The technical memorandum addresses Steps 1 through 5 of the DQO process for the Part A Soil program. Steps 6 and 7 will be developed through discussions with the agencies and stakeholders during the Soil Part A data gaps evaluation, scheduled for Spring 2010.

This TM incorporates revisions made to the December 15, 2009 report based on comments received from DOI on January 22, 2010 and March 10, 2010, and DTSC on January 11, 2010, and from both agencies during a February 4, 2010 meeting. No additional changes have been made to the report.

The attached Response to Comments Table provides responses to specific comments provided by DOI in its January 22, 1010 cover letter and comments table. In addition, the Response to Comments Table provides a response to the DTSC comment provided by email.

If you have any questions regarding RFI/RI activities, please contact me at (805) 234-2257.

Very truly yours,

Yvonne Meeks

Yvonne Meeks

Enclosure

Cc: Karen Baker/DTSC
Aaron Yue/DTSC
Chris Guerre/DTSC
Rick Newell/DOI
Laura Kaweski/DTSC
Addie Farrell/AECOM

DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
1	General	M	There are several inconsistencies between statements in the text and Table 1 and the figures. Examples include Decision Statement 3, Box 2 decision on Figure 7, and the vertical boundaries for Decision 1. In general, Table 1 better reflects DOI's preferences. Please revise the text and figures for consistency with Table 1.	Text and Figures will be revised to be consistent with language in Table 1.
2	Section 2.1.3.1, CSM discussion	M	The CSM discussion includes statements regarding appropriate sampling that are premature for Step 1 of the DQOs. The whole point of the DQOs is to lay out a stepwise process for assessing what are appropriate and adequate samples to resolve the decisions. This section should focus strictly on describing the CSMs, as was proposed in DOI's suggested language. Refrain from offering statements about sampling at this point in the document.	Reference to sampling has been removed from the CSM discussion.
3	Section 2.1.3.1, groundwater discussions	E	This section refers to the groundwater CMS/FS in the future tense. This should be revised to reflect the final nature of the CMS/FS.	Text revised as requested.
4	Section 2.1.3.1, groundwater discussions	A	While DOI agrees that the focus of the DQOs is on soil, additional focused groundwater assessment may be warranted if soil investigations indicate a potential current threat to groundwater.	Modifications made to text as agreed upon during February 4, 2010 meeting with Agencies.

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[a] Comment Types: A = Advisory comment, M = Mandatory Revision, P = Proposed Revision, C = Clarification Request, E = Editorial Revision recommended

DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
5	Sections 2.1.3.2 and 2.1.3.3,	A	It is noted that PG&E chose not to include DOI recommended language acknowledging the contaminant distribution uncertainties resulting from unpredictable scouring and re-deposition processes in washes and ravines. DOI contends it is not possible to predict with confidence the distribution of contamination in the washes and ravines except where impoundments or temporally stable depressions exist. PG&E's reluctance to explicitly acknowledge this point cannot serve as a basis for assuming a higher degree of sampling confidence in the upcoming Steps 6 and 7 than is warranted.	As agreed upon during the February 4, 2010 meeting with the Agencies, this comment will be addressed in Step 6 of the DQOs.
6	Section 2.1.3.3, 4th full paragraph on Page 7	M	The statement that the COPCs for transport to groundwater are primarily hexavalent and total chromium is speculative pending the results of the soil investigations. Remove the sentence.	Text revised as requested.
7	Section 2.1.3.4, second to the last sentence, VOCs in burrows	M	The CSM figure 5 shows the VOC pathway as a potentially complete route "not significant or not directly assessed." The work plan on page 3-13 states that "If complete pathways are identified based on upcoming sampling for VOCs, then the inhalation of burrow air will be evaluated for burrowing receptors. This pathway will be further evaluated and if found to be complete and significant, will be quantitatively evaluated and presented in the ERA." PG&E should not speculate at this point that this pathway is incomplete or insignificant. Remove the statement.	Text revised as requested.

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DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
8	Section 2.4	M	The decision statements in the text should precisely match the decision statements on Table 1. In the case of Decision Statement 3, the phase "if warranted" was added to the text (as well as other modifications). This phrase is not in the decision statement on Table 1 and is not necessary since the decision is already that additional assessment or a response action is warranted. DOI prefers that the statements in Table 1 be used for all cases.	Text revised as requested.
9	Section 2.5.2, page 14, 3rd full paragraph	C	What is meant by "the identification of hot spots will be made through visual examination of the data"? How does this differ from evaluation for outliers?	Visual examination of the data is a qualitative assessment that includes consideration of relative concentrations in relation to nearest neighboring sampling locations (both horizontally and vertically), field observations of staining or debris, and topography. Outlier evaluation, if conducted, will be done quantitatively using applicable statistical tests. The text has been revised to include this clarification.
10	Section 2.5.4 and Table 1	C	Why were soil and waste volumes deleted as inputs for Decision 4? Estimation of soil and waste volumes would be critical for assessing removal alternatives in the CMS/FS.	Soil and waste volumes have been added back as inputs to Decision 4.
11	Section 2.6.1.1,	A	Maximum exposure depths are only applicable to Decision 2 (EPC estimation), not for Decision 1 (nature and extent). DOI will expect a high burden of proof of low permeability if bedrock is to be considered a barrier to vertical migration and sampling.	The text has been modified as agreed upon during February 4, 2010 meeting.
12	Section 2.6.1.2	M	Dioxins/furans and asbestos should be added for the upper portions of AOC-1 near the point where AOC-4 enters. Dioxins/furans and asbestos are COPCs for AOC-4 that could have migrated to the upper reaches of AOC-1.Total PCBs should be added as well.	Dioxins/furans, asbestos, and total PCBs will be analyzed in samples collected from AOC 1 near confluence of AOC 4.

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DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
13	2.7.1.2 and Figure 6	M	The decision rule for Decision 1 does not appropriately consider the process for determining the nature of contamination associated with TAL/TCL detections (whether they are COPCs). Specifically, PG&E proposes to assess whether or not detected TAL/TCL constituents are COPCs based on the very limited (10%) data set, and proposes to consider factors such as frequency of detection, concentrations, and distribution in making the determination. With only 10% of the samples being analyzed for TAL/TCL constituents, reliable estimates of frequency, maximum concentrations, and distribution cannot be made without additional sampling. In DOI's proposed decision rule, TAL/TCL constituents are first identified as potential COPCs by being detected. This then leads to additional sampling necessary to adequately assess their nature (e.g., using frequency of detection, concentrations, and distribution as determining factors in their selection as COPCs). Moreover, PG&E's decision rule does not provide for assessment of the extent of TAL/TCL COPCs. Rather it leads to the risk assessment to evaluate the nature of contamination. DOI requires that TAL/TCL constituents detected in the 10% of samples either be considered COPCs and then assessed for nature and extent along with the other COPCs (including collection of additional samples necessary to characterize the nature and extent), or be investigated further with additional sampling before any argument can be made to exclude them as COPCs.	The text and Figure 6 has been modified as agreed upon during the February 4, 2010 meeting.

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DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
14	Section 2.7.1.2	C	The issue of screening level development and its purported complexity as discussed in this section is unclear to DOI. For many TAL/TCL constituents, soil screening levels are already available from EPA (RSLs) and California (CHHSLs). For TAL/TCL COPCs without existing screening levels, risk based assessment might be necessary to determine whether they have the potential to be risk drivers. However, this could only be accomplished once the nature of the COPCs has been assessed through an appropriate level of sampling, as discussed above.	The text has been modified as agreed upon during February 4, 2010 meeting.
15	Section 2.7.1.2	C	EPA has recently (December 2009) updated its RSLs. In some cases, the updated RSLs are lower than the CHHSLs. Screening should be conducted against the most stringent of the RSL and CHHSL levels. Also, neither the RSLs nor the CHHSLs have screening levels for petroleum compounds, which are PCOCs for some AOCs. The California Regional Water Quality Control Board-San Francisco Bay Region has published soil ESLs for TPH-gasoline, diesel, and motor oil (residual range) that are commonly used in California as screening levels. What is PG&E's intent with regard to screening of petroleum compounds?	The hierarchy of screening values, as presented in the Draft Part A Soil Sampling Workplan was to use California values (i.e., CHHSLs) where they exist over EPA RSLs, as they incorporate California-specific assumptions regarding toxicity and exposure (e.g., dermal absorption). Screening is not conducted specifically against the most stringent of the RSL and CHHSL levels. The RSL is only used, instead of the CHHSL, in those instances where the toxicity values used in the CHHSLs are outdated. Specifically, the following exceptions to the general hierarchy are as follows: • PCBs (use RSL, which incorporates more recent updated oral cancer slope factor, consistent with the AOC 4 discussions); • cadmium (calculate a 'modified' CHHSL, because consistent with USEPA, CA no longer considers cadmium to be carcinogenic via oral exposure. Calculated a 'modified'

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DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
				CHHSL (as opposed to using the RSL), because CA has a more conservative inhalation potency factor than USEPA (0.0042 versus 0.0018 (ug/m3$^{)-1}$); • cobalt (use RSL, because the toxicity value for cobalt has been updated); and • vanadium (use RSL, because the toxicity value has been updated). Based on discussions with DOI and DTSC, and because the RSLs and CHHSLs do not have screening levels for petroleum compounds, the Environmental Screening Levels (ESLs) developed by staff of the California Regional Water Quality Control Board-San Francisco Bay Region will be used to screen soil samples analyzed for TPH-gasoline, diesel, and motor oil. It is important to note that the use of ESLs will be limited only for petroleum hydrocarbons defined as TPH-gasoline, diesel, and motor oil. Individual hydrocarbon compounds that comprise TPH, such benzene, toluene, ethyl benzene, xylenes, and polycyclic aromatic hydrocarbons will be screened based on appropriate RSLs or CHHSLs. The Regional Board has developed several TPH ESLs based on different end points, such as leaching to groundwater, human health (ESLs are developed for both a

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DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
				Hazard Index of 0.2 and 1.0), and gross contamination. TPH ESLs for the protection of terrestrial species are not available. PG&E proposes to use the ESLs developed for a residential exposure scenario for human health, based on a Hazard Index of 1.0. Using screening levels that are based on a Hazard Index of 1.0 is consistent with the CHHSLs and RSLs, which for noncancer endpoints are based on an HI of 1.0. Leaching of TPH to groundwater will be evaluated by assessing leaching of the individual hydrocarbon compounds that comprise TPH. From ESL Table K-1, the following TPH Screening levels are proposed: TPH-G = 540 mg/kg TPG-D = 540 mg/kg TPH-MO = 1,800 mg/kg
16	Section 2.7.1.3 and Figure 6	M	Box 8, which includes the statement that nature and extent have been adequately defined, is not a suitable endpoint if additional sampling is judged to be warranted but infeasible (i.e., path from Box 13). All that can be said in that case is that no further data collection is required. DOI's recommended Decision Rule appropriately addressed this condition by adding the phrase "no further data collection is necessary to resolve Decision 1" to the equivalent of Box 13.	Comment noted - Figure will be modified.
17	Section 2.7.2.2, 1st bullet	E	There is a typo in the 1st bullet. Should read "… at a given unit, combination <u>of</u> units, or portion …"	Text revised as suggested.

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DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
18	Section 2.7.2.3, 2nd bullet	E	There is a typo in the 2nd bullet, second sentence. Box number is missing. Should be Box 7.	Text revised as suggested.
19	Section 2.7.2.3, 2nd bullet	E	There is a typo in the 2nd bullet. The flow path leads back to Box 2 to restart the process, not Box 1.	Text revised as suggested.
20	Section 2.7.2.3, 3rd paragraph	M	Determining the “various soil technologies being considered” at this phase of the soil investigation is premature and cannot be utilized in determining whether the proposed characterization depth is valid. This is particularly true since the soils investigation information will also be used to evaluate groundwater impacts.	Assume comment is referring to Section 2.7.1.3. Text revised as suggested.
21	Section 2.7.3.1 and Figure 8	M	PG&E chose to eliminate DOI’s recommended path for responding to evidence of a current impact to groundwater without modeling (Box 5 of DOI’s revisions to the draft Decision Rule for Decision 3). Modeling is appropriate for assessing potential future threat in cases where existing data indicate groundwater is not likely to be currently affected, but soil exceeds groundwater protection levels. However, modeling typically would not be an appropriate response in cases where existing data indicate a current impact to groundwater is possible. Please add the DOI recommended path for moving directly to plan development in the event that data indicate a current impact to groundwater may exist.	Text revised as suggested.
22	Section 2.7.4.3, 2nd bullet	E	There is a typo in the 2nd bullet. The flow path leads back to Box 2 to restart the process, not Box 1.	Text revised as suggested
23	Figure 7	M	Box 2 introduces new language “calculate/determine a reliable EPC” versus the language in the text (and recommended by DOI) of “calculate a representative EPC”. The process is in fact calculation of a representative EPC. Revise the language on Figure 7 as recommended by DOI and included in Section 2.7.2.2.	Comment noted. Figure 7 has been modified to be consistent with the text.

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DOI Comments – January 22, 2010

Comment Number	Location	Type[a]	Comment	Comment Response
24	Figure 8	M	Please add Box 1 to be "Combine Part A and historical RFI/RI data" as recommended in DOI's revisions to the draft Decision 3 Decision Rule. PG&E omitted this box leaving the question of which data to be compared unanswered.	Text revised as suggested

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DTSC Comments – January 11, 2010

Comment Number	Location	Comment	Response
1	Section 2.7.1.3 (Box 11 decision)	The discussions leading to the possible outcomes for this box should indicate that the agencies shall be consulted prior to determining the outcome of Box 11.	Comment noted and text has been revised.

[a] Comment Types: A = Advisory comment, M = Mandatory Revision, P = Proposed Revision, C = Clarification Request, E = Editorial Revision recommended

Data Quality Objectives Steps 1 through 5 – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

PREPARED FOR:	Pacific Gas and Electric Company
PREPARED BY:	CH2M HILL
DATE:	December 14, 2009
	Revised: March 12, 2010

1.0 Introduction

The purpose of this technical memorandum is to document the results of Steps 1 through 5 of the data quality objectives (DQO) process for Phase 2 of the soil investigation outside the fence line of the Topock Compressor Station (referred to as Phase 2 of the Soil Part A program). The California Department of Toxic Substances Control's (DTSC's) August 10, 2007 conditional approval letter for the Soil Part A Work Plan specifically rejected the DQO sections in that workplan while directing PG&E to implement Phase 1 of the soil sampling program in accordance with the work plan. DTSC, the United States Department of the Interior (DOI), and Pacific Gas and Electric Company (PG&E) then convened a series of meetings to collaboratively develop the DQOs for evaluating Phase 1 data and identifying sampling needs for Phase 2 of the soil Part A program. Steps 1 through 5 were addressed during several meetings held from June through September 2008. Steps 6 and 7 will be addressed during meetings to be held in the first half of 2010.

The Soil Part A program addresses 9 Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and other undesignated areas (UAs) outside the Topock Compressor Station fence line. These areas are SWMU 1/AOC 1, AOCs 4, 9, 10, 11, 12, and 14; Undesignated Area (UA) 1 -- the Potential Pipeline Disposal Area; and UA 2 -- the Former 300B Pipeline Liquids Tank. These units are shown in Figure 1. (All figures are provided at the end of this technical memorandum).

The DQO process is a recognized procedure for defining project objectives and decisions, and optimizing sampling and other information-gathering programs to balance uncertainty, site disturbances, and cost in an acceptable manner. The goal of the DQO process is to ensure that data collected at each stage of the investigation process are of sufficient quantity and quality to enable the specified decisions to be made.

The United States Environmental Protection Agency (USEPA) has issued detailed guidance for the DQO process (USEPA, 2000, 2006a-b). The DQO process consists of seven steps:

- **Step 1: State the Problem.** Concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem. Identify resources available to resolve the problem, and develop the conceptual site model.
- **Step 2: Identify the Decision(s)**. Identify the principal study questions that require new environmental data to address the contamination problem and what actions may result to resolve the problem statement.
- **Step 3: Identify the Inputs to the Decision**. Identify the information and environmental measurements that are needed to resolve principal study questions
- **Step 4: Define the Study Boundaries**. Specify the spatial and temporal aspects of the environmental media that the data must represent to support the decision.
- **Step 5: Develop a Decision Rule**. For each principal study question, define the statistical parameter(s) of interest, specify action levels, and integrate the previous DQO outputs into "if…then" statements that describe the logical basis for choosing among alternative actions.
- **Step 6: Specify Tolerable Limits on Decision Errors**. Define the decision makers' tolerable decision error rates based on the consequences of making an incorrect decision.
- **Step 7: Optimize the Design**. Evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

While the steps of the DQO process are described sequentially above, the iterative nature of the DQO process allows one or more of these steps to be revisited as more information on the problem is obtained. Detailed DQOs for the subsequent phases of the soil investigation will be developed during those phases.

This technical memorandum addresses Steps 1 through 5 of the DQO process for Phase 2 of the Soil Part A program. DTSC, DOI, and PG&E agreed to defer Steps 6 and 7 pending completion of Phase 1 sampling and analysis, and to address those two steps once validated data from the Phase 1 Part A site investigation are available for each of the AOCs. An understanding of the characteristics of the Phase 1 data is necessary to guide decisions on the tolerable limits on decision errors for Phase 2 data.

2.0 Data Quality Objectives

Steps 1 through 5 of the DQO process for Phase 2 were completed collaboratively by DTSC, DOI, and PG&E for all of the investigation areas included in the Soil Part A Work Plan. This section provides a detailed description of the assumptions for each step and the process for implementing each step. A summary of the DQOs for Steps 1 through 5 is provided in Table 1.

2.1 Step 1: Problem Statement

Step 1 consists of defining the problem and includes review of existing information; identification of the planning team; development of a conceptual model of the environmental hazard to be investigated (site conceptual model); identification of available resources, constraints, and deadlines; and a brief discussion of potential remedial/closure options. These components are described in detail below.

2.1.1 Problem Definition

Historic practices at the Topock Compressor Station have resulted in known and potential releases of constituents of potential concern (COPCs) and constituents of potential ecological concern (COPECs) in several locations in the vicinity of the station. These locations are defined in the approved *Revised Final RCRA Facility Investigation/Remedial Investigation Report, Volume 1 – Site Background and History* (Revised Final RFI/RI Volume 1) (CH2M HILL, 2007). The Soil Part A program addresses SWMU 1/AOC 1, AOCs 4, 9, 10, 11, 12, and 14; UA 1, the Potential Pipeline Disposal Area; and UA 2, the Former 300B Pipeline Liquids Tank. The existing data regarding these units have been documented in the Soil Part A Work Plan.

The overall problem statement for the Soil Part A program is:

Contaminants in soil in AOCs/UAs outside the compressor station fence line resulting from historical compressor station practices may pose an unacceptable risk to humans or the environment, or threaten groundwater. Additional site-specific information is needed to:

- *Determine the nature and extent of soil and sediment contamination*
- *Estimate representative exposure point concentrations (EPCs) to support human health and ecological risk assessment being conducted separately from the Part A soil study*
- *Determine whether residual soil concentrations pose a threat to groundwater*
- *Estimate soil properties and contaminant distribution in support of the Corrective Measures Study/Feasibility Study (CMS/FS) and/or remedial design*

The nature and extent of soil COPCs and soil COPECs associated with former compressor station practices at or affecting these units must be defined to determine whether unacceptable risks or impacts to groundwater occur currently or could occur in the future, and whether soil remediation is required and should be implemented. The extent of the soil COPCs and COPECs must be understood in sufficient detail laterally and vertically to allow risk assessment to be conducted and remedial decisions to be made.

2.1.2 Conceptual Site Models

The conceptual site model (CSM) is a schematic representation of how constituents released from a source may be transported to the surrounding environmental media and ultimately may come into contact with human or ecological receptors. The CSM includes known and suspected sources of contamination, types of constituents and affected media, known and potential routes of migration, and known or potential human and environmental receptors.

The CSMs provide the framework for where and to what depths investigations should occur and the factors that must be considered in developing screening values. The CSMs also support the identification of potential remedial technologies. Information on contaminant transport and migration mechanisms and potentially exposed receptors helps guide the necessary investigation of the lateral and vertical extent of contamination. Detailed investigation-area-specific CSMs were developed for the *Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California* (RAWP; ARCADIS, 2008a). The CSMs originally presented in the RAWP were based on knowledge from historical data. Those CSMs have been updated to incorporate the findings of the Groundwater Risk Assessment (GWRA; ARCADIS 2009), and included herein as Figures 2 through 5. The focus of the CSMs is on evaluating potential exposure pathways to human and ecological receptors.

The CSMs rely on the detailed information on the physical characteristics and setting of the study area, including surface features, meteorology, site geology, surface water hydrology, site hydrogeology, land use, cultural resources, and ecology presented in Appendix A of the Part A Work Plan.

2.1.3 Constituent Release, Migration, and Potential Exposure Pathways

Figures 2 through 5 depict the conceptual contaminant release, migration, and potential exposure pathways for the following areas and receptors:

- Figure 2 - Bat Cave Wash: recreational, tribal, worker, and hypothetical future groundwater uses
- Figure 3 - AOCs 4, 9, 10, 11, 12, and 14, and UA-1 and UA-2: recreational, tribal, worker, and hypothetical future groundwater uses
- Figure 4 - Bat Cave Wash: future hypothetical residential user north of the railroad
- Figure 5 - Bat Cave Wash and other areas outside the compressor station: ecological receptors

2.1.3.1 Overview of Release and Migration Pathways

For simplicity, this discussion addresses the common features of the four CSMs. All CSMs have surface soil as the primary source medium. All CSMs also include the release mechanism where COPCs in surface soil may be eroded and entrained in stormwater/ surface water runoff and subsequently re-deposited as contaminated soil in other areas within a wash or ravine. Entrained soil may be transported to areas of standing or flowing water and then be deposited in downstream areas. Soil that is inundated with water even in the absence of storm events is considered sediment. When entrained soil is deposited in these areas, it is considered sediment, and may result in the presence of contaminated sediment.

In order for soil to be entrained in run-off, it must be scoured from another portion of the project area. Such potential 'scouring' events were discussed with the agencies, and various hypothetical soil scouring depths were agreed upon in order to identify Phase 2 sampling needs and the relevant exposure depth intervals that would be used to assess the potential significance of chemical impacts (ARCADIS, 2008a).

Contaminated surface soil or sediment resulting from entrainment of affected soils are secondary source media or exposure media and may be ingested or contacted directly. COPCs/COPECs may also be entrained as dust in ambient air, leading to potential inhalation exposure and/or surface re-deposition (ARCADIS, 2008a).

All CSMs also show that contaminants in surface soil may also percolate or infiltrate into the subsurface to affect subsurface soil and groundwater as secondary source media. Contaminated subsurface soil may be ingested, contacted directly, or inhaled as dust during intrusive events.

Historical data show that volatile organic compounds (VOCs) have been infrequently detected at very low concentrations in soil; therefore, historical data suggest that volatilization is an insignificant secondary release mechanism. However, as indicated in Table 1, additional soil sampling is proposed to further evaluate the presence of compounds that may volatilize and affect ambient air, potentially leading to inhalation exposure. As shown on the CSMs, if VOCs are present in groundwater, the VOCs may also be volatilized to affect ambient air, leading to inhalation exposure. However, the GWRA concluded that VOCs were infrequently detected at low levels in groundwater. Therefore, the GWRA concluded that volatilization from pumped groundwater and subsequent inhalation of VOCs was an insignificant pathway.

The CSMs all include a migration pathway showing groundwater potentially impacted by subsurface soil contamination, with subsequent migration of contaminated groundwater to extraction wells and discharge to surface water, leading to potential ingestion and dermal contact exposure routes. These potential exposure pathways were the subject of the GWRA (ARCADIS, 2009) for releases to SWMU 1/AOC 1. The GWRA concluded that hexavalent chromium is the only risk-related chemical of concern (COC) for the groundwater CMS/FS (CH2M HILL, 2009)[1]. The GWRA also concluded that discharge of chemically-affected groundwater to surface water is an insignificant pathway based on a review of site-specific groundwater and surface water data. Accordingly, the GWRA (ARCADIS, 2009) concluded that quantitative surface water human health and ecological risk assessments are not warranted.

The focus of this technical memorandum is to develop DQOs for: (1) guiding the soil sampling activities and (2) evaluating soil data (e.g., evaluating the potential for previously unidentified soil contamination to impact groundwater quality). Therefore, surface and subsurface soil are the primary media of interest for data collection and evaluation.

2.1.3.2 Human Health Potential Migration and Exposure Pathways for Bat Cave Wash

In Bat Cave Wash, the primary source of contamination for the surface soil is historic direct discharge of untreated wastewater at SWMU 1, the Former Percolation Bed (see Figures 2 and 4). Topography generally limits surface runoff pathways in Bat Cave Wash to the floor

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[1] Because there is no current direct human exposure pathway for contact with impacted site groundwater, there is no human or population currently at risk of adverse health effects due to the presence of chemicals in the groundwater. Further, because there is no significant ecological exposure pathway for contact with impacted site groundwater, there is no ecological population currently at risk of adverse effects due to the presence of COPCs in the groundwater

of the wash. Periodic runoff and flash flood events may disturb the soil bed, resulting in rapid erosion, movement, and re-deposition of material down wash. These events can cover surface soil and expose subsurface soil, and are referred to as scouring events.

Windblown contamination from the wash may not be fully constrained within the bed of the wash. While it is possible for surface soil contaminants eroded and dispersed by wind to potentially affect areas outside the wash limits, aerial deposition of windblown contamination is generally expected to follow a pattern of decreasing concentrations with increasing distance from Bat Cave Wash.

North of the railroad, future residential use of the wash is hypothesized by DOI (see Figure 4). Residential activities hypothesized by DOI include eating homegrown produce and poultry. Garden produce and poultry could contact contaminants directly from contaminated surface soil, or could contact contaminants through irrigation with impacted groundwater. The GWRA has already evaluated irrigation with contaminated groundwater, and concluded that potential human exposure to produce and poultry irrigated with impacted groundwater is insignificant relative to the potential exposure resulting from direct ingestion and dermal contact with impacted groundwater (ARCADIS, 2009). Soil data proposed for collection in Part A will be used to evaluate the potential significance of contact of homegrown produce and poultry with contaminants in soil. Therefore, for this pathway, surface and subsurface soil (depths consistent with garden produce root growth) are the media of interest for soil sampling north of the railroad.

Soil data for Bat Cave Wash will be used to evaluate potential risk from contaminated surface and subsurface soil that may be ingested or contacted directly, or soil particles that may be entrained as dust in ambient air, leading to potential inhalation exposure. The hypothetical future resident and maintenance worker both are assumed to participate in intrusive activities as described in the RAWP (ARCADIS, 2008a).

2.1.3.3 Human Health Potential Migration and Exposure Pathways for AOCs 4, 9, 10, 11, 12, and 14, and UA-1 and UA-2

This section addresses other areas (i.e., AOCs 4,9,10,11, and 14 and UA-1 and UA-2) besides Bat Cave Wash where contaminants may be present due to the migration pathways shown on Figure 3 and described above (see Section 2.1.3.1). The primary sources for release to surface soil in these areas include: discharges/runoff from the compressor station, disposal of debris, leaking above ground tank, and potential pipe disposal area. Constituents known to have been released at the Topock Compressor Station consist of non-volatile compounds. These constituents were released primarily as liquids. Some constituents may also have been released as dust on the station (i.e., from sand blasting) and would have been deposited onto the ground surface. These constituents would also have been transported outside the facility fence line via stormwater runoff.

Local topography is the primary feature to consider when examining releases of constituents from the Topock Compressor Station to areas outside the fence line via surface runoff. The compressor station is located on a ridgeline bordered by low areas (washes and ravines) on the north, east, west, and southwest sides of the station. Higher-elevation terrain is located to the south and southeast. In the past, runoff from the compressor station would have preferentially entered and/or accumulated in low-lying areas, including the Debris

Ravine (AOC 4), the East Ravine (AOC 10), and other topographic low areas (AOC 11) contiguous with the compressor station fence line, potentially contaminating surface soil.

Topography generally limits surface runoff pathways in the ravines to the floor of the ravines. Within the East Ravine, several impoundment berms were constructed across the ravine in the past. Within the Debris Ravine and AOC 11, periodic runoff events disturb the soil bed, resulting in rapid erosion, movement, and re-deposition of material downstream. Impoundment areas and stable low-lying areas are most likely to contain contaminated soil.

Potential groundwater contamination extent and migration is not restricted by topography. Contaminated groundwater originating from the ravines, if present, could migrate in directions different from the topographic slope. The groundwater impact of discharges to AOC 1/SWMU 1 were thoroughly evaluated outside the boundaries of Bat Cave Wash by the RFI/RI and the GWRA.

Prior investigation results indicate that COPCs released to SWMU 1 (Former Percolation Bed) have also entered groundwater. While soluble constituents have the potential to have been transported to groundwater at other locations outside the compressor station, the quantity of liquids released and the frequency of release would only be a small fraction of the volume of liquid released to SWMU 1.

Solid materials and debris have been disposed of at the Debris Ravine (AOC 4) and the Railroad Debris Site (AOC 14). Debris may have been disposed of at the Fill Area (AOC 12) and UA 1 (Potential Pipeline Disposal Area). In these locations, debris of various types was physically placed into the unit. In many cases, the debris was subsequently covered with soil. In addition, white powdery material is present in SWMU 1, within the bank of Bat Cave Wash below the compressor station.

COPCs associated with the debris located in these areas and the white powder in Bat Cave Wash could be located in the immediate vicinity of the debris or powder and in surrounding and underlying soil. In some cases, stormwater runoff could transport debris, powder, and contaminated soil to lower-lying areas.

Soil data for each area will be used to evaluate potential risk from contaminated surface and subsurface soil that may be ingested or contacted directly, or soil particles that may be entrained as dust in ambient air, leading to potential inhalation exposure.

2.1.3.4 Ecological Potential Exposure and Migration Pathways for Bat Cave Wash and Other Areas

Figure 5 depicts the ecological CSM for Bat Cave Wash and AOCs 4, 9, 10, 11, 12, and 14, and UA-1 and UA-2. The primary sources and primary source medium (surface soil) are the same as depicted for human exposure. The ecological CSM differs from the human CSMs in the receptors and the distinction between shallow soil and deeper soil, reflecting the potential for exposure of plants, invertebrates, and burrowing mammals in shallow soil but not deeper soil. Potential exposure media include surface soil, shallow soil, and sediment, as well as aquatic and terrestrial biota tissue (which can lead to exposure via ingestion), direct contact, root uptake, or inhalation of particulates.

2.1.4 Potentially Exposed Receptors

The investigation areas are located in and adjacent to public lands, including the Havasu National Wildlife Refuge and land owned by United States Bureau of Reclamation (managed by United States Bureau of Land Management [BLM]). Access limitations are due primarily to topography and climate. There is no active effort to limit human access to the area. Thus, there are both potential human and ecological receptors for soil. Potential exposures to groundwater from SWMU 1 (Former Percolation Bed) and AOC 1 (Bat Cave Wash) have been addressed in Final RFI/RI Volume 2 (Groundwater) and the GWRA (ARCADIS, 2009).

2.1.4.1 Potential Human Receptors

The human receptor populations are grouped as follows:

- Bat Cave Wash – recreational user, tribal user, maintenance worker, hypothetical future groundwater user, and hypothetical future resident (north of the railroad only)
- Other AOCs/UAs outside the compressor station fence line – recreational user, tribal user, maintenance worker, and hypothetical future groundwater user

Recreational users hiking in or visiting the wildlife refuge would be expected potentially to come into contact with soil intervals (see below) defined as: surface (0 to 0.5 ft bgs) and shallow (0 to 3 ft bgs). Maintenance workers may come into contact with subsurface soils as deep as 10 feet (bgs) if a gas pipeline has to be fully exposed for maintenance work (defined as subsurface II). PG&E is working with tribal representatives to develop a tribal use scenario and to define the specific land-use locations and exposure assumptions that would be representative of tribal use of the land.

The GWRA (ARCADIS, 2009) evaluated the potential groundwater impacts associated with Bat Cave Wash, as well as any potential groundwater impacts located outside the wash. The assumption was made that the groundwater, in the future, could be hypothetically used as a potable source of water across any site location, even if residential use is not planned for that area. Therefore, the hypothetical future groundwater user is included on CSM Figures 2 through 4 since the groundwater was evaluated in the GWRA for all areas sampled regardless of well location.

It is unlikely in the foreseeable future that the land currently occupied by the Havasu National Wildlife Refuge and managed by the United States Fish and Wildlife Service will become residential. However, BLM has specifically requested an evaluation of a future residential use on its property. Therefore, although future residential land use is a highly unlikely scenario, a future hypothetical residential land use scenario will be evaluated for BLM property in Bat Cave Wash north of the railroad. PG&E plans to continue owning and operating the associated property outside the fence line as supporting areas for the compressor station for the foreseeable future. Accordingly, the reasonably anticipated future use of the PG&E-owned land is for ongoing industrial operations.

Federal workers may be engaged in land management activities on Refuge and BLM land, such as sampling, fire suppression, or various types of foliage or wildlife maintenance. The recreational and maintenance worker receptors are expected to be protective of the federal worker receptor.

2.1.4.2 Potential Ecological Receptors

Ecological receptors outside the compressor station may include terrestrial flora and fauna associated with Mojave Creosote scrub, Mojave wash scrub, Desert Riparian, and Tamarisk Thicket habitats. Representative animal receptors present in the vicinity of the site include birds such as raptors, songbirds, ground-nesting birds, and species tolerant of human disturbance (e.g., dove and raven). Snakes, lizards, small mammals, larger herbivores, and larger carnivorous mammals such as the desert kit fox are also present. Representative terrestrial receptors include larger burrowing animals (e.g., kit fox) capable of burrowing to depths of several feet bgs and deep-rooted plants such as mesquite. Other representative terrestrial plant species include creosote bush and associated species such as spineflower (*Chorizanthe brevicornu*) and cheesebush (*Hymenoclea salsola*).

2.1.4.3 Leaching to Groundwater

A potential indirect exposure route associated with soil is the potential for residual COPCs in soil to leach to groundwater. If the rate of leaching is sufficiently high, concentrations of COPCs in groundwater could potentially pose a risk if receptors are exposed to groundwater or groundwater migrates to a location where it can affect surface water. There are no current uses of the groundwater near the facility. As indicated above, potential risks associated with groundwater affected by SWMU 1/AOC 1 are being addressed separately.

2.1.4.4 Potential Exposure Depth Intervals

Based on the types of receptors likely to be found in the investigation areas and nearby areas, the types of activities likely to occur, and the nature of the soils in the area, four exposure depth intervals are of interest; surface soil, shallow soil, subsurface soil to 6 ft bgs and subsurface soil to 10 ft bgs. For human health, exposure intervals for soil are surface soil (0 to 0.5 foot bgs), shallow soil (0 to 3 feet bgs), subsurface soil I (0 to 6 feet bgs), and subsurface soil II (0 to 10 feet bgs). For ecological receptors, exposure intervals for soil are surface soil (0 to 0.5 foot bgs), shallow soil (0 to 3 feet bgs), and subsurface soil I (0 to 6 feet bgs).

2.2 Planning Team

The planning team for the Soil Part A program consists of PG&E, DTSC, DOI, and the tribes. Designated representatives from these organizations will meet to evaluate data and determine whether each of the decisions to be made can be made with a sufficient level of certainty.

2.3 Constraints, Resources, and Deadlines

Resources available to complete the soil RFI/RI and subsequent steps in the RCRA corrective action and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) programs consist of PG&E staff and consultants, DTSC and DOI staff and consultants, and tribal staff and consultants. Resources are limited in terms of available knowledgeable staff and project deadlines (as outlined in the project "rainbow" schedule). The Soil Part A program is on the critical path to determining and implementing the final soil remedy for the project.

There are physical, cultural, and biological constraints on the site investigation and remediation effort. Physical constraints outside the fence line consist of challenging topography, limited access, and possible presence of high-pressure gas lines and other utilities. The remote location of the compressor station also makes certain investigation and remediation activities more difficult. In addition, the site is located in and around sensitive habitat areas. The site is also located in an area rich in cultural and historical resources. Several federally recognized tribes have identified areas of traditional, religious, and cultural importance in the vicinity of the Topock Compressor Station..

The physical constraints and the types of COPCs and COPECs released limit the potential remedial actions that could be employed to address constituents posing an unacceptable risk to human health and the environment or threat to groundwater. For the purposes of developing these DQOs, the potential remedial actions fall into three categories: (1) no further action, (2) institutional controls, and (3) certain remedial technologies and will be further defined in the CMS/FS workplan.

2.4 Step 2: Identify the Decisions

Step 2 consists of identifying the decisions to be made in the Part A soil study. Activities completed in this step consist of identifying the principal study questions, defining the alternative actions that may be taken based upon the range of possible outcomes , and combining the alternative actions and the principal study questions into decision statements.

The Part A soil investigation sampling and analysis activities are intended to provide site-specific information to:

- Determine the nature and extent of soil and sediment contamination
- Estimate representative exposure point concentrations (EPCs) to support human health and ecological risk assessment being conducted separately from the Part A soil study
- Determine whether residual soil concentrations pose a potential threat to groundwater
- Estimate soil properties and contaminant distribution in support of the Corrective Measures Study/Feasibility Study (CMS/FS) and/or remedial design

Based on these objectives, four principal study questions were identified. The principal study questions and alternative outcomes of the questions are discussed below. A decision statement is provided for each. Decision statements are summarized in Table 1.

1. What are the nature and extent of residual soil and/or sediment COPC and/or COPEC concentrations resulting from historic compressor station practices?

   The alternative outcomes of this question are: (a) the nature and extent of residual soil and/or sediment concentrations are fully defined based on sample data; or (b) it is infeasible or unwarranted to fully define the nature and extent of soil and/or sediment concentrations based on sample data, and uncertainties will be addressed in the risk assessment and/or CMS/FS.

   Decision Statement: Determine the nature and extent of residual soil and/or sediment concentrations resulting from historic compressor station practices. If determination of the full nature and extent of soil and/or sediment concentrations based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment and/or CMS/FS.

2. What are representative EPCs for residual soil and/or sediment contamination resulting from historic compressor station practices?

   The alternative outcomes of this question are: (a) representative EPCs can be determined based on sample data; or (b) it is infeasible to determine representative EPCs based on sample data, and uncertainties will be addressed in the risk assessment.

   Decision Statement: Determine representative EPCs for residual soil and/or sediment contamination resulting from historic compressor station practices that may pose unacceptable risks to current or future human or ecological receptors. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment or CMS/FS.

3. Do residual soil concentrations resulting from historic compressor station practices pose a potential threat to groundwater?

   The alternative outcomes of this question are: (a) conclude a threat to groundwater may exist, warranting either further site investigation or remedial action to protect groundwater, or (b) conclude no threat to groundwater exists and no further action is needed to protect groundwater.

   Decision Statement: Determine whether residual soil concentrations resulting from historic compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat, or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address potential threats to groundwater.

4. What are the site-specific soil properties and contaminant distribution relative to CMS/FS decisions and/or remedial design, if remediation is anticipated?

   The alternative outcomes of this question are: (a) site-specific soil property and contaminant distribution information can be fully determined based on sample data to support the CMS/FS and remedial design; or (b) it is infeasible to fully determine site-specific soil property and contaminant distribution information based on sample data, and uncertainties will be addressed in the CMS/FS decisions and remedial design.

   Decision Statement: Determine the site-specific soil property and contaminant distribution information necessary to support the CMS/FS decisions and remedial design. If full determination of site-specific soil property and contaminant distribution information based on sample data is not feasible, address uncertainties in the CMS/FS and remedial design.

2.5 Step 3: Inputs to the Decision

Once the necessary decisions have been determined, the next step is to identify the inputs required to make the decisions. While there may be significant overlap between the inputs required for the various decisions, the inputs for each decision are defined separately, to ensure all required inputs have been identified. Inputs for each decision are also listed on Table 1.

2.5.1 Inputs to Decision 1 – Nature and Extent of COPCs/COPECs

Three types of information have to be available and considered when assessing whether the nature and extent of contamination at a site are adequately understood: (1) usable COPC and COPEC concentration data, (2) potential contaminant fate and transport mechanisms, and (3) screening and comparison values.

Both existing and new data may provide usable COPC and COPEC concentrations for soil and sediment. Newly collected COPC and COPEC concentration data must meet data quality criteria (including reporting limits and other criteria) set forth in the *Draft PG&E Program Quality Assurance Project Plan* (QAPP) (CH2M HILL, 2008a) to be considered usable. Existing data were evaluated in the *Final Soil and Sediment Data Usability Assessment Technical Memorandum, PG&E Topock Compressor Station* (CH2M HILL, 2008b). Category 1 and 2 data will be used to delineate the nature and extent of contamination. Collectively, new data meeting the criteria set forth in the QAPP and Category 1 and 2 data identified in the Data Usability Assessment are considered usable COPC and COPEC data for Decision 1. Sufficient usable data must be available for each unit. These usable COPC and COPEC concentration data must be compared to background and other screening levels to assess whether the delineation of nature and extent is adequate.

As described in the Revised Final RFI/RI Volume 1 (CH2M HILL, 2007), five phases of data collection have been completed to date to support characterization of SWMUs and AOCs at the Topock Compressor Station. Data collected from implementation of the Part A Work Plan will be combined with the usable data from the existing data set.

The CSMs are an input to Decision 1 because they describe the potential transport mechanisms and fate of COPCs and COPECs potentially released into the environment. This ensures that site data are collected in the appropriate locations.

Six types of comparison/screening levels were identified for this study: background soil concentrations (CH2M HILL 2009), ecological comparison values (ECVs) that are calculated to be protective of the species potentially present in the area outside the fence line, DTSC California human health screening levels (CHHSLs) for residential use (OEHHA, 2005), USEPA regional screening levels (RSLs) for residential use for those compounds for which CHHSLs are unavailable (USEPA, 2008), Environmental Screening Levels (ESLs) developed by staff of the California Regional Water Quality Control Board-San Francisco Bay Region for screening soil samples analyzed for total petroleum hydrocarbons (TPH) gasoline, diesel, and motor oil (RWQCBSF, 2008), and project specific screening levels developed for COPCs/COPECs identified from TAL/TCL data. All six types of screening levels will be specifically used to assess the extent of contamination, and do not necessarily indicate the presence of unacceptable risk (which will be evaluated in the Baseline Risk Assessment). Ideally, the extent of contamination will be defined to the lowest of the applicable delineation action levels. As noted in the discussion for Step 1, physical, cultural, and biological constraints may limit the feasibility of sampling in certain areas.

The background soil study determined that background metals concentrations are generally consistent throughout the study area and the soil column, and that there are no ambient levels of polycyclic aromatic hydrocarbons (PAHs) or pesticides. The results of the background soil study and the statistical analyses describing the characteristics, uses, and limitations of the background soils dataset will be submitted separately as a technical memorandum for review and approval by DTSC and the federal agencies. A series of statistical tests will be conducted to assess whether concentrations of constituents detected in the soil at the various units are elevated above background. There is no single statistical test that can be used to determine when concentrations in soil represent background levels. Rather, there are several tests that may be used to support this determination. To evaluate whether the concentrations of constituents across the exposure area are comparable to background concentrations, the use of both point estimates (e.g., the 95 percent upper tolerance limit) and statistical distributional tests (comparisons of means and medians) may be used to compare the concentrations of constituents detected to background concentrations.

ECVs have been developed for metals and those organic constituents encountered in the top 6 feet of soil. ECVs will be used to a maximum depth of 6 feet bgs, consistent with DTSC guidance for ecological risk assessment (CalEPA, 1998) and as agreed for burrowing animals in the RAWP (ARCADIS, 2008a). CHHSLs, RSLs, ESLs, and project specific screening levels developed for TAL/TCL COPCs/COPECs will be used to a maximum depth of 10 feet bgs, consistent with the RAWP for human health risk assessment for exposure to soil (ARCADIS, 2008a).

2.5.2 Inputs to Decision 2 – Data to Support EPC Calculations

The inputs required for Decision 2 include COPC and COPEC concentrations in soil and sediment within the exposure areas and depth categories defined in the RAWP (ARCADIS, 2008a). Only COPC and COPEC data meeting data quality Category 1 standards may be used for the risk assessment. A Data Usability Matrix for Soil Risk Assessment has been developed to aid in evaluating data usability and adequacy for risk assessment purposes and will be used as a Decision 2 input tool (See Table A-1, Appendix A). The matrix lists the total number of existing and newly collected samples per AOC and sub AOC areas, identifying horizontal and vertical coverages, exposure depths as defined in the RAWP (ARCADIS, 2008a), analytical suites, data quality, representativeness and comparability.

Approaches for developing the human health and ecological risk assessments and estimating representative EPCs are specified in the RAWP (ARCADIS, 2008a). The EPC is a conservative estimate of the average chemical concentration in an environmental medium to which a receptor may be exposed. The EPC is constituent-specific and is estimated for each individual exposure area within a site. The risk assessments will calculate EPCs based on specific data groupings and depth categories, as discussed below. Therefore, it is critical to consider those data groupings and depth categories when determining the inputs needed for estimation of representative EPCs.

For the human health risk assessment, the exposure areas outside the fence line consist of: (1) Bat Cave Wash (which includes SWMU 1/AOC 1 and the portion of the drainage feature extending north to the river); (2) the remaining AOCs/UAs located outside the compressor station fence line; and (3) 1/8-acre parcels within Bat Cave Wash north of the railroad (for the hypothetical future residential user only). Once data are available from the soil sampling activities, additional refinements to the exposure areas may occur.

The EPCs for direct soil contact (i.e., soil ingestion, dermal contact, and inhalation of particulates) will be estimated based on separate data groups for each of the exposure areas and will consider the following separate depth categories for each receptor: 0 to 0.5 foot bgs, 0 to 3 foot bgs, 0 to 6 foot bgs, and 0 to 10 foot bgs. Typically, the soil EPCs will be the 95% upper confidence limit (UCL) on the arithmetic mean for the exposure area and depth category being considered. Additionally, specific areas of hot spots may warrant specific assessment. In general, the identification of hot spots will be conducted through visual examination of the data. Visual examination of the data is a qualitative assessment that includes consideration of relative concentrations in relation to nearest neighboring sampling locations (both horizontally and vertically), field observations of staining or debris, and topography. Additional assessment may consist of evaluating the site data for outliers, which if conducted, will be done quantitatively using applicable statistical tests and may require additional and/or alternative statistical evaluations for identifying the appropriate EPCs.

EPCs in air from dust will be modeled from soil data by dividing the concentration of each constituent in the soil by a particulate emission factor. As stated in the preceding paragraph, the EPCs for direct contact pathways, including particulate inhalation, will be estimated using data from the four listed depth intervals, as appropriate, for the receptor as identified in the RAWP. EPCs in air from VOCs, if present, will be modeled from soil data based on a volatilization factor equation.

For the ecological risk assessment, the exposure areas for the large home range receptors consist of Bat Cave Wash and AOC 4 as one exposure area, and AOCs 9, 10, 11, 12, and 14 and UA-1 as another single exposure area. For the small home range receptors, the ecological risk assessment will initially include each individual AOC/UA as a separate exposure area. Once data are available from the soil sampling activities, additional refinements to the exposure areas may occur.

For direct exposure, the ecological risk assessment will evaluate representative EPCs from soils within the depth categories of 0 to 0.5 foot bgs, 0 to 3 foot bgs, and 0 to 6 foot bgs, which are consistent with three of the categories specified for the human health risk assessment. Therefore, soil data needed to address direct exposure for the ecological risk assessment conform to data needs for the human health risk assessment.

Typically, the EPCs for soil and sediment COPECs will be the 95% UCL on the arithmetic mean. The maximum detected concentration may be selected if the data do not support a valid UCL calculation. Additionally, specific areas of hot spots may warrant specific assessment.

If a potentially complete pathway from soil to burrow air for VOCs is identified based on the Part A investigation results, transport modeling, active soil gas sampling and analysis, and sampling and analyzing burrow air are all alternatives that could be considered. If transport modeling is conducted, burrow air concentrations will be estimated using soil data from the 0 to 6 feet interval.

Exposure modeling will be used to estimate representative EPCs for biota tissue from soil concentrations from the same depth categories as for the soil EPCs.

2.5.3 Inputs to Decision 3 – Impacts to Groundwater

The inputs required for Decision 3 consist of information that is required to calculate soil screening levels (SSLs) protective of groundwater and to conduct modeling, where necessary. These inputs are shown in Table 1. Soil background concentrations are also an input to this decision because SSLs will only be calculated for metals where soil concentrations exceed background. SSLs consider the volume and cross-sectional area of the potential source and will thus be developed on a unit-specific basis. Groundwater maximum contaminant levels and groundwater background values will define the maximum allowable concentrations of COPCs in groundwater. USEPA literature and other technical literature will serve as the source for modeling parameters. Existing and new site data will provide information on the nature and extent of COPCs, depth to groundwater, and geotechnical, geochemical, and hydraulic characteristics of the vadose zone soil.

2.5.4 Inputs to Decision 4 – Data for CMS/FS

Inputs to Decision 4 consist of soil property and contaminant distribution data and other information needed to estimate required remediation volumes and to determine the most appropriate and cost-effective remedial approach for each area potentially requiring remediation. Inputs to Decision 4 include volumes of soil and debris, specific soil physical and chemical properties that could influence the performance of certain remedial technologies (e.g., porosity, grain size, density, organic carbon content, soil chemical properties), and waste characterization parameters for any soils that may need to be transported offsite.

New and existing analytical data will provide information regarding chemical and physical soil characteristics and waste characterization parameters. New and existing data regarding the nature and extent of COPCs and COPECs, coupled with results of the human health and ecological risk assessments will provide the volumes of soil potentially requiring remediation. New and existing data will be supplemented by USEPA and other technical literature regarding physical and chemical properties of COPCs and soils and the performance and requirements of specific remedial technologies. Debris mapping will be conducted to estimate the types and volumes of debris present in areas where solid materials were discarded.

2.6 Step 4: Study Boundaries

Study boundaries include spatial (lateral and vertical), temporal, and analytical boundaries for each unit or group of units, as appropriate. Constraints that could interfere with sampling are also identified in this step and are reflected in the definition of the boundaries. Boundaries must be defined for each decision individually, as the scale at which data will be evaluated and the data populations of interest may vary for each decision. Temporal boundaries are required because a given medium or unit may change over time. Practical constraints may limit the spatial and/or temporal boundaries or regions that will be included in the study. Practical constraints associated with the Topock RCRA corrective action/CERCLA program consist primarily of access limitations (physical, cultural, historical, or biological constraints) but may also include other factors such as soil characteristics and the presence of bedrock. Study boundaries, especially the lateral and vertical study boundaries, are subject to change as additional data are collected. The study boundaries associated with each of the decisions are summarized in Table 1.

2.6.1 Decision 1 Study Boundaries – Nature and Extent of COPCs and COPECs

Lateral Boundaries

Lateral boundaries for Decision 1 are initially estimated based on the current boundaries of each individual unit as estimated in the Revised Final RFI/RI Volume 1 (CH2M HILL, 2007). For AOCs within drainages, such as AOC 1, AOC 4, AOC 9, AOC 10, and AOC 11, the lateral boundaries are expected to be constrained by topography in the up-drainage and cross-drainage directions. The down-drainage extent is not constrained and remains to be defined through sampling and analysis.

For AOC14, the lateral boundary is initially estimated to be bounded by Bat Cave Wash to the west, the former plant road and historic Route 66 to the east, Interstate 40 to the south, and the railroad tracks to the north. For AOC-12 and UA-1, the locations and extents of the AOCs are estimated based on anecdotal information on past waste disposal, and are shown on Figure 1, and as described in the Revised Final RFI/RI Volume 1 (CH2M HILL 2007).

For UA-2, the lateral boundary is the area surrounding the location of the former aboveground drip tank.

Where units are adjacent, the lateral study boundaries are defined at a clear physical demarcation to the extent feasible. For example, the western lateral study boundary for AOC 4 is at the mouth of the Debris Ravine where it joins Bat Cave Wash.

The specific lateral boundaries for each unit are shown in Table 1.

2.6.1.1 Vertical Boundaries

The vertical boundary of the soil investigation for Decision 1 extends from the ground surface to the water table.

2.6.1.2 Analytical Boundaries

Analytical boundaries for Decision 1 include both chemical (COPCs, COPECs, and general chemistry) parameters and soil physical characteristics. Sample location tables were included in the Part A Soil Workplan (a separate table was provided for each AOC). In addition, a comprehensive planned sample table, specifying analytes for all proposed samples, was provided in Appendix B of the workplan. Similar tables will be provided for the Phase 2 sampling program.

Chemical Parameters

Chemical parameters were defined for each individual unit and may be refined following completion of the Phase 1 sampling program. The list of analytical parameters at each unit is based on the site use and release history described in the Revised Final RFI/RI Volume 1 (CH2M HILL, 2007) and fate and transport mechanisms, as documented in the CSMs. Based on the available information, it was determined Title 22 metals, hexavalent chromium, total petroleum hydrocarbons, volatile organic compounds, semivolatile organic compounds, and PAHs are COPCs/COPECs for all areas outside the fence line except UA-2. VOCs are not considered COPCs/COPECs for surface soil. Dioxins and furans are COPCs/COPECs at AOC-4. Asbestos is a COPC for AOC 4, AOC-14, and UA 1 (asbestos is not a COPEC).

COPCs/COPECs at UA-2 are limited to total petroleum hydrocarbons and PAHs. Dioxins/furans, asbestos, and PCBs will be analyzed in samples collected from the upper end of AOC 1 where AOC 4 enters AOC 1. Ten percent of the samples collected in all AOCs will be analyzed for the full suite of inorganic and organic analyses per the CERCLA Target Analyte List (TAL) and Target Compound List (TCL). Select samples were analyzed to characterize the soluble fraction of compounds present at concentrations exceeding 10 times the total threshold limit concentration or 20 times the toxicity characteristic leaching procedure values. The samples selected will be determined based on the Title 22 metals analysis results.

2.6.1.3 Temporal Boundaries

All historic RFI/RI and new Part A soil sampling Category 1 data and acceptable Category 2 data (based on the final Data Usability Assessment) will be evaluated for determination of the nature and extent of contamination.

2.6.2 Decision 2 Study Boundaries – Data to Support Calculation of EPCs

2.6.2.1 Lateral Boundaries

The lateral study boundaries for Decision 2 are the same as for Decision 1.

2.6.2.2 Vertical Boundaries

Vertical study area boundaries for Decision 2 are defined by potential maximum exposure depths. Based on the types of receptors likely to be found in the investigation areas and nearby areas, the types of activities likely to occur, and the nature of the soils in the area, four exposure depth intervals are of interest; surface soil, shallow soil, subsurface soil to 6 feet bgs and subsurface soil to 10 feet bgs. For human health, exposure intervals for soil are surface soil (0 to 0.5 foot bgs), shallow soil (0 to 3 feet bgs), subsurface soil I (0 to 6 feet bgs), and subsurface soil II (0 to 10 feet bgs). Depths up to 10 feet bgs are appropriate for maintenance workers. Depths up to 3 feet bgs are appropriate for all human receptor populations being evaluated including: recreational users, tribal users, maintenance workers, and hypothetical future residents. Depths of 0 to 6 feet bgs and 0 to 10 feet bgs apply only to the maintenance worker and the hypothetical future resident (north of the railroad). For ecological receptors, exposure intervals for soil are surface soil (0 to 0.5 foot bgs), shallow soil (0 to 3 feet bgs), and subsurface soil I (0 to 6 feet bgs). Thus, the vertical study boundary for Decision 2 is 10 feet bgs, except at SWMU 1/AOC 1 where scouring scenarios will be considered. For SWMU 1/AOC 1, the vertical study boundary for Decision 2 is 15 feet bgs. This additional 5 feet of sampling depth (10 to 15 feet bgs) is needed to account for potential exposure 10 feet below the surface AFTER a 5 foot scouring event has occurred.

2.6.2.3 Analytical Boundaries

The same analytical boundaries for chemical parameters that apply to Decision 1 apply to Decision 2.

2.6.2.4 Temporal Boundaries

The same temporal boundaries that apply to Decision 1 apply to Decision 2; however, only existing Category 1 data will be considered for use in the risk assessment.

The Data Usability Matrix for Soil Risk Assessment lists the various Risk Assessment study boundaries for existing and newly collected data (Appendix A – Table A-1).

2.6.3 Decision 3 Study Boundaries - Impacts to Groundwater

2.6.3.1 Lateral Boundaries

The definition of lateral study boundaries for Decision 3 will be an iterative process. Initially, the lateral study boundaries for Decision 3 will be the same as for Decision 1. Following completion of the Phase 1 data evaluation, Decision 3 study boundaries will be refined to consist of those areas with COPC/COPEC concentrations exceeding the SSLs.

2.6.3.2 Vertical Boundaries

The vertical study area boundaries for Decision 3 are the same as for Decision 1.

2.6.3.3 Analytical Boundaries

The same analytical boundaries for chemical parameters that apply to Decision 1 also apply to Decision 3. Additional data regarding soil characteristics may be collected if needed to complete any required modeling. Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes.

2.6.3.4 Temporal Boundaries

The temporal boundaries for Decision 3 are the same as for Decision 1.

2.6.4 Decision 4 Study Boundaries – Inputs to CMS/FS

2.6.4.1 Lateral Boundaries

Initially, human health screening levels (RSLs, CHHSLs, and ESLs), ecological comparison values, and project specific screening levels developed for TAL/TCL COPCs/COPECs developed for this project will be used to define the lateral study boundaries for Decision 4. Results of the human health and ecological risk assessments will refine the lateral boundaries for remedial actions.

2.6.4.2 Vertical Boundaries

The vertical study area boundary for Decision 4 is the maximum depth for which remedial actions may be taken at the site to achieve remedial action objectives. The maximum depth for which soil remedial actions may be taken is determined by a combination of feasible technology types as defined in the CMS/FS workplan and physical or other constraints on soil remediation.

2.6.4.3 Analytical Boundaries

The same analytical boundaries for chemical parameters and soil characteristics that apply to Decision 1 also apply to Decision 4. Additional data regarding physical soil characteristics may be collected if needed to complete any required modeling and to support remedial technology selection and feasibility evaluation.

2.6.4.4 Temporal Boundaries

The temporal boundaries for Decision 4 are the same as for Decision 1.

2.7 Step 5: Decision Rule

Decision rules are "if…, then…" statements that describe the actions to be taken depending on the site-specific findings. A decision flow chart was developed for each of the four decisions identified in these DQOs. The decision process depicted on Figures 6 through 9 is described below.

2.7.1 Decision 1 - Nature and Extent of COPCs - Decision Rules and Decision Process

Refer to Figure 6 for the following discussion of the decision rule for Decision 1. The decision rule is applied separately for each AOC, SWMU, and UA.

2.7.1.1 Boxes 1 through 3

Once the Part A Phase 1 soil samples have been collected and the data have been validated (Boxes 1 and 2), the Phase 1 data and existing historic RFI/RI data sets for each AOC/SWMU/UA will be combined.

The data collected during the Phase 1 investigation will be validated as described in the QAPP (CH2M HILL, 2008a) and the *Draft Soil Addendum for the Topock Compressor Station, RCRA Facility Investigation/Remedial Investigation* (CH2M HILL, 2008c). The validated data will then be combined with existing data. Existing data were evaluated in the Data Usability Assessment (CH2M HILL, 2008b), and only data meeting data quality Category 1 or 2 requirements will be used to assess the nature and extent of COPCs and COPECs.

During this step, the existing data will also be reviewed to assess whether they are still considered reliable. If site conditions have changed substantially (e.g., as in Bat Cave Wash following the 2006 high runoff events), the data will be assessed to determine whether it is likely that the changes in site conditions have altered the conditions at that particular location. This data assessment process will be limited to surface and near-surface samples, as deeper samples would not be expected to be affected. Any surface or near-surface data for organic COPCs and COPECs will also be noted, as organic constituents located in surface and near-surface soils may have degraded under the influence of high surface temperatures and/or light. Older data for organic compounds will be compared to newer data for organics in the same vicinity.

2.7.1.2 Boxes 4 through 8

Once the new and existing data sets have been combined and reviewed, the combined data set for each unit will be first be reviewed to assess whether, as a result of the TAL/TCL analysis, any new compounds that qualify as COPCs/COPECs have been identified in the areas outside the compressor station (Box 4). Box 4 consists of the following decision:

Are any new COPCs/COPECs identified as a result of the TCL/TAL analysis?

If new compounds have been identified, a decision will be made in conjunction with DTSC and DOI to determine whether the detected compound represents a new COPC or COPEC. The decision whether any newly identified compounds may represent new COPCs and/or COPECs will be based on multiple factors including:

- Potential for the compound to be related to the compressor station (e.g., potential for the compound to be associated with past activities at the compressor station and/or to be a breakdown product of constituents known to have originated at the compressor station)
- Frequency of detection
- Concentrations detected, and
- Distribution of detections.

The outcome of Box 4 can be

> ***Yes**: new COPCs/COPECs have been identified, or*
>
> ***No**: no new COPCs/COPECs have been identified.*

It should be noted that it is possible for new compounds to be detected without these compounds necessarily being designated as COPCs/COPECs. Additional sampling may be warranted in order to make this decision.

If the outcome from the decision in Box 4 is yes, the next step is to determine whether screening values will be required for the newly-identified COPCs/COPECs (Box 5A). If the outcome from Box 4 is no, the decision process moves to Box 5C, and the decision process continues with comparison to screening levels (see discussion below).

The decision for Box 5A is:

Is development of screening value for new COPCs/COPECs required?

The possible outcomes for this decision step are:

> ***No**: Screening values are not required.*
>
> ***Yes**: Screening values are required.*

Screening levels may not need to be developed because they already exist. If screening levels do not need to be developed, the process moves to Box 7, evaluation of lateral and vertical extent. Screening may not be required because the frequency of detection and/or detected concentrations of these compounds are too low to merit the likely complex effort of developing screening levels. The decision to develop additional screening levels will be made in conjunction with DTSC and DOI. If screening levels are not developed the significance of the new COPCs and any associated uncertainties would be addressed in the risk assessment (Box 6A).

If screening levels will be required for any new COPCs/COPECs they will be developed by PG&E and require concurrence from DTSC and DOI (Box 5B). Once appropriate screening levels are available for all COPCs/COPECs the lateral and vertical extent of these compounds can be evaluated.

Following the identification of potential new COPCs/COPECs, all data will then be compared to screening criteria (Box 5C). The combined data tables will flag each occurrence of a COPC or COPEC exceeding one or more of the screening criteria. The following sets of screening values will be used:

- Background soil concentrations of metals (CH2M HILL, 2008d).
- CHHSLs for residential use, where available (OEHHA, 2005).
- RSLs for residential use for constituents for which CHHSLs are not available (USEPA, 2008).
- ESLs for residential use for petroleum hydrocarbon compounds TPH-gasoline, diesel, and motor oil.
- Preliminary ECVs developed by ARCADIS for PG&E (ARCADIS, 2008b)

- Project specific screening levels developed for COPCs/COPECs identified from TAL/TCL data.

ECVs have been developed for metals and select organics. ECVs have only been developed for organic COPECs that have been detected. Certain ECVs for metals are lower than the background soil concentrations and/or method quantitation limits; in these cases, the background concentration or method quantitation limit will be used in lieu of the ECV when determining whether delineation is adequate.

The initial comparison will be on a point-by-point basis for all depths (i.e., a simultaneous lateral and vertical assessment). The detected concentrations at each unit will first be compared to either the background concentrations (for metals) or the lowest applicable screening criterion for organic compounds. The lowest applicable organic screening value may differ depending on depth (ECVs are applicable to a maximum depth of 6 feet bgs; CHHSLs/RSLs are applicable to a depth of 10 feet bgs).

As a further check for metals, a population (central tendency) comparison such as the Wilcoxon Rank Sum Test will be performed for the population of detected concentrations to the applicable background data set, provided there are sufficient detections of the metal in question to allow a meaningful statistical comparison to be made.

If any COPCs or COPECs are present above background concentrations or the lowest applicable screening criterion for organic compounds, the locations of the COPC or COPEC concentrations exceeding the initial screening will be examined to determine whether nearby samples provide an adequate perimeter (lateral) or base (vertical) of samples to meet the initial screening criteria. In addition to point by point comparisons of site data to screening levels, spatial trends will be reviewed graphically (Box 6B).

Spatial trends will be evaluated both laterally and vertically. For lateral delineation, for samples potentially containing elevated levels of COPCs or COPECs, concentration trends toward the perimeter of the unit will be reviewed to ensure that concentrations are generally decreasing toward the perimeter. Vertical concentration trends will also be reviewed for each boring showing elevated concentrations of COPCs or COPECs. Potential hot spots will be identified through the presence of clusters of elevated concentrations of COPCs/COPECs. Evaluation of spatial trends will include the following considerations:

- Lateral concentration trends toward the edge of a unit or affected area (i.e., potential hot spot) within a unit
- Vertical concentration trends in each boring, and throughout a given unit or area
- Distribution of detections and non-detections of each constituent within a unit, and
- Where applicable, concentrations trends at the upstream unit.

For ease of evaluation, COPC and COPEC concentrations exceeding the screening criteria will be presented in different colors on the figures, according to the lowest concentration screening criterion exceeded.

The spatial trends analysis will used to make the decision identified in Box 7:

Are lateral and vertical boundaries of COPCs/COPECs including hot spots, if applicable, defined?

The possible outcomes of Box 7 are:

> ***Yes:*** *the lateral and vertical extent of COPCs/COPECs including any hot spots are defined, or*
>
> ***No:*** *the lateral and vertical extent of COPCs/COPECs including any hot spots are not fully defined*

This evaluation will be conducted for each compound, and may indicate that the boundaries of some but not all compounds at a given unit are adequately defined. If all boundaries are defined for a given unit, no further data are required to resolve Decision 1 (Box 8). The determination that COPC/COPEC boundaries have been adequately defined at a specific unit will be made in consultation with DTSC and DOI.

2.7.1.3 Boxes 10 through 13

If the determination is made that the boundaries have not been adequately defined, additional sampling of specific compounds may be required to complete the delineation of the lateral and vertical extent of contamination and/or hot spots. The specific areas where COPC/COPEC boundaries are not adequately defined will provide the basis for further sampling recommendations (Box 10). The information developed pursuant to Box 9 will be used to define the additional sampling needed to delineate a chemical boundary or define potential hot spots in each area identified as needing further delineation. The extent of additional sampling recommended will be defined in consultation with DTSC, and DOI. Once the additional sampling necessary to create a complete delineation has been defined (Box 10), Box 11 requires the following decision:

Would additional sampling significantly improve data quality, or risk assessment or site remediation decisions, and is the additional sampling feasible?

The possible outcomes for the decision in Box 11 are as follows:

> ***Yes****: Additional data would significantly improve data quality and/or risk assessments and site remediation decisions, and the additional data collection is feasible*
>
> ***No*** *The additional data would not significantly improve data quality and/or risk assessments and site remediation decisions, and is therefore not necessary; or, while additional data would significantly improve data quality and/or risk assessments and site remediation decisions, the additional data collection is not feasible due to physical or institutional constraints*

Data quality may be improved if existing sample results for the COPC or COPEC in question at the given unit are for older samples that may no longer represent current conditions (e.g., surface soil results in Bat Cave Wash collected prior to 2006 high runoff events), or have data flags that could limit the reliability of the data.

The risk assessment team will review the value of the additional sampling for improving the risk characterization for the specific COPC/COPEC at the given unit. Risk characterization may be improved by additional sampling if: the existing number of samples for an exposure area or designated hot spot is low; the detection limits did not achieve adequate concentrations for risk assessment purposes; the total number of samples in a given exposure depth interval is low; or the lateral or vertical distribution is uncertain at a level significant to the risk decisions.

Remedial decision making may be improved if the area or volume of potentially-impacted soil could be defined more precisely. Thus, additional sampling in areas where samples are spaced relatively far apart and/or where vertical characterization is limited might be considered to improve remedial decision making. If there are remaining uncertainties regarding soil physical properties in areas where remediation may be required, remedial decision-making could also be improved through the collection of additional data pertaining to the physical characteristics of interest.

If it is concluded in Box 11 that additional sampling is not feasible or warranted, then no further sampling is required and remaining uncertainties would be addressed in the risk assessment or CMS/FS (Box 13), and no further sampling is required to resolve Decision 1. The agencies will be consulted prior to concluding additional sampling is not feasible or warranted.

If additional data collection is desirable and feasible, the additional sampling needs will be defined, the sampling will be conducted and the new data will be validated (Box 12). After the data are validated, the flowchart leads back to Box 3 to reinitiate the data evaluation process.

2.7.1.4 Box 14

Once it has been determined that the nature and extent of contamination have been adequately defined and no further data collection is necessary to resolve Decision 1, the flow chart leads to Boxes 14A through 14C that refer to the decision rules for Decisions 2, 3, and 4. Those decision rules (Figures 7, 8, and 9) address data sufficiency for estimating EPCs, assessment of threat to groundwater, and data sufficiency for estimating soil properties and contaminant distribution to support the CMS/FS and remedial design.

2.7.2 Decision 2 – Data to Support Calculation of EPCs- Decision Rules and Decision Process

Refer to Figure 7 for the following discussion of the decision rule for Decision 2. This decision rule follows from the decision rule for Decision 1.

2.7.2.1 Box 1

The first step in addressing Decision 2 is to group all Part A soil investigation and Category 1 historic RFI/RI soil and sediment data by exposure area and depth category defined in the Risk Assessment Work Plan (ARCADIS, 2008a),as discussed below.

2.7.2.2 Boxes 2 through 4

Boxes 2 though 4 consist of the evaluation of data adequacy and additional data needs, if warranted. Box 2 addresses the following decision:

> *Are sufficient Category 1 data available to calculate representative EPCs for each exposure area and applicable depth interval (as defined in the Risk Assessment Work Plan)?*

The outcomes of the decision in Box 2 are:

- **Yes** – If sufficient Category 1 data exist to calculate representative EPCs for each exposure area and depth interval, the flow chart leads to Box 3, which concludes no further data collection is necessary to resolve Decision 2, and Box 9, for the calculation of representative EPCs and conduct of the risk assessments. The RAWP defines the process to be used to calculate EPC, assess risk and determine whether chemicals present at a given unit, combination of units, of portion of a unit potentially pose an unacceptable risk. The risk assessment will recommend which chemicals for which areas should be carried into the CMS to provide information for risk management decisions

- **No** - If the Category 1 data are not sufficient to calculate representative EPCs for each exposure area and depth interval, the flow chart leads to Box 4 to determine what additional samples are necessary to allow calculation of representative EPCs. In this step, PG&E, in consultation with DOI and DTSC, will define specific sampling needs.

The Box 2 decision will be resolved by comparing the existing medium-specific data for each exposure area and depth interval with the data requirements imposed by the acceptable limits on decision errors to be developed for Step 6 of the DQOs, coupled with professional judgment from the risk assessment experts. Box 4 will also consider the Step 6 requirements when defining the additional samples needed.

2.7.2.3 Box 5

Box 5 addresses the feasibility of collecting the additional samples identified as desirable in Box 4. As discussed for Decision 1, there are significant physical and other practical limitations on sampling in the areas outside the fence line. The proposed additional sampling effort will be evaluated by PG&E in consultation with DOI, DTSC and the stakeholders to determine if implementation of the sampling effort is feasible. The outcomes of Box 5 are:

- **No** – Further sampling is not feasible. The flow chart leads to Box 8 (EPC uncertainties are addressed in the risk assessment), and no further sampling is necessary to resolve Decision 2 (Box 3).
- **Yes** – Further sampling is feasible. The flow chart leads to Box 6. Additional sample collection is conducted and the data are validated. The flow chart then leads to Box 7 to combine the newly collected data with the previous Category 1 and Part A Phase 1 data set, and from there back to Box 2 to restart the decision rule with the new data set.

2.7.3 Decision 3 – Threat to Groundwater - Decision Rules and Decision Process

Refer to Figure 8 for the following discussion of the decision rule for Decision 3. This decision rule follows from the decision rule for Decision 1.

2.7.3.1 Boxes 1 through 5

The same data set used for Decision 1 will be used for Decision 3. The combined data set will be compared against soil screening levels. The combined data tables will flag each occurrence of a COPC exceeding the relevant SSL.

Box 3 addresses whether the screening level assessment based on SSLs indicates a threat to groundwater.

The potential outcomes of Box 3 are:

- **Yes** – A potential threat to groundwater exists from residual soil contamination at this AOC/UA based on the screening level assessment. Additional assessment is warranted. The flow chart leads to Box 5 to assess whether data indicate a potential current threat to groundwater exists.
- **No** – No threat to groundwater is indicated by the screening level assessment for this AOC/SWMU/UA. The flowchart leads to Box 4; no further sampling is required to resolve Decision 3.

The decision criteria used for this decision are the SSLs. The development of SSLs is described in the *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station Technical Memorandum* dated August 1, 2008 (CH2M HILL, 2008e). SSLs will be calculated for each unit. COPC concentrations within each unit will first be compared to the SSLs developed for that unit. If COPC concentrations are all below SSLs, then soil within that unit does not pose a potential threat to groundwater.

SSLs are highly conservative screening concentrations; SSLs were chosen as the first step in evaluating the potential threat of leaching to groundwater because they are a simple, conservative screening tool. The calculation process for SSLs does not take into consideration changes in concentration with depth but assumes that the maximum concentration detected at any point in the soil column is present at the groundwater interface and that all constituents are completely leachable. If SSLs are exceeded for any COPC at any unit, it does not mean that that particular COPC in soil in that particular unit necessarily poses a potential threat of leaching to groundwater; rather, it is an indication of a potential threat. More site-specific and detailed evaluation (modeling) may be appropriate to better assess the potential threat of leaching to groundwater for that specific compound at that unit.

Box 5 addresses whether data indicate a potential current threat to groundwater exists.

Box 5 addresses the following decision:

Do data indicate a potential current groundwater impact?

Outcomes of Box 5 are:

- **Yes** – Soil data indicate a current groundwater impact. The flowchart leads to Box 12, which requires either the development of a plan for an AOC-specific groundwater assessment and/or inclusion of the potential source area in the CMS/FS and characterization of any uncertainties in the CMS/FS.
- **No** – A potential future threat to groundwater exists from residual soil contamination at this AOC/UA based on the screening level assessment. Additional assessment is warranted. The flow chart leads to Box 6 to conduct vadose zone modeling to further assess the potential impact.

The criteria for resolving this decision are vertical concentration trends of compounds in each boring, and throughout a given unit or area location. If soil data indicates elevated concentrations of compounds (as compared to screening criteria) in samples throughout the boring and at the depth of the soil/groundwater interface, a potential for a current impact to groundwater exists.

Boxes 6 and 7 address quantitative vadose zone modeling to assess whether residual soil concentrations could affect groundwater in the future even if current groundwater impacts are not indicated. The HYDRUS-1D (Simunek et al., 1998) vadose zone model will be used. HYDRUS is a finite-element model for one-dimensional solute fate and transport simulations that incorporates sorption along with dispersion in the vadose zone. Critical input to the model will be an estimate of the mass of the COPC(s) present in soil, based on soil sample data. Box 7 addresses the following decision:

Does modeling indicate the potential for soil-related impacts to groundwater?

Outcomes of Box 7 are:

- **Yes** – Modeling indicates the potential for future impacts to groundwater from the residual soil contamination at the AOC/SWMU/UA. The flowchart leads to Box 8 to assess whether additional site-specific refinement of the model is warranted to better simulate site conditions.
- **No** – Modeling does not indicate a potential impact to groundwater. The flowchart leads to Box 4; no further sampling is required to resolve Decision 3.

The criteria for resolving this decision are the simulated groundwater concentrations relative to groundwater chemical-specific Applicable or Relevant and Appropriate Requirements (ARARs) for COPCs. The target groundwater concentrations used to assess potential impacts to groundwater are the California State groundwater maximum contaminant levels (MCLs), both primary and secondary. The MCLs have been defined as chemical-specific ARARs)in Volume 2 of the Resource Conservation & Recovery Act (RCRA) facility investigation (RFI) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial investigation (RI) Revised Final Report (CH2M HILL, 2009).

2.7.3.2 Boxes 8 and 9

Boxes 8 and 9 address the need for collecting additional data in support of model refinement. Box 6 addresses the following decision:

Is further site-specific refinement of the model warranted?

The primary consideration for this decision is the evaluation of the potential uncertainty in the refined model results (i.e., would the refined model be significantly more reliable?). The decision to pursue a more refined model on which to base decision making will be made PG&E in consultation with DTSC and DOI.

The outcomes of Box 8 are:

- **Yes** – Further refinement is warranted. The flow chart leads to Box 9 to assess whether additional data collection is necessary to support the model refinement.
- **No** – Further refinement of the model is not warranted. The flowchart leads to Box 12, which requires either the development of a plan for an AOC-specific groundwater assessment or inclusion of the potential source area in the CMS/FS and characterization of any uncertainties in the CMS/FS.

If further refinement is warranted, the next decision is a determination of whether additional data collection is required to refine the model. Refinements would not necessarily require additional sampling, because refinements may also be achieved through further literature research regarding physical and chemical characteristics, more detailed modeling of the area of interest (i.e., smaller "cells"), and/or use of a model more specifically targeted at the compound in question. Box 9 states:

Is additional data collection required to refine the model?

The outcomes of Box 9 are:

- **Yes** – Additional sampling is required. The flow chart leads to Box 10 to determine additional data collection needs.
- **No** – Further data collected is not required. The flowchart leads to Box 14, and the model is refined without additional sample collection.

The need for additional data collection may be due to a variety of factors. It is likely that a number of assumptions will have had to be made as part of the initial modeling effort; for example site-specific leaching data (soluble threshold limits concentration and/or toxicity characteristic leaching procedure data) may not be available for all compounds of interest. It may also be determined that, rather than this type of waste characterization analysis, a DI-WET or similar modified testing method would have been more appropriate to characterize the in-situ leaching potential in the areas outside the fence line.

2.7.3.3 Boxes 10 and 11

Boxes 10 through 11 define the additional data needed and the feasibility of collecting the desired data. Following the decision in Box 9 that additional data collection is required to refine the model, the data to be collected are determined in Box 10. From Box 10, the process flows to Box 11, which addresses the following decision:

Is additional data collection feasible?

Considerations for this decision are the types of data that need to be collected to refine the model and the feasibility of collecting additional samples. Feasibility of sample collection may be limited by physical, cultural/historical, and/or biological factors. The decision regarding the feasibility of additional data collection will be made by PG&E in consultation with DTSC and DOI.

Outcomes of Box 11 are:

- **Yes** – Additional data collection is feasible. The flow chart leads to Box 13 to collect the additional samples and validate the newly collected data. From there, the flowchart leads to Box 14 to refine the model, and then to back Box 6 to conduct the refined modeling.
- **No** – Additional data collection is not feasible. The flowchart leads to Box 12, which requires either the development of a plan for groundwater assessment or inclusion of the potential source area in the CMS/FS and characterization of any uncertainties in the CMS/FS.

2.7.4 Decision 4 – Inputs to CMS/FS and Remedial Design - Decision Rules and Decision Process

Refer to Figure 9 for the following discussion of the decision rule for Decision 4. This decision rule follows from the decision rule for Decision 1.

2.7.4.1 Box 1

The first step in addressing Decision 4 is to compile Part A soil investigation and historic RFI/RI soil property data and nature and extent of contamination information from Decision 1.

2.7.4.2 Box 2

Box 2 addresses the following decision:

Are soil property and contaminant distribution data (see Decision) sufficient to support the CMS/FS and/or remedial design?

The outcomes of the decision in Box 2 are:

- **Yes** – If sufficient soil property and contaminant distribution information is available to support the CMS/FS and/or remedial design, the flow chart leads to Box 3, which concludes no further sampling is necessary to resolve Decision 4, and Box 9, for conduct of the CMS/FS and remedial design.
- **No** - Available soil property and contaminant distribution information is insufficient to support the CMS/FS and/or remedial design, the flow chart leads to Box 4 to determine what additional samples are necessary to support the CMS/FS and/or remedial design.

Considerations for this decision are the availability of site-specific soil property data, such as porosity, grain size, Atterberg limits, organic carbon content, and chemical makeup, and contaminant distribution information. Once the delineation of the nature and extent of COPCs and COPECs at each unit is complete as defined for Decision 1, areas and volumes of soil potentially requiring remediation can be calculated. Consequently, sufficient data on contaminant distribution are available when the Decision 1 data needs are met. The actual volumes of soil ultimately requiring remediation will be determined based on the results of the risk assessment and other factors considered in developing remediation action objectives.

A preliminary assessment of potential remedial technologies and presumptive remedies will guide identification of the data needs to support the CMS/FS and remedial design. Once an initial list of suitable remedial technologies has been agreed upon the approved CMS/FS workplan, soil property data requirements will be identified and will be compared to the available soil property data to assess whether sufficient data are available to support remedy alternative evaluation and selection, and/or remedial design.

2.7.4.3 Boxes 5 through 8

Box 5 addresses the feasibility of collecting the additional samples. As discussed for Decision 1, there are significant physical and other practical limitations on sampling in the areas outside the fence line. The proposed additional sampling effort will be evaluated by PG&E in consultation with DOI, DTSC, and the stakeholders to determine if implementation of the sampling effort is feasible. The outcomes of Box 5 are:

- **No** – Further sampling is not feasible. The flow chart leads to Box 6 (uncertainties are addressed in the CMS/FS and/or remedial design), and no further data collection is necessary to resolve Decision 4 (Box 3).
- **Yes** – Further sampling is feasible. The flow chart leads to Box 7. Additional data collection is conducted, the data are validated as appropriate, and the new and existing data are combined (Box 8). The flow chart then leads back to Box 2 to restart the decision rule with the expanded data set.

2.8 Steps 6 and 7: Acceptable Limits on Decision Error and Optimize Sampling Design

Step 6 is intended to define acceptable limits on decision errors. A decision error would occur if, based on the available data, the project team chooses the wrong response action in the sense that a different response action would have been chosen if the project team had access "perfect data" or absolute truth. The purpose of Step 7 is to *"identify a resource-effective data collection design for generating data that are expected to satisfy the DQOs"* (USEPA 2000). The output of this step will be the Phase 2 sampling design agreed upon by the stakeholders during the Part A Phase 1 data gaps evaluation process. Following compilation of and initial assessment of the Phase 1 soil data, DOI, DTSC and PG&E, in consultation with stakeholders, will reconvene to develop Steps 6 and 7 of the DQO process.

3.0 References

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Table

TABLE 1
Data Quality Objectives – Part A Soil Investigation
PG&E Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision[1]**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
Contaminants in soil in AOCs/UAs outside the compressor station fence line resulting from historical compressor station practices may pose an unacceptable risk to humans or the environment, or threaten groundwater. Site-specific information is needed to: Determine the nature and extent of soil and sediment contamination Estimate representative exposure point concentrations (EPCs) to support human health and ecological risk assessment being conducted separately from the Part A soil study Determine whether residual soil concentrations pose a threat to groundwater Estimate soil properties and contaminant distribution in support of the Corrective Measures Study/Feasibility Study (CMS/FS) and/or remedial design	**<u>Decision 1</u>** Determine the nature and extent of residual soil and/or sediment concentrations resulting from historic compressor station practices. If determination of the full nature and extent of contamination based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment or CMS/FS.	COPCs and COPECs by AOC/SWMU/UA Part A and representative Category 1 and 2 historic RFI/RI COPC and COPEC data grouped by AOC/SWMU/UA and medium Data Usability Matrix for Soil and/or sediment (Appendix A) Comparison/screening values (background, risk-based, and regulatory screening values) Conceptual Site Models (CSMs) Geologic/hydrogeologic/hydrologic information Topographic information Soil physical and chemical property information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	<u>Lateral Extent</u> Initially the same as the currently defined boundaries of each SWMU, AOC and UA: SWMU1/AOC 1: Within Bat Cave Wash from mouth of Debris Ravine north to the riparian area at mouth of bat cave wash. AOC 4: Within the ravine from a point directly south of the water tanks to the junction with Bat Cave Wash; north slope of ravine directly south from end of small access road west to west side of storage area. AOC 9: Within the potential drainage path to the East Ravine from the break in the former storm drain; initially estimated to be from facility fence line 2/3 of the way east down the slope to the East Ravine; approximately 100 feet north to south centered on the alignment of the former storm drain. AOC 10: Within the East Ravine from its head at the compressor station to its downstream mouth. Low areas, former discharge and outfall locations (where known), and/or former retention areas (as indicated by presence of vegetation or sedimentation) are of particular emphasis. AOC 11: Within the drainage from its head at the compressor station to the low areas and/or former retention areas (as indicated by presence of vegetation or sedimentation) northwest of the compressor station access road, south of I-40, and east of the compressor station fence line. AOC 12: Areas indicated by former employees as sites of potential waste disposal. AOC 14: The area north of I-40 bounded by Bat Cave Wash to the west, the former plant road to the east, and the railroad tracks to the north. UA-1 (Potential Pipeline Disposal Area): An area approximately 20 feet wide by 100 feet long, encompassing an area indicated by a former employee as the site for burial of asbestos wrapped pipes. UA-2 (Former 300B Pipeline Liquids Tank): Area immediately surrounding the former location of a 900-gallon-capacity aboveground drip tank located southeast of the compressor station on a shelf in the hill next to a section of old Route 66. <u>Vertical Extent</u> Vertical study area boundaries extend from the ground surface to the water table. <u>Analytical Parameters</u>[1] *Chemical Parameters* (COPCs and COPECs) Title 22 metals, hexavalent chromium, total petroleum hydrocarbons, VOCs, SVOCs, and PAHs for all areas outside the fence line except UA-2. VOCs and TPH-purgeable will not be analyzed in the surface (0.0 – 0.5 foot) soil samples. Dioxins and furans are COPCs/COPECs at AOC-4. Asbestos is a COPC for AOC 4, AOC-14, and UA-1. COPCs/COPECs at UA-2 are limited to total petroleum hydrocarbons and PAHs. Dioxins/furans, asbestos, and PCBs will be analyzed in samples collected from the upper end of AOC 1 where AOC 4 enters AOC 1.Ten percent of the samples collected in all AOCs will be analyzed for the full inorganic and organic analysis suites per the CERCLA Target Analyte List and Target Compound List.	See Figure 6 for the Decision 1 decision rule

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[1] A comprehensive planned sample table, specifying analytes for all proposed samples, was provided in Appendix B of the Part A Soil Workplan.

TABLE 1
Data Quality Objectives – Part A Soil Investigation
PG&E Topock Compressor Station, Needles, California

STEP 1 Problem Statement	STEP 2 Decision Statement	STEP 3 Inputs to the Decision[1]	STEP 4 Study Area Boundaries	STEP 5 Decision Rules
			During Phase 1, select samples were analyzed to characterize the soluble fraction of compounds present at concentrations exceeding 10 x TTLC or 20 x TCLP values. Samples were selected after Title 22 metals data had been received. PG&E performed SPLP on approximately 2 soil samples per AOC and analyzed for Cr(VI) and Cr(T). These data were validated. Temporal Boundaries Validated Part A soil sampling data and representative Category 1 and Category 2 historic RFI/RI data (based on the final Data Usability Assessment) .	
	Decision 2 Determine representative EPCs for residual soil and/or sediment contamination resulting from historic compressor station practices that may pose unacceptable risks to current or future human or ecological receptors. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment or CMS/FS.	Nature and extent of contamination assessment from Decision 1 Part A and representative Category 1 historic RFI/RI COPC and COPEC data grouped by exposure area and depth interval Data Usability Matrix for soil and/or sediment (Appendix A) RAWP CSMs Geologic/hydrogeologic/hydrologic information Topographic information Soil physical and chemical property information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	Lateral Extent Same as for Decision 1. Vertical Extent Vertical study area boundaries for Decision 2 are defined by potential maximum exposure depths. For human health risk assessment, the maximum exposure depth is 10 feet for all AOCs/SWMUs/UAs except for Bat Cave Wash (SWMU 1/AOC 1), which is 15 feet to account for possible scouring of the surface during runoff events. For ecological risk assessment, the maximum depth is 6 feet, except in Bat Cave Wash, where the maximum exposure depth for ecological receptors is 11 feet to account for possible scouring during run-off events. Analytical Parameters Same as for Decision 1 Temporal Boundaries Validated Part A soil sampling data and representative Category 1 historic RFI/RI data (based on the final Data Usability Assessment)	See Figure 7 for the Decision 2 decision rule
	Decision 3 Determine whether residual soil concentrations resulting from historic compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat, or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address threat to groundwater.	Nature and extent of contamination assessment from Decision 1 COPCs by AOC/SWMU/UA Part A and representative Category 1 and 2 historic RFI/RI COPC and COPEC data grouped by AOC/SWMU/UA Data Usability Matrix for soil and/or sediment (Appendix A) Comparison/screening values (SSLs and groundwater/ drinking water ARARs) CSMs Geologic/hydrogeologic/hydrologic information Topographic information Soil physical and chemical property information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	Lateral Extent Those portions of each AOC/SWMU/UA where COPC concentrations exceed SSLs Vertical Extent Same as for Decision 1. Analytical Parameters *Chemical Parameters (COPCs/COPECs)* Same as for Decision 1. *Soil Characteristics* (to support modeling) Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes. Temporal Boundaries Same as for Decision 1	See Figure 8 for the Decision 3 decision rule

TABLE 1
Data Quality Objectives – Part A Soil Investigation
PG&E Topock Compressor Station, Needles, California

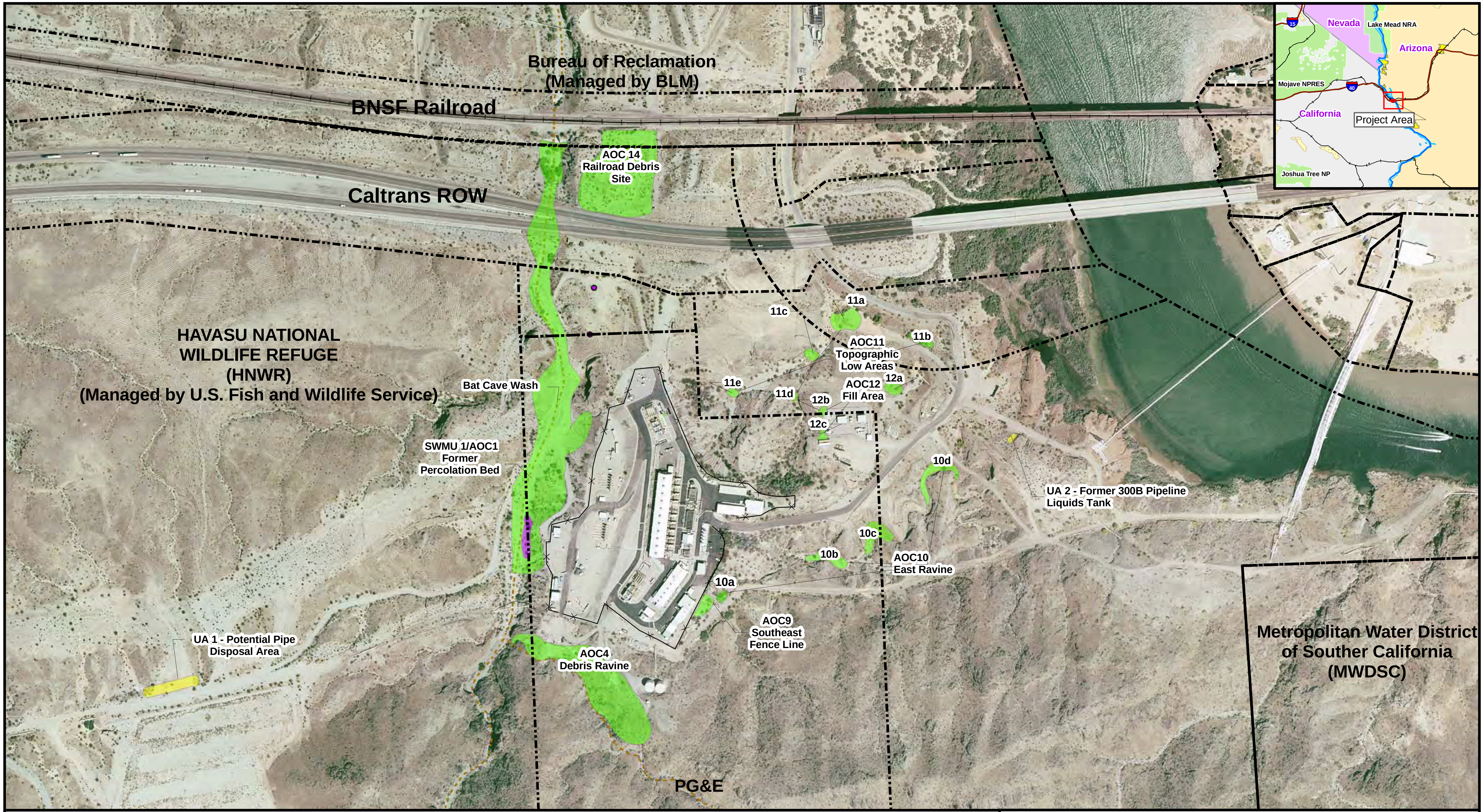
STEP 1 Problem Statement	STEP 2 Decision Statement	STEP 3 Inputs to the Decision[1]	STEP 4 Study Area Boundaries	STEP 5 Decision Rules
	Decision 4 Determine the site-specific soil property and contaminant distribution information necessary to support the CMS/FS decisions and remedial action design. If full determination of site-specific soil property and contaminant distribution information based on sample data is not feasible, address uncertainties in the CMS/FS and remedial design.	Nature and extent of contamination assessment from Decision 1 COCs from human health and ecological risk assessments Remedial action objectives and ARARs Risk-based and regulatory soil and/or sediment cleanup levels Estimated soil and debris volumes Waste classification testing results for soil, sediment, and/or debris as required Waste comparison/screening levels (TTLC, STLC, RCRA toxicity) Soil physical and chemical property information Geologic/hydrogeologic/hydrologic information Topographic information AOC/SWMU/UA location and use history information Cultural and historic information by AOC/SWMU/UA Infrastructure information by AOC/SWMU/UA	Lateral Extent Initially same as for Decision 1, to be refined based on results of risk assessments and threat to groundwater assessments Vertical Extent Initially same as for Decision 1, to be refined based on results of risk assessments and threat to groundwater assessments, and remedial alternative practical constraints Analytical Parameters *Chemical Parameters (COCs)* Initially same as COPCs/COPeCs for Decision 1, to be refined to specific COCs based on results of risk assessments and threat to groundwater assessments *Soil Characteristics* (to support remedial technology selection and feasibility evaluation) Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes. Temporal Boundaries Same as for Decision 1	See Figure 9 for the Decision 4 decision rule

Notes:

1) The list of analytical parameters is based on CSM and will be refined after each round of investigation/data evaluation. COCs will be selected based on the risk assessment.

VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds
TPH - Total Petroleum Hydrocarbons
CSMs - Conceptual Site Models
ARARs - Applicable or Relevant and Appropriate Requirements
mg/kg - milligrams per kilogram
CMS/FS – Corrective Measures Study/Feasibility Study
PAHs – Polycyclic Aromatic Hydrocarbons

Figures



LEGEND

🟪	Solid Waste Management Unit (SWMU)
🟩	Area of Concern (AOC)
🟨	Other Undesignated Areas
—×—	Compressor Station Fence Line

* UA - Undesignated Area

N

Feet
0 175 350 700

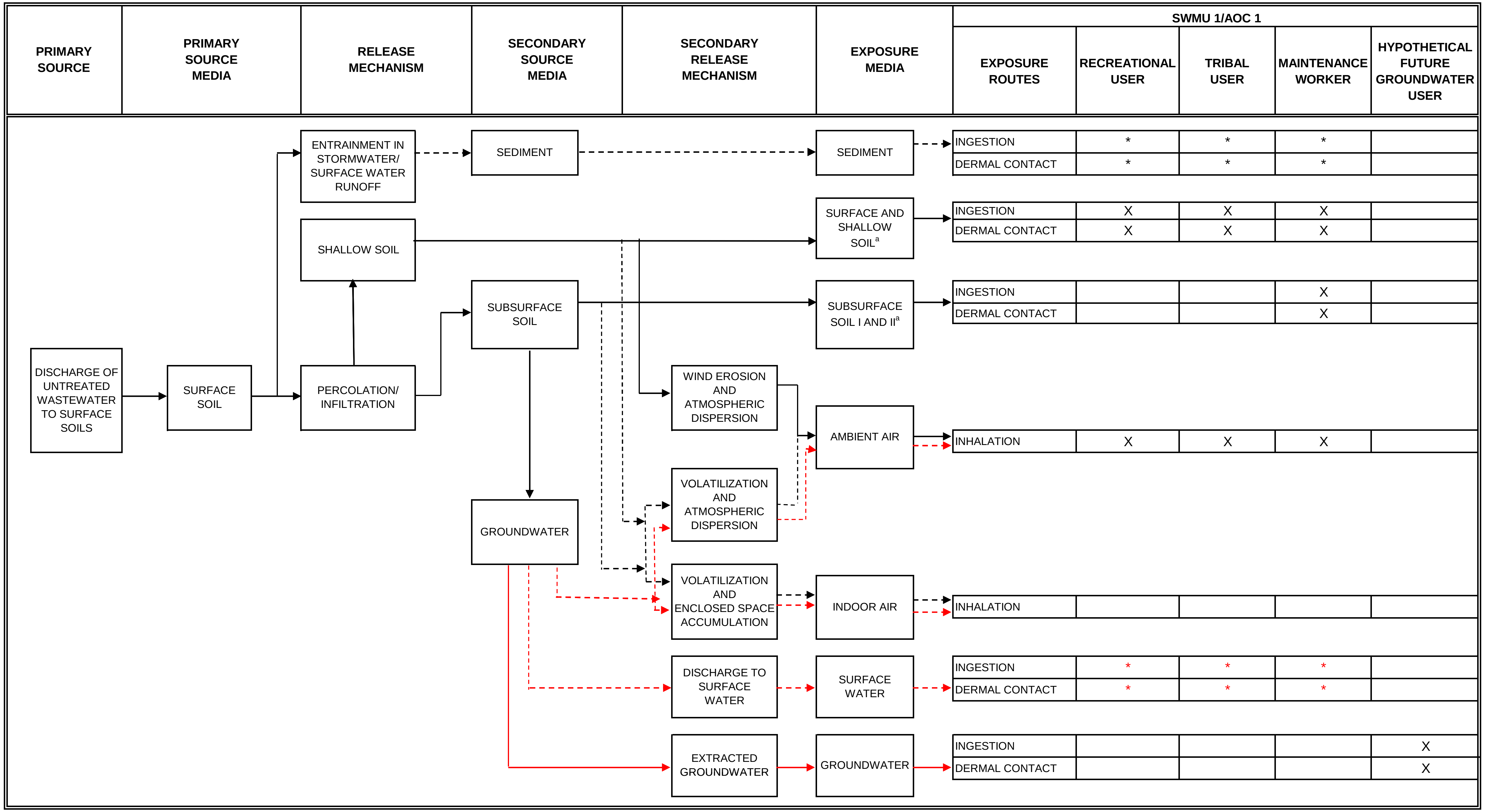
FIGURE 1
SOLID WASTE MANAGEMENT UNITS (SWMUS), AREAS OF CONCERN (AOCS), AND OTHER UNDESIGNATED AREAS ADDRESSED BY THE DATA QUALITY OBJECTIVES FOR THE PART A SOIL INVESTIGATION

DATA QUALITY OBJECTIVES - PART A SOIL INVESTIGATION
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

FIGURE 2

UPDATED[1] PRELIMINARY HUMAN HEALTH CSM FOR BAT CAVE WASH: RECREATIONAL, TRIBAL, AND WORKER USES

PACIFIC GAS AND ELECTRIC COMPANY
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT WORK PLAN



EXPOSURE MEDIA	SWMU 1/AOC 1 EXPOSURE ROUTES	RECREATIONAL USER	TRIBAL USER	MAINTENANCE WORKER	HYPOTHETICAL FUTURE GROUNDWATER USER
SEDIMENT	INGESTION	*	*	*	
	DERMAL CONTACT	*	*	*	
SURFACE AND SHALLOW SOIL[a]	INGESTION	X	X	X	
	DERMAL CONTACT	X	X	X	
SUBSURFACE SOIL I AND II[a]	INGESTION			X	
	DERMAL CONTACT			X	
AMBIENT AIR	INHALATION	X	X	X	
INDOOR AIR	INHALATION				
SURFACE WATER	INGESTION	*	*	*	
	DERMAL CONTACT	*	*	*	
GROUNDWATER	INGESTION				X
	DERMAL CONTACT				X

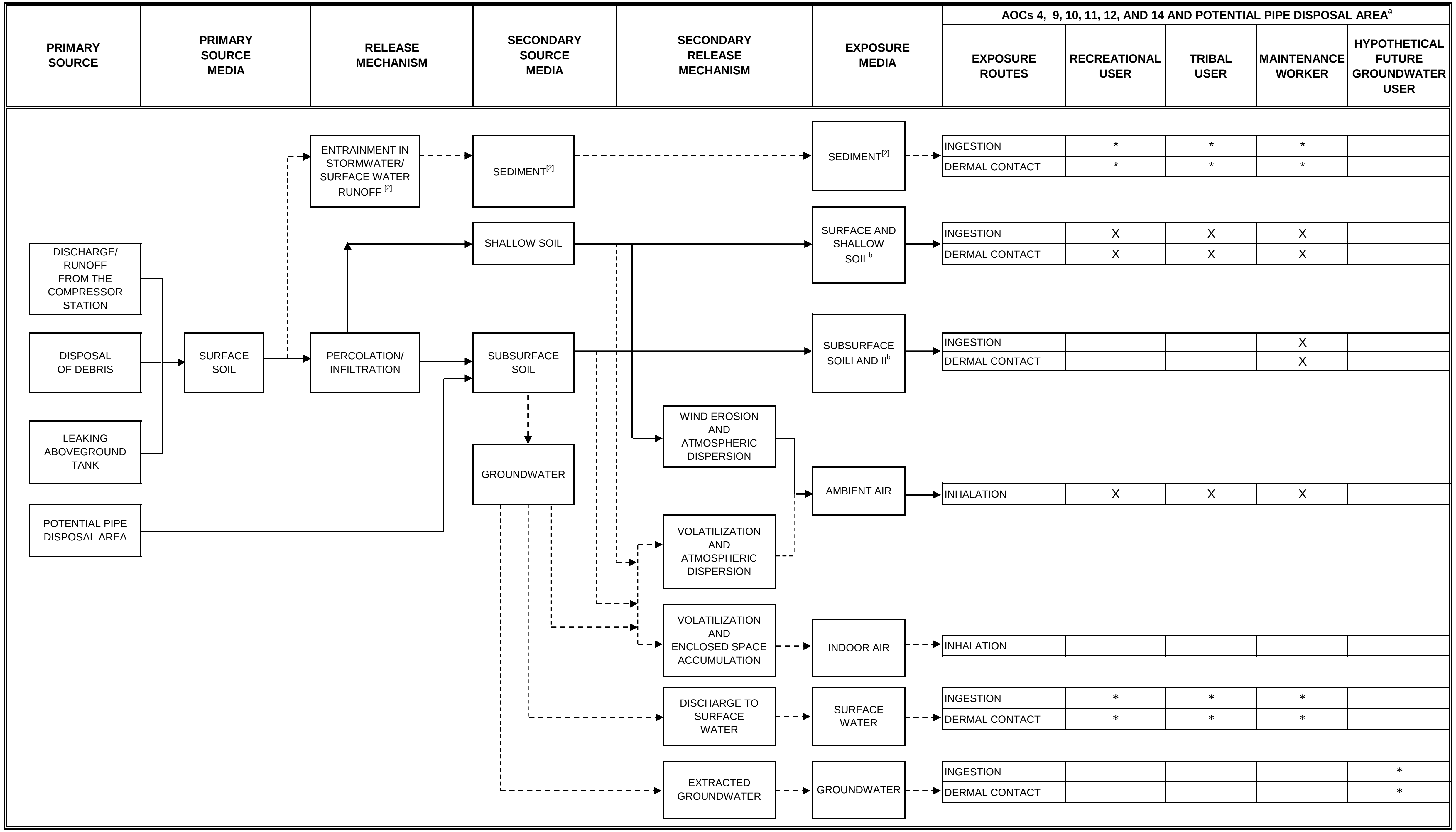
NOTES:

[1]	Conceptual site model (CSM) from the Topock Final Human Health and Ecological Risk Assessment Work Plan (RAWP; ARCADIS, 2008) and updated with information based on the Topock Groundwater Risk Assessment (GWRA; ARCADIS, 2009).
a	For applicable soil exposure depth, please see Fig 3-1 in the RAWP (ARCADIS, 2008).
→	Potentially complete transport pathway to be included in the quantitative soil risk assessment.
- - →	Potentially complete transport pathway to be further evaluated in the soil risk assessment.
→	Quantitative evaluation of the groundwater pathway completed in the GWRA (ARCADIS, 2009a); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential future impacts or current localized impacts to groundwater from soil.
- - →	Insignificant transport pathway as evaluated in the GWRA (ARCADIS, 2009a).
X	Potentially complete exposure route to be included in the quantitative soil risk assessment; quantitative evaluation of groundwater exposure route completed in the GWRA (ARCADIS, 2009a).
*	Potentially complete exposure route to be further evaluated in the soil risk assessment.
*	Insignificant exposure route as evaluated in the GWRA (ARCADIS, 2009a).

FIGURE 3

UPDATED[1] PRELIMINARY HUMAN HEALTH CSM FOR AOCS 4, 9, 10, 11, 12, 14, and POTENTIAL PIPELINE DISPOSAL AREA (OUTSIDE THE COMPRESSOR STATION) [a]

PACIFIC GAS AND ELECTRIC COMPANY
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT WORK PLAN



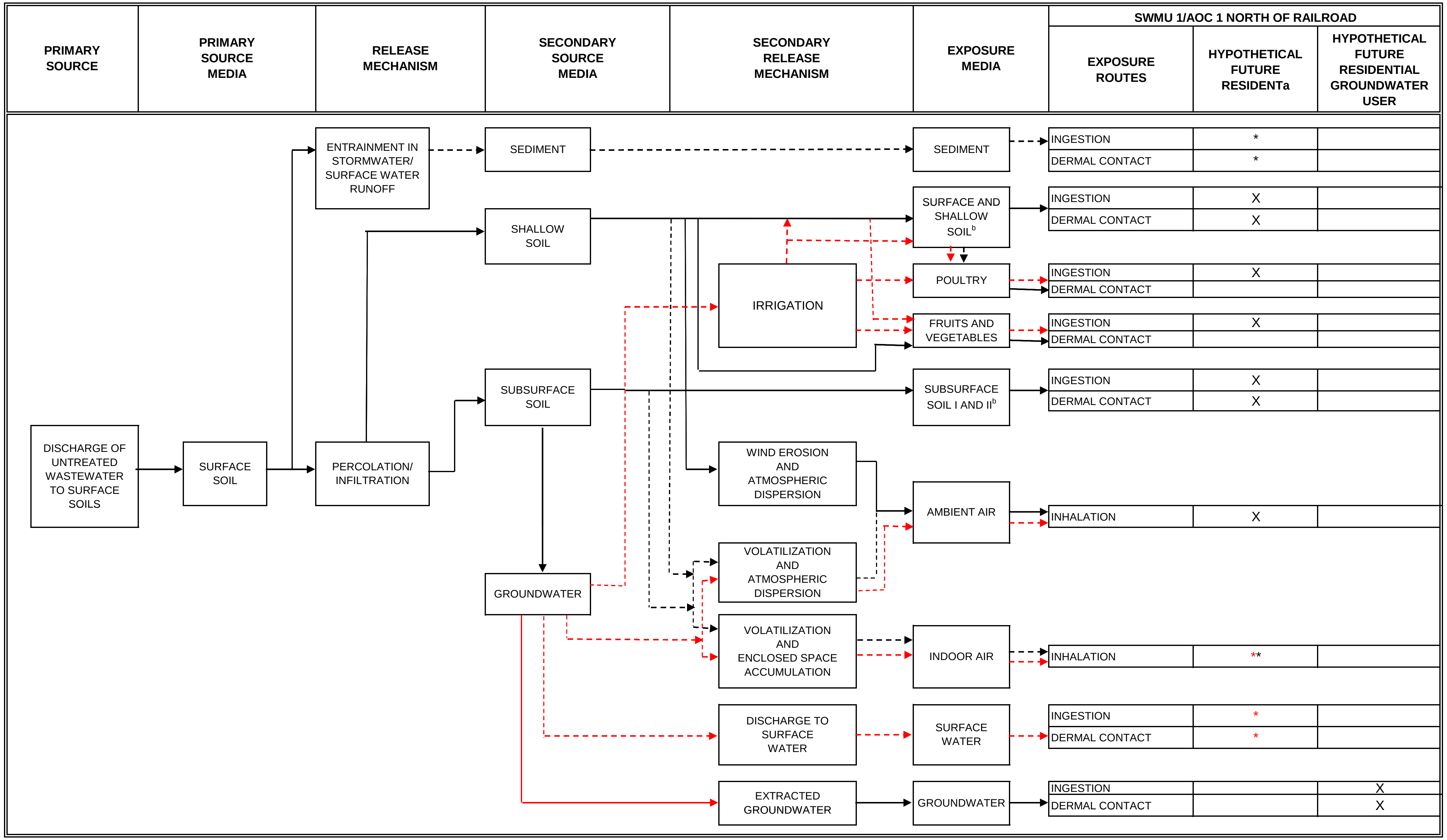
EXPOSURE MEDIA	EXPOSURE ROUTES	RECREATIONAL USER	TRIBAL USER	MAINTENANCE WORKER	HYPOTHETICAL FUTURE GROUNDWATER USER
SEDIMENT[2]	INGESTION	*	*	*	
	DERMAL CONTACT	*	*	*	
SURFACE AND SHALLOW SOIL[b]	INGESTION	X	X	X	
	DERMAL CONTACT	X	X	X	
SUBSURFACE SOILI AND II[b]	INGESTION			X	
	DERMAL CONTACT			X	
AMBIENT AIR	INHALATION	X	X	X	
INDOOR AIR	INHALATION				
SURFACE WATER	INGESTION	*	*	*	
	DERMAL CONTACT	*	*	*	
GROUNDWATER	INGESTION				*
	DERMAL CONTACT				*

NOTES:

[1]	Conceptual site model (CSM) from the Topock Final Human Health and Ecological Risk Assessment Work Plan (RAWP; ARCADIS, 2008) and updated with information based on the Topock Groundwater Risk Assessment (GWRA; ARCADIS, 2009a).
[2]	Applicable to AOC 10 only.
a	The Former 300B Pipeline Liquids Tank Area outside the compressor station has already been closed (CH2M HILL, 2007), but DTSC has requested additional investigation (CalEPA, 2007). If complete pathways are identified based on the results, the Former 300B Pipeline Liquids Tank Area will also be included in the Human Health Risk Assessment (HHRA).
b	For applicable soil exposure depth, please see Fig 3-1 in the RAWP (ARCADIS, 2008).
⟶	Potentially complete transport pathway to be included in the quantitative risk assessment.
- - -→	Potentially complete transport pathway to be further evaluated in the risk assessment; Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential future impacts or current localized impacts to groundwater from soil.
X	Potentially complete exposure route to be included in the quantitative risk assessment.
*	Potentially complete exposure route to be further evaluated in the risk assessment.

FIGURE 4
UPDATED[1] PRELIMINARY HUMAN HEALTH CSM FOR BAT CAVE WASH:
HYPOTHETICAL FUTURE RESIDENTIAL USE NORTH OF RAILROAD

PACIFIC GAS AND ELECTRIC COMPANY
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT WORK PLAN



NOTES:

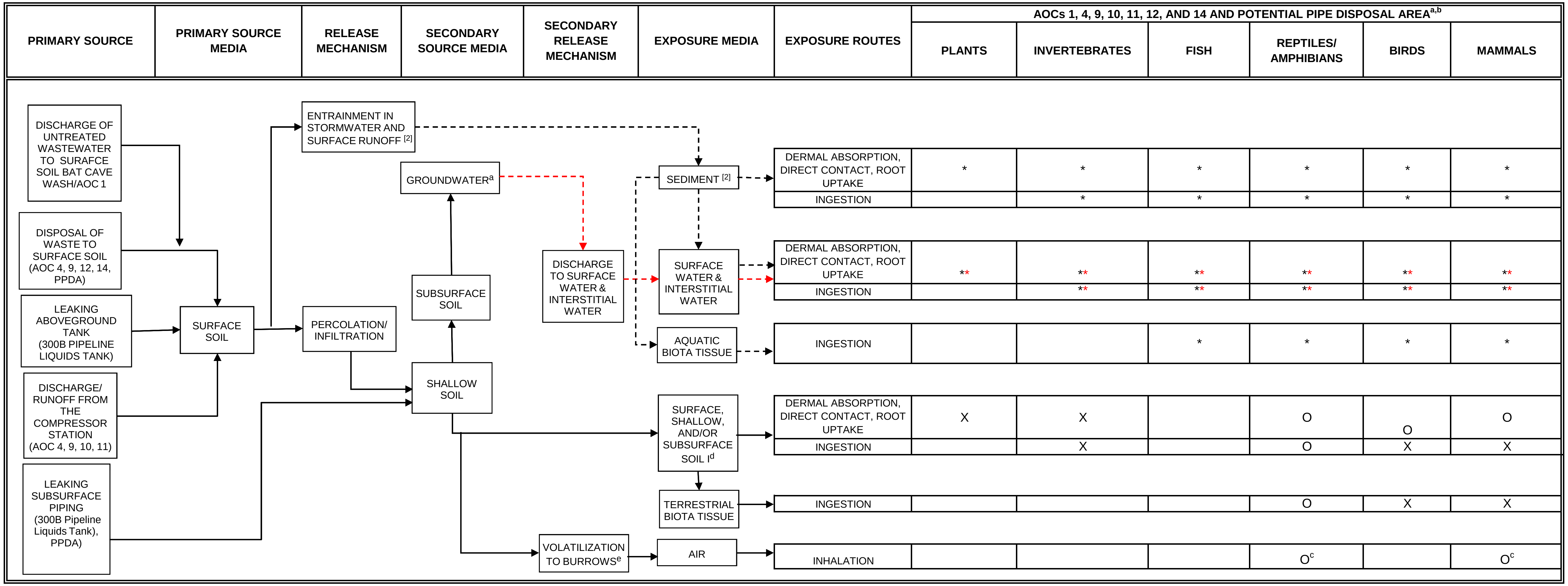
[1] Conceptual site model (CSM) from the Topock Final Human Health and Ecological Risk Assessment Work Plan (RAWP; ARCADIS, 2008) and updated with information based on the Topock Groundwater Risk Assessment (GWRA; ARCADIS,

[a] As described in the text, the U.S. Bureau of Land Management (USBLM) has requested that the risk assessment assume future unrestricted use of their property. Accordingly, a future hypothetical residential scenario for contact with soils will be evaluated for property owned by USBLM.

[b] For applicable soil exposure depth, please see Fig 3-1 in the RAWP (ARCADIS, 2008).

——→	Potentially complete transport pathway to be included in the quantitative soil risk assessment.
- - →	Potentially complete transport pathway to be evaluated qualitatively in the soil risk assessment.
——→	Quantitative evaluation of the groundwater pathway completed in the GWRA (ARCADIS, 2009a); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential future impacts or current localized impacts to groundwater from soil.
- - →	Insignificant transport pathway as evaluated in the GWRA (ARCADIS, 2009a).
X	Potentially complete exposure route to be included in the quantitative soil risk assessment; quantitative evaluation of the groundwater pathway completed in the GWRA (ARCADIS, 2009a).
*	Potentially complete exposure route to be further evaluated in the soil risk assessment.
*	Insignificant exposure route as evaluated in the GWRA (ARCADIS, 2009a).

FIGURE 5
UPDATED[1] ECOLOGICAL CONCEPTUAL SITE MODEL
PACIFIC GAS AND ELECTRIC COMPANY
HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT WORK PLAN



EXPOSURE MEDIA	EXPOSURE ROUTES	PLANTS	INVERTEBRATES	FISH	REPTILES/ AMPHIBIANS	BIRDS	MAMMALS
SEDIMENT [2]	DERMAL ABSORPTION, DIRECT CONTACT, ROOT UPTAKE	*	*	*	*	*	*
	INGESTION		*	*	*	*	*
SURFACE WATER & INTERSTITIAL WATER	DERMAL ABSORPTION, DIRECT CONTACT, ROOT UPTAKE	**	**	**	**	**	**
	INGESTION		**	**	**	**	**
AQUATIC BIOTA TISSUE	INGESTION			*	*	*	*
SURFACE, SHALLOW, AND/OR SUBSURFACE SOIL I[d]	DERMAL ABSORPTION, DIRECT CONTACT, ROOT UPTAKE	X	X		O	O	O
	INGESTION		X		O	X	X
TERRESTRIAL BIOTA TISSUE	INGESTION				O	X	X
AIR	INHALATION				O[c]		O[c]

NOTES:

[1]	Conceptual site model (CSM) from the Topock Final Human Health and Ecological Risk Assessment Work Plan (RAWP; ARCADIS, 2008) and updated with information based on the Topock Groundwater Risk Assessment (GWRA; ARCADIS, 2009a).
[2]	Applicable to AOC 1 and AOC 10 only.
a	As requested by California's Department of Toxic Substances Control (DTSC), the groundwater-to-phreatophytes pathway and consumption of phreatophytes by herbivores were evaluated in the GWRA (ARCADIS, 2009a) and exposure and risk were found to be insignificant.
——▶	Potentially complete exposure pathway
- - - -▶	Soil/sediment potential pathway under evaluation (separate assessment)
- - - -▶	Insignificant transport pathway as evaluated in the GWRA (ARCADIS, 2009a). Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential future impacts or current localized impacts to groundwater from soil.
*	Soil/sediment exposure route under evaluation (separate assessment)
*	Insignificant exposure route as evaluated in the GWRA (ARCADIS, 2009a).
X	Potentially complete exposure route
O	Potentially complete exposure route not significant or not directly assessed
AOC	Area of concern
PPDA	Potential Pipeline Disposal Area

a. The Former 300B Pipeline Liquids Tank area has already been closed (CH2M HILL, 2007), but DTSC has requested additional investigation (CalEPA, 2007). If complete pathways are identified based on the results, the Former 300B Pipeline Liquids Tank area will be included in the Ecological Risk Assessment (ERA).

b. For the large home range ecological receptors, two exposure areas will be evaluated: (i) BCW (AOC 1) and AOC 4 and (ii) all other remaining AOCs outside the compressor station (AOCs 9, 10, 11, 12, 14, Potential Pipeline Disposal Area).
For small home range ecological receptors, the Potential Pipeline Disposal Area and each AOC outside the compressor station (AOCs 4, 9, 10, 11, 12, 14) will be evaluated as separate exposure areas (See Section 3 of the RAWP; ARCADIS, 2008).
All exposure pathways inside the compressor station are considered incomplete and will not be evaluated for ecological receptors.

c. Potential inhalation exposure in burrows was included for the Former 300B Pipeline Liquids Tank area only based on the potential presence of volatile organic compounds (VOCs).

d. For applicable soil exposure depth, please see Fig 3-1 in the RAWP Addendum (ARCADIS, 2009b).

e. Applicable soil depth is 0-6 feet below ground surface (bgs) for volatilization to burrow air.

References for Figures 2, 3, 4, and 5.

ARCADIS. 2008. Revised Human Health and Ecological Risk Assessment Work Plan, Pacific Gas and Electric (PG&E) Topock Compressor Station, Needles, California.

ARACDIS. 2009a. Human and Ecological Risk Assessment of Groundwater Impacted by Activities at Solid Waste Management Unit (SWMU) 1/ Area of Concern (AOC 1 and SWMU 2, Pacific Gas and Electric (PG&E) Topock Compressor Station, Needles, California. November.

ARACDIS. 2009b. Revised Addendum to the Revised Human Health and Ecological Risk Assessment Work Plan, Pacific Gas and Electric (PG&E) Topock Compressor Station, Needles, California. February.

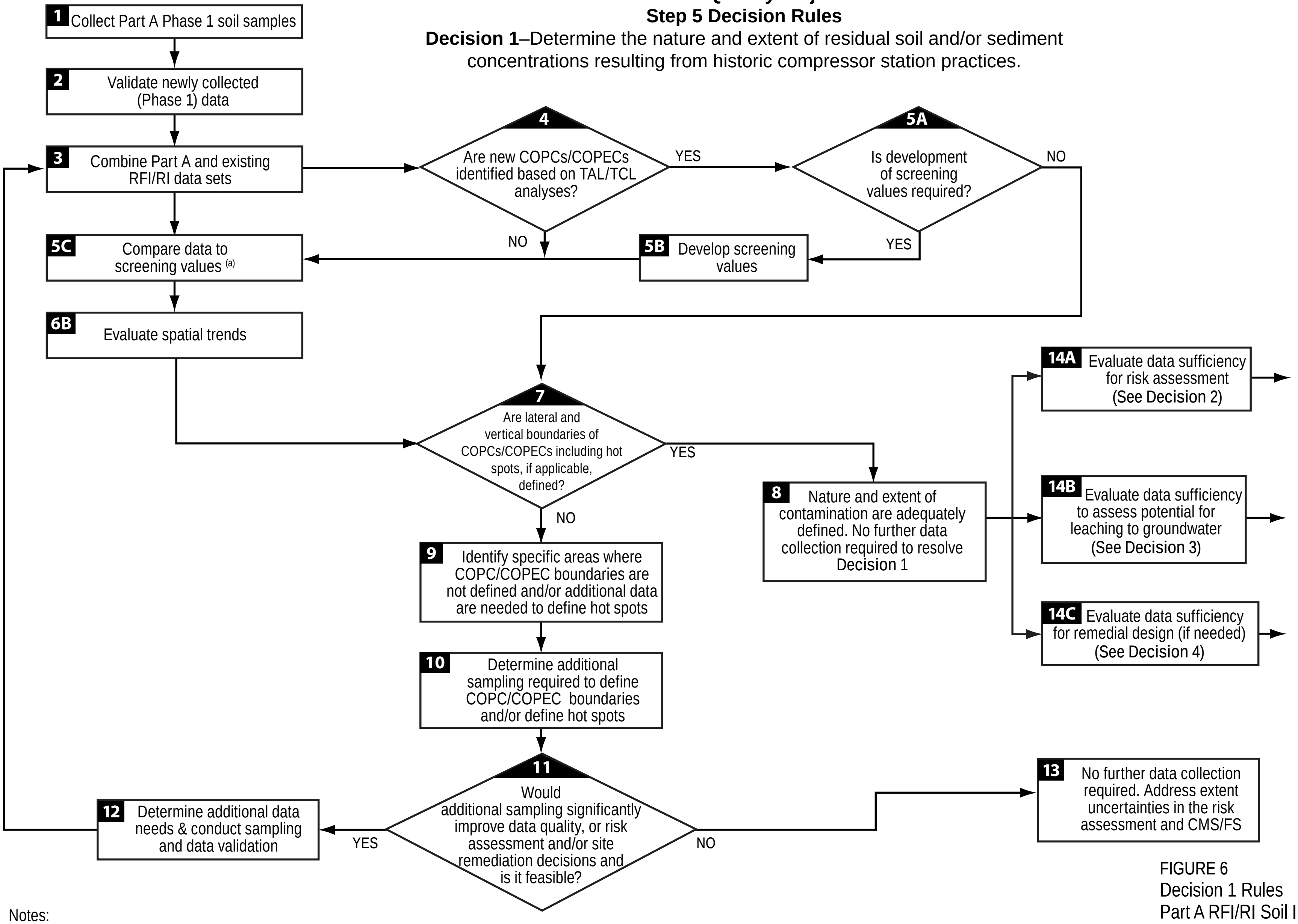
CH2M HILL. 2007. Pipeline Liquids Tank Closure, Pacific Gas and Electric (PG&E) Topock Compressor Station, Needles, California. Technical Memorandum. April 26.

CalEPA. 2007. Letter “Comments and Conditional Approval of the RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Pacific Gas and Electric (PG&E) Topock Compressor Station, Needles, California. August 10.

Draft Data Quality Objectives

Step 5 Decision Rules

Decision 1–Determine the nature and extent of residual soil and/or sediment concentrations resulting from historic compressor station practices.



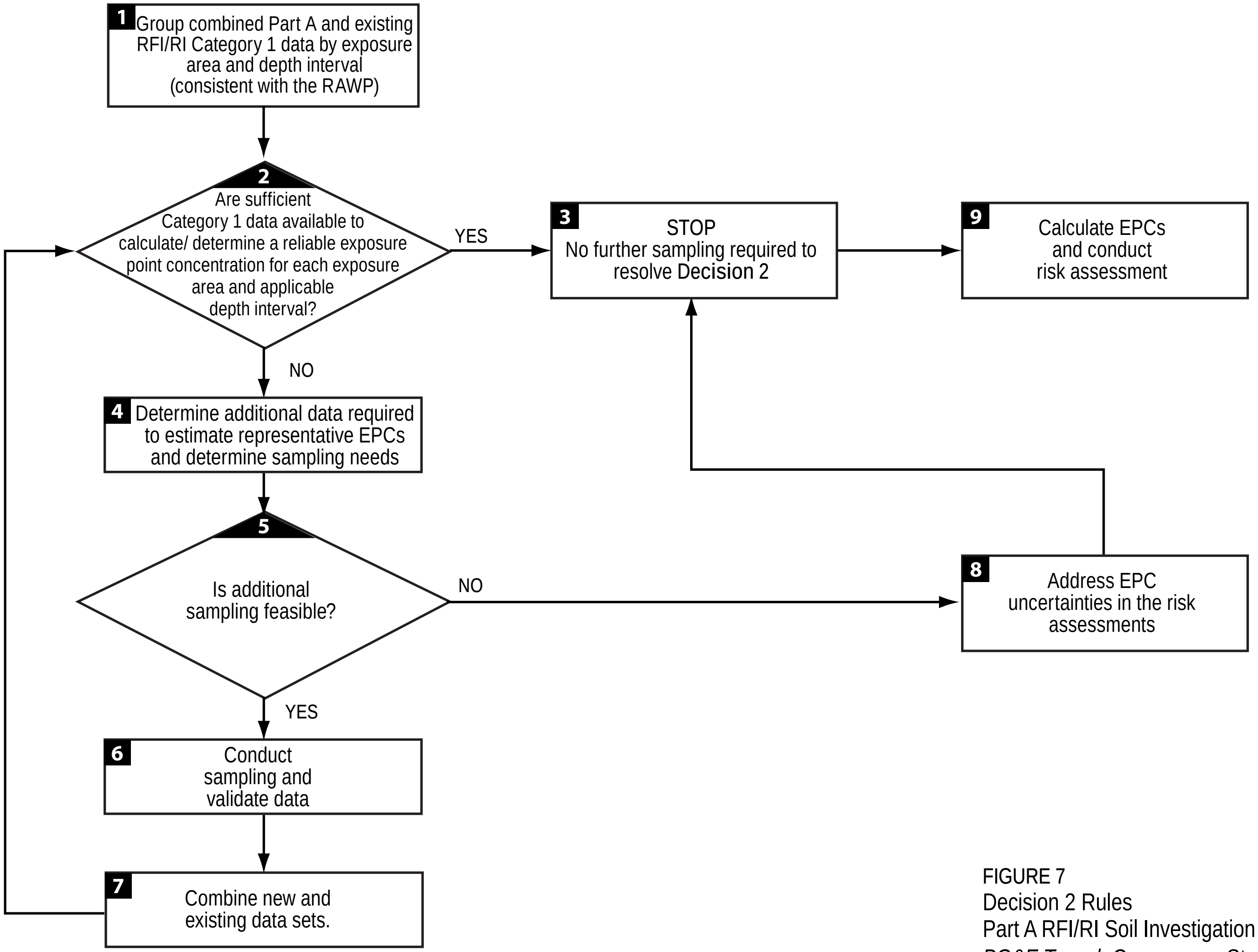
Notes:
– Steps are for each unit (SWMU, AOC, or UA)
– (a) Screening levels will include background (for metals), CHHSLs, ECVs, and Soil Screening Levels for protection of groundwater

FIGURE 6
Decision 1 Rules
Part A RFI/RI Soil Investigation
PG&E Topock Compressor Station
Needles, California

Draft Data Quality Objectives

Step 5 Decision Rules

Decision 2–Determine representative EPCs for residual soil and/or sediment contamination resulting from historic compressor station practices that may pose unacceptable risks to current or future human or ecological receptors.



Notes:
EPC: Exposure Point Concentration
RAWP: Risk Assessment Workplan

FIGURE 7
Decision 2 Rules
Part A RFI/RI Soil Investigation
PG&E Topock Compressor Station
Needles, California

Draft Data Quality Objectives
Step 5 Decision Rules
Decision 3–Determine whether residual soil concentrations resulting from historic compressor station practices may threaten groundwater.

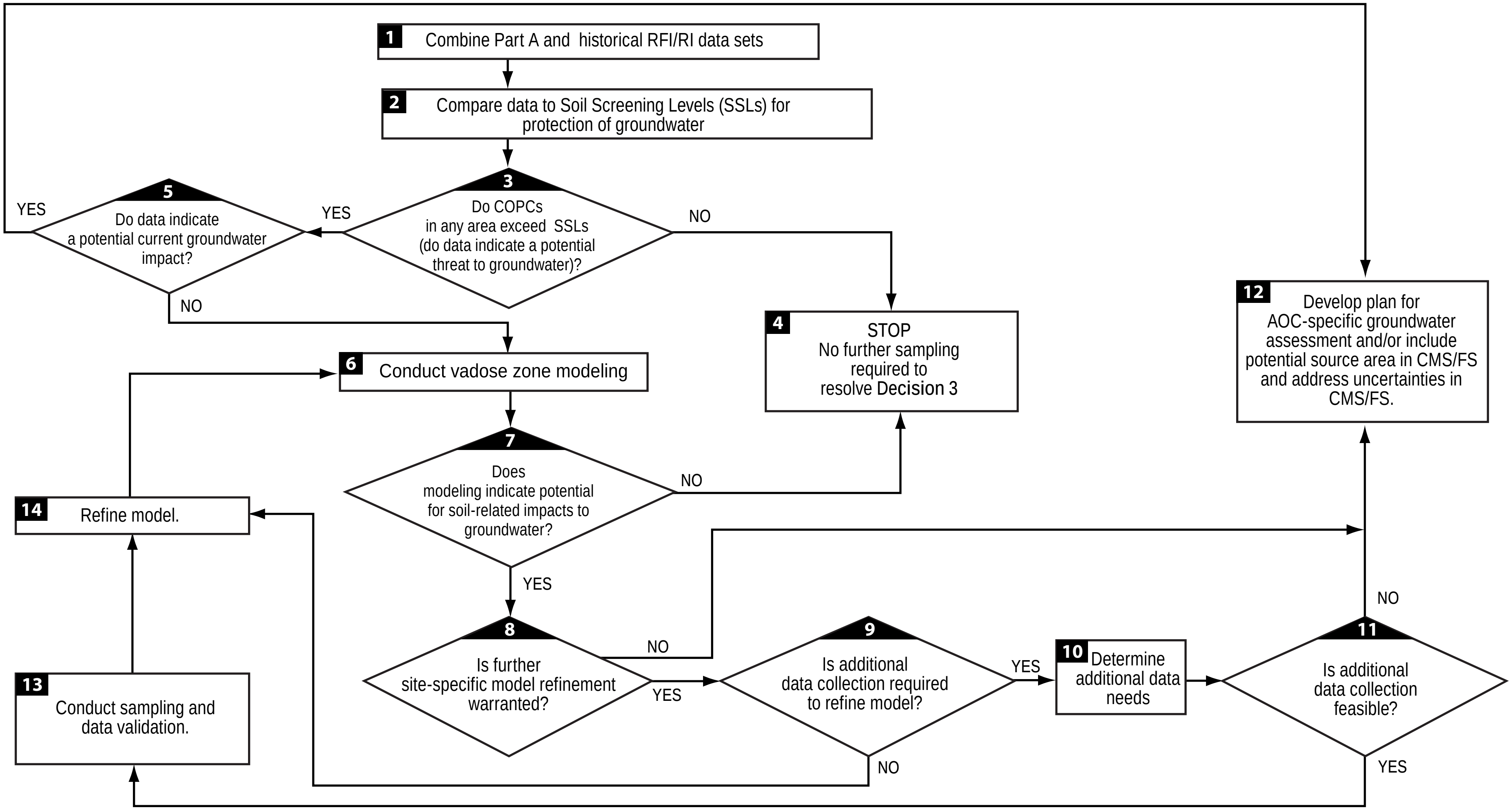


FIGURE 8
Decision 3 Rules
Part A RFI/RI Soil Investigation
PG&E Topock Compressor Station
Needles, California

Notes:
SSL: Soil Screen Levels for protection of groundwater
COPCs: Chemicals of Potential Concern
CMS/FS: Corrective Measure Study/Feasibililty Study

Draft Data Quality Objectives
Step 5 Decision Rules
Decision 4–Determine site-specific soil property and contaminant distribution information necessary to support CMS/FS decisions and/or remedial design.

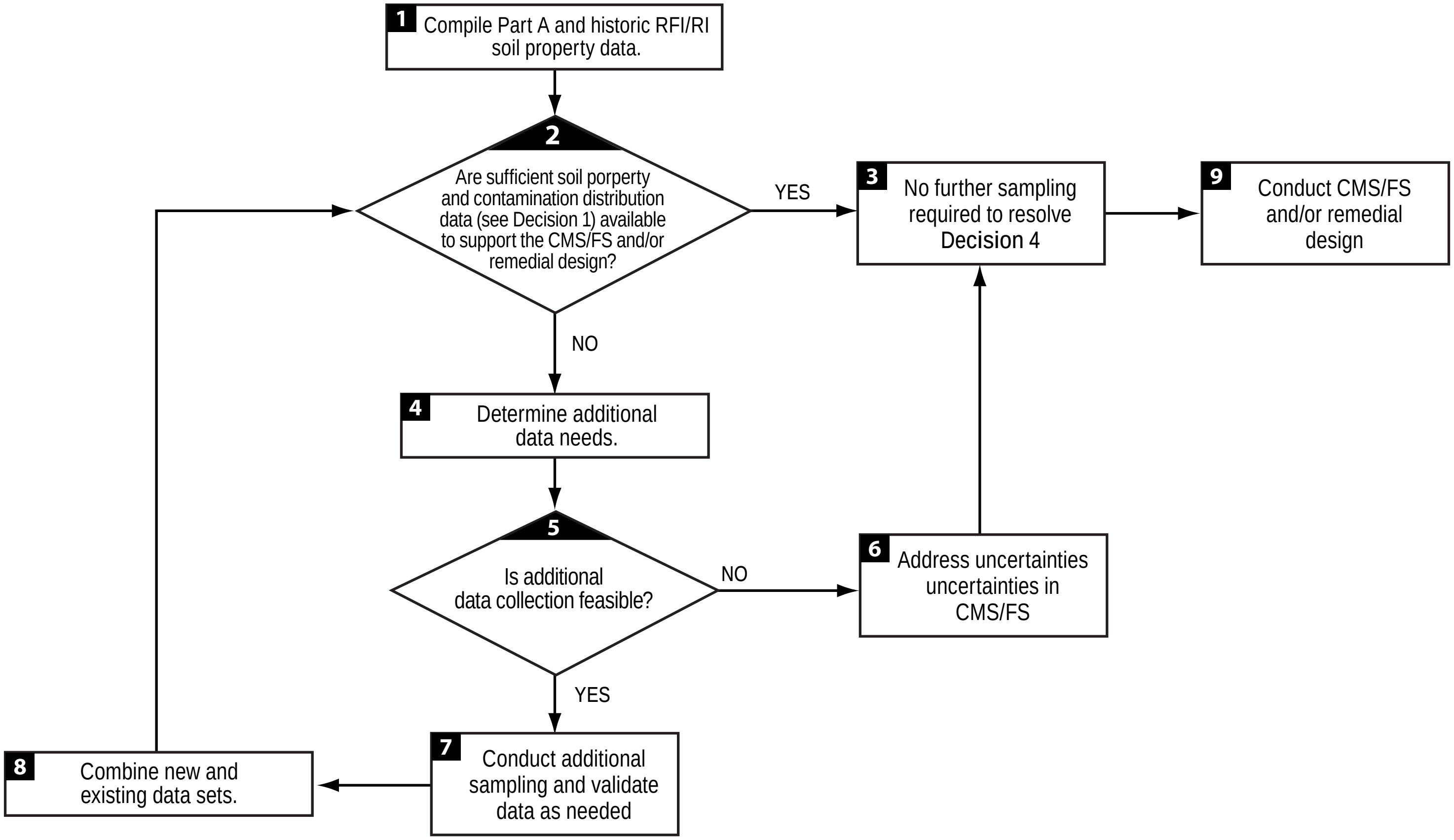


FIGURE 9
Decision 4 Rules
Part A RFI/RI Soil Investigation
PG&E Topock Compressor Station
Needles, California

Notes:
CMS/FS: Corrective Measure Study/Feasibililty Study

Appendix A
Data Usability Matrix for Risk Assessment

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

			Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]								
					Sampling Depth		Exposure Depth						
AOC or SubAOC Area[a]	**Data Use**	**Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively**	**Number of Soil Sampling Locations**	**Status of Soil Sampling**	**Number of Soil Samples**	**Status of Soil Samples**	**Number of Soil Samples**	**Status of Soil Samples**	**Analytical Suite[c,d]**	**Data Quality[e,f,g,h]**	**Representative[i]**	**Comparability[j]**	**Notes[k]**
AOC-1: Upland BCW for Current Conditions	**HHRA and ERA:** COPC Selection EPC Calculations Pathway Analysis Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	86	35 locations completed previously 51 locations completed in Phase I sampling	0 to 0.5 foot bgs: 73	23 samples collected previously 50 samples collected in Phase I sampling	0 to 0.5 foot bgs: 73	23 samples collected previously 50 samples collected in Phase I sampling	Full suite at most locations except surface interval (0 to 0.5 feet bgs), which did not include VOCs or TPH-purgeable	Category 1 Data (excluded Category 3 data from 8 locations [DS-1 through DS-4 and PB-1 through PB-4]) Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data validation: at least 10%	Yes; all locations extend to at least 10 feet bgs	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during the data gaps assessment.** The Phase I samples include sampling locations north of the railroad (BCW1 through BCW5), locations south of railroad, and locations from Banks and White Powdery areas. Samples were not collected from 7 to 8 feet bgs at 7 locations and from 9 to 10 feet bgs at 4 locations because of refusal. The proposed Phase I sampling in the Part A Work Plan (CH2M HILL, 2006a) for 0.5 or 1 feet bgs sample was collected at 0 to 0.5 feet bgs at the start of native material when feasible. Vertical coverage of the samples previously collected assumes samples collected from the Banks were at the 0 to 0.5 feet bgs depth interval. If sampling depth interval was not specified in the Work Plan (CH2M HILL, 2006a), that sample was not included in the vertical coverage for any depth.
					0.5 to 3 feet bgs: 65	15 samples collected previously 50 samples collected in Phase I sampling	0 to 3 feet bgs:138	38 samples collected previously 100 samples collected in Phase I sampling					
					>3 to 6 feet bgs: 64	14 samples collected previously 50 samples collected in Phase I sampling	0 to 6 feet bgs: 202	52 samples collected previously 150 samples collected in Phase I sampling					
					>6 to 10 feet bgs: 68	18 samples collected previously 50 samples collected in Phase I sampling	0 to 10 feet bgs: 270	70 samples collected previously 200 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-1: Upland BCW for the 2 feet Scouring Scenario	**HHRA and ERA:** COPC Selection EPC Calculations Pathway Analysis Hot spot Analysis	Soil Modeled from soil concentrations: • Biota (ERA)	70	19 locations completed previously 51 locations completed in Phase I sampling	Current 2 to 3 feet bgs: 65	15 samples collected previously 50 samples collected in Phase I sampling	0 to 1 feet bgs post scour (current 2 to 3 feet bgs): 65	15 samples collected previously 50 samples collected in Phase I sampling	Full suite	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data validation: at least 10%	Yes; all locations extend to at least 10 feet bgs	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during the data gaps assessment.** This scenario assumes scouring of top 2 feet of soil. Exposure depths adjusted accordingly for this future scenario based on current data. Please see the Revised RAWP Addendum (ARCADIS, 2009) for scouring scenario exposure depths. The Phase I samples include sampling locations north of the railroad (BCW1 through BCW5) and White Powdery areas.
					Current >3 to 6 feet bgs: 64	14 samples collected previously 50 samples collected in Phase I sampling	0 to 4 feet bgs post scour (current >2 to 6 feet bgs): 129	29 samples collected previously 100 samples collected in Phase I sampling					
					Current >6 to 10 feet bgs: 68	18 samples collected previously 50 samples collected in Phase I sampling	0 to 8 feet bgs post scour (current >2 to 10 feet bgs): 197	47 samples collected previously 150 samples collected in Phase I sampling					
					HHRA scenario only. Current > 10 to 12 feet bgs: 0	0 samples collected previously 0 samples collected in Phase I sampling	HHRA scenario only. 0 to 10 feet bgs post scour (current > 2 to 12 feet bgs): 197	47 samples collected previously 150 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-1: Upland BCW for the 5 feet Scouring Scenario	**HHRA and ERA:** COPC Selection EPC Calculations Pathway Analysis Hot Spot Analysis	Soil Modeled from soil concentrations: • Biota (ERA)	71	20 locations completed previously 51 locations completed in Phase I sampling	Current 5 to 6 feet bgs: 62	12 samples collected previously 50 samples collected in the Phase I sampling	0 to 1 foot bgs post scour (current 5 to 6 feet bgs): 62	12 samples collected previously 50 samples collected in Phase I sampling	Full suite	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data validation: at least 10%	Yes; all locations extend to at least 10 feet bgs	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during the data gaps assessment.** This scenario assumes scouring of top 5 feet of soil. Exposure depths adjusted accordingly for this future scenario based on current data. Please see the Revised RAWP Addendum (ARCADIS, 2009) for scouring scenario exposure depths. The Phase I samples include sampling locations north of the railroad (BCW1 through BCW5) and White Powdery areas.
					Current > 6 to 10 feet bgs: 68	18 samples collected previously 50 samples collected in Phase I sampling	0 to 5 feet bgs post scour (current >5 to 10 feet bgs): 130	30 samples collected previously 100 samples collected in Phase I sampling					
					Current >10 to 15 feet bgs: 8	2 samples collected previously 6 samples collected in Phase I sampling	0 to 10 feet bgs post scour (current >5 to 15 feet bgs): 138	32 samples collected previously 106 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-1: Riparian BCW	**HHRA and ERA:** Screening Pathway Analysis	Sediment	10	9 locations completed previously (SED 5 through 12 and SS-1) 1 location (BCW-6) completed in Phase I sampling; this sample was collected in a transitional environment between soil and sediment..	0 to 0.5 foot bss: 2	1 sample collected previously 1 sample collected in Phase I sampling	0 to 0.5 foot bss: 2	1 sample collected previously 1 sample collected in Phase I sampling	. Hexavalent chromium and Title 22 metals for all samples; limited samples with full suite analysis.	Category 1 Data Meets requirements of the QAPP Background concentrations not available Data Validation: at least 10%	Data is limited for a predictive ecological risk assessment, but adequate for screening purposes for ERA and HHRA. Deep vertical coverage is good. All locations extend to at least 10 feet bss. Shallow horizontal coverage is limited; four samples from 0 to 0.5 foot bss.	Yes	**Sufficiency of data for screening purposes as defined in the RAWP will be evaluated during the data gaps assessment.** Much of the area is inaccessible without road building through thick riparian vegetation.
					0.5 to 3 feet bss:9	8 samples collected previously 1 sample collected in Phase I sampling	0 to 3 feet bss: 11	9 samples collected previously 2 samples collected in Phase I sampling					
					3 to 6 feet bss: 0	0 samples collected previously 0 samples collected in Phase I sampling due to refusal	0 to 6 ft bss: 11	9 samples collected previously 2 samples collected in Phase I sampling					
					6 to 10 feet bss: 0	0 samples collected previously 0 samples proposed in Phase I sampling	0 to 10 feet bgs: 11	9 samples collected previously 2 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
North of AOC 1: USBLM Land north of the railroad	**HHRA (residential)** COPC Selection EPC Calculations	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Fruits and Vegetables	13	8 locations completed previously (SS-2, SS-7, SS-8, SSB-8, SSB-9, DS-3, DS-4, and MW-13) 5 locations completed in Phase I sampling (BCW-1 through BCW-5)	0 to 0.5 foot bgs: 10	5 samples collected previously 5 samples collected in Phase I sampling	0 to 0.5 foot bgs: 10	5 samples collected previously 5 samples collected in Phase I sampling	Full suite at most locations except surface interval (0 to 0.5 foot bgs), which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes Data Validation: at least 10%.	Yes for deeper soils but limited for surface soil (0 to 0.5 foot bgs)	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during the data gaps assessment.** This area will be evaluated separately for a future residential scenario only. If presence of VOCs in soils indicates a concern for potential migration to indoor air, soil gas data will need to be collected and evaluated for the inhalation of VOCs in indoor air pathway. Did not collect samples from 5 to 6 feet bgs at two locations and from 9- 10 feet bgs samples at two locations because of refusal.
					0.5 to 3 feet bgs: 10	5 samples collected previously 5 samples collected in Phase I sampling	0 to 3 feet bgs: 20	10 samples collected previously 10 samples collected in Phase I sampling					
					3 to 6 feet bgs: 5	2 samples collected previously 3 samples collected in Phase I sampling	0 to 6 feet bgs: 25	12 samples collected previously 13 samples collected in Phase I sampling					
					6 to 10 feet bgs: 6	3 samples collected previously 3 samples collected in Phase I sampling	0 to 10 feet bgs: 31	15 samples collected previously 16 samples collected in Phase I sampling					
North of AOC 1: USBLM Land north of	**HHRA (residential)**	Soil Modeled from soil	8	3 locations completed previously	Current 2 to 3 feet bgs: 7	2 samples collected	0 to 1 feet bgs post scour	2 samples collected	Full suite at most locations except surface interval	Category 1 Data Meets requirements	Yes for deeper soils but limited for surface	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during**

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
the railroad for the 2 feet Scouring Scenario	COPC Selection EPC Calculations	concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Fruits and Vegetables		(SSB-8, SSB-9, and MW-13) 5 locations completed in the Phase I sampling (BCW-1 through BCW-5)		previously 5 samples collected in the Phase I sampling	(current 2 to 3 feet bgs): 7	previously 5 samples collected in the Phase I sampling	(0 to 0.5 foot bgs), which did not include VOCs or TPH-purgeable.	of the QAPP; the reporting limits are less than: • Site specific background • HH screening values for all analytes Data Validation: at least 10%.	soil (0 to 0.5 foot bgs)		**the data gaps assessment.** This area will be evaluated separately for a future residential scenario only. If presence of VOCs in soils indicates a concern for potential migration to indoor air, soil gas data will need to be collected and evaluated for the inhalation of VOCs in indoor air pathway. Did not collect samples from 5 to 6 feet bgs at two locations and from 9- 10 feet bgs samples at two locations because of refusal.
					Current >3 to 6 feet bgs: 6	2 samples collected previously 4 samples collected in the Phase I sampling	0 to 4 feet bgs post scour (current >2 to 6 feet bgs): 13	4 samples collected previously 9 samples collected in Phase I sampling					
					Current >6 to 10 feet bgs: 7	3 samples collected previously 4 samples collected in the Phase I sampling	0 to 8 feet bgs post scour (current >2 to 10 feet bgs): 20	7 samples collected previously 13 samples collected in the Phase I sampling					
					Current > 10 to 12 feet bgs: 0	0 samples collected previously 0 samples collected in the Phase I sampling	0 to 10 feet bgs post scour (current > 2 to 12 feet bgs): 20	7samples collected previously 13 samples collected in the Phase I sampling					
North of AOC 1: USBLM Land north of	**HHRA (residential)** COPC	Soil Modeled from soil	8	3 locations completed previously (SSB-8, SSB-	Current 5 to 6 feet bgs: 6	2 samples collected previously	0 to 1 foot bgs post scour (current 5 to	2 samples collected previously	Full suite at most locations except surface interval (0 to 0.5 foot	Category 1 Data Meets requirements of the QAPP; the	Yes for deeper soils but limited for surface soil (0 to 0.5 foot bgs)	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during the data gaps assessment.**

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
the railroad for the 5 feet Scouring Scenario	Selection EPC Calculations	concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Fruits and Vegetables		9, and MW-13) 5 locations completed in the Phase I sampling (BCW-1 through BCW-5)		4 samples collected in the Phase I sampling	6 feet bgs): 6	4 samples collected in the Phase I sampling	bgs), which did not include VOCs or TPH-purgeable.	reporting limits are less than: • Site specific background • HH screening values for all analytes Data Validation: at least 10%.			This area will be evaluated separately for a future residential scenario only. If presence of VOCs in soils indicates a concern for potential migration to indoor air, soil gas data will need to be collected and evaluated for the inhalation of VOCs in indoor air pathway. Did not collect samples from 5 to 6 feet bgs at two locations and from 9- 10 feet bgs samples at two locations because of refusal.
					Current > 6 to 10 feet bgs: 7	3 samples collected previously 4 samples collected in the Phase I sampling	0 to 5 feet bgs post scour (current >5 to 10 feet bgs): 13	5 samples collected previously 8 samples collected in Phase I sampling					
					Current >10 to 15 feet bgs: 0	0 samples collected previously 0 samples collected in the Phase I sampling	0 to 10 feet bgs post scour (current >5 to 15 feet bgs): 13	5 samples collected previously 8 samples collected in the Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

			Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]								
					Sampling Depth		**Exposure Depth**						
AOC or SubAOC Area[a]	**Data Use**	**Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively**	**Number of Soil Sampling Locations**	**Status of Soil Sampling**	**Number of Soil Samples**	**Status of Soil Samples**	**Number of Soil Samples**	**Status of Soil Samples**	**Analytical Suite[c,d]**	**Data Quality[e,f,g,h]**	**Representative[i]**	**Comparability[j]**	**Notes[k]**
AOC-4: Debris Ravine	**HHRA and ERA:** COPC Selection EPC Calculations Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	35	8 locations completed previously 27 locations proposed in Phase I sampling	0 to 0.5 foot bgs: 42	8 samples collected previously 34 samples collected in Phase I sampling	0 to 0.5 foot bgs: 42	8 samples collected previously 34 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during the data gaps assessment.** Very rugged area. Required sampling via long reach backhoe for certain locations.. All locations extend to 6 feet bgs or refusal and sample from 1 location was collected at 8 feet bgs. Vertical coverage evaluation was based on the proposed sampling at locations shown in the updated figures (CH2M HILL, 2008d on DTSC website) but not listed in the Part A Work Plan (CH2M HILL, 2006a) and confirmed by the Soil Investigation team. It follows similar sampling depths proposed for this area in the Part A Work Plan (CH2M HILL, 2006a). Only 11 samples were collected from 2 to 3 feet bgs because of refusal.
					0.5 to 3 feet bgs: 16	5 samples collected previously 11 samples collected in Phase I sampling	0 to 3 feet bgs: 58	13 samples collected previously 45 samples collected Phase I sampling					
					3 to 6 feet bgs: 2	0 samples collected previously 2 samples collected in Phase I sampling	0 to 6 feet bgs: 60	13 samples collected previously 47 samples collected in Phase I sampling					
					6 to 10 feet bgs: 1	0 samples collected previously 1 sample collected in Phase I sampling	0 to 10 feet bgs: 61	13 samples collected previously 48 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-9: Southeast Fence Line	**HHRA and ERA:** COPC Selection EPC Calculations Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	22	9 locations completed previously 13 locations completed in Phase I sampling	0 to 0.5 foot bgs: 13	0 samples collected previously 13 samples collected in Phase I sampling	0 to 0.5 foot bgs: 13	0 samples collected previously 13 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs for most of the metals and PAHs Data Validation: at least 10%	Yes for deeper soils, but limited for surface soil (0 to 0.5 foot bgs)	Yes	**Sufficiency of data to calculate EPCs for each exposure interval will be determined during the data gaps assessment.** Steep sloped area required sampling with long reach excavator for certain locations. Potential source is stormwater discharge pipe and/or auxiliary jacket cooling water leaks and spills from historically unbermed area.. Vertical coverage evaluation were based on the proposed sampling in the Part A Work Plan (CH2M HILL, 2006a), updated figures (CH2M HILL, 2008d on DTSC website), and confirmed by the Soil Investigation team that the 0.5 to 1 foot bgs were collected at 0 to 0.5 foot bgs at the start of native material if feasible. In Phase I sampling, most locations were terminated at 3 feet bgs; however, at two locations soil samples were collected at 5 to 6 feet bgs.
					0.5 to 3 feet bgs: 22	9 samples collected previously 13 samples collected in Phase I sampling	0 to 3 feet bgs: 35	9 samples collected previously 26 samples collected in Phase I sampling					
					3 to 6 feet bgs: 2	0 samples collected previously 2 samples collected in Phase I sampling	0 to 6 feet bgs: 37	9 samples collected previously 28 samples collected in Phase I sampling					
					6 to 10 feet bgs: 0	0 samples collected previously 0 samples collected in Phase I sampling	0 to 10 feet bgs: 37	9 samples collected previously 28 samples collected in Phase I sampling					

			Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]								
					Sampling Depth		Exposure Depth						
AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples	Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
AOC-10: East Ravine	**HHRA and ERA:** COPC Selection EPC Calculations Pathway Analysis Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	31	9 locations completed previously 22 locations completed in Phase I sampling	0 to 0.5 foot bgs: 30	8 samples collected previously 22 samples collected in Phase I sampling	0 to 0.5 foot bgs: 30	8 samples collected previously 22 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes	Yes	**Sufficiency of data to calculate EPCs for each depth interval will be determined during the data gaps assessment.** Some locations were inaccessible to mechanical drilling equipment due to steep slopes and rugged terrain. Sample were not collected from 2 to 3 feet bgs at two locations; from 5 to 6 feet bgs at three locations; and from 9 to10 feet bgs at five locations because of refusal.
					0.5 to 3 feet bgs: 26	6 samples collected previously 20 samples collected in Phase I sampling	0 to 3 feet bgs: 56	14 samples collected previously 42 samples collected in Phase I sampling					
					>3 to 6 feet bgs: 19	0 samples collected previously 19 samples collected in Phase I sampling	0 to 6 feet bgs: 75	14 samples collected previously 61 samples collected in Phase I sampling					
					> 6 to 10 feet bgs: 17	0 samples collected previously 17 samples collected in Phase I sampling	0 to 10 feet bgs: 92	14 samples collected previously 78 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-10: East Ravine for the 2 feet Scouring Scenario	**HHRA and ERA:** COPC Selection EPC Calculations Pathway Analysis Hot Spot Analysis	Soil Modeled from soil concentrations: • Biota (ERA)	20	0 locations completed previously 20 locations completed in Phase I sampling	Current 2 to 3 feet bgs: 26	6 samples collected previously 20 samples collected in Phase I sampling	0 to 1 feet bgs post scour (current 2 to 3 feet bgs): 26	6 samples collected previously 20 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes	Yes	**Sufficiency of data to calculate EPCs for each depth interval will be determined during the data gaps assessment.** This scenario assumes scouring of top 2 feet of soil. Exposure depths adjusted accordingly for this future scenario based on current data. Please see the Revised RAWP Addendum (ARCADIS, 2009) for scouring scenario exposure depths. Some locations were inaccessible to mechanical drilling equipment due to steep slopes and rugged terrain. Samples were not collected from 2 to 3 feet bgs at two locations; from 5 to 6 feet bgs at three locations; and from 9 to 10 feet bgs at five locations because of refusal.
					Current >3 to 6 feet bgs: 19	0 samples collected previously 19 samples collected in Phase I sampling	0 to 4 feet bgs post scour (current >2 to 6 feet bgs): 45	6 samples collected 39 samples collected in Phase I sampling					
					Current >6 to 10 feet bgs: 17	0 samples collected previously 17 samples collected in Phase I sampling	0 to 8 feet bgs post scour (current >2 to 10 feet bgs): 62	6 samples collected 56 samples collected in Phase I sampling					
					HHRA scenario only Current > 10 to 12 feet bgs: 0	0 samples collected previously 0 samples collected in Phase I sampling	HHRA scenario only 0 to 10 feet bgs post scour (current > 2 to 14 feet bgs): 62	6 samples collected 56 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-10: East Ravine for the 5 feet Scouring Scenario	**HHRA and ERA:** COPC Selection EPC Calculations Pathway Analysis Hot Spot Analysis	Soil Modeled from soil concentrations: • Biota (ERA)	19	0 locations completed previously 19 locations completed) in Phase I sampling	Current 5 to 6 feet bgs: 19	0 samples collected previously 19 samples collected in Phase I sampling	0 to 1 foot bgs post scour (current 5 to 6 feet bgs): 19	0 samples collected previously 19 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes	Yes	**Sufficiency of data to calculate EPCs for each depth interval will be determined during the data gaps assessment.** This scenario assumes scouring of top 5 feet of soil. Exposure depths adjusted accordingly for this future scenario based on current data. Please see the Revised RAWP Addendum (ARCADIS, 2009) for scouring scenario exposure depths. Some locations were inaccessible to mechanical drilling equipment due to steep slopes and rugged terrain. Samples were not collected from 5 to 6 feet bgs at three locations and from 9 to 10 feet bgs at five locations because of refusal. Vertical coverage evaluation was based on the proposed sampling in the Part A Work Plan (CH2M HILL, 2006a), updated figures (CH2M HILL, 2008d on DTSC website) and confirmed by the Soil Investigation team that the samples at 0.5 to 1 foot bgs were collected at 0 to 0.5 foot bgs at the start of native material when feasible. Vertical coverage evaluation was based on the proposed sampling at locations shown in the updated figures (CH2M HILL, 2008d on DTSC website) but not listed in the Part A Work Plan (CH2M HILL, 2006a) and it follows similar sampling depths proposed for this area in the Part A Work Plan (CH2M HILL, 2006a).
					Current >6 to 10 feet bgs: 17	0 samples collected previously 17 samples collected in Phase I sampling	0 to 5 feet bgs post scour (current >5 to 10 feet bgs): 36	0 samples collected previously 36 samples collected in Phase I sampling					
					Current >10 to 15 feet bgs: 0	0 samples collected previously 0 samples collected in Phase I sampling	0 to 10 feet bgs post scour (current >5 to 15 feet bgs): 36	0 samples collected previously 36 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

			Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]								
					Sampling Depth		Exposure Depth						
AOC or SubAOC Area[a]	**Data Use**	**Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively**	**Number of Soil Sampling Locations**	**Status of Soil Sampling**	**Number of Soil Samples**	**Status of Soil Samples**	**Number of Soil Samples**	**Status of Soil Samples**	**Analytical Suite[c,d]**	**Data Quality[e,f,g,h]**	**Representative[i]**	**Comparability[j]**	**Notes[k]**
AOC-11: Topographic Low Areas	**HHRA and ERA:** COPC Selection EPC Calculations Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	19	No locations completed previously 19 locations completed (including 2 in the grassy areas) in Phase I sampling	0 to 0.5 foot bgs: 19	0 samples collected previously 19 samples collected in Phase I sampling	0 to 0.5 foot bgs: 19	0 samples collected previously 19 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes	Yes	**Sufficiency of data to calculate EPCs for each depth interval will be determined during the data gaps assessment.** Four samples were collected during the installation of MW12. However, these were at depths > 10 feet bgs and will not be considered for the risk assessment. Horizontal and vertical coverage includes secondary proposed sampling locations. If presence of VOCs in soils indicates a concern for potential migration to indoor air, soil gas data will need to be collected. If sufficient soil gas data are collected, the inhalation of VOCs in outdoor air will be evaluated using soil gas data. Vertical coverage evaluation was based on the proposed sampling in the Part A Work Plan (CH2M HILL, 2006a), updated figures (CH2M HILL, 2008d on DTSC website), and confirmed by the Soil Investigation team that for 0.5 to 1 foot bgs, samples were collected at 0 to 0.5 foot bgs at the start of native material when feasible.
					0.5 to 3 feet bgs: 19	0 samples collected previously 19 samples collected in Phase I sampling	0 to 3 feet bgs: 38	0 samples collected previously 38 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-11 (continued): Topographic Low Areas					3 to 6 feet bgs: 18	0 samples collected previously 18 samples collected in Phase I sampling	0 to 6 feet bgs: 56	0 samples collected previously 56 samples collected in Phase I sampling					All samples extended down to 10 feet bgs in the Phase I sampling. Of these 19 sample locations, seven locations were supplemental samples and were only analyzed for PAHs and metals, with the exception of all samples collected at locations AOC11e-SS-1 and AOC11E-SS-2, which were also analyzed for PCBs. VOCs and SVOCs (except PAHs) were not detected in shallower samples, therefore, supplemental samples were not analyzed for VOCs and SVOCs (except PAHs). Soil samples collected at 9 to 10 feet bgs were sent to the laboratory as supplemental soil samples pending analysis based on detected analytes in the shallower samples. Most of these samples were analyzed for PAHs and metals, with the exception of the 1-0 ft samples collected at AOC11e-1 and AOC11e-2, which were also analyzed for PCBs. VOCs and SVOCs (except PAHs) were not detected in shallower samples; therefore, supplemental samples were not analyzed for VOCs and SVOCs (except PAHs).
					6 to 10 feet bgs: 18	0 samples collected previously 18 samples collected in Phase I sampling	0 to 10 feet bgs: 74	0 samples collected previously 74 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
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AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
AOC-12: Fill Area	**HHRA and ERA:** COPC Selection EPC Calculations Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	NA	NA	0 to 0.5 foot bgs: 2	0 samples collected previously 2 samples collected in Phase I sampling	0 to 0.5 foot bgs: 2	0 samples collected previously 2 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes for Phase I investigation; not for risk assessment. If contamination is identified in Phase I investigation, additional and representative data will be collected in Phase II sampling.	Yes	**Sufficiency of data to support risk assessment is contingent on whether contamination is identified during Phase I Soil Investigation. Phase I data will be reviewed for adequacy to support risk assessment and data gaps, if any, will be identified.** No fill was identified during the geophysical survey. Currently, two surface soil samples and two 3-foot samples were collected for TAL/TCL list analysis. In addition, samples were also collected at the bottom of the trenches, every 20 linear feet. If debris and/or contamination is identified during the Phase I investigation, if needed, additional characterization and risk assessment sampling for this AOC will be included as part of the Phase II sampling event.
					0.5 to 3 feet bgs: 7	0 samples collected previously 7 samples collected in Phase I sampling	0 to 3 feet bgs: 9	0 samples collected previously 9 samples collected in Phase I sampling					
					3 to 6 feet bgs: 5	0 samples collected previously 5 samples collected in Phase I sampling	0 to 6 feet bgs: 14	0 samples collected previously 14 samples collected in Phase I sampling					
					6 to 10 feet bgs: 4	0 samples collected previously 4 samples collected in Phase I sampling	0 to 10 feet bgs: 18	0 samples collected previously 18 samples collected in Phase I sampling					

Table A-1
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		Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]								
					Sampling Depth		Exposure Depth						
AOC or SubAOC Area[a]	Data Use		Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples	Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
AOC-14: Railroad Debris Site	**HHRA and ERA:** COPC Selection EPC Calculations Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	42	25 locations completed previously 17 locations completed in Phase I sampling	0 to 0.5 foot bgs: 34	17 samples collected previously 17 samples collected in Phase I sampling	0 to 0.5 feet bgs: 34	17 samples collected previously 17 samples collected in Phase I sampling	Full suite except surface interval, which did not include VOCs or TPH-purgeable.	Category 1 Data Meets requirements of the QAPP; the reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes	Yes	**Sufficiency of data to calculate EPCs for all depth intervals will be determined during the data gaps assessment.** Horizontal and vertical coverage includes secondary proposed sampling locations. All secondary proposed sampling locations were analyzed for full analytical suite, except surface interval which was not analyzed for VOCs or TPH-P. Data will be collected to 10 feet bgs (a sample will be collected at 15 feet bgs and held for analysis pending shallow sample results). All samples collected at 15 feet bgs were analyzed for the full analytical suite.
					0.5 to 3 feet bgs: 25	8 samples collected previously 17 samples collected in Phase I sampling	0 to 3 feet bgs: 59	25 samples collected previously 34 samples collected in Phase I sampling					
					3 to 6 feet bgs: 23	6 samples collected previously 17 samples collected in Phase I sampling	0 to 6 feet bgs: 82	31 samples collected previously 51 samples collected in Phase I sampling					
					6 to 10 feet bgs: 17	0 samples collected previously 17 samples collected in Phase I sampling	0 to 10 feet bgs: 99	31 samples collected previously 68 samples collected in Phase I sampling					

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Data Usability Matrix for Soil Risk Assessment
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AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]				Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
					Sampling Depth		Exposure Depth						
			Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples					
Potential Pipeline Disposal Area	**HHRA and ERA:** COPC Selection EPC Calculations Hot Spot Analysis	Soil Modeled from soil concentrations: • Air – Dust (HHRA) • Air – VOCs (HHRA) in outdoor air • Biota (ERA)	NA	NA	0 to 0.5 foot bgs: NA	0 samples collected previously NA for Phase I sampling	0 to 0.5 foot bgs: NA	0 samples collected previously NA for Phase I sampling	NA	NA	NA	NA	The pipes have been identified during the geophysical survey. No trenching or sampling occurred in this area. Investigation approach in this area is being reevaluated. If contamination is identified in future soil investigations and if needed, additional characterization and risk assessment sampling for this AOC will be included as part of the Phase II sampling event.
					0.5 to 3 feet bgs: NA	0 samples collected previously NA for Phase I sampling	0 to 3 feet bgs: NA	0 samples collected previously NA for Phase I sampling					
					3 to 6 feet bgs: NA	0 samples collected previously NA for Phase I sampling	0 to 6 feet bgs: NA	0 samples collected previously NA for Phase I sampling					
					6 to 10 feet bgs: NA	0 samples collected previously NA for Phase I sampling	0 to 10 feet bgs: NA	0 samples collected previously NA for Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
PG&E Topock
Needles, California

			Horizontal Coverage (Sampling Locations)[b]		Vertical Coverage (Number of Samples)[b]								
					Sampling Depth		Exposure Depth						
AOC or SubAOC Area[a]	Data Use	Data Type (Matrix) for Potentially Complete Pathways that will be Evaluated Quantitatively	Number of Soil Sampling Locations	Status of Soil Sampling	Number of Soil Samples	Status of Soil Samples	Number of Soil Samples	Status of Soil Samples	Analytical Suite[c,d]	Data Quality[e,f,g,h]	Representative[i]	Comparability[j]	Notes[k]
Former 300B Pipeline Liquids Tank	**HHRA and ERA:** COPC Selection EPC Calculations	Soil Burrow air (modeled from soil concentrations)	5	0 locations completed previously 5 locations completed in Phase I sampling	0 to 0.5 foot bgs:5	0 samples collected previously 5 samples collected in Phase I sampling	0 to 0.5 foot bgs: 5	0 samples collected previously 5 samples collected in Phase I sampling	Full suite plus PCBs	Category 1 Data Meets requirements of the QAPP; he reporting limits are less than: • Site-specific background • HH screening values for all analytes • ECVs or most of the metals and PAHs Data Validation: at least 10%	Yes; provided pipeline liquids tank was the only source.	Yes	**Sufficiency of data for site characterization; if contamination is identified in samples collected from existing locations or recently sampled Phase I sampling locations that will warrant a risk assessment for this area, then additional samples may be required to complete the risk assessment.** This area has already been closed (CH2M HILL, 2006a). Closure suggests that most, if not all, of the contamination has been removed. Proposed sampling is to confirm closure of this area. If new sources are identified, additional samples may need to collected (at least for the surface interval) if EPC calculations are needed. Samples were not collected from 2 to 3 feet bgs at one location and from 9 to 10 feet bgs at four locations because of refusal.
					0.5 to 3 feet bgs: 4	0 samples collected previously 4 samples collected in Phase I sampling	0 to 3 feet bgs: 9	0 samples collected previously 9 samples collected in Phase I sampling					
					3 to 6 feet bgs: 1	0 sample collected previously 1 sample collected in Phase I sampling	0 to 6 feet bgs: 10	0 samples collected previously 10 samples collected in Phase I sampling					
					6 to 10 feet bgs: 0	0 samples collected previously 0 samples collected in Phase I sampling	0 to 10 feet bgs: 10	0 samples collected previously 10 samples collected in Phase I sampling					

Table A-1
Data Usability Matrix for Soil Risk Assessment
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Notes: Information for this table was obtained from Part A Soil Investigation Work Plan (CH2M HILL, 2006a) and the updated figures for Part A Soil Investigation Work Plan posted on the DTSC website: http://www.dtsc-topock.com . Information presented in this table is current as of December 15, 2008 and includes historical sampling and Part A Phase I sampling information. The conclusions regarding representativeness and data adequacy will be based on the outcome of Step 6 of the data quality objectives (Table 1), which has yet to be performed. The intent of the matrix, when finalized, is to summarize all the relevant information pertaining to data usability and adequacy for determining EPCs.

a. This matrix includes soil sampling information only for areas outside the compressor station. For HHRA, the soil sampling presented in this matrix will be used to evaluate two exposure areas (ARCADIS, 2008): (i) BCW, and (ii) the rest of the AOCs/subareas outside the compressor station. BCW includes a sub area of USBLM land north of the railroad (north of AOC 1) to be evaluated separately for potential future residential use. For the ERA, for small home ranging receptors, each AOC or subarea will be evaluated as separate exposure areas; for large home range receptors, two exposure areas will be evaluated: (i) BCW and AOC4 and (ii) the rest of the AOCs/subareas outside the compressor station.

b. Assumption is that horizontal and vertical extent will be characterized to background regardless of risk assessment needs. If a background value is not available then the lesser of the soil ecological comparison value, the USEPA Regional Screening level, or DTSC CHHSL will be used. Horizontal coverage refers to the adequacy of the number of locations to support EPCs for the exposure area. The horizontal coverage was based on all the sample locations in the Work Plans (all sample locations indicated at least some surface interval [0/0.5/1/3/6/10 feet bgs]). Vertical coverage refers to the adequacy of sampling depth intervals to provide information to support calculation of EPCs for the four exposure intervals and the number of samples at each depth interval was reported. For calculation of EPCs, a minimum of 8 samples and 5 detects are required for the ERA, depths evaluated will include 0 to 0.5, 0 to 3, and 0 to 6 foot/feet bgs. For the HHRA, depths evaluated will include 0 to 0.5, 0 to 3, 0 to 6, and 0 to 10 foot/feet bgs. Vertical coverage for Phase I sampling was obtained from Part A Work Plan (CH2M HILL, 2006a) and confirmed with the Soil Investigation team. The 0.5 foot bgs sample were collected from 0 to 0.5 feet bgs; the 3 feet bgs samples were collected from 2 to 3 feet bgs; the 6 feet bgs samples were collected from 5 to 6 feet bgs; and the 10 feet bgs samples were collected from 9 to 10 feet bgs.

c. Full suite of analytes and TAL/TCL analytes are listed in the Draft QAPP (CH2M HILL, 2008a,b); analyte classes include metals, PAHs, SVOCs, VOCs, TPH, PCBs, and pesticides.

d. Limited VOC and TPH data from the surface interval does not compromise the assessment to evaluate potential risks to human health or burrowing receptors.

e. Only Category 1 data which are considered suitable for risk assessment were included in the horizontal and vertical coverage evaluation in this matrix (CH2M HILL, 2006a).

f. Site-specific background concentrations are not yet final; preliminary site-specific background concentrations were estimated for metals with available data and reported in the QAPP (CH2M HILL, 2006a). The reporting limits were less than preliminary site-specific background concentrations for all metals (Draft QAPP; CH2M HILL, 2008a,b). For metals with no site-specific preliminary background concentrations, reporting limits were compared to California regional background concentrations (Bradford et al., 1996); the reporting limits for these metals were less than the regional background concentrations.

g. Human health screening values were based on the lesser of the CHHSLs and USEPA Regional Screening Levels. The reporting limits were less than the final human health screening values for most of the chemicals (Draft QAPP; CH2M HILL, 2008a,b).

h. ECVs were calculated for metals and PAHs (ARCADIS, 2008). The reporting limits were less than the ECVs for PAHs and for most of the metals except antimony, cadmium, lead, mercury, nickel, selenium, and zinc (Draft QAPP; CH2M HILL, 2008a,b). ECVs for the rest of the analytes have not yet been developed.

i. “Yes” indicates that data are considered representative; this is optimized by the appropriate placement of Phase I sample locations in areas suspected to have been impacted by site releases. Further, the analyte list captures those chemicals assumed to be associated with a potential release. Adequacy of the representativeness will be re-assessed once Phase I data are obtained. [Representativeness is defined as the degree to which sample data accurately reflect the characteristics of a population of samples. It is achieved through a well-designed sampling program and by using standardized sampling strategies and techniques and analytical procedures (DUA; CH2M HILL, 2008c)].

j. “Yes” indicates, as stated in the DUA Technical Memorandum (CH2M HILL, 2008c), that existing datasets were reported which consistent units and reporting limits for soil and sediment data were equivalent to those required by the QAPP Addendum (CH2M HILL, 2006b). The existing datasets with are considered usable for risk assessment, and will be supplemented with additional data that meet the overall requirements of the Draft QAPP (CH2M HILL, 2008a,b) and thus, the existing Category 1 data should be very comparable to the data that will be generated during Phase I sampling. [Comparability is defined as the confidence in which one dataset can be compared to another. It is achieved by maintaining standard techniques and procedures for collecting and analyzing samples and reporting the analytical results in standard units].

k. Data considered sufficient to calculate EPCs assumes validation of Phase I soil data will not result in data unsuitable for risk assessment (e.g., “R” or reject qualified).

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ACRONYMS:

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AOC = area of concern; BCW = Bat Cave Wash; bgs = feet below ground surface; bss = feet below sediment surface; CHHSLs = California Human Health Screening Levels; COPC = chemicals of potential concern; DTSC = Department of Toxic Substances Control; DUA = data usability assessment; ECV = ecological comparison values; EPC = exposure point concentration; ERA = ecological risk assessment; HH or HHRA = human health risk assessment; NA = not available or not applicable; QAPP = quality assurance project plan; PAHs = polycyclic aromatic hydrocarbons; PCBs = polychlorinated biphenyls; SVOCs = semi-volatile organic compounds; TAL/TCL = target analyte list metals/target compound list organics; TPH = total petroleum hydrocarbons; USBLM = U.S. Bureau of Land Management; USEPA=U.S. Environmental Protection Agency; VOCs = volatile organic compounds.

Appendix B
Investigation Procedures, Field Methodology and White Powder/Debris Mapping Results (on CD only)

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
GPS	global positioning system
IDW	investigation-derived waste
IM	Interim Measure
PG&E	Pacific Gas and Electric Company
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA Facility Investigation/Remedial Investigation
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
UA	undesignated area
UU	undifferentiated utility
VOC	volatile organic compound
Water Board	California Regional Water Quality Control Board
XRF	X-ray fluorescence

APPENDIX B

Investigation Procedures and Field Methodology

B.1 Introduction

This appendix describes field activities performed as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) Soil Investigation Part A, Phase 1. The following sections summarize field methodology, debris and white powder material mapping, trenching observations, and any deviations from the *RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A Work Plan* (CH2M HILL, 2006) pertaining to the field activities performed in 2008. The primary objectives of this soil investigation were to determine the nature and extent of contamination and to collect sufficient data for the purposes of performing human and ecological risk assessments and evaluating remedial action alternatives.

B.1.1 Approvals and Authorizations

The Part A Phase 1 soil investigation was executed in conformance with the following approvals and authorizations:

- DTSC and DOI conditionally approved the Soil Part A Work Plan on August 10, 2007 (DTSC, 2007) and June 4, 2008 (DOI, 2008), respectively.
- Clarification of DTSC's conditional approval was documented in the "Clarification to Responses to PG&E Topock Compressor Station Soil Investigation Part A Work Plan August 10, 2007 Conditional Approval Letter" (CH2M HILL, 2007a).
- Pre-construction and post-construction biological surveys were conducted in compliance with the *Programmatic Biological Assessment for the Pacific Gas and Electric Topock Compressor Station Remedial and Investigative Action* (CH2M HILL, 2007b).

B.2 Field Methodology

This section describes the methods used in field activities related to embankment modification; X-ray fluorescence (XRF) analyzer field screening; installation of soil boreholes; and collection of soil, debris, and white powder material samples.

B.2.1 Embankment Modification

An existing embankment within Area of Concern 10 (AOC 10) was modified to provide access for soil sampling equipment to subareas AOC 10b and -10c. Excavation equipment was used to re-grade the material comprising the upper one-half of the embankment such that the slope of a portion of the embankment was shallower. The material that was displaced during grading was moved to the east and west of the existing embankment slope to create shallower sloping “ramps.” The lower half of the embankment was not disturbed such that surface water flow in the upper portion of AOC 10 would not flow freely to the lower portion.

Prior to conducting the embankment modification, an XRF threshold value for total chromium (300 milligrams per kilogram) was developed jointly with United States Department of the Interior to determine if implementation of erosion control measures was needed during this work (CH2M HILL, 2008). As the total height of the embankment was lowered during modification, soil samples were collected within the embankment from the excavated surface from three locations equally spaced along the length of the feature. Samples collected were analyzed for screening analysis of total chromium using a portable XRF analyzer (Section B.2.2) and one confirmation soil sample was collected and analyzed for total chromium and hexavalent chromium using an off-site laboratory. The results of the analyses were compared to the XRF threshold value. Based on results of the analyses it was determined that erosion control measures were not required. However, temporary silt fence was installed downstream of the embankment to impede the migration of sediments as a Best Management Practice (BMP).

B.2.2 X-ray Fluorescence Field Screening

A portable XRF analyzer was used to assist with identifying sample and trench locations in AOC 4 and to determine if erosion controls were necessary during the AOC 10 embankment modification by field screening soil samples for total chromium. The XRF analyzer was calibrated daily in the field with standards provided by the XRF manufacturer. Soil samples were collected using a clean stainless-steel trowel, placed in clean zip-top bags, and analyzed in the field for total chromium using the XRF analyzer. XRF analyzer results were recorded in the field notebook.

B.2.3 Installation of Boreholes and Soil Sample Collection

Four methods of subsurface soil collection were used during the RFI/RI Soil Investigation Part A, Phase 1. Methods for collecting soil samples included drilling, excavation, trenching, and hand sampling. Attachment B1 contains boring logs and trench logs associated with the RFI/RI Soil Investigation Part A, Phase 1.

B.2.3.1 Drilling

Boreholes were drilled using rotosonic and direct-push methods. A limited access (track mounted), “mini” rotosonic drill rig was used to install the rotosonic boreholes. Boreholes were advanced with a 4-inch-inner-diameter core barrel and then over-drilled with 5-inch- or 6-inch-outer-diameter drill pipe (drive casing), as necessary. Continuous cores were collected via a core barrel attached to the end of the 4-inch drive casing advanced ahead of the outer casing, generally in 5-foot intervals. The cores were placed in plastic sample bags.

A limited access (track-mounted) direct-push rig (Marl M5T), also capable of hollow-stem auger drilling, was used to install the direct-push boreholes. Continuous direct-push cores were collected using a hydraulic hammer to advance a 4-foot-long, 1.5-inch-diameter, hollow core stainless-steel sampler lined with a dedicated acetate liner into the ground. If borehole advancement by direct-push was impeded due to adverse subsurface conditions, hollow-stem augers were used to displace gravels or cobbles, and then direct-push coring was continued.

Soil samples were collected from drilled boreholes at pre-designated depth intervals in accordance with the sample collection and handling procedures described in Section B.2.4. Once drilling and sampling activities were complete, each borehole was backfilled with a mixture of clean sand and bentonite chips, and hydrated.

B.2.3.2 Trenching and Potholing

An excavator or backhoe was used to install trenches and potholes to evaluate the presence, nature, and extent of buried debris, and collect soil samples in areas where site conditions were unsuitable for drilling. Trenches and potholes were deepened gradually so that subtle changes in lithology and buried debris could be documented. Soil samples for laboratory analysis were collected directly from the excavator or backhoe bucket from soils that were not in contact with the bucket. Soil samples were collected at pre-designated depth intervals in accordance with the sample collection and handling procedures described in Section B.2.4.

Excavated material was used to backfill the excavation from which it originated.

B.2.3.3 Hand Tools

Hand tools, which include stainless-steel trowels, slide hammers, and hand augers, were used for samples collected between 0 and 3 feet below ground surface (bgs) in areas that could not be accessed by drilling or excavation equipment. Soil samples collected in the depth interval from 0 to 1 foot bgs were collected using a stainless-steel trowel. Soil samples collected in the depth interval from 1 to 3 feet bgs were collected using a hand auger or a slide hammer to drive a core sampler into the undisturbed soil to the desired sampling depth. Soil samples were collected at pre-designated depth intervals in accordance with the sample collection and handling procedures described in Section B.2.4.

Each hole created using hand tools was backfilled using the material removed from that hole.

B.2.4 Sample Collection and Handling

This section describes the procedures for the collection and handling of soil, debris, and white powder material samples.

B.2.4.1 Soil, White Powder Material, and Debris Sample Collection for Inorganic, Semivolatile Organic Compounds, Pesticides, and Polychlorinated Biphenyls Analyses

Upon retrieval of the soil from the drilling cores or excavations, the soil was logged for lithology in accordance with the Unified Soil Classification System by or under the supervision of a California Professional Geologist. Soil and white powder samples requiring inorganic, semivolatile organic compounds, pesticides, and polychlorinated biphenyls analyses were collected directly from the drilling core or backhoe/excavator bucket using stainless-steel trowels. The collected material was then put through a stainless-steel sieve to remove any rocks and other debris from the soil sample prior to being homogenized in a stainless-steel bowl. After homogenization, the soil was transferred to unpreserved glass sample jars.

Debris (e.g., wood, dry wall, etc.) samples were collected using stainless-steel trowels, as appropriate, and depending on the size of the debris, either placed into glass sample jars or large plastic zip-top bags. Samples of white powder material were collected using stainless-steel trowels and were placed directly into glass jars; these samples were not homogenized.

B.2.4.2 Soil Sample Collection for VOC and TPH-gasoline Analyses

Soil sample aliquots designated for VOC and TPH-gasoline analyses were collected immediately upon opening the relatively undisturbed drilling core, or recovery from an excavation, (i.e., before geologic logging or the collection of other soil sample aliquots) to minimize the potential for volatilization of compounds to the atmosphere. VOC and TPH-gasoline aliquots were collected using dedicated plastic syringes. Using the syringes, a specific volume of sample, which correlates to an approximate target mass, was transferred directly from the drilling core or backhoe/excavator bucket into pre-preserved sample vials. The sample vials were chilled prior to use to minimize evaporation of the preservative when opened. Syringes could not be used to collect sample from soils consisting of loose sand and gravel. In this case, stainless-steel trowels were used to transfer the soil into the vials for volume measurement prior to preservation.

B.2.4.3 Sample Management and Storage

Samples were placed immediately into field coolers with ice; VOC and TPH-gasoline containers were arranged in the sample cooler standing upright. The field coolers were taken to the sample management area, where the samples were transferred into a refrigerator and/or freezer. If transport of a sample to the laboratory was scheduled for a pickup more than 24 hours after sampling, samples were stored in the freezer.

B.2.4.4 Shipping

Samples collected for chemical analysis were transported to the laboratory via courier, generally on a daily basis. Samples collected for geotechnical analyses were shipped via Federal Express. Chains-of-custody accompanied all samples to the laboratory.

B.2.5 Decontamination and Management of Investigation-derived Waste

This section discusses procedures for decontamination of the soil sampling equipment and the management of investigation-derived waste (IDW).

B.2.5.1 Decontamination

Drilling and excavation equipment (i.e., drilling rig, backhoe/excavator tracks, etc.) was cleaned prior to mobilization to the Pacific Gas and Electric Company (PG&E) Topock Compressor Station and were cleaned between investigation areas as determined necessary by the field team leader. When appropriate, equipment was transported to the designated decontamination area (Figure B-1) and steam cleaned. If necessary, equipment was cleaned using dry methods prior to leaving an excavation area to prevent the tracking of material out of the area. Equipment blanks were collected at a frequency of one per sampling crew per day where non-dedicated equipment was used. Results of equipment blanks are discussed in Appendix D.

Rotosonic and direct-push drilling pipe and core barrels were steam cleaned at the designated decontamination area between boreholes. The direct-push core barrels were fitted with dedicated acetate liners for each core. Backhoe/excavator buckets were steam cleaned before work began and between sampling locations using a dry brush.

All hand tools were cleaned between sample locations. Each field team established a mobile decontamination unit in each sample area. The mobile decontamination units included three containers: one with Liquinox soap and two with rinse water. After each sample, the stainless-steel mixing bowl, stainless-steel sieve, and trowel were cleaned thoroughly in the Liquinox soap mixture with a brush and then rinsed twice in each of the consecutive rinse buckets.

B.2.5.2 Management of Investigation-derived Waste

Drill cuttings were contained at the drilling location in a receptacle (i.e., skid hopper or equivalent) that could be safely moved with a forklift or loader. As necessary, the hopper was emptied into roll-off bins located in the decontamination area. For the duration of the field event, approximately 15 yards of soil were contained in one bin. A composite soil sample, comprising four sub-samples, was used to characterize the IDW prior to offsite disposal. Refer to Attachment B2 for soil manifest and complete analytical results.

Liquid IDW was contained at the decontamination area in a tank that could be safely moved by a forklift or loader. As necessary, the tank was emptied at the Topock Compressor Station Interim Measures 3(IM No. 3) onsite treatment facility. Waste characterization for the liquid IDW disposed at the IM No. 3 treatment facility was not required per approval from the California Regional Water Quality Control Board (Water Board, 2006).

B.3 Debris and White Powder Material Mapping

The following section describes the mapping process and results for debris and/or white powder material mapping at AOC 4, AOC 10, Solid Waste Management Unit (SWMU) 1, and AOC 14. Due to the varying nature of site topography in each of these areas, methods of documentation and inventory of the debris and/or white powder material varied.

B.3.1 Debris Mapping and Results in AOC 4 – Debris Ravine

Debris mapping within AOC 4 was performed by creating a grid to accurately capture the extent of debris in and on the slopes of the steep ravine (Figure B-2). The grid was placed in over areas of containing the most extensive debris within AOC 4 and captured most of the debris in and on the slopes of the steep ravine. The ravine was sectioned off in 20-foot by 10-foot grid squares using rope and stakes. Global positioning system (GPS) coordinates were taken near the stakes at the top and bottom of each rope line. The debris was then noted and each grid section was photo documented, and described below.

Debris observed at AOC 4 generally consisted of broken glass, wooden slats, miscellaneous industrial debris, concrete slabs, rebar, scrap metal, and miscellaneous burned debris, as shown in Attachment B3, Photographs 1 through 4. The most extensive debris was observed along the western portion of the primary ravine slope of AOC 4 and included three large pieces of concrete, wooden slats, white powder material, scrap metal, and piping, as shown in Attachment B3, Photographs 5 and 6. Debris is also observed to the east along the ravine floor, as shown in Attachment B3, Photograph 7. Two samples of the wooden slats were collected (AOC4-Wood1 and AOC4-Wood2) and were sent to the laboratory for analyses, as listed in Table B-1.

Debris observed in grid section B, shown in Figure B-2, consisted of a large piece of concrete and wood debris, as shown in Attachment B3, Photograph 8. White powder material, shown in Attachment B3, Photograph 9, was found in quadrant B30, shown in Figure B-2. A sample of the white powder material was collected (AOC4-B30) and sent to the laboratory for analyses, as listed in Table B-1.

A pile of wooden slats was observed in grid sections C and D near the bottom of the ravine, as shown in Attachment B3, Photographs 10 through 12. No other debris was observed in these grid sections; however, green stained soil was observed near the top of grid section D.

No debris was observed in grid sections E through I, shown in Attachment B3, Photograph 13. Green stained soil was observed in section G, as shown in Attachment B3, Photograph 14.

B.3.2 White Powder and Debris Mapping in AOC 10 – East Ravine

As part of the conditional approval of the RCRA Facility Investigation/Remedial Investigation, Soil Investigation Work Plan, Part A, DTSC requested that the white powder and metal debris observed in AOC 10 be mapped. PG&E conducted a site walk at AOC 10 in May 2009 to map the white powder and debris areas. White powder was observed in the ravine bottom within subarea 10d and between subareas 10c and 10d. Several areas of miscellaneous debris were identified, as shown on Figure B-3. Miscellaneous debris consisted of pieces of metal, cans, tires, concrete rubble, tiles, and bricks. A small dirt pile with small pieces of green wood was observed near the access road adjacent to subarea 10d, this debris pile is being evaluated as part of AOC 10 (see Appendix C, Attachment C-4). Two areas of discolored soil were observed in the debris areas located on northern ravine wall, as shown on Figures C4-1 through C4-10. Following recent heavy rainfall in January 2010, an additional white powder area was discovered on the slope near the station access road north and slightly west of subarea 10b; these areas are also shown Figures C4-1 through C4-10.

B.3.3 White Powder Material and Debris Mapping in SWMU 1 – Former Percolation Bed

Several areas of surficial white powder material were identified in SWMU 1 during previous investigations and site visits. The surficial extent of the white powder material quantified by various methods, as described below, and was plotted on a figure.

In SWMU 1, the white powder material was visually documented, photographed, and plotted in Figure B-4. White powder material was observed in the slope near sample locations SWMU1-WP8 and SWMU1-WP10, as shown in Figure B-4. A white powder lens was also observed at the toe of the slope near the floor of Bat Cave Wash beginning at sample location SWMU1-WP6a and tapering off at 10 feet south of sample location

SWMU1-WP7, as shown in Figure B-4. These observations are further investigated and discussed in Section B.5.1.

B.3.4 White Powder Material and Debris Mapping AOC 14 – Railroad Debris Site

Several areas of surficial white powder material were identified in AOC 14 during previous investigations and site visits. The surficial extent of the white powder material was quantified by various methods, as described below, and was plotted on a figure.

The extent of the white powder material in six areas of AOC 14 (AOC14-WP1 through AOC14-WP6) was documented by walking the perimeter of the visible white powder material, recording the GPS coordinates, and plotting those areas on a figure. The seventh area (AOC14-WP7) was located from a photograph of the I-40 road cut. The seven areas of white powder material observed are shown in Figure B-5. Sampling locations AOC14-1, AOC14-2, AOC14-11, AOC14-12, and AOC14-13 were collocated within white powder areas. White powder material areas AOC14-WP2, AOC14-WP5, and AOC13-WP6 were the only areas that had no sampling locations in the immediate proximity. During drilling activities at AOC 14, white powder material and/or debris were encountered in borings AOC14-2 (at 0.5 foot bgs) and AOC14-3 (at 2-3 feet bgs). Samples of the white powder material and debris were collected at these two locations and were sent to the laboratory for analyses, as shown in Table B-1.

In May 2009 PG&E conducted a site walk at AOC 14 in to map the debris areas. Debris was observed on the hill above AOC 14 towards the east. The debris consisted of concrete rubble, transite, cans, and miscellaneous trash; these debris areas are shown on Figures C7-1 to C7-7. No sampling has occurred in these debris areas. Nature and extent of contamination in these debris areas has not been defined. Section 8 presents the proposed Part A, Phase 2 sample locations within these debris areas.

Additional debris and burned debris was also identified on the west side of AOC 14, near a small drainage feature in the western wall of Bat Cave Wash near the northwestern edges of AOC 14 (see Figures C7-1 to C7-7). Some debris was noted on the side of the wash. The nature and extent of the debris toward Bat Cave Wash have not been defined.

B.4 Newly Identified Debris, Historic Burn, and White Powder Areas

In a letter dated May 15, 2009, DTSC directed PG&E to, among other items, to submit a formal description of historic burning operations, and of any previously undocumented disposal practices, at the Topock Compressor Station. PG&E has gathered information from interviews with current and former PG&E employees regarding historic burn activities on or near the PG&E Topock Compressor Station, as well as waste disposal activities that were not previously documented. PG&E attempted to contact many former PG&E employees and was successful in interviewing a total of twelve current and former PG&E employees on these topics, in addition to the fourteen interviewed during 2006. The information derived from the majority of the employee interviews and documentation of previously unidentified disposal practices was submitted to DTSC and DOI in a letter dated August 14, 2009 (PG&E 2009a). Supplemental information was provided in letters dated October 15, 2009 (PG&E

2009b), January 15, 2010 (PG&E 2010a), and January 29, 2010 (PG&E 2010b). All employee interviews were completed in time for the January 29, 2010 information submittal.

In addition, the major storm event in January 2010 exposed five new white powder areas (one in Bat Cave Wash, three in East Ravine, and one in AOC 11). These newly-identified areas are shown on Figure B-6 and are also included in the individual AOC data gaps evaluations in Appendix C.

B.5 Trenching

This section summarizes observations made during trenching activities at SWMU 1, AOC 4, and AOC 12. Soil and debris samples were collected from the trenches, as listed in Table B-1. Soil lithology and debris were logged by, or under the direction of a California Professional Geologist; the trench logs are located in Attachment B1.

B.5.1 SWMU 1 – Former Percolation Bed

Eight trenches were advanced into the eastern slope of Bat Cave Wash within SWMU 1 between October 5, 2008 and October 7, 2008 to assess the extent of white powder material. The locations of the eight trenches (SWMU1 WP1h, SWMU1 WP2h, SWMU1 WP3h, SWMU1 WP5h,[1] SWMU1 WP6h, SWMU1 WP7, SWMU1 WP8, and SWMU1 WP10) are shown in Figure B-4 and in Attachment B4, Photograph 1. Trench logs for these trenches are included in Attachment B1, B-1 through B-7.Trench dimensions were determined in the field to characterize extent while retaining slope integrity. Soil and white powder samples were collected from the trenches, as listed in Table B-1. Sample intervals are discussed below. Trench SWMU1 WP1h is located near the northern end of the white powder material and was approximately 4.5 feet long by 3 feet wide and extended approximately 7.5 feet into the slope, as shown in Attachment B4, Photograph 2. White powder material was not observed in this trench, shown in Attachment B4, Photographs 3 through 6. However, debris and green stained soil was observed in the north sidewall near the surface, as shown in Attachment B4, Photographs 7 and 8. Samples were collected at 0-0.5, 2-3, 5-6, and 9-10 feet bgs.

Trench SWMU1 WP3h was approximately 6.5 feet long by 3 feet wide and extended approximately 5 feet into the slope. A 1-foot-thick layer of white powder material was observed in the sidewalls of this trench, as shown in Attachment B4, Photographs 9 through 11. Due to the white powder observations in the sidewalls of this trench, a step-out trench (SWMU1 WP2h) was advanced approximately 3 feet north of trench SWMU1 WP3h, as shown in Figure B-4 and in Attachment B4, Photograph 12. A thin white powder material lens was observed on the south wall of this step-out trench. Samples were collected at 0-0.5, 2-3, and 5-6 feet bgs.

Trench SWMU1 WP5h was approximately 6 feet long by 3 feet wide and extended 10 feet into the slope. Only a small lens of white powder material was observed in the southern sidewall of the trench, as shown in Attachment B4, Photographs 13 through 16. Samples were collected at 0-0.5, 2-3, and 5-6 feet bgs. A sample of the white powder material (SWMU1 WP5h at 2-3 feet bgs) was collected and sent to the laboratory of analyses, as listed

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[1] Because sample locations were named relative to prior sample locations, there is no location 4.

in Table B-1. Trench SWMU1 WP6h was approximately 4 feet long by 3 feet wide and extended approximately 10 feet into the slope. Two small white powder material lenses were observed in this trench, and small outcrops of white powder material were also observed in the back wall and north sidewall of the trench at approximately 2 feet bgs, as shown in Attachment B4, Photograph 17. Samples were collected at 0-0.5, 2-3, 5-6, and 9-10 feet bgs. A sample of the white powder material (SWMU1 WP6h at 0-0.5 foot bgs) was collected and sent to the laboratory of analyses, as listed in Table B-1.

Trench SWMU1 WP7 was approximately 9 feet long by 3 feet wide and extended approximately 11 feet into the slope. A 2-foot-thick layer of consolidated white chalky material was observed in the trench, as shown in Attachment B4, Photographs 18 through 20. Samples were collected at 0-0.5, 2-3, 5-6, and 9-10 feet bgs. A sample of the white powder material (SWMU1 WP7 at 2-3 feet bgs) was collected and sent to the laboratory of analyses, as listed in Table B-1. The white chalky material layer had a small area of red staining, shown in Attachment B4, Photograph 21. Under the layer of consolidated chalky material, a 1-foot layer of green stained soil was observed. In addition, a surficial layer of white powder material was observed at the toe of the slope beginning at sample location SWMU1 WP6a and tapering off 10 feet south of trench SWMU1 WP7, as shown in Figure B-4. Based on this observation, a small trench was advanced into the slope approximately 3 feet above the surficial layer. The horizontal lens of white powder material was observed beneath the surficial rock and rubble layer, as shown in Attachment B4, Photograph 22.

Trench SWMU1 WP8 was approximately 7 feet long by 3 feet wide and extended 10 feet into the slope, as shown in Attachment B4, Photograph 23. A 6-inch layer of green stained soil was observed beneath a surficial rock and rubble layer. Under the green stained soil layer, a layer of white powder material approximately 1 foot thick, followed by a second layer of green stained soil approximately 1 foot thick, were observed in this trench, as shown in Attachment B4, Photographs 24 through 26. Samples were collected at 0-0.5, 2-3, 5-6, and 9-10 feet bgs.

Trench SWMU1 WP10 was approximately 10 feet long by 3 feet wide and extended 9 feet into the slope, as shown in Attachment B4, Photograph 27. A layer of green stained soil approximately 6 inches thick was observed beneath a surficial rock and rubble layer. Under the green stained soil layer, a layer of white powder material approximately 6 inches thick, followed by a second layer of green stained soil approximately 6 inches thick, and followed by a second layer of white powder material approximately 1 foot thick, were observed in this trench, as shown in Attachment B4, Photographs 28 through 30. A sample of the white powder material (SWMU1 WP10 at 2-3 feet bgs) was collected and sent to the laboratory of analyses, as listed in Table B-1. Samples were collected at 0-0.5, 2-3, 5-6, and 9-10 feet bgs.

B.5.2 AOC 4 – Debris Ravine

Four trenches (AOC4-T1 through AOC4-T4) were advanced in AOC 4 between October 22, 2008 and October 24, 2008 to determine the nature and extent of buried debris. Trench locations were chosen based on visual observations of debris and on XRF analyzer field screening results for total chromium. Trench locations are shown in Figure B-2. Trench logs for these trenches are included in Attachment B1, B-8 through B-11.

Trench AOC4-T1 was installed slightly east of the established debris mapping grid, as shown in Figure B-2. The trench was approximately 8 feet by 2 feet and extended to 4 feet bgs, as shown in Attachment B5, Photograph 1. No significant debris was observed in this trench, with the exception of a metal wire in the east sidewall, shown in Attachment B5, Photograph 2. AOC4-T1a was collected in the center of the trench at 0.5 and 3 feet bgs.

Trench AOC4-T2 was installed to determine the extent of fill in the eastern portion of the ravine. The trench was approximately 20 feet by 2 feet and extended to 6 feet bgs, as shown in Attachment B5, Photograph 3. Trench AOC4-T2 extended into the undisturbed interior of the ravine, which was approximately 1 foot of fill. Debris observed in this trench included trash, household burned trash, laboratory glassware, tiles, and rope, as shown in Attachment B5, Photographs 4 and 5. There were three sampling locations in this trench: AOC4-T2a (3-4 feet bgs), AOC4-T2b (2-3 and 7-8 feet bgs), and AOC4-T2c (0-0.5 and 2-3 feet bgs).

Trench AOC4-T3 was installed at the top of the primary ravine slope, as shown in Attachment B5, Photograph 6. This trench was approximately 25 feet long by 3 feet wide and extended to 4.5 feet bgs, as shown in Attachment B5, Photograph 7. A rusted pipe was observed in the west sidewall, shown in Attachment B5, Photograph 8. There was also green stained soil and a yellow coated rock found in this trench. There were three sampling locations in this trench: AOC4-T3a (2-3 feet bgs), AOC4-T3b (2-3 feet bgs), and AOC4-T3c (2-3 feet bgs).

Trench AOC4-T4 was also located at the top of the primary ravine slope, west of trench AOC4-T3 (Attachment B5, Photograph 9). This trench was approximately 25 feet long by 3 feet wide and extended to 4.5 feet bgs. No debris or discolored soil was observed in this trench. There were three sampling locations in this trench: AOC4-T4a (2-3 feet bgs), AOC4-T4b (2-3 feet bgs), and AOC4-T4c (2-3 feet bgs).

B.5.3 AOC 12 – Fill Area

Five trenches were proposed in AOC 12 to assess three potential debris disposal areas (AOC 12a, AOC 12b, and AOC 12c), as shown on Figure B-1. Trench logs for these trenches are included in Attachment B1, Figures B-12 through B-16. Prior to trenching activities at AOC 12, a geophysical survey was performed at each trench location to attempt to locate buried debris and to identify the location of underground utility infrastructure. The results of the surveys identified two alignments crossing AOC 12a, which were positively identified by PG&E via hand digging as a PG&E gas pipeline and associated cathodic protection wire. In AOC 12b and AOC 12c, geophysical results indicated two undifferentiated utilities (UUs) extending east from aboveground storage tank bunker pipe stub-outs.

The trenches were advanced in AOC 12 at the locations specified in the work plan between September 20, 2008 and September 22, 2008. Aside from the underground utility structures, anomalies that may be attributable to buried debris were not observed. Complete geophysical survey results are presented in Attachment B6.

Trench AOC12a-T1, located in potential disposal area AOC 12a, was approximately 18 feet long by 2.5 feet wide and extended to 8 feet bgs. There were two sampling locations in this trench: AOC12a-T1a (0-0.5, 2-3, and 7-8 feet bgs) and AOC12a-T1c (7-8 feet bgs). Trench AOC12a-T2 is perpendicular to and intersects trench AOC12a-T1, as shown on Figure B-1.

Trench AOC12a-T2 was approximately 12 feet long by 2.5 feet wide and extended to 8 feet bgs to native material, as shown in Attachment B7, Photograph 1. There were two sampling locations in this trench: AOC12a-T2a (6-7 feet bgs) and AOC12a-T2b (7-8 feet bgs). No debris was observed in either of these trenches.

Trench AOC12b-T1, located in potential disposal area AOC 12b, was approximately 35 feet long by 2.5 feet wide and extended to 3 feet bgs to native material, as shown in Attachment B7, Photographs 2 and 3. There were two sampling locations in this trench: AOC12b-T1a (2-3 feet bgs) and AOC12b-T1b (2-3 feet bgs). No debris was observed in the trench.

In area AOC 12c, two trenches were advanced (AOC12c-T1 and AOC12c-T2). Trench AOC12c-T1 was approximately 20 feet long by 2.5 feet wide and extended to 11 feet bgs, as shown in Attachment B7, Photograph 4. There were three sampling locations in this trench: AOC12c-T1a (0-0.5, 2-3, and 10-11 feet bgs), AOC12c-T1b (2-3, 3-4, and 10-11 feet bgs), and AOC12c-T1c (10-11 feet bgs).

Trench AOC12c-T2 intersects trench AOC12c-T1, as shown in Figure B-1. Trench AOC12c-T2 was approximately 20 feet long by 2.5 feet wide and extended to 8 feet bgs, as shown in Attachment B7, Photographs 5 and 6. There were two sampling locations in this trench: AOC12c-T2a (7-8 feet bgs) and AOC12c-T2b (7-8 feet bgs). A large piece of concrete (at approximately 1.5 feet bgs), small piece of wire (at approximately 5 feet bgs), an 18-inch wooden slat, plastic debris, and a bung cover from a polyethylene drum were observed in trench AOC12c-T1, as shown in Attachment B7, Photographs 7 and 8.

B.6 Geophysical Survey - UA 1 – Potential Pipeline Disposal Area

A geophysical survey was performed in UA 1 to evaluate the potential presence of buried asbestos-wrapped metal pipes in this area and to identify the location of underground utility infrastructure. Results of the geophysical survey did not suggest the presence of buried pipes in this area; however, several small metallic anomalies and two UUs were observed sporadically across the UA 1 area. One UU was truncated in the north and extended out of the survey area in the south, and the other UU was located in the southern portion of the survey area trending east-west. Complete geophysical survey results are presented in Attachment B6.

Following the geophysical survey, further visual assessment of the area in the vicinity of UA 1 identified miscellaneous pipe band clamps and small quantities of insulation to the east of UA 1. A pronounced soil mound approximately 100 feet long by 25 feet wide is also observed in this area. The initial location of UA 1 was based on tentative identification by a former employee; due to the long period of time that had elapsed since the disposal activities allegedly took place, it is possible that the area initially identified was off-set from the actual location.

B.7 Deviations from the Draft Work Plan

Table B-1 lists deviations from the Draft Work Plan. Deviations to the workplan fall into two categories:

1. Additional samples or locations added based on agency comments
2. Collection of proposed samples not possible due encountering refusal or groundwater

B.8 References

California Department of Toxic Substances Control (DTSC). 2007. *Comments and Conditional Approval of the RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part A, Pacific Gas and Electric Company (PG&E), Topock Compressor Station, Needles, California (EPA ID No. CAT080011729)*. August 10.

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Table

TABLE B-1

Field Activities Summary Table and Deviations from Draft Work Plan

RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report

Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
Background															
BKG-01	9/18/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-01	9/18/08	2 - 3	X	X										Rotosonic	
BKG-02	9/18/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-02	9/18/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-03	9/18/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-03	9/18/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-04	9/18/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-04	9/18/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-05	9/19/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-05	9/19/08	2 - 3 and 5 - 6	X	X										Rotosonic	
BKG-06	9/19/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-06	9/19/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-07	9/19/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-07	9/19/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-08	8/23/08	0 - 0.5	X	X	X		X							Hand Tools	
BKG-08	8/23/08	1 - 2	X	X										Hand Tools	
BKG-09	8/23/08	0 - 0.5	X	X	X		X							Hand Tools	Bedrock encounter at 1 ft bgs; not able to collect proposed soil sample at 1-2 ft bgs.
BKG-10	9/19/08	0 - 0.5	X	X	X		X							Hand Tools	
BKG-10	9/19/08	1 - 2	X	X										Hand Tools	
BKG-11	9/19/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-11	9/19/08	1 - 2	X	X										Rotosonic	
BKG-12	8/23/08	0 - 0.5	X	X	X		X							Hand Tools	
BKG-12	8/23/08	2 - 3 and 5 - 6	X	X										Hand Tools	Bedrock encounter at 6 ft bgs; not able to collect proposed soil sample at 9-10 ft bgs.
BKG-13	9/20/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-13	9/20/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-14	9/20/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-14	9/20/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-15	9/20/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-15	9/20/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-16	9/23/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-16	9/23/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	
BKG-17	9/20/08	0 - 0.5	X	X	X		X							Rotosonic	
BKG-17	9/20/08	2 - 3, 5 - 6, and 9 - 10	X	X										Rotosonic	

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
AOC 1 - Area Around Former Percolation Bed															
AOC1-BCW1	9/20/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
AOC1-BCW1	9/20/08	2 - 3	X	X	X	X				X			X	Rotosonic	Granite bolder encountered at 5.5 ft bgs; not able to collect proposed soil samples at 5-6 and 9-10 ft bgs.
AOC1-BCW2	10/4/08	0 - 0.5	X	X	X				X				X	Rotosonic	
AOC1-BCW2	10/4/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-BCW3	10/4/08	0 - 0.5	X	X	X				X				X	Rotosonic	
AOC1-BCW3	10/4/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-BCW4	10/4/08	0 - 0.5	X	X	X				X				X	Rotosonic	
AOC1-BCW4	10/4/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-BCW5	10/4/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
AOC1-BCW5	10/4/08	2 - 3, 5 - 6, and 9 - 10	X	X	X					X			X	Rotosonic	
AOC1-BCW6	8/22/08	0 - 0.5	X	X	X	X					X		X	Hand Tools	
AOC1-BCW6	8/22/08	2 - 3	X	X	X					X			X	Hand Tools	Cobble encountered at 4.2 ft bgs; not able to collect proposed soil samples at 5-6 and 9-10 ft bgs.
AOC1-T1a	10/16/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
AOC1-T1a	10/16/08	2 - 3	X	X	X					X			X	Rotosonic	
AOC1-T1a	10/16/08	5 - 6 and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-T1b	10/16/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
AOC1-T1b	10/16/08	2 - 3	X	X	X					X			X	Rotosonic	
AOC1-T1b	10/16/08	5 - 6 and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-T1c	10/16/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
AOC1-T1c	10/16/08	2 - 3	X	X	X					X			X	Rotosonic	
AOC1-T1c	10/16/08	5 - 6 and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-T2a	10/5/08	0 - 0.5	X	X	X				X				X	Rotosonic	
AOC1-T2a	10/16/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-T2b	10/16/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
AOC1-T2b	10/16/08	2 - 3	X	X	X					X			X	Rotosonic	
AOC1-T2b	10/16/08	5 - 6 and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-T2c	10/8/08	0 - 0.5	X	X	X				X				X	Rotosonic	
AOC1-T2c	10/8/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-T2d	10/7/08	0 - 0.5	X	X	X				X				X	Rotosonic	

TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

Sample Location	Sample Date	Sample Depth (ft bgs)	Analytical Suite[a] Metals	Hexavalent Chromium	PAHs	PCBs	Pesticides	VOCs, SVOCs, TPH-purgable, and TPH-extractable	SVOCs and TPH-extractable	CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable	CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable	Asbestos	pH	Collection Method	Deviation from Draft Work Plan and Notes
AOC1-T2d	10/7/08	2 - 3, 5 - 6, 9 - 10, 19 - 20, 29 - 30, 39 - 40, 49 - 50, 59 - 60, and 69 - 70	X	X	X			X					X	Rotosonic	Groundwater encountered at 72 ft bgs; not able to collect proposed soil samples at 79-80, 89-90, and 99-100 ft bgs. An SPLP extraction was performed on soil samples collected at 2 -3 and 5-6 ft bgs, and leachate was analyzed for total and hexavalent chromium.
AOC1-T2e	10/16/08	0 - 0.5	X	X	X				X				X	Rotosonic	
AOC1-T2e	10/16/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
AOC1-T3a	10/5/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC1-T3a	10/17/08	2 - 3	X	X	X	X				X			X	Direct-Push	
AOC1-T3a	10/17/08	5 - 6 and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T3b	10/5/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC1-T3b	10/17/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T3c	10/5/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC1-T3c	10/5/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T4a	10/3/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC1-T4a	10/3/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T4b	10/2/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC1-T4b	10/2/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T4c	10/4/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC1-T4c	10/4/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC1-T4c	10/4/08	5 - 6 and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T5a	10/4/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC1-T5a	10/4/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T5b	10/4/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC1-T5b	10/4/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC1-T5b	10/4/08	5 - 6 and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T5c	10/4/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC1-T5c	10/4/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Direct-Push	
AOC1-T6a	9/30/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC1-T6a	9/30/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Excavator	
AOC1-T6b	9/30/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC1-T6b	9/30/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Excavator	
AOC1-T6c	9/30/08	0 - 0.5	X	X	X	X					X		X	Excavator	
AOC1-T6c	9/30/08	2.5 - 3	X	X	X					X			X	Excavator	
AOC1-T6c	9/30/08	5.5 - 6	X	X	X			X					X	Excavator	Bedrock encountered at 6 ft bgs; not able to collect proposed soil samples at 9-10 ft bgs.
SWMU 1 - Former Percolation Bed															

TABLE B-1

Field Activities Summary Table and Deviations from Draft Work Plan

RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report

Pacific Gas and Electric, Topock Compressor Station, Needles, California

Sample Location	Sample Date	Sample Depth (ft bgs)	Analytical Suite^a Metals	Hexavalent Chromium	PAHs	PCBs	Pesticides	VOCs, SVOCs, TPH-purgable, and TPH-extractable	SVOCs and TPH-extractable	CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable	CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable	Asbestos	pH	Collection Method	Deviation from Draft Work Plan and Notes
SWMU1-1	10/16/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-1	10/16/08	2 - 3	X	X	X					X			X	Rotosonic	
SWMU1-1	10/16/08	5 - 6 and 9 - 10	X	X	X			X					X	Rotosonic	An SPLP extraction was performed on the soil sample collected at 5-6 ft bgs, and leachate was analyzed for total and hexavalent chromium
SWMU1-2	10/15/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-2	10/15/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-3	10/6/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-3	10/6/08	2 - 3	X	X	X	X				X			X	Rotosonic	
SWMU1-3	10/6/08	5 - 6, 9 - 10, 19 - 20, 29 - 30, 39 - 40, 49 - 50, 59 - 6-, 69 - 70, and 79 - 80	X	X	X			X					X	Rotosonic	Groundwater encountered at 77 ft bgs; not able to collect proposed soil samples at 89-90 and 99-100 ft bgs. An SPLP extraction was performed on the soil sample collected at 5-6 ft bgs, and leachate was analyzed for total and hexavalent chromium.
SWMU1-4	10/15/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-4	10/15/08	2 - 3	X	X	X					X			X	Rotosonic	
SWMU1-4	10/15/08	5 - 6, 7 - 8, 9 - 10, and 13 - 14	X	X	X			X					X	Rotosonic	
SWMU1-5	10/15/08	9 - 10, 13 - 14, 15 - 16, and 19 - 20	X	X	X			X					X	Rotosonic	
SWMU1-6	10/15/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-6	10/15/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-7	10/15/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-7	10/15/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-8	10/15/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-8	10/15/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	An SPLP extraction was performed on the soil sample collected at 2-3 ft bgs, and leachate was analyzed for total and hexavalent chromium.
SWMU1-9	10/14/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-9	10/14/08	2 - 3	X	X	X					X			X	Rotosonic	
SWMU1-9	10/14/08	5 - 6 and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-10	10/14/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-10	10/14/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-11	10/15/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-11	10/15/08	2 - 3	X	X	X					X			X	Rotosonic	
SWMU1-11	10/15/08	5 - 6 and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-12	10/14/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-12	10/14/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-13	10/14/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-13	10/14/08	2 - 3, 5 - 6, and 9 - 10	X	X	X					X			X	Rotosonic	

TABLE B-1

Field Activities Summary Table and Deviations from Draft Work Plan

RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report

Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
SWMU1-14	10/14/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-14	10/14/08	2 - 3, 5 - 6, and 9 - 10	X	X	X			X					X	Rotosonic	
SWMU1-15	9/22/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-15	9/22/08	2 - 3	X	X	X	X				X			X	Rotosonic	
SWMU1-15	9/22/08	5 - 6, 9 - 10, 19 - 20, 29 - 30, 39 - 40, 49 - 50, 59 - 6-, 69 - 70, 79 - 80, and 89 - 90	X	X	X			X					X	Rotosonic	Bedrock encountered at 90 ft bgs; not able to collect proposed soil sample at 99-100 ft bgs.
SWMU1-16	9/21/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-16	9/21/08	2 - 3 and 5 - 6	X	X	X			X					X	Rotosonic	
SWMU1-17	9/21/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-17	9/21/08	2 - 3	X	X	X					X			X	Rotosonic	
SWMU1-17	9/21/08	5 - 6	X	X	X			X					X	Rotosonic	
SWMU1-17	9/21/08	9 - 10	X	X	X				X				X	Rotosonic	
SWMU1-WP-1h	10/7/08	0 - 0.5	X	X	X	X					X		X	Excavator	
SWMU1-WP-1h	10/7/08	2 - 3	X	X	X					X			X	Excavator	
SWMU1-WP-1h	10/7/08	5 - 6 and 9 - 10	X	X	X			X					X	Excavator	Excavator was not able to collect samples within a one-foot depth interval, therefore, the proposed sample at 7 -8 ft bgs was not collected.
SWMU1-WP-3a	10/14/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-WP-3a	10/14/08	2 - 3	X	X	X					X			X	Rotosonic	
SWMU1-WP-3a	10/14/08	5 - 6, 7 - 8, 9 - 10, 11 - 12, and 13 -14	X	X	X			X					X	Rotosonic	
SWMU1-WP-3h	10/7/08	0 - 0.5	X	X	X				X				X	Excavator	
SWMU1-WP-3h	10/7/08	2 - 3 and 5 - 6	X	X	X			X					X	Excavator	
SWMU1-WP-5a	10/5/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-WP-5a	10/5/08	2 - 3	X	X	X					X			X	Rotosonic	
SWMU1-WP-5a	10/5/08	5 - 6, 7 - 8, 9 -10, 11 - 12, and 13 - 14	X	X	X			X					X	Rotosonic	
SWMU1-WP-5h	10/7/08	0 - 0.5	X	X	X	X					X		X	Excavator	
SWMU1-WP-5h	10/7/08	2-3 and 5-6	X	X	X			X					X	Excavator	White powder material was observed and sampled at 2-3 ft bgs. Hardpan encountered at 7 ft bgs; not able to collect proposed soil samples 7-8 and 9-10 ft bgs.
SWMU1-WP-6a	10/5/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-WP-6a	10/5/08	2 - 3	X	X	X	X				X			X	Rotosonic	
SWMU1-WP-6a	10/5/08	5 - 6, 7 - 8, 9 -10, 11 - 12, and 13 - 14	X	X	X			X					X	Rotosonic	
SWMU1-WP-6h	10/6/08	0 - 0.5	X	X	X	X					X		X	Excavator	White powder material was observed and sampled.
SWMU1-WP-6h	10/6/08	2 - 3	X	X	X	X				X			X	Excavator	
SWMU1-WP-6h	10/6/08	5 - 6 and 9 - 10	X	X	X			X					X	Excavator	Excavator was not able to collect samples within a one-foot depth interval, therefore, the proposed sample at 7 -8 ft bgs was not collected.

TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

Sample Location	Sample Date	Sample Depth (ft bgs)	Analytical Suite[a] Metals	Hexavalent Chromium	PAHs	PCBs	Pesticides	VOCs, SVOCs, TPH-purgable, and TPH-extractable	SVOCs and TPH-extractable	CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable	CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable	Asbestos	pH	Collection Method	Deviation from Draft Work Plan and Notes
SWMU1-WP-T3a	10/5/08	0 - 0.5	X	X	X	X					X		X	Rotosonic	
SWMU1-WP-T3a	10/5/08	2 - 3, 5 - 6, 7 - 8, 9 - 10, 11 - 12, and 13 -14	X	X	X					X			X	Rotosonic	
SWMU1-WP-7	10/6/08	0 - 0.5	X	X	X	X					X		X	Excavator	
SWMU1-WP-7	10/6/08	2 - 3	X	X	X	X				X			X	Excavator	White powder material was observed and sampled.
SWMU1-WP-7	10/6/08	5 - 6 and 9 - 10	X	X	X			X					X	Excavator	Excavator was not able to collect samples within a one-foot depth interval, therefore, the proposed sample at 7 -8 ft bgs was not collected.
SWMU1-WP-8	10/6/08	0 - 0.5	X	X	X	X					X		X	Excavator	
SWMU1-WP-8	10/6/08	2 - 3	X	X	X	X				X			X	Excavator	
SWMU1-WP-8	10/6/08	5 - 6 and 9 - 10	X	X	X			X					X	Excavator	Excavator was not able to collect samples within a one-foot depth interval, therefore, the proposed sample at 7 -8 ft bgs was not collected.
SWMU1-WP-9	9/21/08	0 - 0.5	X	X	X				X				X	Rotosonic	
SWMU1-WP-9	9/21/08	2 - 3, 5 - 6, 7 - 8, 9 - 10, 11 - 12, and 13 -14	X	X	X			X					X	Rotosonic	
SWMU1-WP-10	10/5/08	0 - 0.5	X	X	X				X				X	Excavator	
SWMU1-WP-10	10/5/08	2-3, 5 - 6 and 9 - 10	X	X	X			X					X	Excavator	White powder material was observed and sampled at 2-3 ft bgs. Excavator was not able to collect samples within a one-foot depth interval, therefore, the proposed sample at 7 -8 ft bgs was not collected.
AOC 4 - Debris Ravine															
AOC4-1	10/14/08	0 - 0.5	X	X	X	X					X			Hand Tools	
AOC4-1	10/14/08	0.5 - 1	X	X	X				X					Hand Tools	
AOC4-1	10/14/08	2 - 3	X	X	X					X				Hand Tools	
AOC4-2	10/3/08	0 - 0.5 and 0.5 - 1	X	X	X				X			X		Excavator	
AOC4-3	8/24/08	0 - 0.5 and 0.5 - 1	X	X	X				X					Hand Tools	Gravel encountered at 1.2 ft bgs; not able to collect proposed soil sample at 2-3 ft bgs.
AOC4-4	8/24/08	0 - 0.5	X	X	X	X					X	X		Hand Tools	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 0.5-1 and 2-3 ft bgs.
AOC4-5	10/3/08	0 - 0.5	X	X	X				X			X		Hand Tools	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 0.5-1 and 2-3 ft bgs.
AOC4-6	8/24/08	0 - 0.5	X	X	X				X			X		Excavator	
AOC4-6	8/24/08	0.5 - 1	X	X	X				X			X		Excavator	
AOC4-6	10/3/08	2 - 3	X	X	X			X				X		Excavator	
AOC4-7	10/3/08	0 - 0.5	X	X	X	X					X	X		Excavator	Proposed soil samples at 0.5-1 and 2-3 ft bgs were not able to be collected due excavation integrity.
AOC4-8	10/3/08	0 - 0.5	X	X	X				X			X		Hand Tools	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 0.5-1 and 2-3 ft bgs.
AOC4-9	8/24/08	0 - 0.5	X	X	X				X			X		Hand Tools	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 0.5-1 and 2-3 ft bgs.
AOC4-10	10/3/08	0 - 0.5	X	X	X				X			X		Hand Tools	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 0.5-1 and 2-3 ft bgs.

TABLE B-1

Field Activities Summary Table and Deviations from Draft Work Plan

RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report

Pacific Gas and Electric, Topock Compressor Station, Needles, California

Analytical Suite^{a}

Sample Location	Sample Date	Sample Depth (ft bgs)	Metals	Hexavalent Chromium	PAHs	PCBs	Pesticides	VOCs, SVOCs, TPH-purgable, and TPH-extractable	SVOCs and TPH-extractable	CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable	CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable	Asbestos	pH	Collection Method	Deviation from Draft Work Plan and Notes
AOC4-11	10/3/08	0 - 0.5	X	X	X	X					X	X		Hand Tools	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 0.5-1 and 2-3 ft bgs.
AOC4-12	10/3/08	0 - 0.5 and 0.5 - 1	X	X	X				X				X	Hand Tools	
AOC4-12A	8/24/08	0 - 0.5	X	X	X				X					Hand Tools	
AOC4-13	8/24/08	0 - 0.5	X	X	X	X					X	X		Hand Tools	
AOC4-14	8/24/08	0 - 0.5	X	X	X				X			X		Hand Tools	
AOC4-15	9/19/08	0 - 0.5 and 0.5 - 1	X	X	X				X			X		Excavator	
AOC4-15	9/19/08	2 - 3	X	X	X			X				X		Excavator	
AOC4-B10	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	
AOC4-B20	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-B30	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid. White powder material was observed and sampled.
AOC4-D10	10/5/08	0 - 0.5	X	X	X				X					Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-D20	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-D30	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-DE5	10/5/08	0 - 0.5	X	X	X	X					X	X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-GH10	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-GH30	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-I20	10/5/08	0 - 0.5	X	X	X				X			X		Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-I30	10/5/08	0 - 0.5	X	X	X				X					Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-Z25	10/5/08	0 - 0.5	X	X	X				X					Excavator	Additional sample collected to characterize stained soil found in the AOC4 surface debris mapping grid.
AOC4-SS-1	9/19/08	0 - 0.5	X	X	X				X					Hand Tools	An SPLP extraction was performed, and leachate was analyzed for total and hexavalent chromium.
AOC4-SS-2	10/3/08	0 - 0.5	X	X	X				X					Hand Tools	
AOC4-SS-3	10/3/08	0 - 0.5	X	X	X				X					Hand Tools	
AOC4-Stained	10/4/08	0 - 0.5	X	X	X	X					X			Hand Tools	Stained soil found in surface debris mapping grid. An SPLP extraction was performed, and leachate was analyzed for total and hexavalent chromium.

TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
AOC4-T1a	10/22/08	0 - 0.5	X	X	X	X					X	X		Excavator	
AOC4-T1a	10/22/08	3.5 - 4	X	X	X			X						Excavator	
AOC4-T2a	10/22/08	3.5 - 4	X	X	X			X						Excavator	
AOC4-T2b	10/22/08	2 - 3 and 7 - 8	X	X	X			X				X		Excavator	
AOC4-T2c	10/22/08	0 - 0.5	X	X	X				X					Excavator	
AOC4-T2c	10/22/08	2.5 - 3	X	X	X			X				X		Excavator	
AOC4-T3a	10/23/08	2.5 - 3	X	X	X			X				X		Excavator	
AOC4-T3b	10/23/08	2.5 - 3	X	X	X			X						Excavator	
AOC4-T3c	10/23/08	2.5 - 3	X	X	X			X						Excavator	
AOC4-T4a	10/23/08	2.5 - 3	X	X	X	X				X				Excavator	
AOC4-T4b	10/23/08	2.5 - 3	X	X	X			X						Excavator	
AOC4-T4c	10/23/08	2.5 - 3	X	X	X			X						Excavator	
AOC4-Wood1	10/3/08	NA	X	X	X				X					NA	
AOC4-Wood2	10/3/08	NA	X	X	X				X					NA	
AOC 9 - Southeast Fence Line															
AOC9-1	10/1/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC9-1	10/1/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-2	9/18/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC9-2	9/18/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-3	9/18/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC9-3	9/18/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-4	9/18/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC9-4	9/18/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-5	10/1/08	0 - 0.5	X	X	X	X					X		X	Excavator	
AOC9-5	10/1/08	2 - 3	X	X	X	X				X			X	Excavator	
AOC9-6	9/18/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC9-6	9/18/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-7	9/18/08	0 - 0.5	X	X	X				X				X	Excavator	An SPLP extraction was performed, and leachate was analyzed for total and hexavalent chromium.
AOC9-7	9/18/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-8	10/1/08	0 - 0.5	X	X	X				X				X	Excavator	An SPLP extraction was performed, and leachate was analyzed for total and hexavalent chromium.
AOC9-8	10/1/08	2.5 - 3 and 5.5-6	X	X	X			X					X	Excavator	
AOC9-9	10/1/08	0 - 0.5	X	X	X				X				X	Excavator	

TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
AOC9-9	10/1/08	2.5 - 3 and 5.5-6	X	X	X			X					X	Excavator	
AOC9-10	10/1/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC9-10	10/1/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-11	9/18/08	0 - 0.5	X	X	X	X					X		X	Excavator	
AOC9-11	9/18/08	2 - 3	X	X	X					X			X	Excavator	
AOC9-12	10/1/08	0 - 0.5	X	X	X	X					X		X	Excavator	
AOC9-12	10/1/08	2 - 3	X	X	X	X				X			X	Excavator	
AOC9-13	9/19/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC9-13	9/19/08	2 - 3	X	X	X			X					X	Excavator	
AOC9-14	10/2/08	0 - 0.5	X	X	X				X			X	X	Excavator	Sample location added to collect a sample of white powder material found 45 ft south of end of compressor station and in line with "swamp cooler".
AOC9-14	10/2/08	2 - 3	X	X	X			X				X	X	Excavator	Soil sample collected beneath white powder material found at the surface (0-0.5 ft bgs).
AOC 10 - East Ravine															
AOC10-1	10/2/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC10-1	10/2/08	2 - 3 and 5 - 6	X	X	X			X					X	Excavator	
AOC10-1	10/2/08	9 - 10	X	X	X			X						Excavator	
AOC10-2	10/2/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC10-2	10/2/08	2 - 3 and 5 - 6	X	X	X			X					X	Excavator	
AOC10-2	10/2/08	7 - 8	X	X	X			X						Excavator	Bedrock encountered at 8 ft bgs; not able to collect proposed soil samples at 9-10 ft bgs.
AOC10-3	9/19/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC10-3	9/19/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC10-3	9/19/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC10-3	9/19/08	9 - 10	X	X	X									Direct-Push	
AOC10-4	9/19/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10-4	9/19/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC10-4	9/19/08	9 - 10	X	X	X									Direct-Push	
AOC10-5	9/19/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	Bedrock encountered at 8.2 ft bgs; not able to collect proposed soil sample at 9-10 ft bgs.
AOC10-5	9/19/08	2 - 3	X	X	X	X				X			X	Direct-Push	
AOC10-5	9/19/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC10-6	9/20/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10-6	9/20/08	2 - 3	X	X	X			X					X	Direct-Push	Bedrock encountered at 3 ft bgs; not able to collect proposed soil samples at 5-6 and 9-10 ft bgs.
AOC10-7	9/20/08	0 - 0.5	X	X	X				X				X	Direct-Push	

TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
AOC10-7	9/20/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	Bedrock encountered at 8 ft bgs; not able to collect proposed soil sample at 9-10 ft bgs.
AOC10-8	8/22/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 2-3, 5-6, and 9-10 ft bgs.
AOC10a-1	10/17/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	Bedrock encountered at 0.5 ft bgs; not able to collect proposed soil samples at 2-3, 5-6, and 9-10 ft bgs.
AOC10b-1	9/30/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC10b-1	9/30/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC10b-1	9/30/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC10b-1	9/30/08	9 - 10	X	X	X			X						Direct-Push	
AOC10b-2	9/30/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10b-2	9/30/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC10b-2	9/30/08	9 - 10	X	X	X			X						Direct-Push	
AOC10b-3	9/30/08	0 - 0.5	X	X	X				X				X	Direct-Push	An SPLP extraction was performed, and leachate was analyzed for total and hexavalent chromium.
AOC10b-3	10/1/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC10b-3	10/1/08	9 - 10	X	X	X			X						Direct-Push	
AOC10b-4	9/30/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10b-4	9/30/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC10b-4	9/30/08	9 - 10	X	X	X			X						Direct-Push	
AOC10c-1	10/1/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC10c-1	10/1/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC10c-1	10/1/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC10c-1	10/1/08	9 - 10	X	X	X			X						Direct-Push	
AOC10c-2	10/1/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC10c-2	10/1/08	2 - 3	X	X	X	X				X			X	Direct-Push	
AOC10c-2	10/1/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC10c-2	10/1/08	9 - 10	X	X	X			X						Direct-Push	
AOC10c-3	10/2/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10c-3	10/2/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC10c-3	10/2/08	9 - 10	X	X	X			X						Direct-Push	
AOC10c-4	10/1/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10c-4	10/1/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC10c-4	10/1/08	9 - 10	X	X	X			X						Direct-Push	
AOC10c-5	10/1/08	0 - 0.5	X	X	X				X				X	Direct-Push	

TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

Sample Location	Sample Date	Sample Depth (ft bgs)	Analytical Suite[a] Metals	Hexavalent Chromium	PAHs	PCBs	Pesticides	VOCs, SVOCs, TPH-purgable, and TPH-extractable	SVOCs and TPH-extractable	CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable	CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable	Asbestos	pH	Collection Method	Deviation from Draft Work Plan and Notes
AOC10c-5	10/1/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	An SPLP extraction was performed on the soil sample collected at 2 -3 ft bgs, and leachate was analyzed for total and hexavalent chromium.
AOC10c-5	10/1/08	9 - 10	X	X	X			X						Direct-Push	
AOC10d-1	9/18/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10d-1	9/18/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC10d-1	9/18/08	9 - 10	X	X	X									Direct-Push	
AOC10d-2	9/17/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC10d-2	9/17/08	2 - 3	X	X	X	X				X			X	Direct-Push	
AOC10d-2	9/17/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC10d-2	9/17/08	9 - 10	X	X	X									Direct-Push	
AOC10d-3	9/17/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC10d-3	9/18/08	2 - 3	X	X	X	X				X			X	Direct-Push	
AOC10d-3	9/18/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC10d-3	9/18/08	9 - 10	X	X	X									Direct-Push	
AOC10d-4	9/18/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC10d-4	9/18/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	An SPLP extraction was performed on the soil sample collected at 2 -3 ft bgs, and leachate was analyzed for total and hexavalent chromium.
AOC10d-4	9/18/08	9 - 10	X	X	X									Direct-Push	
AOC10-XRF-01	8/25/08	0 -0.5	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-02	8/25/08	0 - 0.5	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-03	8/25/08	0 - 0.5	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-04	9/21/08	0 - 0.5	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-05	9/21/08	0 - 0.5	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-06	9/21/08	0 - 0.5	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-7	9/21/08	1 - 2	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-8	9/21/08	1 - 2	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-9	9/21/08	1 - 2	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC10-XRF-10	9/21/08	3 - 4	X	X										Hand Tools	Confirmation samples for embankment modification to create an access route into the ravine.
AOC 11 - Topographic Low Areas															
AOC11a-1	9/21/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC11a-1	9/21/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC11a-1	9/21/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC11a-1	9/21/08	9 - 10	X	X	X									Direct-Push	
AOC11a-2	9/21/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	

TABLE B-1

Field Activities Summary Table and Deviations from Draft Work Plan

RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report

Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
AOC11a-2	9/21/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC11a-2	9/21/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC11a-2	9/21/08	9 - 10	X	X	X									Direct-Push	
AOC11a-3	9/20/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC11a-3	9/20/08	2 - 3	X	X	X					X			X	Direct-Push	
AOC11a-3	9/20/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC11a-3	9/20/08	9 - 10	X	X	X									Direct-Push	
AOC11a-4	9/20/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC11a-4	9/20/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC11a-4	9/20/08	9 - 10	X	X	X									Direct-Push	
AOC11a-5	9/21/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC11a-5	9/21/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	
AOC11a-5	9/21/08	9 - 10	X	X	X									Direct-Push	
AOC11a-SS-1	9/21/08	0 - 0.5, 2 - 3, 5 - 6, and 9 - 10	X	X	X									Direct-Push	
AOC11a-SS-2	9/21/08	0 - 0.5 and 2 - 3	X	X	X									Direct-Push	Bedrock encountered at 3.5 ft bgs; not able to collect proposed soil samples at 5-6 and 9-10 ft bgs.
AOC11a-SS-3	9/20/08	0 - 0.5, 2 - 3, 5 - 6, and 9 - 10	X	X	X									Direct-Push	
AOC11b-1	9/17/08	0 - 0.5	X	X	X	X					X		X	Excavator	
AOC11b-1	9/17/08	2 - 3	X	X	X					X			X	Excavator	
AOC11b-1	9/17/08	5 - 6	X	X	X			X					X	Excavator	
AOC11b-1	9/17/08	9 - 10	X	X	X									Excavator	
AOC11b-2	9/17/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC11b-2	9/17/08	2 - 3 and 5 - 6	X	X	X			X					X	Excavator	
AOC11b-2	9/17/08	9 - 10	X	X	X									Excavator	
AOC11c-1	9/21/08	0 - 0.5	X	X	X				X				X	Direct-Push	
AOC11c-1	9/22/08	2 - 3 and 5 - 6	X	X	X			X					X	Direct-Push	An SPLP extraction was performed on the soil sample collected at 2 -3 ft bgs, and leachate was analyzed for total and hexavalent chromium.
AOC11c-1	9/22/08	9 - 10	X	X	X									Direct-Push	
AOC11c-2	9/21/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC11c-2	9/22/08	2 - 3	X	X	X	X				X			X	Direct-Push	
AOC11c-2	9/22/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC11c-2	9/22/08	9 - 10	X	X	X									Direct-Push	
AOC11c-SS-1	9/21/08	0 - 0.5, 2 - 3, 5 - 6, and 9 - 10	X	X	X									Direct-Push	
AOC11c-SS-2	9/22/08	0 - 0.5, 2 - 3, 5 - 6, and 9 - 10	X	X	X									Direct-Push	
AOC11d-1	9/23/08	0 - 0.5	X	X	X	X					X		X	Direct-Push	
AOC11d-1	9/23/08	2 - 3	X	X	X	X				X			X	Direct-Push	

TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
AOC11d-1	9/23/08	5 - 6	X	X	X			X					X	Direct-Push	
AOC11d-1	9/23/08	9 - 10	X	X	X			X						Direct-Push	
AOC11e-1	9/23/08	0 - 0.5	X	X	X				X				X	Excavator	
AOC11e-1	9/23/08	2 - 3 and 5 - 6	X	X	X			X					X	Excavator	
AOC11e-1	9/23/08	9 - 10	X	X	X			X						Excavator	
AOC11e-2	9/24/08	0 - 0.5	X	X	X	X					X		X	Excavator	
AOC11e-2	9/24/08	2 - 3	X	X	X	X				X			X	Excavator	An SPLP extraction was performed, and leachate was analyzed for total and hexavalent chromium.
AOC11e-2	9/24/08	5 - 6	X	X	X	X		X					X	Excavator	
AOC11e-2	9/24/08	9 - 10	X	X	X	X		X						Excavator	
AOC11e-SS-1	9/23/08	0 - 0.5, 2 - 3, 5 - 6, and 9 - 10	X	X	X	X			X					Excavator	
AOC11e-SS-2	9/23/08	0 - 0.5, 2 - 3, 5 - 6, and 9 - 10	X	X	X	X			X					Excavator	
AOC 12 - Fill Area															
AOC12a-T1a	9/22/08	0 - 0.5	X	X	X	X					X	X	X	Excavator	
AOC12a-T1a	9/22/08	2 - 3	X	X	X	X				X		X	X	Excavator	
AOC12a-T1a	9/22/08	7 - 8	X	X	X			X				X	X	Excavator	
AOC12a-T1c	9/22/08	7 - 8	X	X	X			X				X	X	Excavator	
AOC12a-T2a	9/22/08	6 - 7	X	X	X			X				X	X	Excavator	
AOC12a-T2b	9/22/08	7 - 8	X	X	X			X				X	X	Excavator	
AOC12b-T1a	9/20/08	2 - 3	X	X	X			X				X	X	Excavator	
AOC12b-T1b	9/20/08	2 - 3	X	X	X			X				X	X	Excavator	
AOC12c-T1a	9/20/08	0 - 0.5	X	X	X	X					X	X	X	Excavator	
AOC12c-T1a	9/20/08	2 - 3	X	X	X					X		X	X	Excavator	
AOC12c-T1a	9/20/08	10 - 11	X	X	X			X				X	X	Excavator	
AOC12c-T1b	9/20/08	2 - 3, 3 - 4, and 10 - 11	X	X	X			X				X	X	Excavator	
AOC12c-T1c	9/20/08	10 - 11	X	X	X			X				X	X	Excavator	
AOC12c-T2a	9/20/08	7 - 8	X	X	X			X				X	X	Excavator	
AOC12c-T2b	9/20/08	7 - 8	X	X	X			X				X	X	Excavator	
AOC 14 - Railroad Debris Site															
AOC14-1	9/30/08	0 - 0.5	X	X	X	X					X	X		Rotosonic	
AOC14-1	9/30/08	2 - 3	X	X	X					X				Rotosonic	
AOC14-1	9/30/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X						Rotosonic	
AOC14-2	9/30/08	0 - 0.5	X	X	X	X					X	X		Rotosonic	
AOC14-2	10/1/08	0.5 - 1.5	X	X	X			X				X		Hand Tools	White powder material was observed and sampled.
AOC14-2	9/30/08	2 - 3	X	X	X					X		X		Rotosonic	

TABLE B-1

Field Activities Summary Table and Deviations from Draft Work Plan

RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report

Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]											
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**
AOC14-2	9/30/08	5 - 6	X	X	X			X						Rotosonic	An SPLP extraction was performed, and leachate was analyzed for total and hexavalent chromium.
AOC14-2	9/30/08	9 - 10	X	X	X			X				X		Rotosonic	
AOC14-2	9/30/08	14 - 15	X	X	X			X						Rotosonic	
AOC14-3	10/1/08	0 - 0.5	X	X	X	X					X			Rotosonic	
AOC14-3	10/1/08	2 - 3	X	X	X					X				Rotosonic	
AOC14-3	10/1/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X						Rotosonic	
AOC14-4	10/1/08	0 - 0.5	X	X	X	X					X			Rotosonic	
AOC14-4	10/1/08	2 - 3	X	X	X					X				Rotosonic	
AOC14-4	10/1/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X						Rotosonic	
AOC14-5	10/2/08	0 - 0.5	X	X	X	X					X			Rotosonic	
AOC14-5	10/2/08	2 - 3	X	X	X					X		X		Rotosonic	
AOC14-5	10/2/08	5 - 6 and 9 - 10	X	X	X			X						Rotosonic	
AOC14-5	10/2/08	14 - 15	X	X	X			X				X		Rotosonic	
AOC14-6	10/2/08	0 - 0.5	X	X	X				X					Rotosonic	
AOC14-6	10/2/08	2 - 3, 5 - 6, 9 - 10, and 14 - 15	X	X	X			X						Rotosonic	
AOC14-7	10/2/08	0 - 0.5	X	X	X	X					X			Rotosonic	
AOC14-7	10/2/08	2 - 3	X	X	X					X				Rotosonic	
AOC14-7	10/2/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X						Rotosonic	
AOC14-8	10/2/08	0 - 0.5	X	X	X	X					X			Rotosonic	
AOC14-8	10/2/08	2 - 3	X	X	X					X				Rotosonic	
AOC14-8	10/2/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X						Rotosonic	
AOC14-9	10/1/08	0 - 0.5	X	X	X				X					Rotosonic	
AOC14-9	10/1/08	2 - 3	X	X	X			X				X		Rotosonic	
AOC14-9	10/1/08	5 - 6, 5 - 6, 9 - 10, and 14 - 15	X	X	X			X						Rotosonic	
AOC14-10	10/1/08	0 - 0.5	X	X	X	X					X			Rotosonic	
AOC14-10	10/1/08	2 - 3, 5 - 6, 9 - 10, and 14 - 15	X	X	X					X				Rotosonic	
AOC14-11	10/1/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X						Rotosonic	
AOC14-12	9/30/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X				X		Rotosonic	
AOC14-13	10/1/2008	3 - 3.25	X	X	X			X				X		Hand Tools	White debris was observed and sampled.
AOC14-13	9/30/08	5 - 6, 9 - 10, and 14 -15	X	X	X			X				X		Rotosonic	An SPLP extraction was performed on the soil sample collected at 5-6 ft bgs, and leachate was analyzed for total and hexavalent chromium.
AOC14-SS-1	10/1/08	0 - 0.5	X	X	X				X			X		Rotosonic	
AOC14-SS-1	10/1/08	2 - 3	X	X	X			X				X		Rotosonic	
AOC14-SS-1	10/1/08	5 - 6	X	X	X			X				X		Rotosonic	
AOC14-SS-1	10/1/08	9 - 10 and 14 - 15	X	X	X			X						Rotosonic	

TABLE B-1

Field Activities Summary Table and Deviations from Draft Work Plan

RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report

Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	Sample Date	Sample Depth (ft bgs)	Metals	Hexavalent Chromium	PAHs	PCBs	Pesticides	VOCs, SVOCs, TPH-purgable, and TPH-extractable	SVOCs and TPH-extractable	CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable	CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable	Asbestos	pH	Collection Method	Deviation from Draft Work Plan and Notes
AOC14-SS-2	10/1/08	0 - 0.5	X	X	X				X					Rotosonic	
AOC14-SS-2	10/1/08	2 - 3, 5 - 6, 9 - 10, and 14 - 15	X	X	X			X						Rotosonic	
AOC14-SS-3	10/2/08	0 - 0.5	X	X	X				X					Rotosonic	
AOC14-SS-3	10/2/08	2 - 3, 5 - 6, 9 - 10, and 14 - 15	X	X	X			X						Rotosonic	
AOC14-SS-4	10/2/08	0 - 0.5	X	X	X				X					Rotosonic	
AOC14-SS-4	10/2/08	2 - 3	X	X	X			X						Rotosonic	
AOC14-SS-4	10/2/08	5 - 6	X	X	X			X				X		Rotosonic	
AOC14-SS-4	10/2/08	9 - 10 and 14 - 15	X	X	X			X						Rotosonic	
UA 2 - Former 300 B Pipeline Liquids Tank															
UA2-300B-1	9/23/08	0 - 0.5	X	X	X	X					X			Hand Tools	
UA2-300B-1	9/23/08	0.5 - 1	X	X	X	X			X					Hand Tools	
UA2-300B-1	10/23/08	2.5 - 3	X	X	X	X				X				Hand Tools	
UA2-300B-1	10/23/08	5.5 - 6	X	X	X	X		X						Hand Tools	
UA2-300B-2	10/3/08	0 - 0.5 and 0.5 to 1	X	X	X	X			X					Direct-Push	
UA2-300B-2	10/3/08	2 - 3	X	X	X	X		X						Direct-Push	Refusal encountered at 5 ft bgs; not able to collect proposed soil sample at 5-6 ft bgs.
UA2-300B-3	10/3/08	0 - 0.5 and 0.5 to 1	X	X	X	X			X					Direct-Push	
UA2-300B-3	10/3/08	2 - 3 and 5 - 6	X	X	X	X		X						Direct-Push	
UA2-300B-4	10/3/08	0 - 0.5 and 0.5 to 1	X	X	X	X			X					Direct-Push	
UA2-300B-4	10/3/08	2 - 3	X	X	X	X		X						Direct-Push	Refusal encountered at 5 ft bgs; not able to collect proposed soil sample at 5-6 ft bgs.
UA2-300B-5	10/3/08	0 - 0.5	X	X	X	X					X			Direct-Push	
UA2-300B-5	10/3/08	0.5 - 1	X	X	X	X			X					Direct-Push	
UA2-300B-5	10/3/08	2 - 3	X	X	X	X				X				Direct-Push	Refusal encountered at 5.5 ft bgs; not able to collect proposed soil sample at 5-6 ft bgs.

Notes:

[a] Agencies requested that 10 percent of all soil samples collected in an AOC/SWMU be analyzed for the United States Environmental Protection Agency CLP TAL/TCL analytical suite.

AOC	Area of Concern
CLP TAL	United States Environmental Protection Agency Contract Laboratory Program Target Analyte List
CLP TCL	United States Environmental Protection Agency Contract Laboratory Program Target Compound List
ft bgs	feet below ground surface
NA	not applicable
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SPLP	synthetic precipitation leaching procedure
SVOC	semivolatile organic compounds

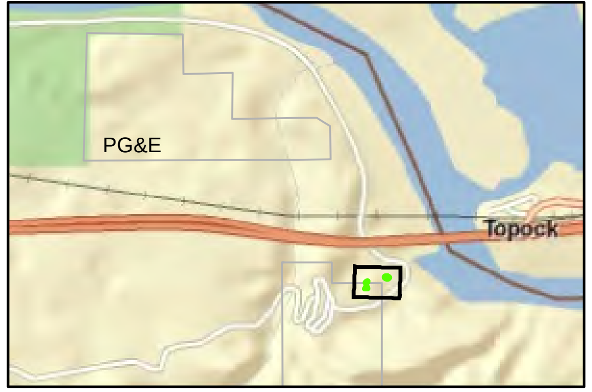
TABLE B-1
Field Activities Summary Table and Deviations from Draft Work Plan
RCRA Facility Investigation/Remedial Investigation Soil Investigation Part A, Phase I Data Gaps Evaluation Report
Pacific Gas and Electric, Topock Compressor Station, Needles, California

			Analytical Suite[a]												
Sample Location	**Sample Date**	**Sample Depth (ft bgs)**	**Metals**	**Hexavalent Chromium**	**PAHs**	**PCBs**	**Pesticides**	**VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**SVOCs and TPH-extractable**	**CLP TCL VOCs, SVOCs, TPH-purgable, and TPH-extractable**	**CLP TAL Metals, CLP TCL SVOCs and Pesticides, and TPH-extractable**	**Asbestos**	**pH**	**Collection Method**	**Deviation from Draft Work Plan and Notes**

SWMU	solid waste management unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compounds

Figures

VICINITY MAP



LEGEND

●	Boring
━	Trench
━	Transwestern Pipeline
━	Mojave Pipeline
━	PG&E Pipeline
━	SoCal Gas Pipeline
▢	Decontamination Pad & Equipment Storage Area
▢	AOC12 Boundary

AOC12a-T1a (08)
Year of Installation
Sample Location ID

FIGURE B-1
Sampling and Trench Locations for AOC12 - Fill Area

Soil Investigation Part A
Phase I Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2009\AOC12\AOC12_SAMPLOCS_WP.MXD BKAHLER 9/13/2010 16:27:08

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FIGURE B-2
Debris Surface Mapping and Sampling/Trench Locations for AOC4 - Debris Ravine

Soil Investigation Part A,
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

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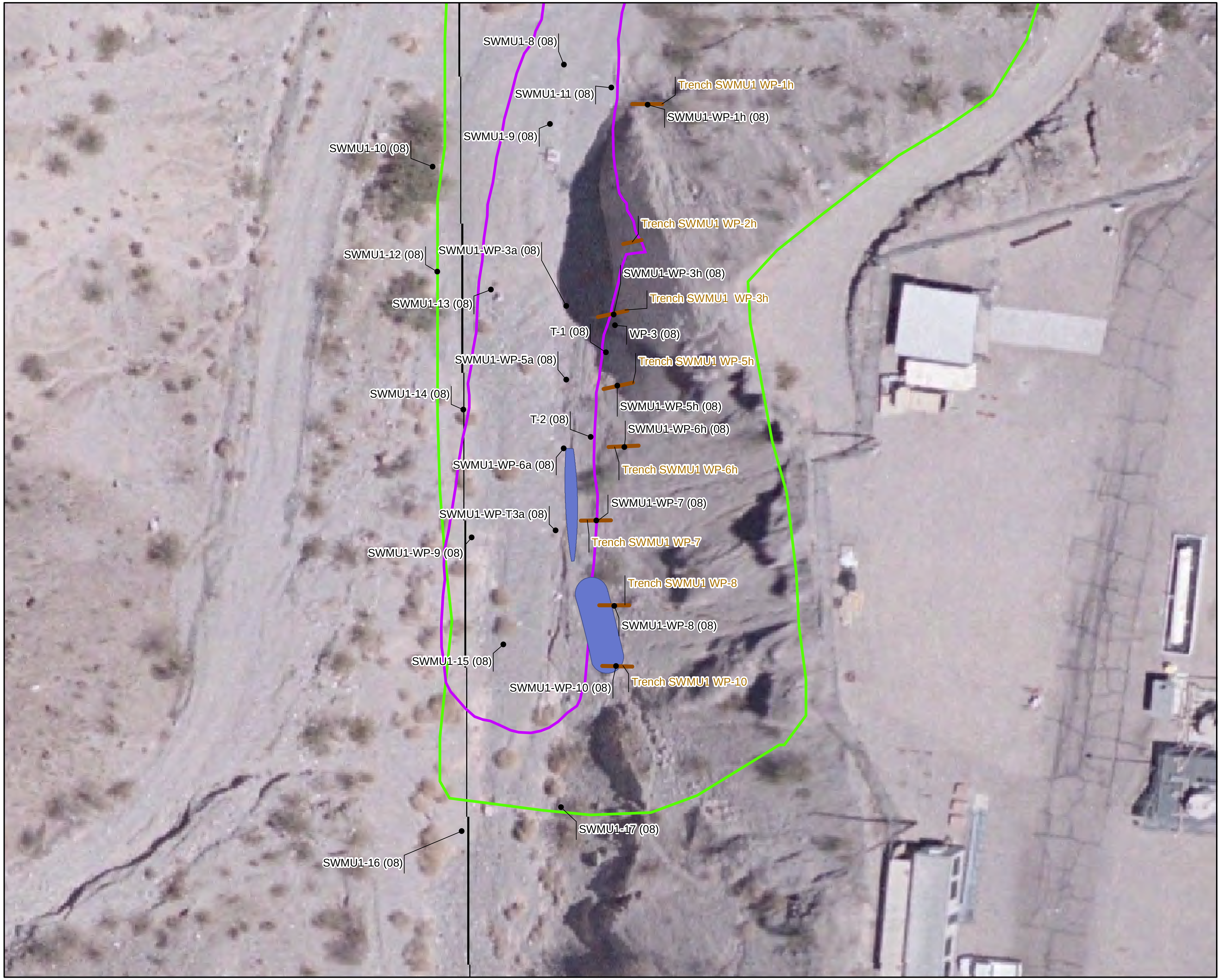
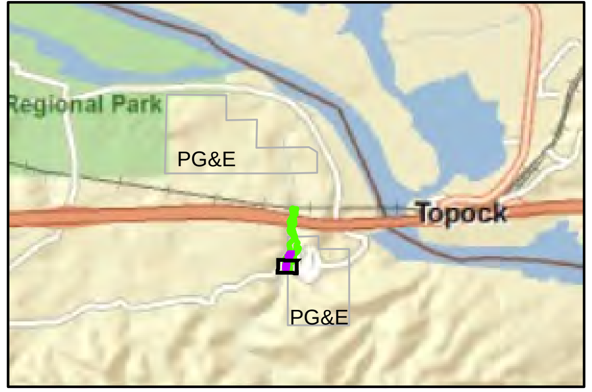
Note:
Topographic contours shown are in 2 foot intervals.

FIGURE B-3
White Powder and Debris in AOC 10

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



VICINITY MAP



LEGEND

- ● Boring
- ⊕ Monitoring Well
- ━ Approximate trench location and extent
- ● Approximate location of White Powder at ground surface before investigation (2008)
- ◯ SWMU 1 Boundary
- ◯ AOC 1 Boundary

SWMU1-6 (08)
Year of Installation
Sample Location ID

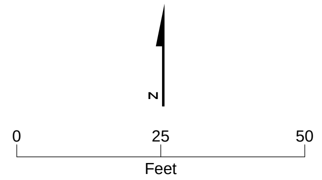


FIGURE B-4
White Powder Surface Mapping and Sampling/Trench Locations for SWMU1- Former Percolation Bed

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2009\SWM1AOC1\SWMU1_WHITEPOWDER.MXD BKAHLER 6/22/2010 16:22:43

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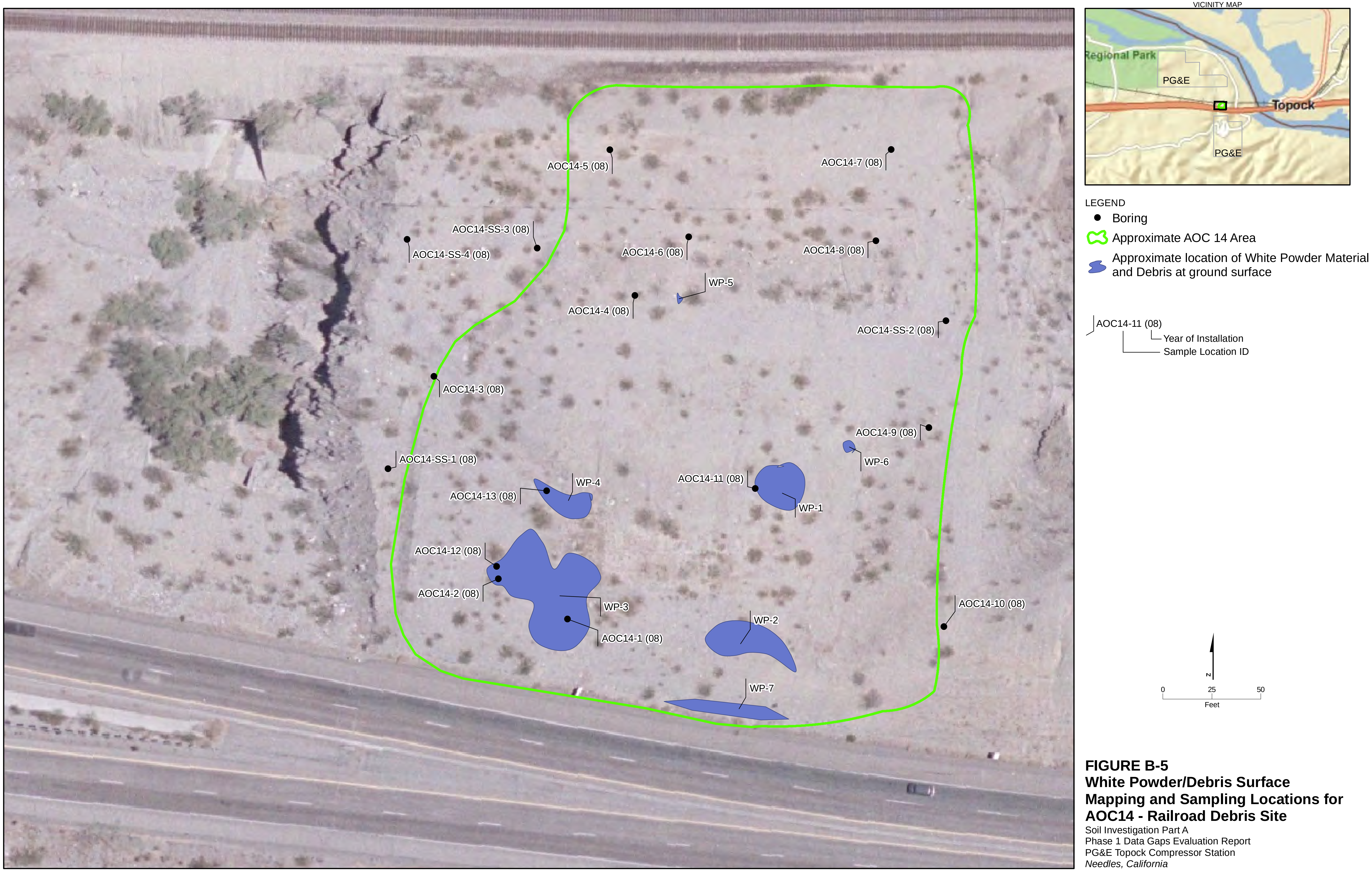

FIGURE B-5
White Powder/Debris Surface Mapping and Sampling Locations for AOC14 - Railroad Debris Site

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2009\AOC14\AOC14_SAMPLOCS_WPLOCS.MXD BKAHLER 6/22/2010 16:25:43

CH2MHILL

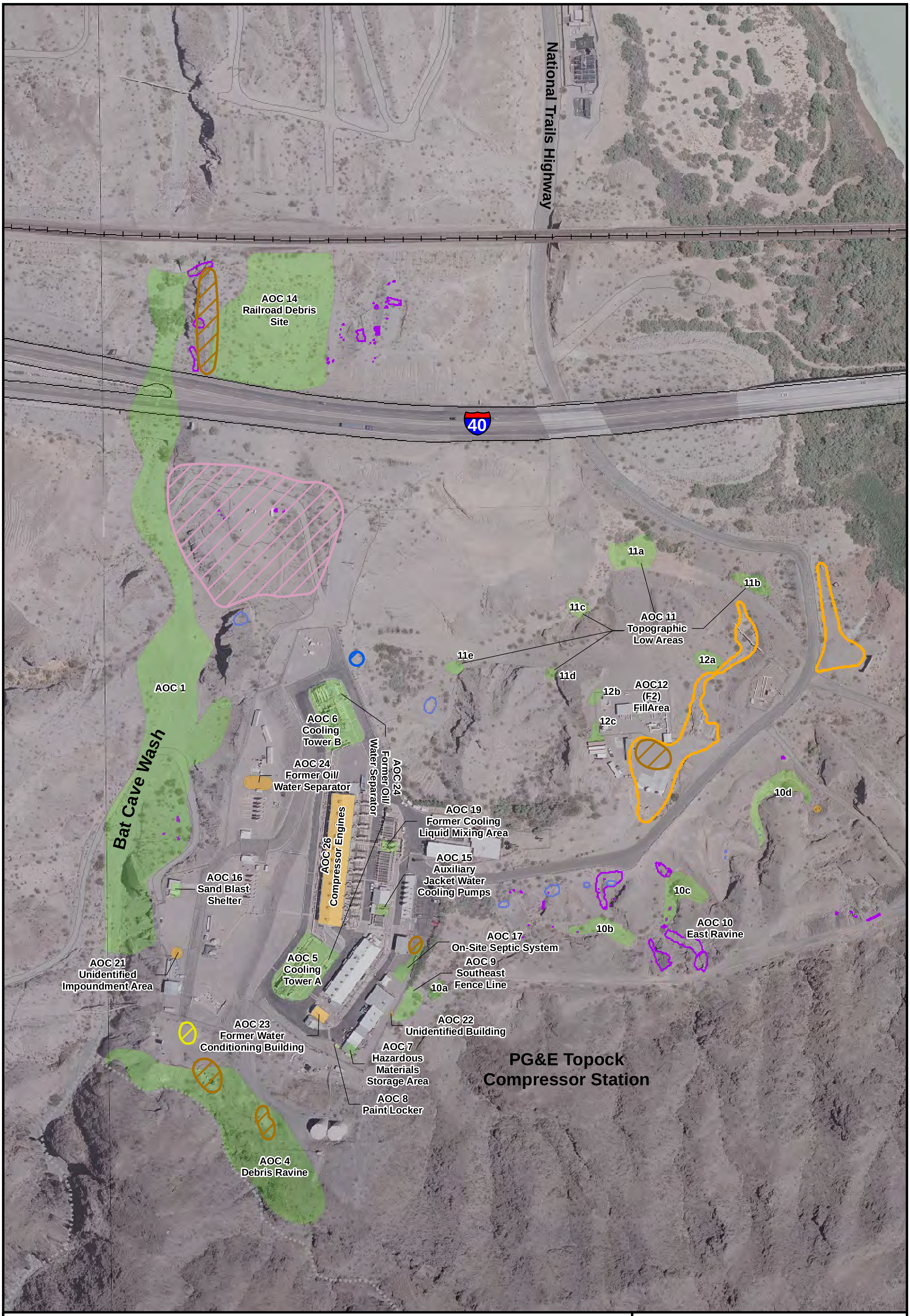

Figure B-6
New Areas of Debris, Potential White Powder Material, and Burning Areas

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

CH2MHILL

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2010\WASTEDISPOSAL_BURN_AREAS.MXD BKAHLER 9/9/2010 14:40:23

Attachment B1
Soil Boring and Trench Logs

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	BKG-01

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103426.5 N, 7610224.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 2:40:00 PM 9/18/2008 END : 3:15:00 PM 9/18/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0		SILTY SAND (SM) with gravel: yellowish brown (10YR 5/4), (15% gravel/50% sand/35% fines), poorly graded, predominantly fine-grained, highly angular, no dominant mineralogy, loosely consolidated, no apparent structure, dry, max clast size = 60mm.	Drill rate was steady and borehole was sound. Backfilled with hydrated medium bentonite chips.
				Total Depth at 3 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**BKG-02**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103261.6 N, 7611861.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 9:53:00 AM 9/18/2008 END : 10:00:00 AM 9/18/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (60% gravel/20% sand/20% fines), highly angular to angular, poorly graded, no dominant mineralogy, medium density, clast - supported, dry, max clast size = 60 mm.	Drill rate was steady and very quick. Borehole subject to slump. Backfilled with hydrated medium bentonite chips.
				SILTY SAND (SM): yellowish brown (10YR 5/6), (0% gravel/60% sand/40% fines), poorly graded, predominantly fine-grained sand, angular, predominantly quartz-based sand, loosely consolidated, no structure, dry, max clast size = 3 mm.	
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, angular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 30 mm.	
5		10.0			
				SAND (SP) with gravel and silt: yellowish brown (10YR 5/4), (30% gravel/50% sand/20% fines), poorly graded, angular to subangular, predominantly coarse-grained quartz and feldspar sands, loosely consolidated, no apparent structure, dry, max clast size = 30 mm.	
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	BKG-03

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103774.2 N, 7611992.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 11:00:00 AM 9/18/2008 END : 11:45:00 AM 9/18/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (60% gravel/20% sand/20% fines), highly angular to angular, poorly graded, no dominant mineralogy, medium density, clast - supported, dry, max clast size = 60 mm.	Drill rate sporadic but relatively quick. Borehole structure was sound. Backfilled with hydrated medium bentonite chips.
			☒	SILTY GRAVEL (GM) with sand: reddish brown (5YR 5/4), (40% gravel/30% sand/30% fines), angular, poorly graded, no dominant mineralogy, moderate density, matrix-supported, dry, max clast size=40mm.	
5		10.0	☒		
				POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/4), (60% gravel/30% sand/10% fines), angular to subrounded, no dominant mineralogy, moderate density, clast - supported, predominantly fine gravel, dry, max clast size = 20 mm.	
			☒	SANDY SILT (ML) with gravel: yellowish brown (10YR 5/4), (20% gravel/20% sand/60% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, sand predominantly fine-grained, matrix-supported, dry, max clast size=20mm.	
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **BKG-04**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102970.8 N, 7612655.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 1:40:00 PM 9/18/2008 END : 2:10:00 PM 9/18/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: reddish brown (5YR 5/4), (40% gravel/30% sand/30% fines), angular, poorly graded, no dominant mineralogy, moderate density, matrix-supported, dry, max clast size=40mm.	Drill rate constant; borehole structure was sound. Backfilled with hydrated medium bentonite chips.
			☒	SILTY SAND (SM) with gravel: yellowish brown (10YR 5/4), (20% gravel/50% sand/30% fines), poorly graded, predominantly fine-grained sand, angular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 30 mm.	
5		10.0	☒		
				SANDY SILT (ML): yellowish brown (10YR 5/4), (10% gravel/30% sand/60% fines), poorly graded, angular to subangular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size=30mm.	
			☒		
10				Total Depth at 10 ft below ground surface	
15					

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PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**BKG-05**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station   LOCATION : (2099655.6 N, 7611035.0 E)

ELEVATION : ft. ()   DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A   START : 10:40:00 AM 9/19/2008   END : 11:30:00 AM 9/19/2008   LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML) with sand: yellowish brown (10YR 5/4), (40% gravel/20% sand/40% fines), poorly graded, angular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size=30 mm.	Drill rate slow at 1.5-2 foot interval, then quick through remainder. Borehole integrity was sound. Backfilled with hydrated medium bentonite chips.
				SANDY SILT (ML): yellowish brown (10YR 5/4), (0% gravel/40% sand/60% fines), poorly graded, subangular, predominantly quartz-based sand, fine-grained, loosely consolidated, no apparent structure, dry.	
		6.0	☒	SANDY SILT (ML) with gravel: reddish brown (10YR 5/4), (30% gravel/30% sand/40% fines), poorly graded, angular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size=40mm.	
				POORLY GRADED SAND (SP): yellowish brown (10YR 5/4), (5% gravel/95% sand/0% fines), poorly graded, subangular to subrounded, predominantly fine-grained quartz, loosely consolidated, no apparent structure, dry, max clast size = 10mm.	
5			☒	SILTY SAND (SM): yellowish brown (10YR 5/4), (10% gravel/50% sand/40% fines), poorly graded, angular to subangular, predominantly quartz-based, loosely consolidated, no apparent structure, dry, max clast size = 20 mm.	
				Total Depth at 6 ft below ground surface	
10					
15					

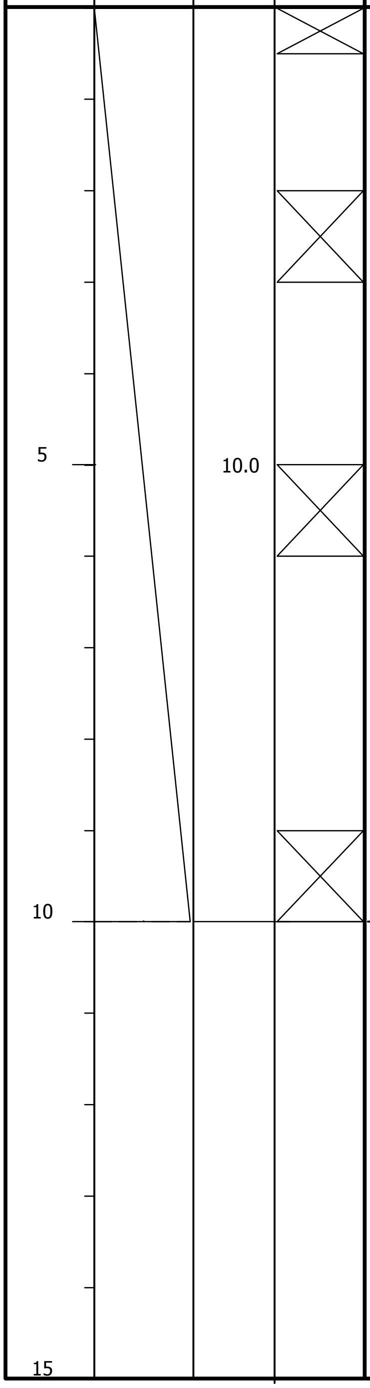
PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: BKG-06

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2100440.7 N, 7610913.5 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Boart Longyear
DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel
WATER LEVELS : N/A
START : 9:40:00 AM 9/19/2008
END : 10:20:00 AM 9/19/2008
LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0–10	SILTY SAND (SM): yellowish brown (10YR 5/4), (10% gravel/50% sand/40% fines), poorly graded, subangular, predominantly fine-grained quartz sand, loose to medium density, no apparent structure, dry, max clast size = 30mm.	Drill rate slow to start, quickening over time. Borehole integrity was sound. Backfilled with hydrated medium bentonite chips.
10	Total Depth at 10 ft below ground surface	



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PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: BKG-07

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2099749.8 N, 7612009.7 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A

START : 1:15:00 PM 9/19/2008

END : 1:57:00 PM 9/19/2008

LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILT (ML) with sand: yellowish brown (10YR 5/4), (10% gravel/20% sand/70% fines), poorly graded, angular to subangular, predominantly quartz (sand), loosely consolidated to moderate density, no apparent structure, dry, max clast size = 40 mm.	Drill rates increased in last 5 feet. Borehole integrity was sound. Backfilled with hydrated medium bentonite chips.
5		10.0		At 5 ft bgs: color change to reddish brown (5YR 5/4)	
				At 7 ft bgs: color change to yellowish brown (10YR 5/4)	
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	**BORING NUMBER:**
354948.FP.08.FW.SC	**BKG-08**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2099328.2 N, 7614303.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 10:00:00 AM 8/23/2008 END : 10:05:00 AM 8/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.0		SILTY SAND (SM): yellowish brown (10YR 5/6),(0% gravel/80% sand/20% fines), poorly graded, predominantly quartz sand, loosely consolidated, no structure, dry.	
				SILTY GRAVEL (GM) with sand, yellowish brown (10YR 5/8), (50% gravel/30% sand/20% fines), well-graded, angular, no dominant mineralogy, medium density, clast-supported, dry, max clast size=80 mm. gravel refusal below 2 ft bgs	
				Total Depth at 2 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	BKG-09

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2099663.2 N, 7614533.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 8:20:00 AM 8/23/2008 END : 8:30:00 AM 8/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.0	☒	SILTY GRAVEL (GM) with sand, yellowish brown (10YR 5/6), (50% gravel/20% sand/30% fines), well-graded, angular to subangular, no dominant mineralogy, medium density, clast-supported, dry, max clast size=50 mm.	
				Total Depth at 1 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**BKG-10**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2099206.6 N, 7613954.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 3:20:00 PM 9/19/2008 END : 3:55:00 PM 9/19/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.0		SILTY SAND (SM): yellowish brown (10YR 5/4), (20% gravel/50% sand/30% fines), poorly graded, angular, no dominant mineralogy, loose to medium density, no apparent structure, dry, max clast size = 70 mm.	Location bored using hand tools as it was more efficient than mobilizing drill rig to remote location. Borehole integrity was sound. Backfilled with native soil per instruction.
				Total Depth at 2 ft below ground surface	
5					
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **BKG-11**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2098691.8 N, 7613892.2 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A

START : 2:30:00 PM 9/19/2008

END : 3:00:00 PM 9/19/2008

LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.0		SILTY SAND (SM): yellowish brown (10YR 5/4), (20% gravel/50% sand/30% fines), poorly graded, angular, no dominant mineralogy, loose to medium density, no apparent structure, dry, max clast size = 70mm.	Drill rate was moderately slow. Borehole integrity was sound. Backfilled with hydrated medium bentonite chips.
				Total Depth at 2 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER:
354948.FP.08.FW.SC

BORING NUMBER:
BKG-12

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2102754.8 N, 7613604.7 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : N/A
DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools
WATER LEVELS : N/A
START : 9:25:00 AM 8/23/2008
END : 9:52:00 AM 8/23/2008
LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY SAND (SM): yellowish brown (10YR 5/6), (5% gravel/55% sand/40% fines), well graded, subangular to subrounded, predominantly quartz, loosely consolidated, no structure, dry, max clast size = 20mm.	
				SILTY GRAVEL (GM) with sand, brown (10YR 4/3), (60% gravel/20% sand/20% fines), well-graded, angular to subangular, no dominant mineralogy, medium density, clast-supported, dry, max clast size=60 mm.	
		6.0			
5				bedrock encountered at 6 ft bgs	
				Total Depth at 6 ft below ground surface	
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**BKG-13**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102835.8 N, 7613187.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 10:00:00 AM 9/20/2008 END : 10:35:00 AM 9/19/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: reddish brown (5YR 5/4), (50% gravel/20% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 70mm.	Drill rate steady and quick. Borehole integrity was sound. Backfilled with hydrated medium bentonite chips.
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose to medium density, matrix-supported, dry, max clast size = 40mm.	
5		10.0	☒		
				SANDY SILT (ML) with gravel: yellowish brown (10YR 5/4), (20% gravel/20% sand/60% fines), poorly graded, subrounded, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 30mm.	
			☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**BKG-14**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2103135.2 N, 7613297.1 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A

START : 8:45:00 AM 9/20/2008

END : 9:32:00 AM 9/20/2008

LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION	COMMENTS
				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 50mm.	Drill rate was quick and steady. Borehole integrity was sound. Backfilled with medium bentonite chips.
			☒	SANDY SILT (ML) with gravel: yellowish brown (10YR 5/4), (20% gravel/20% sand/60% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 20mm.	
5		10.0	☒		
			☒		
10				<u>Total Depth at 10 ft below ground surface</u>	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	BKG-15

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103127.1 N, 7614414.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 2:10:00 PM 9/20/2008 END : 2:50:00 PM 9/20/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SANDY SILT (ML) with gravel: reddish brown (5YR 5/4), (15% gravel/25% sand/60% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 40mm.	Drill rate was constant but slow between 9-10' bgs region. Hole integrity was sound. Backfilled with hydrated medium bentonite chips.
			☒	SILTY GRAVEL (GP) with sand: yellowish brown (10YR 5/4), (55% gravel/25% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, clast-supported, dry, max clast size = 40mm.	
5		10.0	☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 30mm.	
			☒		
10				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC	**BORING NUMBER:** BKG-16

SOIL BORING LOG

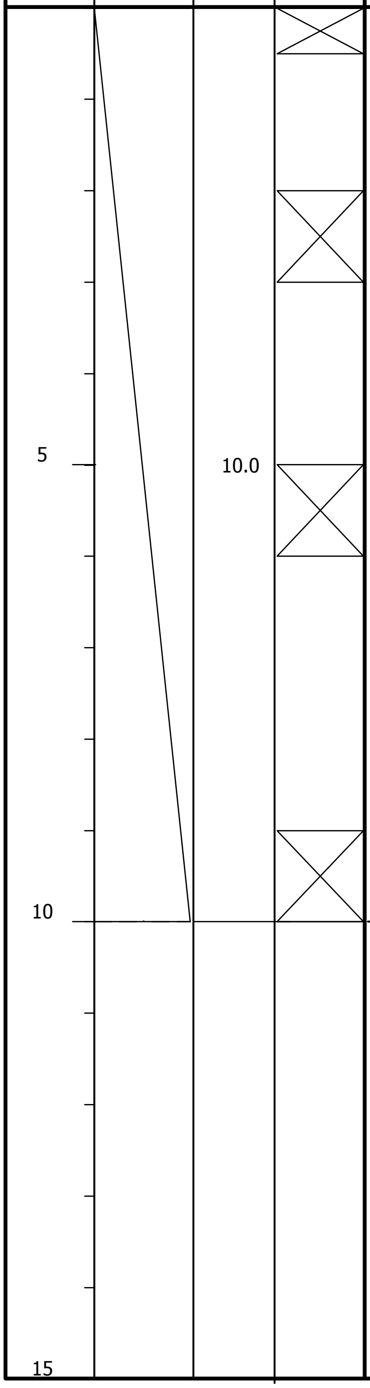
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103220.8 N, 7614565.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 1:39:00 PM 9/23/2008 END : 2:00:00 PM 9/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION



SILT (ML) with sand: yellowish brown (10YR 5/4), (10% gravel/10% sand/80% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 30mm.

Drill rate was quick and constant. Borehole integrity was sound. Backfilled with hydrated medium bentonite chips.

Total Depth at 10 ft below ground surface

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: BKG-17

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2102777.3 N, 7613658.7 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Boart Longyear
DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel
WATER LEVELS : N/A
START : 11:15:00 AM 9/20/2008
END : 12:14:00 PM 9/20/2008
LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: reddish brown (5YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loosely consolidated, matrix supported, dry, max clast size = 50mm.	Drill rates were steady. Borehole integrity was mostly sound; some slumps below 4.0 feet bgs. Borehole backfilled with hydrated medium bentonite chips.
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (60% gravel/20% sand/20% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loosely consolidated, clast-supported, dry, max clast size = 40mm.	
				SANDY SILT (ML) with gravel: yellowish brown (10YR 5/4), (20% gravel/20% sand/60% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 20mm.	
5		10.0			
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-1** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100919.3 N, 7614876.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 8:14:00 AM 10/16/2008 END : 8:25:00 AM 10/16/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4) (40% gravel /40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-2** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100875.9 N, 7614843.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 2:18:00 PM 10/15/2008 END : 2:30:00 PM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4) (40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	SWMU1-3 SHEET 1 OF 6

SOIL BORING LOG

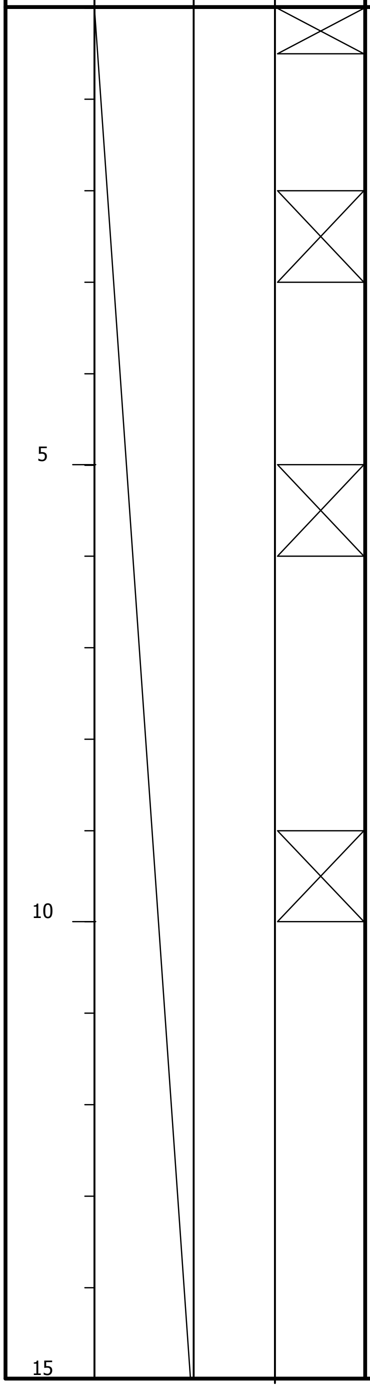
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100845.7 N, 7614831.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 77 ft bgs START : 10:24:00 AM 10/6/2008 END : 9:15:00 AM 10/7/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/3), (40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, clast/matrix-supported, dry, max clast size =50mm.	Drill rate steady. Borehole integrity sound. Backfilled with slurry grout. Objective is to reach groundwater.



PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-3** SHEET 2 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100845.7 N, 7614831.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 77 ft bgs START : 10:24:00 AM 10/6/2008 END : 9:15:00 AM 10/7/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
20			☒		
				POORLY GRADED GRAVEL(GP) with sand: brown (10YR 5/4), (60% gravel/40% sand/0% fines), poorly graded, subangular, no dominant mineralogy, loose density, clast-supported, dry, max clast size =40mm.	
25					
30			☒		

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: SWMU1-3

SHEET 3 **OF** 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2100845.7 N, 7614831.6 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Boart Longyear
DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel
WATER LEVELS : 77 ft bgs
START : 10:24:00 AM 10/6/2008
END : 9:15:00 AM 10/7/2008
LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: brown (10YR 5/3), (40% gravel/20% sand/40% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =30mm.	
				POORLY GRADED SAND (SP-SM) with silt and gravel: brown (10YR 5/3), (40% gravel/50% sand/10% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	
35					
			☒		
40		80.0		POORLY GRADED SAND (SP-SM) with silt: reddish brown (5YR 5/4), (10% gravel/80% sand/10% fines), poorly graded, subangular, no dominant mineralogy, predominantly fine grained sand, loose density, matrix-supported, dry, max clast size=10 mm.	
45					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	SWMU1-3 SHEET 4 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100845.7 N, 7614831.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 77 ft bgs START : 10:24:00 AM 10/6/2008 END : 9:15:00 AM 10/7/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (ML) with gravel: brown (10YR 5/3), (30% gravel/30% sand/40% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=20 mm.	
50				SILTY SAND (SM): reddish brown (5YR 4/4), (10% gravel/70% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=20mm.	
55					
			☒		
60					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	SWMU1-3 SHEET 5 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100845.7 N, 7614831.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 77 ft bgs START : 10:24:00 AM 10/6/2008 END : 9:15:00 AM 10/7/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					Drilling stopped 10/6/08 at 16:30. Drilling resumed 10/7/08 at 08:05.
65					
70			☒	SANDY SILT (ML): reddish brown (5YR 4/4)(10% gravel/20% sand/70% fines), poorly graded, subangular to subrounded, no dominant mineralogy but larger clay component, loose to medium density, matrix-supported, moist, max clast size=10mm. 70 ft bgs: weathered bedrock.	
75					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	SWMU1-3 SHEET 6 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100845.7 N, 7614831.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 77 ft bgs START : 10:24:00 AM 10/6/2008 END : 9:15:00 AM 10/7/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY SAND (SM): dark reddish brown (5YR 3/3), (10% gravel/70% sand/20% fines), poorly graded, subangular to subrounded, no dominant mineralogy, predominantly medium-grained sand, loose density, matrix-supported, saturated, max clast size=10mm. 77 ft bgs: groundwater encountered.	
			☒	Total Depth at 80 ft below ground surface	
80					
85					
90					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-4** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100786.2 N, 7614796.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 1:30:00 PM 10/15/2008 END : 1:56:00 PM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL(GM) with sand: yellowish brown (10YR 5/4)(40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5			☒		
		14.0	☒		
10			☒		
			☒	Total Depth at 14 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-5**	**SHEET 1 OF 2**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100808.4 N, 7614826.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 9:54:00 AM 10/15/2008 END : 10:35:00 AM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL(GM) with sand: yellowish brown (10YR 5/4), (40% gravel/40% sand/20% fines), poorly graded, no dominant mineralogy, subangular, loose density, matrix-supported, dry, max clast size =50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
			☒		
10		20.0			
			☒		
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-5** **SHEET 2 OF 2**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100808.4 N, 7614826.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 9:54:00 AM 10/15/2008 END : 10:35:00 AM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				Total Depth at 20 ft below ground surface	
20					
25					
30					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-6** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100747.0 N, 7614782.8 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 12:58:00 PM 10/15/2008 END : 1:10:00 PM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL(GM) with sand: yellowish brown (10YR 5/4), (40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50 mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-7** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100742.0 N, 7614810.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 8:00:00 AM 10/15/2008 END : 8:18:00 AM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL(GM) with sand: yellowish brown (10YR 5/4), (40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-8** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100703.7 N, 7614783.8 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 9:16:00 AM 10/15/2008 END : 12:04:00 AM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50 mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-9** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100683.9 N, 7614779.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 2:01:00 PM 10/14/2008 END : 2:19:00 PM 10/14/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	SWMU1-10 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100669.6 N, 7614740.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 1:32:00 PM 10/14/2008 END : 1:48:00 PM 10/14/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size = 50 mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5		10.0	☒		
10			☒	Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-11** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100695.9 N, 7614799.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 8:38:00 AM 10/15/2008 END : 8:54:00 AM 10/15/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand:yellowish brown (10YR 5/4), (40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-12**	**SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2100634.7 N, 7614741.6 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A

START : 9:43:00 AM 10/14/2008

END : 10:02:00 AM 10/14/2008

LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines),poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =50mm	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-13** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100628.6 N, 7614759.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 10:14:00 AM 10/14/2008 END : 10:29:00 AM 10/14/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown, (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size = 50 mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5		10.0			
10				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-14** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100588.6 N, 7614750.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 9:04:00 AM 10/14/2008 END : 9:19:00 AM 10/14/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size = 50 mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒	Total Depth at 10 ft below ground surface	
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-15** SHEET 1 OF 6

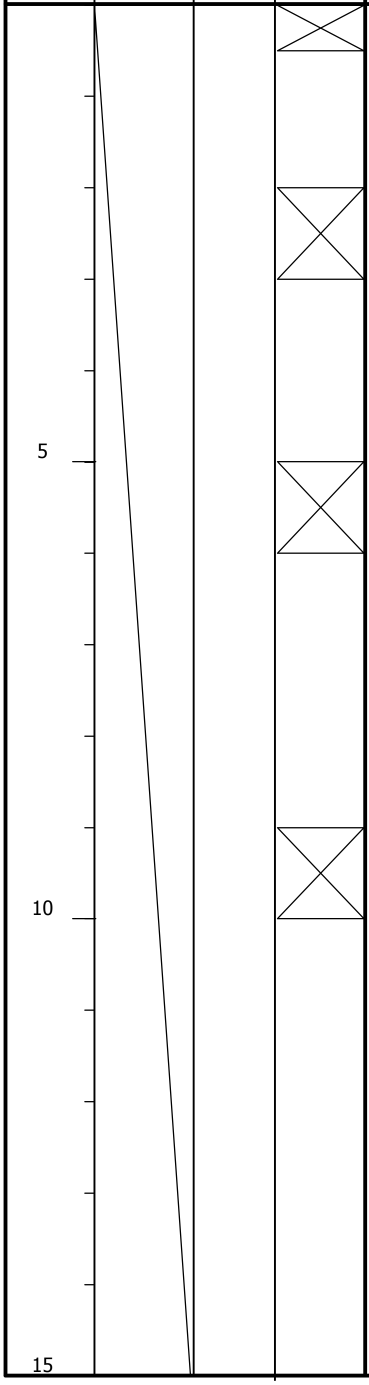
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100510.3 N, 7614763.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 80 ft bgs START : 8:49:00 AM 9/22/2008 END : 9:44:00 AM 9/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (50% gravel/10% sand/40% fines), poorly graded, subangular to angular, no dominant mineralogy, sand is fine-grained only, loose to medium density to five ft bgs, moderate to dense sand to 10 ft bgs, loose to medium density to 28 ft bgs, clast-or-matrix supported (varied), dry, max clast size =50mm.	Purpose of boring is to establish lithology to groundwater and/or to bedrock, not to exceed 100 ft bgs. Drill rates varied but met refusal at 90 feet bgs. Borehole integrity supplemented by 6" steel casing. Casing advanced to 70 ft bgs by end of 9/22/08 while boring advanced to 80 feet bgs by end of 9/22/08. Borehole caved in below 70 ft bgs by start of day 9/23/08. Water encountered at 80 ft bgs. Nearby well yielded groundwater level of 78 ft bgs. No presence of dark reddish-brown miocene conglomerate at this location. bedrock is granitic in nature.

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-15** SHEET 2 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100510.3 N, 7614763.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 80 ft bgs START : 8:49:00 AM 9/22/2008 END : 9:44:00 AM 9/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
20		
25		
	SILT (ML): reddish brown (5YR 5/4)(10% gravel/10% sand/80% fines), poorly graded, subangular, no dominant mineralogy, loose to medium density, matrix-supported, dry, max clast size=40mm.	
30		

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-15** SHEET 3 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100510.3 N, 7614763.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 80 ft bgs START : 8:49:00 AM 9/22/2008 END : 9:44:00 AM 9/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION	COMMENTS
				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILT (ML) with sand: yellowish brown (10YR 5/4)(10% gravel/10% sand/80% fines), poorly graded, subangular, no dominant mineralogy, loose to medium density, matrix-supported, dry, max clast size=80mm.	
35					
				SILTY GRAVEL (GM): reddish brown (5YR 5/4), (50% gravel/10% sand/40% fines), poorly graded, subangular to angular, no dominant mineralogy, loose to medium density, clast-or-matrix supported (varied), dry, max clast size =80mm.	
			☒		
40					
45					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-15** SHEET 4 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100510.3 N, 7614763.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 80 ft bgs START : 8:49:00 AM 9/22/2008 END : 9:44:00 AM 9/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		90.0			
			☒	POORLY GRADED GRAVEL (GP-GM) with silt and sand: reddish brown (5YR 5/4)(50% gravel/40% sand/10% fines), poorly graded, angular to subangular, no dominant mineralogy, loose to medium density, clast-or-matrix supported (varied), dry, max clast size =40mm.	
50				SILT (ML) with sand: reddish brown (5YR 4/3), (0% gravel/25% sand/75% fines), poorly graded, angular to subangular, no dominant mineralogy, predominantly fine-grained sand, loose to medium density, matrix-supported, dry, max clast size =80 mm.	
55				SILTY GRAVEL (GM) with sand: reddish brown (5YR 5/4), (30% gravel/40% sand/30% fines), poorly graded, angular to subangular, no dominant mineralogy, fine-grained sand, loose to medium density, matrix-supported, dry, max clast size = 80 mm.	
60			☒		

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: SWMU1-15 **SHEET** 5 **OF** 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100510.3 N, 7614763.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 80 ft bgs START : 8:49:00 AM 9/22/2008 END : 9:44:00 AM 9/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
65					
			☒	SILTY GRAVEL (GM) with sand: reddish brown (5YR 4/3), (30% gravel/40% sand/30% fines), poorly graded, subangular, no dominant mineralogy, fine-to medium grained sand, loose to medium density, matrix-supported, dry, max clast size = 50 mm.	
70					
				SILT (ML) with sand: brown (7.5YR 4/3), (10% gravel/10% sand/80% fines), higher content of clay, poorly graded, subangular to highly angular, no dominant mineralogy, soft clay and loose density, sand and silt, matrix-supported, moist, max clast size = 100 mm.	
75					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-15** SHEET 6 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100510.3 N, 7614763.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : 80 ft bgs START : 8:49:00 AM 9/22/2008 END : 9:44:00 AM 9/23/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
80			☒		
				Bedrock (BR): granitic, fragments are highly angular; presence of rock dust, brittle from 81.0-85.0 feet bgs.	
85					
90			☒	Total Depth at 90 ft below ground surface	

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-16** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100448.0 N, 7614749.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 10:35:00 AM 9/21/2008 END : 11:36:00 AM 9/21/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	POORLY GRADED GRAVEL (GP-GM): with silt and sand: yellowish brown (10YR 5/4),(55% gravel/35% sand/10% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loosely consolidated, clast-supported, dry, max clast size= 80mm.	Drill rate quick up to 7 ft bgs zone where drill rig encountered a granite boulder. Moved rig approximately 2.0 feet due south and encountered granite boulder at 8.5 feet bgs. Borehole integrity was sound. Backfilled borehole with hydrated medium bentonite chips.
			☒		
		9.0			
5			☒		
				Total Depth at 9 ft below ground surface 8.5 feet bgs: granite boulder encountered, refusal at 9.0 feet bgs.	
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-17** **SHEET 1 OF 1**

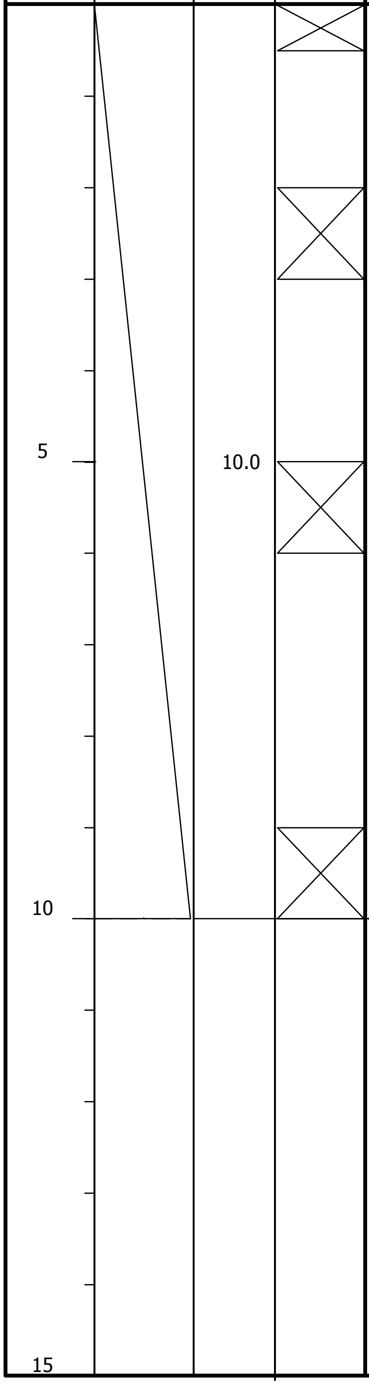
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100456.0 N, 7614782.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 9:23:00 AM 9/21/2008 END : 10:07:00 AM 9/21/2008 LOGGER : A. Brewster



DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (50% gravel/15% sand/35% fines), poorly graded, subangular, no dominant mineralogy, loosely consolidated, clast-supported, dry, max clast size=50 mm.	Drill rate slow at approx 1.5 bgs, otherwise quick. Borehole integrity was sound. Borehole backfilled with hydrated medium bentonite chips.
	Total Depth at 10 ft below ground surface	

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-WP-3a** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100623.2 N, 7614784.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 10:50:00 AM 10/14/2008 END : 11:15:00 AM 10/14/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size = 50 mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
		14.0			
10					
				Total Depth at 14 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-WPt-3a** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100548.3 N, 7614781.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 8:15:00 AM 10/5/2008 END : 8:45:00 AM 10/5/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				GRAVELLY SILT (ML): greyish brown (2.5Y 5/2), (30% gravel/10% sand/60% fines), poorly graded, subangular to subrounded, no dominant miineralogy, loose density 0-1 ft bgs, medium density 1- 5 ft bgs, loose density 5-14 ft bgs, matrix-supported, dry, max clast size= 50 mm.	Drill rate quick, constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
		14.0			
10					
				Total Depth at 14 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-WP-5a** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100598.6 N, 7614784.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 10:53:00 AM 10/5/2008 END : 11:22:00 AM 10/5/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				GRAVELLY SILT (ML): greyish brown (2.5Y 5/2), (30% gravel/10% sand/60% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density 0-1 ft bgs, medium density 1- 5 ft bgs, loose density 5-14 ft bgs, matrix-supported, dry, max clast size 50mm.	Drill rate quick, constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
		14.0			
10					
				Total Depth at 14 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **SWMU1-WP-6a** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100575.6 N, 7614783.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4" core barrel

WATER LEVELS : N/A START : 9:20:00 AM 10/5/2008 END : 10:20:00 AM 10/5/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML): greyish brown (2.5Y 5/2), (30% gravel/10% sand/60% fines), poorly graded, subangular to subrounded, no dominant miineralogy, loose density 0-1 ft bgs, medium density 1- 5 ft bgs, loose density 5-14 ft bgs, matrix-supported, dry, max clast size =50mm.	Drill rate quick, constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5			☒		
		14.0	☒		
			☒		
10					
			☒		
			☒	Total Depth at 14 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**SWMU1-WP-09** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100545.9 N, 7614753.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : ,

WATER LEVELS : N/A START : 1:30:00 PM 9/21/2008 END : 2:20:00 PM 9/21/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM): with sand: yellowish brown (10YR 5/4),(50% gravel/25% sand/25% fines), poorly graded, angular to subangular, no dominant mineralogy, loosely consolidated, clast-supported, dry, max clast size=50mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
		14.0			
10					
				Total Depth at 14 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-BCW-01** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103160.4 N, 7614783.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 3:40:00 PM 9/20/2008 END : 5:00:00 PM 9/20/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION	COMMENTS
				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML) with sand: yellowish brown (10YR 5/4), (25% gravel/20% sand/55% fines), poorly graded, subrounded, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 20mm.	Drill rate quick in ML zone; met refusal at 5.5 bgs at original location. Relocated approx 2 feet due west and met refusal at 5.5 bgs. Recovered core from 5.5' bgs yielded solid granite core.
		5.5	☒		
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4). (65% gravel/10% sand/25% fines), poorly graded, subrounded to rounded, no dominant mineralogy, loosely consolidated, clast-supported, dry, max clast size = boulder.	
5					
				Boring terminated at 5.5 feet bgs due to presence of granite boulder at 5.0 feet bgs.	
				<u>Total Depth at 5.5 ft below ground surface</u>	
10					
15					

PROJECT NUMBER: 354948.FP.08.FW.SC	**BORING NUMBER:** AOC1-BCW-02 **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103958.3 N, 7614565.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 10:17:00 AM 10/4/2008 END : 10:37:00 AM 10/4/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				POORLY GRADED SAND (SP) with gravel: yellowish brown (10YR 5/4), (25% gravel/70% sand/5% fines), subangular to subrounded, no dominant mineralogy, loose density, matrix-supported, fining-upwards, dry 0-9 ft bgs, moist 9-10 ft bgs, max clast size=30 mm.	Drill rate quick, constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5		10.0			
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-BCW-03** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2104023.1 N, 7614559.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 11:09:00 AM 10/4/2008 END : 11:23:00 AM 10/4/2009 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	POORLY GRADED SAND (SP) with gravel: yellowish brown (10YR 5/4), (25% gravel/70% sand/5% fines), subangular to subrounded, no dominant mineralogy, loose density, matrix-supported, fining-upwards, dry 0-9 ft bgs, moist 9-10 ft bgs, max clast size=30 mm.	Drill rate quick, constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒		
10				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-BCW-04** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103860.8 N, 7614623.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 8:40:00 AM 10/4/2008 END : 9:00:00 AM 10/4/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	POORLY GRADED SAND (SP) with gravel: yellowish brown (10YR 5/4), (25% gravel/70% sand/5% fines), subangular to subrounded, no dominant mineralogy, loose density, matrix-supported, fining-upwards, dry 0-9 ft bgs, moist 9-10 ft bgs, max clast size=30 mm.	Drill rate quick, constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-BCW-05** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2103912.3 N, 7614606.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 9:20:00 AM 10/4/2008 END : 9:40:00 AM 10/4/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	POORLY GRADED SAND (SP) with gravel: yellowish brown (10YR 5/4), (25% gravel/70% sand/5% fines), subangular to subrounded, no dominant mineralogy, loose density, matrix-supported, fining-upwards, dry 0-9 ft bgs, moist 9-10 ft bgs, max clast size=30 mm.	Drill rate quick, constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-BCW-06** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2104445.4 N, 7615013.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR :

DRILLING METHOD AND EQUIPMENT : hand auger, hand tools

WATER LEVELS : 1.8 ft bgs START : 2:00:00 PM 8/22/2008 END : 2:46:00 PM 8/22/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM): brown, (10YR 4/3), (0% gravel/80% sand/20% fines), poorly graded, medium density, finely laminated, moist, presence of plant roots.	
		4.2	☒	SILTY SAND (SM): very dark gray, (10YR 3/1), (0% gravel/80% sand/20% fines), poorly graded, very loosely consolidated, no structure, saturated (underwater), presence of plant roots, soil is stained black with organics.	
				POORLY GRADED SAND (SP-SM) with silt and gravel: brown (10YR 4/3), (30% gravel, 60% sand, 10% fines), poorly graded, rounded to subrounded, no dominant mineralogy, loosely consolidated, no structure, saturated, max clast size =50 mm.	
				4.2 feet below ground surface: COBBLES, max clast size =190 mm, rounded to well-rounded.	
5					
				Total Depth at 4.2 ft below ground surface	
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T1a** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100989.8 N, 7614836.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 10:13:00 AM 10/16/2008 END : 10:47:00 AM 10/16/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4) (40% gravel /40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5		10.0			
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T1b SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2100966.9 N, 7614885.6 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Boart Longyear
DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel
WATER LEVELS : N/A
START : 10/16/2008
END : 10/16/2008
LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4) (40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
					Boulder encountered at 8.5 ft. bgs.
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T1c SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100944.8 N, 7614934.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 9:48:00 AM 10/16/2008 END : 9:58:00 AM 10/16/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4)(40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC1-T2a** **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101093.5 N, 7614885.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 11:08:00 AM 10/16/2008 END : 11:22:00 AM 10/16/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4)(40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:
354948.FP.08.FW.SC

BORING NUMBER:
AOC1-T2b
SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2101106.8 N, 7614919.9 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Boart Longyear
DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel
WATER LEVELS : N/A
START : 1:07:00 PM 10/16/2008
END : 1:20:00 PM 10/16/2008
LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4)(40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5		10.0			
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	**BORING NUMBER:**	
354948.FP.08.FW.SC	**AOC1-T2c**	**SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101119.9 N, 7614969.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 11:16:00 AM 10/8/2008 END : 11:32:00 AM 10/8/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4)(40% gravel/30% sand/30% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips
			☒		
5		10.0	☒		
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T2d SHEET 1 OF 6

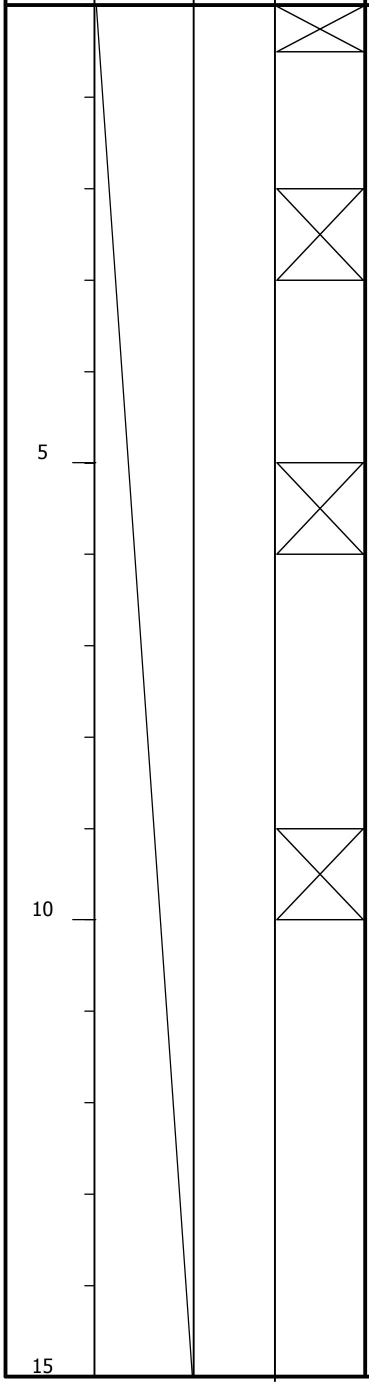
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101069.3 N, 7614920.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : 72 ft bgs START : 1:05:00 PM 10/7/2008 END : 9:50:00 AM 10/8/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	POORLY GRADED SAND (SP-SM) with silt: yellowish brown (10YR 5/4), (10% gravel/80% sand/10% fines), poorly graded, subangular to subrounded, no dominant mineralogy, predominantly fine-to-medium grained sand, loose density, matrix-supported, dry, max clast size=40 mm.	Drill rate steady. Borehole integrity sound. Backfilled with slurry grout. Objective is to reach groundwater.

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T2d SHEET 2 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101069.3 N, 7614920.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : 72 ft bgs START : 1:05:00 PM 10/7/2008 END : 9:50:00 AM 10/8/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft) / INTERVAL (ft) / RECOVERY (ft) / SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	16.0-25.0 feet bgs: color change to brown (7.5YR 5/3).	
20		
25	25.0-60.0 feet bgs: color change to yellowish brown (10YR 5/4).	
30		

CH2MHILL	**PROJECT NUMBER:** **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC1-T2d** **SHEET** 3 **OF** 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101069.3 N, 7614920.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : 72 ft bgs START : 1:05:00 PM 10/7/2008 END : 9:50:00 AM 10/8/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
35					
		75.0			
			☒		
40					
45					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T2d** SHEET 4 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101069.3 N, 7614920.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : 72 ft bgs START : 1:05:00 PM 10/7/2008 END : 9:50:00 AM 10/8/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒		
50					Drilling stopped 10/7/08 at 16:10. Drilling resumed 10/8/08 at 07:40.
55					
			☒		
60					

PROJECT NUMBER:
354948.FP.08.FW.SC

BORING NUMBER:
AOC1-T2d **SHEET 5 OF 6**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101069.3 N, 7614920.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : 72 ft bgs START : 1:05:00 PM 10/7/2008 END : 9:50:00 AM 10/8/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				60.0-70.0 feet bgs: color change to brown (7.5YR 5/2).	
65					
			☒		
70				SANDY SILT (ML): brown (7.5YR 5/2), (10% gravel/25% sand/65% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose to medium density, matrix-supported, saturated/moist, max clast size=10 mm.	
				72.0 feet bgs: groundwater encountered.	
75					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T2d SHEET 6 OF 6

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101069.3 N, 7614920.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : 72 ft bgs START : 1:05:00 PM 10/7/2008 END : 9:50:00 AM 10/8/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				Total Depth at 75 ft below ground surface	
80					
85					
90					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T2e** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101201.7 N, 7614932.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 1:45:00 PM 10/16/2008 END : 2:00:00 PM 10/16/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4)(40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC1-T3a

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2101328.9 N, 7614894.6 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A

START : 8:49:00 AM 10/17/2008

END : 9:00:00 AM 10/17/2008

LOGGER : A. Brewster

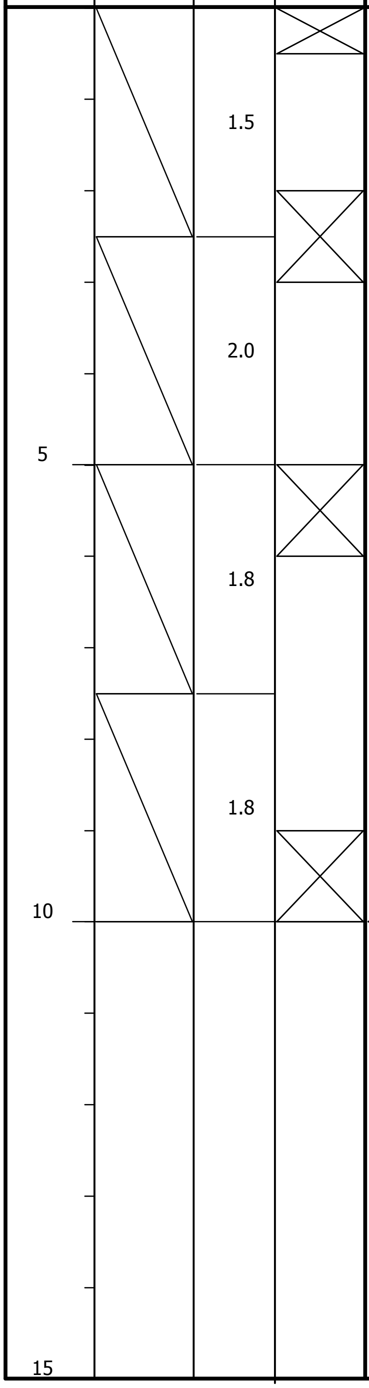
DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4)(40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5		10.0			
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T3b-1 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2101331.3 N, 7614924.5 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.
DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig
WATER LEVELS : N/A
START : 11:00:00 AM 10/5/2008
END : 12:30:00 PM 10/5/2008
LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION



GRAVELLY SILT with sand (ML) pale brown (7.5YR 6/3), dry, no odor, poorly sorted (30% gravel/20% sand/50% fines) max diameter=6 cm, angular to subangular, metamorphic.

Refusal at 10 ft. bgs. Will direct sonic rig to drill this location to collect entire sample set. Backfilled with hydrated bentonite chips.

Total Depth at 10 ft below ground surface

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T3b-2** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101331.3 N, 7614924.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/4 core barrel

WATER LEVELS : N/A START : 7:56:00 AM 10/17/2008 END : 8:26:00 AM 10/17/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4)(40% gravel/40% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=40mm.	Drill rate constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5		10.0	☒		
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC1-T3c **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101338.1 N, 7614947.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 9:00:00 AM 10/5/2008 END : 10:55:00 AM 10/5/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.3		SANDY SILT with gravel (ML): pale brown (7.5YR 6/3), dry, no odor, poorly sorted (15% gravel/30% sand/55% fines) max diameter =5cm, angular to subangular, metamorphic. 2.0-10.0 feet bgs: very gravelly and abundant cobbles.	Very difficult drilling from 2 to 10 ft bgs. Drilled 10 borings in attempt to collect sufficient soil volume for sample jars. Only advanced one boring to 10 ft bgs. Not enough soil volume for complete sample set. Backfilled with hydrated bentonite chips.
		2.0			
5		2.0			
		1.3			
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T4a** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101472.0 N, 7614838.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 2:50:00 PM 10/3/2008 END : 4:10:00 PM 10/3/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.5	☒ ☒	SANDY SILT(ML): light brown (7.5YR 6/4), dry, no odor,(5% gravel/40% sand/55% fines) max diameter =6 cm, angular to subangular, metamorphic.	Hand auger to 1 ft before refusal. Drilled two borings to collect sufficient soil volume to fill sample jars. Borings drilled approximately 1.5 ft apart. Had two other attempts that had refusal at 2 ft and 3 ft bgs. Backfilled with hydrated bentonite chips.
		2.0		4.0-7.0 feet bgs: becomes more coarse (15% gravel/30% sand/55% fines)	
5		2.5	☒	7.0-8.0 feet bgs: more fine interval (5% gravel/30%sand/65% fines)	
		2.0	☒	8.5-10.0 feet bgs: more coarse interval (10% gravel/30%sand/60% fines)	
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC1-T4b

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2101478.3 N, 7614863.0 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

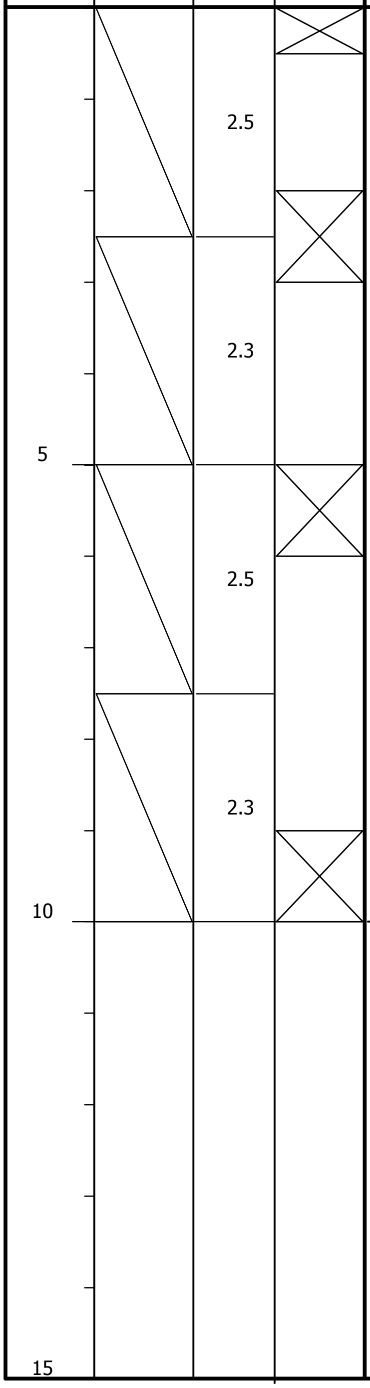
WATER LEVELS : N/A

START : 1:35:00 PM 10/2/2008

END : 3:00:00 PM 10/2/2008

LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SANDY SILT (ML): light brown (7.5YR 6/4), dry, no odor,(10% gravel/30% sand/60% fines) max diameter =6 cm, angular to subangular, metamorphic.	Surface scattered with large boulders and cobble. Drilled 3 borings approx 1 ft apart each in order to collect sufficient soil volume for sample jars. Backfilled with hydrated bentonite chips.
	4.0 feet bgs: large rock encountered.	
5	5.5 feet bgs: soil becomes moist.	
	7.0 feet bgs: large rock encountered	
10	Total Depth at 10 ft below ground surface	
15		



PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T4c** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101483.2 N, 7614878.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 8:45:00 AM 10/4/2008 END : 10:00:00 AM 10/4/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.5		SANDY SILT with gravel (ML): light brown (7.5YR 6/4), dry, no odor, poorly sorted, (15% gravel/30% sand/55% fines), angular to subangular, metamorphic.	Drilled two borings approximately 2 ft apart to collect sufficient soil volume for sample jars. Location was moved approximately 30 ft north to move out of area of abandoned underground natural gas pipeline. Boring backfilled with bentonite chips and hydrated.
		2.5			
5		1.5			
		2.5			
10				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC1-T5a** **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101569.0 N, 7614855.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 12:45:00 PM 10/4/2008 END : 2:20:00 PM 2:20:00 PM LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.5	☒ ☒	GRAVELLY SILT with sand (ML) light brown (7.5YR 6/4), dry, no odor, poorly sorted (20% gravel/15% sand/65% fines) max diameter=12 cm, angular to subangular, metamorphic.	Drilled three borings approximately 1.5 ft. apart in order to collect sufficient soil volume for sample jars. Backfilled with bentonite chips and hydrated.
		2.5		SANDY SILT (ML): light brown (7.5YR 6/4), dry, no odor, poorly sorted, (10% gravel/30% sand/60% fines), max diameter = 5cm, angular to subangular, metamorphic.	
5		2.3	☒		
		2.5	☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T5b** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101614.0 N, 7614843.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 10:20:00 AM 10/4/2008 END : 11:30:00 AM 10/4/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.3	☒	SANDY SILT (ML): light brown (7.5 YR 6/4), dry, no odor, poorly sorted (5% gravel/40% sand/55% fines), angular to subangular, metamorphic.	Drilled two borings approximately 2 ft apart to collect sufficient soil volume for sample jars. Boring backfilled with bentonite chips and hydrated.
		2.0	☒	SANDY SILT with gravel (ML): light brown (7.5YR 6/4), dry, no odor, poorly sorted (15% gravel/30% sand/55% fines), max diameter = 7 cm, angular to subangular, metamorphic.	
5		2.0	☒	6.0 feet bgs: encountered large rock.	
		2.5	☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T5c SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101602.9 N, 7614887.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 2:25:00 PM 10/4/2008 END : 3:30:00 PM 10/4/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION	COMMENTS
				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.5		SANDY SILT (ML): light brown (7.5YR 6/4), dry, loose, no odor, poorly sorted (10% gravel/40% sand/50% fines), max diameter =7cm, angular to subangular, metamorphic.	Drilled two borings approximately 1.5 ft apart to collect sufficient soil sample. Boring backfilled with bentonite chips and hydrated.
		2.5			
5		2.5			
		2.3			
10				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T6a SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102015.8 N, 7614878.8 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 10:30:00 AM 9/30/2008 END : 11:05:00 AM 9/30/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILT (ML)- light brown surface layer	
				GRAVELLY SILT (ML) with sand: light brown, coarse fraction contains angular and rounded gravel to cobbles, poorly sorted, sidewalls remain in place, moisture increases with depth, many noticeable layers of poorly sorted gravel and cobbles, no distinct color changes, no odor.	Galvanized guy wire at 0.5 ft bgs. Tree roots at 0.0 - 1.5 ft bgs. Boring backfilled.
			☒		
5		10.0			
			☒		
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC1-T6b** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102012.6 N, 7614899.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 10:45:00 AM 9/30/2008 END : 9/30/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒ ☒	GRAVELLY SAND (ML) and silt: gravel light to dark grey, angular, fine fraction light brown, coarse fraction poorly graded, many layers with lenses of cobbles, competent sidewall, roots in top 1.5 ft.	Boring backfilled.
5		10.0	☒ ☒	GRAVELLY SANDY SILT (ML): coarse fraction poorly graded with cobbles and boulders.	
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC1-T6c SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102008.9 N, 7614914.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 10:30:00 AM 9/30/2008 END : 3:35:00 PM 9/30/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		6.0	☒ ☒ ☒	SILT: crusty, with wind ripples visible on surface. GRAVELLY SILT (ML) with sand: light brown, coarse fraction poorly sorted, cobbles, angular and rounded, very loose soil.	Boring backfilled.
5					
				6.0 feet bgs: large rock or hard pan, excavator refusal.	
				Total Depth at 6 ft below ground surface	
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC4-1** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100224.5 N, 7614727.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4" core barrel

WATER LEVELS : N/A START : 8:20:00 AM 10/14/2008 END : 8:40:00 AM 10/14/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0	☒ ☒ ☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =80mm.	Drill rate constant. Borehole integrity sound. Backfilled with native.
5				Total Depth at 3 ft below ground surface	
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC4-3** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100161.9 N, 7614860.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 8:20:00 AM 8/24/2008 END : 8:39:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.2		SILTY SAND (SM): yellowish brown (10YR 5/6), (0% gravel/80% sand/20% fines), poorly graded, subrounded to subangular, predominantly quartz, loosely consolidated, no structure, dry.	
				POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/6), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loosely consolidated, clast-supported, dry, max clast size=40mm. 1.2 ft bgs: gravel encountered, refusal.	
				Total Depth at 1.2 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC4-4 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100146.6 N, 7614860.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 8:30:00 AM 8/24/2008 END : 8:45:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		0.5		POORLY GRADED GRAVEL (GP-GM) with silt: very dark greyish brown (10YR 3/2), (80% gravel/10% sand/10% fines), very well sorted/medium grained sand with no fines), but poorly graded(almost entirely gravel). Angular to subangular, no dominant mineralogy but notable lack of quartz sand, loosely consolidated, clast-supported, dry, max clast size=60mm. 0.5 ft. bgs: encountered bedrock, refusal. Total Depth at 0.5 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC4-5 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100134.8 N, 7614932.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 8:50:00 AM 8/24/2008 END : 9:30:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)				SOIL DESCRIPTION	COMMENTS
	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	╲	1.5	☒	POORLY GRADED GRAVEL (GP-GM) with silt: dark greyish brown (10YR 4/2), (80% gravel/10% sand/10% fines), angular, no dominant mineralogy, medium density, clast-supported, dry, max clast size=40mm.	
				1.5 ft. bgs: gravel, refusal. Total Depth at 1.5 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC4-6** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100152.5 N, 7614943.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 9:35:00 AM 8/24/2008 END : 10:25:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.2		SILTY SAND (SM): yellowish brown (10YR 5/3), (5% gravel/70% sand/25% fines), well-graded, subangular to subrounded, predominantly quartz, loosely consolidated, no structure, dry, max clast size= 40 mm	
				POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), subangular to angular, no dominant mineralogy, medium density, clast-supported, dry, max clast size=70mm	
				1.2 ft. bgs: gravel refusal.	
				Total Depth at 1.2 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC4-8 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100103.5 N, 7614968.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 10:10:00 AM 8/24/2008 END : 10:15:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		0.5		POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loose to medium density, clast-supported, dry, max clast size=40mm. 0.5 ft. bgs: bedrock encountered. Total Depth at 0.5 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC4-9** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100099.5 N, 7615002.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 11:10:00 AM 8/24/2008 END : 11:15:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		0.5		POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loose to medium density, clast-supported, dry, max clast size=40mm. 0.5 ft. bgs: bedrock encountered. Total Depth at 0.5 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC4-10 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100072.7 N, 7614998.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 11:10:00 AM 8/24/2008 END : 11:15:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		0.5		POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loose to medium density, clast-supported, dry, max clast size=40mm 0.5 ft. bgs: bedrock encountered. Total Depth at 0.5 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC4-11** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2100036.2 N, 7615016.3 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A

START : 1:10:00 PM 8/24/2008

END : 1:15:00 PM 8/24/2008

LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	☒	0.5	☒	POORLY GRADED GRAVEL (GP-GM): yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loose to medium density, clast-supported, dry, max clast size=40mm. 0.5 ft. bgs: bedrock encountered. Total Depth at 0.5 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC4-12** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100006.7 N, 7615021.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 1:05:00 PM 8/24/2008 END : 12:55:00 AM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		0.5		POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loose to medium density, clast-supported, dry, max clast size=40mm. 0.5 ft. bgs: bedrock encountered. Total Depth at 0.5 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC4-13 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2099979.6 N, 7615042.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 1:00:00 PM 8/24/2008 END : 1:10:00 PM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		0.5		POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loose to medium density, clast-supported, dry, max clast size=40mm. 0.5 ft. bgs: bedrock encountered. Total Depth at 0.5 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC4-14** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2099966.3 N, 7615137.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 12:55:00 PM 8/24/2008 END : 1:10:00 PM 8/24/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		0.5		POORLY GRADED GRAVEL (GP-GM) with silt: yellowish brown (10YR 5/3), (80% gravel/10% sand/10% fines), angular to subangular, no dominant mineralogy, loose to medium density, clast-supported, dry, max clast size=40mm.	
				0.5 ft. bgs: bedrock encountered.	
				Total Depth at 0.5 ft below ground surface	
5					
10					
15					

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC4-15

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100015.5 N, 7615135.7 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 12:10:00 PM 9/19/2008 END : 1:00:00 PM 9/19/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)				SOIL DESCRIPTION	COMMENTS
	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0		SILTY SAND (SM) with debris: light brown, includes glass, plastic, ammunition shells, fill material, low moisture, no odor	
				SILT (ML): light brown, compacted with lenses of lighter silty material	
5				Total Depth at 3 ft below ground surface	
10					
15					

PROJECT NUMBER: 354948.FP.08.FW.SC	**BORING NUMBER:** AOC4-15-ss	**SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (N, E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand tools,

WATER LEVELS : N/A START : 1:10:00 PM 9/19/2008 END : 1:20:00 PM 9/19/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	☒	0.5	☒	SILT (ML): light brown, reddish brown, yellow brown surface stained, dry crusty debris (glass, plastic, hose, wood), no odor, low moisture.	
				Total Depth at 0.5 ft below ground surface	
5					
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-1** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100374.8 N, 7615472.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Long Reach Excavator

WATER LEVELS : N/A START : 10:10:00 AM 10/1/2008 END : 10:40:00 AM 10/1/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML) with sand: light brown, loose consistency, dry, no odor, coarse fraction rounded and angular.	Pothole terminated at 3 ft and backfilled.
		3.0			
			☒	WELL-GRADED SAND (SW) with gravel: light brown sand: well-graded, gravel with 90% angular, 10% rounded, few cobbles.	
				Total Depth at 3 ft below ground surface	
5					
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-2** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100366.7 N, 7615484.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 2:10:00 PM 10/1/2008 END : 2:25:00 PM 10/1/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0	☒	SILTY SAND (SM) with gravel: light brown, poorly graded, dry, no odor. Surface is crusty cemented sand/gravel layer, easily disrupted, 15% gravel.	Excavation terminated at 3 ft. Pothole backfilled.
			☒	SILTY SAND (SM) with gravel: light brown, poorly graded, dry, no odor, 5% gravel.	
				Total Depth at 3 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC9-3 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100353.7 N, 7615484.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 1:45:00 PM 9/18/2008 END : 2:00:00 PM 9/18/2009 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM) with gravel: light brown, poorly graded, dry, no odor, loose consistency, 15% gravel.	PG&E concerned about location of buried storm water pipe- pothole moved slightly to miss drain. Excavation terminated at 3 ft. Pothole backfilled.
		3.0	☒	SILTY SAND (SM) with gravel: light brown, poorly graded, loose consistency, 5% gravel.	
				<u>Total Depth at 3 ft below ground surface</u>	
5					
10					
15					

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC9-4

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2100354.9 N, 7615501.2 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Turnkey Construction
DRILLING METHOD AND EQUIPMENT : Excavation, Excavator
WATER LEVELS : N/A
START : 3:30:00 PM 9/18/2008
END : 3:45:00 PM 9/18/2008
LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0	☒ ☒	SANDY SILT (ML) with gravel to cobbles: light brown, rounded and angular, matted organic material on surface with roots extending to approx 18".	Pothole terminated at 3 ft and backfilled.
				Total Depth at 3 ft below ground surface	
5					
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-5** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2100337.9 N, 7615454.4 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Long Reach Excavator

WATER LEVELS : N/A

START : 2:20:00 PM 10/1/2008

END : 2:40:00 PM 10/1/2008

LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0	☒	SILTY SAND (SM) with gravel and cobbles: light brown, poorly graded, concrete debris at surface and throughout pothole.	Pothole terminated at 3 ft and backfilled.
			☒		
				Total Depth at 3 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-6** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100338.3 N, 7615478.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 4:10:00 PM 9/18/2008 END : 4:30:00 PM 9/18/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0	☒	SANDY SILT (ML) with gravel and cobbles: light brown,top 18" cemented, easily disrupted, dry, no odor.	Pothole terminated at 3 ft and backfilled.
			☒	POORLY-GRADED SAND (SP): light brown, poorly graded, rounded and angular.	
				Total Depth at 3 ft below ground surface	
5					
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-7** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100341.6 N, 7615499.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 1:00:00 PM 9/18/2008 END : 1:15:00 PM 9/18/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM) with gravel: light brown, poorly graded, dry, no odor, loose consistency.	Pothole terminated at 3 ft and backfilled.
		3.0			
			☒	SILTY SAND (SM) with gravel: light brown, poorly graded, dry, no odor, loose consistency.	
				<u>Total Depth at 3 ft below ground surface</u>	
5					
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-8** **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100360.1 N, 7615461.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Long Reach Excavator

WATER LEVELS : N/A START : 11:50:00 AM 10/1/2009 END : 12:30:00 PM 10/1/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		6.0		SANDY SILT (ML) with gravel: light brown, cobbles and debris, coarse fraction angular and rounded, large chunks of concrete throughout pothole.	Pothole terminated at 6 ft and backfilled.
5					
				Total Depth at 6 ft below ground surface	
10					
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-9** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100353.7 N, 7615472.8 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Long Reach Excavator

WATER LEVELS : N/A START : 10:45:00 AM 10/1/2008 END : 11:30:00 AM 10/1/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML) with sand: light brown, concrete rubble.	Pothole terminated at 6 ft and backfilled.
		6.0	☒		
5			☒		
				Total Depth at 6 ft below ground surface	
10					
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC9-10**	**SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100328.7 N, 7615447.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Long Reach Excavator

WATER LEVELS : N/A START : 4:30:00 PM 10/1/2008 END : 4:41:00 PM 10/1/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0	☒ ☒	SILTY SAND (SM) with gravel and cobbles: light brown, poorly graded, concrete debris.	Pothole terminated at 3 ft and backfilled.
				<u>Total Depth at 3 ft below ground surface</u>	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC9-11 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100324.9 N, 7615464.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 4:40:00 PM 10/1/2008 END : 5:00:00 PM 10/1/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0		SANDY SILT (ML) with gravel and cobbles: light brown,very loose, dry, angular, no odor.	Pothole terminated at 3 ft and backfilled.
				Total Depth at 3 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC9-12 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100308.9 N, 7615436.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 3:05:00 PM 10/1/2008 END : 3:51:00 PM 10/1/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0		SILTY SAND (ML): with gravel and cobbles: light brown, poorly graded, concrete debris throughout	Pothole terminated at 3 ft and backfilled.
				Total Depth at 3 ft below ground surface	
5					
10					
15					

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC9-13 **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100304.5 N, 7615455.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 9:00:00 AM 9/19/2008 END : 9:10:00 AM 9/19/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0	☒ ☒	POORLY-GRADED SAND (SW) with gravel: light brown, poorly graded, vegetation roots from 0.0 to 2.5 ft. 20% gravel. Small pieces of wood and metal at 2.5 ft bgs.	Pothole terminated at 3 ft and backfilled.
				Total Depth at 3 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC9-14 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (N, E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Long Reach Excavator

WATER LEVELS : N/A START : 8:35:00 AM 10/2/2008 END : 8:50:00 AM 10/2/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	Surface sample of white accreted gravelly material. One sample contained white fibrous gravel size piece.	
		3.0		SILTY SAND (SM) with gravel: light brown, concrete rubble.	Pothole terminated at 3 ft and backfilled.
			☒		
				Total Depth at 3 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC10-1** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100649.0 N, 7615911.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : excavation, long reach excavator

WATER LEVELS : N/A START : 2:20:00 PM 10/2/2008 END : 3:15:00 PM 10/2/2008 LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SANDY SILT (ML) with gravel and cobbles: light brown, loose consistency, dry, no odor, no hard layer.	Pothole terminated at 10 ft bgs. Backfilled.
			☒		
5			☒		
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10-2 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2100625.9 N, 7616007.0 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : excavation, long reach excavator

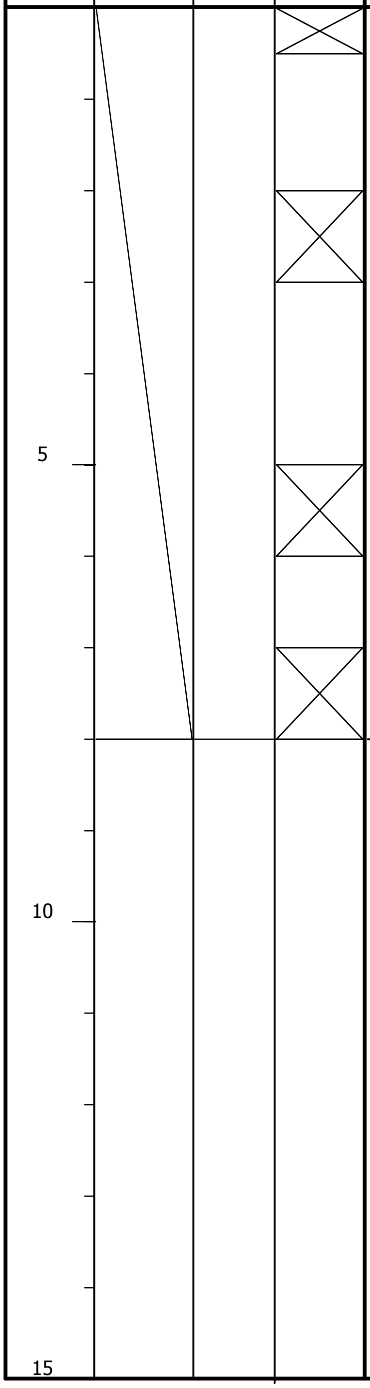
WATER LEVELS : N/A

START : 11:10:00 AM 10/2/2008

END : 12:05:00 PM 10/2/2008

LOGGER : T. Frank

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0	GRAVELLY SILT (ML) with sand and cobbles: poorly sorted, coarse fraction grey, fine fraction light to medium brown. Coarse fraction angular to rounded.	Pothole terminated at 8 ft bgs- hardpan. Backfilled.
8	8.0 feet bgs: hard pan backfill encountered. Total Depth at 8 ft below ground surface	



PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC10-3

SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2100714.1 N, 7616222.5 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

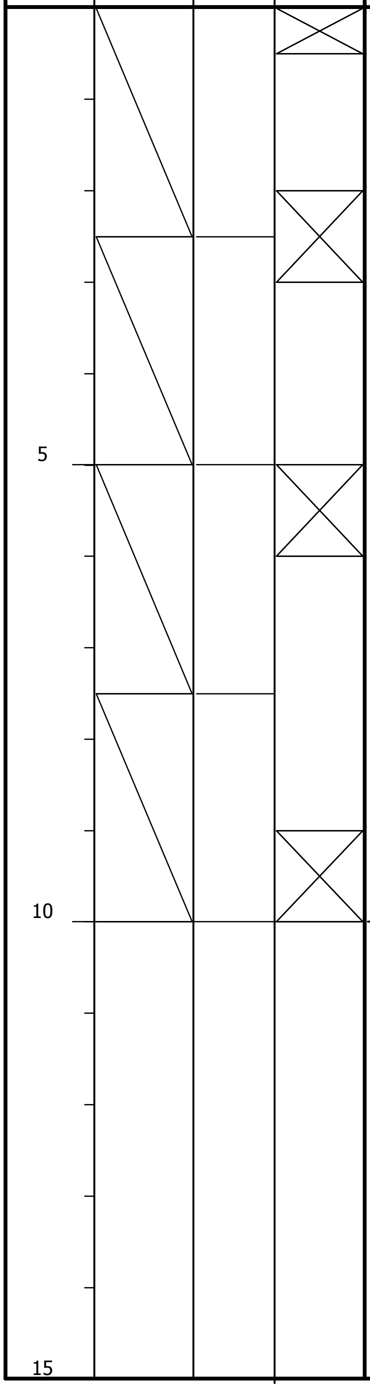
WATER LEVELS : N/A

START : 9/19/2008

END : 9/19/2008

LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) / INTERVAL (ft) / RECOVERY (ft) / SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0–10	SANDY SILT (ML) with gravel: light brown (7.5YR 6/3), poorly sorted, dry, no odor, (20% gravel/25% sand/55% fines), gravel max diameter=5cm. Angular to subangular metamorphic.	Drilled two borings to collect the required amount of soil from each sample depth interval.
10–15	Total Depth at 10 ft below ground surface	

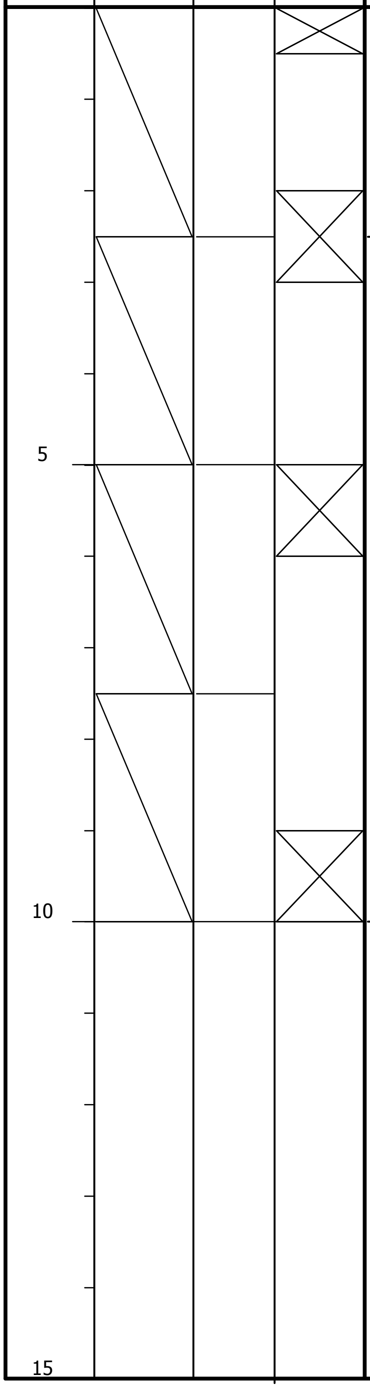


CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10-4 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2100679.5 N, 7616288.3 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.
DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig
WATER LEVELS : N/A
START : 8:30:00 AM 9/19/2008
END : 10:50:00 AM 9/19/2008
LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) — INTERVAL (ft), RECOVERY (ft), SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SANDY SILT (ML): light brown (7.5YR 6/3)(10% gravel/30% sand/60% fines), poorly sorted, dry, no odor, gravel max diameter =5cm. Angular to subangular, metamorphic. SANDY SILT (ML) with gravel: light brown (7.5YR 6/3), poorly sorted, dry, no odor, (20% gravel/25% sand/55% fines), gravel max diameter=5cm. Angular to subangular metamorphic. Total Depth at 10 ft below ground surface	Completed two borings to collect enough soil sample. Second boring approximately 2 feet away from stake.

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10-5 SHEET 1 OF 1

SOIL BORING LOG

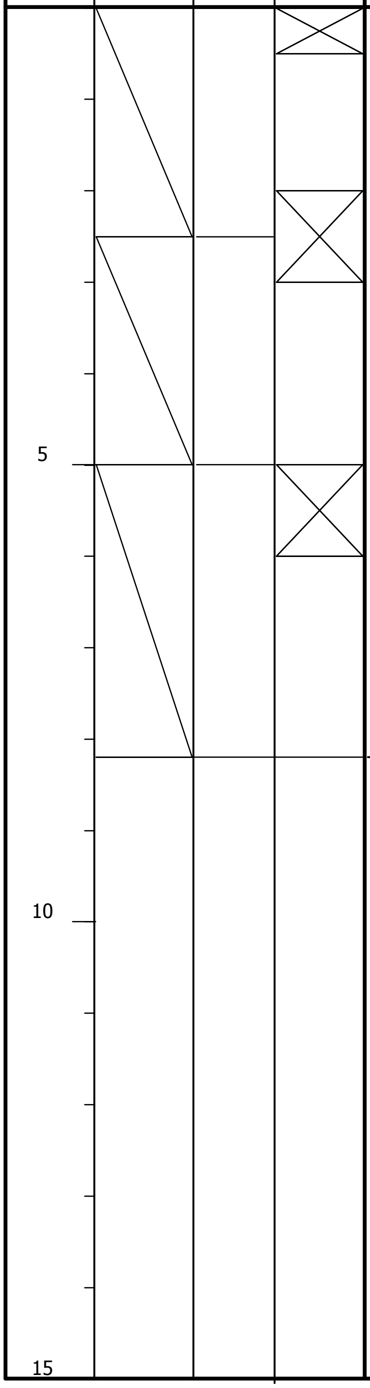
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100967.0 N, 7616410.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 1:45:00 PM 9/19/2008 END : 3:00:00 PM 9/19/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION	COMMENTS
	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION



SANDY SILT (ML): light brown (7.5YR 6/3), (5% gravel/20% sand/75% fines), max diameter gravel =4cm, angular to subangular, metamorphic, miocene conglomerate fragments.

8.2 feet bgs: bedrock encountered.

Total Depth at 8.2 ft below ground surface

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC10-6** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2101013.3 N, 7616416.5 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A

START : 7:00:00 AM 9/20/2008

END : 8:10:00 AM 9/20/2008

LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SANDY SILT (ML): light brown (7.5YR 6/3), poorly to moderately sorted, dry, no odor (5% gravel/20% sand/75% fines), gravel max diameter is 4 cm, angular to subangular, metamorphic.	Drilled two borings to collect the required soil sample volume.
	3.0 feet bgs: encountered bedrock.	
5	<u>Total Depth at 3 ft below ground surface</u>	
10		
15		

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10-7 SHEET 1 OF 1

SOIL BORING LOG

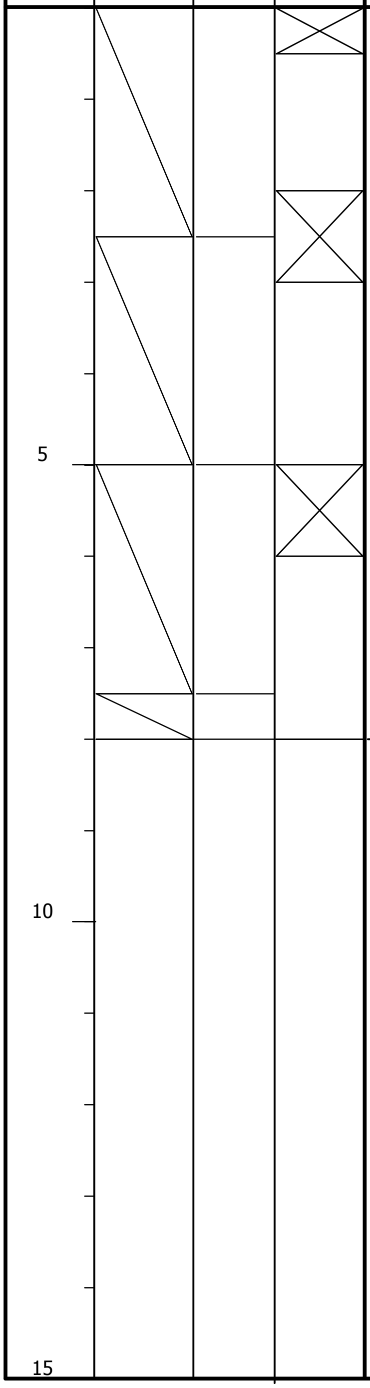
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100989.7 N, 7616503.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 8:15:00 AM 9/20/2008 END : 9:20:00 AM 9/20/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION



SANDY SILT (ML): light brown (7.5YR 6/3), poorly to moderately sorted, dry, no odor (5% gravel/20% sand/75% fines), gravel max diameter is 4 cm, angular to subangular, metamorphic.

Drilled two borings to collect required soil volume for samples.

8.0 feet bgs: bedrock encountered.

<u>Total Depth at 8 ft below ground surface</u>

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10-8 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101122.1 N, 7616635.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : N/A

DRILLING METHOD AND EQUIPMENT : Hand auger, Hand tools

WATER LEVELS : N/A START : 10:30:00 AM 8/22/2008 END : 11:02:00 AM 8/22/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	☒		☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/6), (50% gravel/25% sand/25% fines), well-graded, angular to subrounded, no dominant mineralogy, loosely consolidated, matrix-supported, dry, max clast size = 30 mm.	
				0.5 feet bgs: bedrock encountered.	
				Total Depth at 0.5 ft below ground surface	
5					
10					
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC10b-1** SHEET 1 OF 1

SOIL BORING LOG

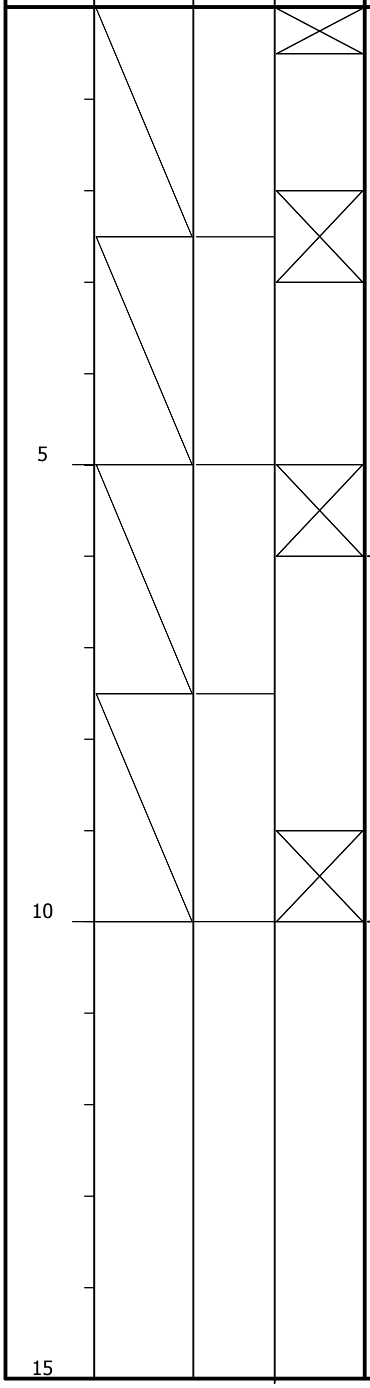
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100512.7 N, 7615850.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 10:30:00 AM 9/30/2008 END : 11:50:00 AM 9/30/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION



SILTY SAND (SM) with gravel: light brown, (7.5YR 6/3), loose, dry, no odor, (30% gravel/50% sand/20% fines), max diameter gravel=10cm, angular to subangular, metamorphic.

Hand auger to 1 ft before refusal. Drilled three borings approximately 1 foot apart. Required to collect sufficient soil volume for samples. Backfilled with bentonite pellets and hydrated.

At 4 ft bgs: becomes more fine grained (10% gravel/60% sand/30% fines).

SILTY SAND (SM) : light brown (7.5YR 6/3), loose, dry, no odor, (5% gravel/70% sand/25% fines), max gravel diameter =2cm, angular to subangular, metamorphic.

Total Depth at 10 ft below ground surface

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC10b-2 **SHEET** 1 **OF** 1

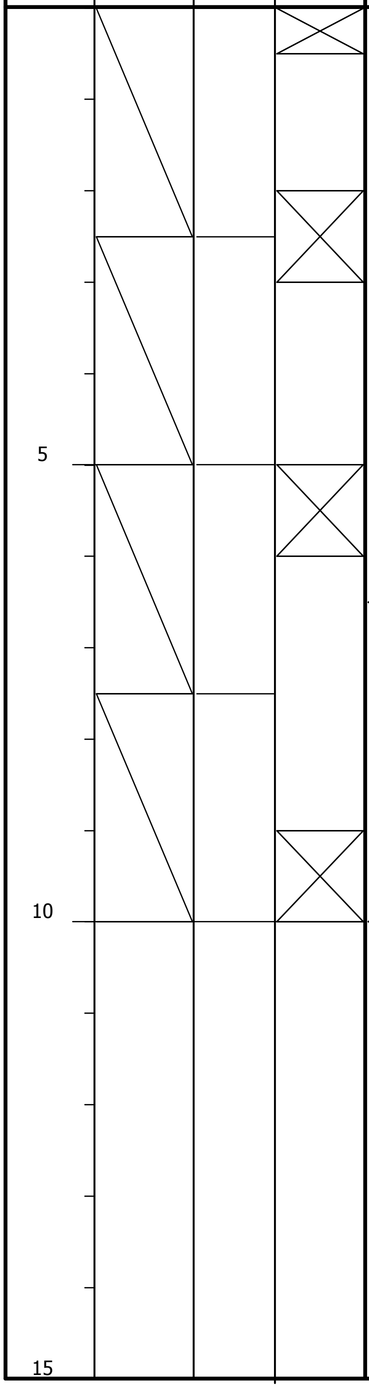
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100520.3 N, 7615904.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 11:55:00 AM 9/30/2008 END : 12:55:00 PM 9/30/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILTY SAND (SM) with gravel: light brown, (7.5YR 6/3), loose, dry, no odor, (25% gravel/60% sand/15% fines), max diameter gravel=8cm, angular to subangular, metamorphic.	Drilled two borings approximately one foot apart. Required to collect sufficient soil volume for samples. Backfilled with bentonite pellets and hydrated.
	SILTY SAND (SM): light brown (7.5YR 6/3), loose, dry, no odor, (5% gravel/70% sand/25% fines), max gravel diameter =2.5cm, angular to subangular, metamorphic.	
	Total Depth at 10 ft below ground surface	

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC10b-3** SHEET 1 OF 1

SOIL BORING LOG

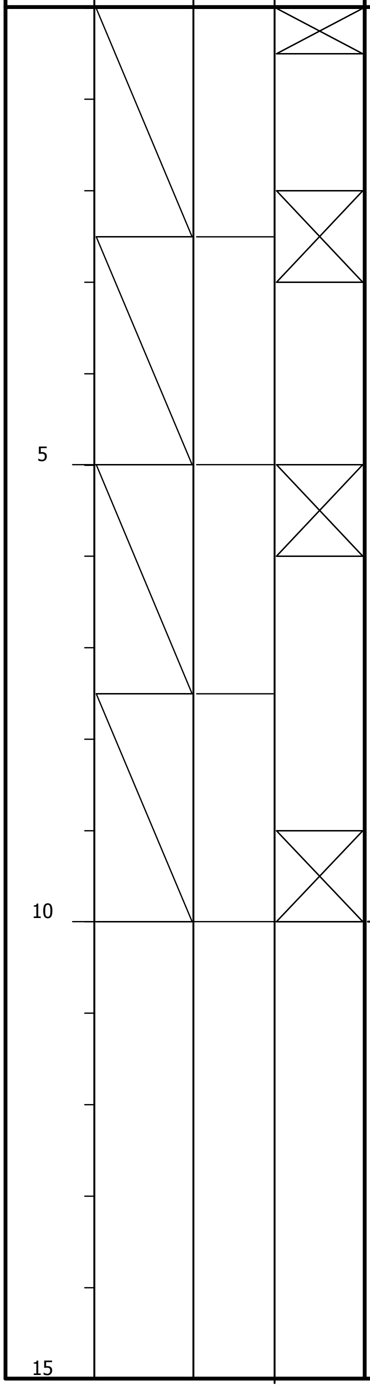
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100478.7 N, 7615986.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 2:00:00 PM 9/30/2008 END : 8:40:00 AM 10/1/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILTY SAND (SM) with gravel: light brown (7.5YR 6/3), dry, loose, no odor, moderately well sorted (30% gravel/50% sand/20% fines), max diameter=5cm, angular to subangular, metamorphic.	Stopped drilling at 14:00 9/30/08 and resumed work at 0710 on 10/1/08. Hand auger to 1 ft before refusal. Drilled three borings approximately 1 to 1.5 ft apart. Required to collect sufficient soil volume for sample jars. Backfilled with bentonite pellets and hydrated.
5	At 5.5 ft bgs: increased gravel and silt content (30% gravel/45% sand/25% fines).	
10	Total Depth at 10 ft below ground surface	
15		



PROJECT NUMBER: 354948.FP.08.FW.SC	**BORING NUMBER:** AOC10b-4 **SHEET** 1 **OF** 1

SOIL BORING LOG

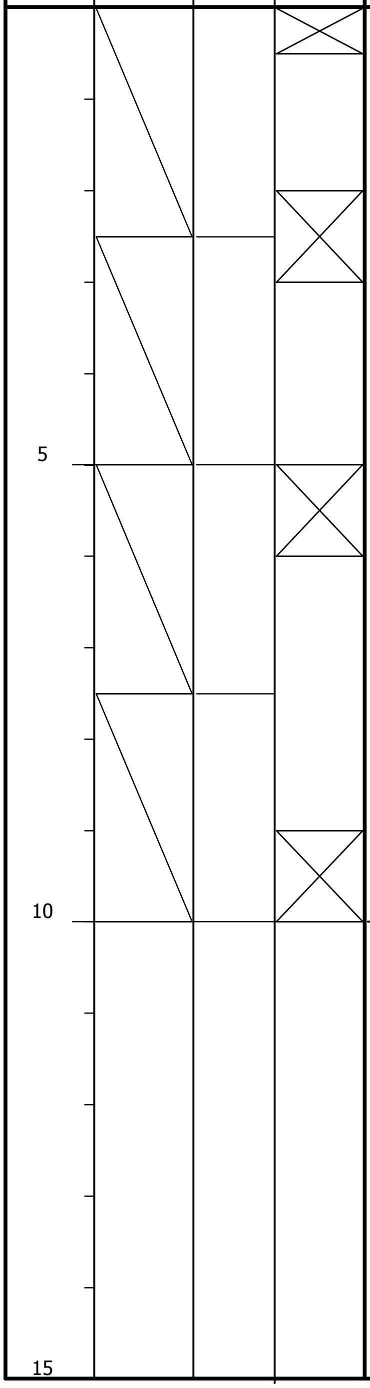
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100545.1 N, 7615940.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 1:30:00 PM 9/30/2008 END : 3:20:00 PM 9/30/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0–10	SILTY SAND (SM) with gravel: light brown (7.5YR 6/3), dry, loose, no odor, (15% gravel/70%sand/15% fines), max gravel diameter=7cm, angular to subangular, metamorphic.	Drilled two borings approximately one foot apart. Required to collect sufficient soil volume for samples. Backfilled with bentonite pellets and hydrated.
10–15	Total Depth at 10 ft below ground surface	



CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10c-1 SHEET 1 OF 1

SOIL BORING LOG

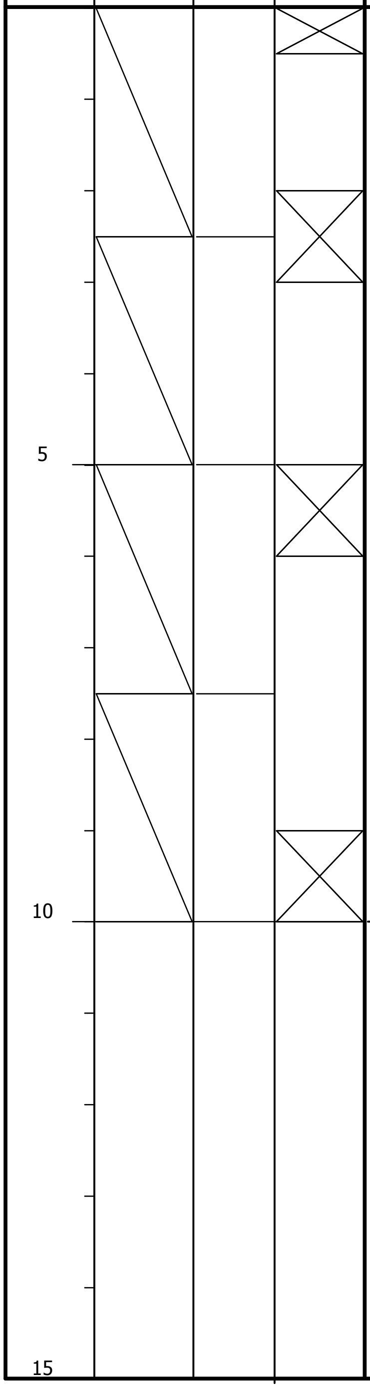
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100554.0 N, 7616077.8 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 8:50:00 AM 10/1/2008 END : 9:55:00 AM 10/1/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) / INTERVAL (ft) / RECOVERY (ft) / SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0–10	SANDY SILT (ML) with gravel: light brown (7.5YR 6/3), dry, no odor, (15% gravel/30% sand/55% fines), max gravel diameter =8cm, angular to subangular, metamorphic.	Drilled two borings approximately 1.5 feet. Required to collect sufficient soil volume for samples. Backfilled with bentonite pellets and hydrated.
10–15	Total Depth at 10 ft below ground surface	



PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC10c-2** SHEET 1 OF 1

SOIL BORING LOG

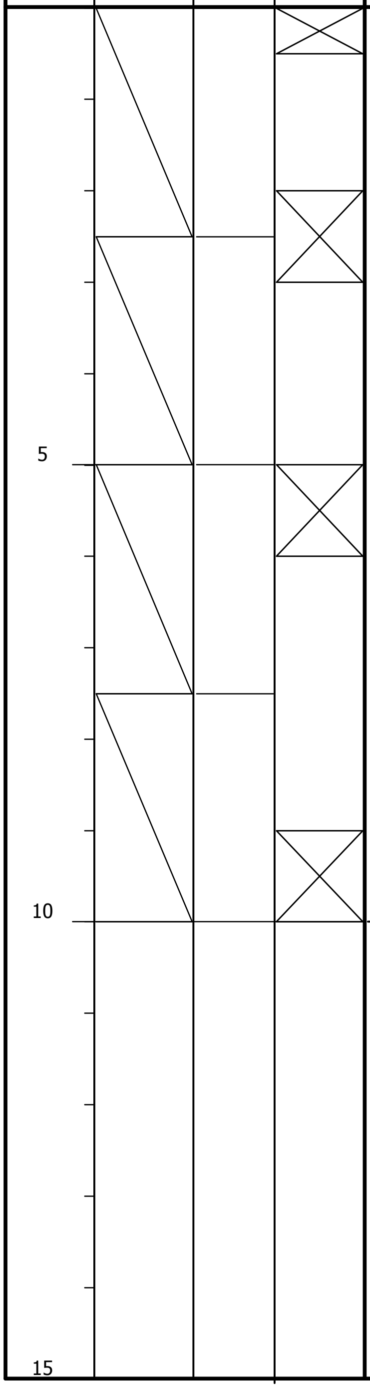
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100586.7 N, 7616088.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 7:20:00 AM 10/1/2008 END : 11:15:00 AM 10/1/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0–10	SANDY SILT (ML) with gravel: light brown (7.5YR 6/3), dry, no odor, (15% gravel/30% sand/55% fines), max gravel diameter =9cm, angular to subangular, metamorphic.	Hand auger to 1 ft before refusal. Drilled three borings approximately 2 ft apart. Required so as to collect sufficient soil volume for samples. Backfilled with bentonite chips and hydrated.
10–15	Total Depth at 10 ft below ground surface	



PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC10c-3** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100636.7 N, 7616126.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 8:30:00 AM 10/2/2008 END : 10:30:00 AM 10/2/2008 LOGGER : R. Tweidt

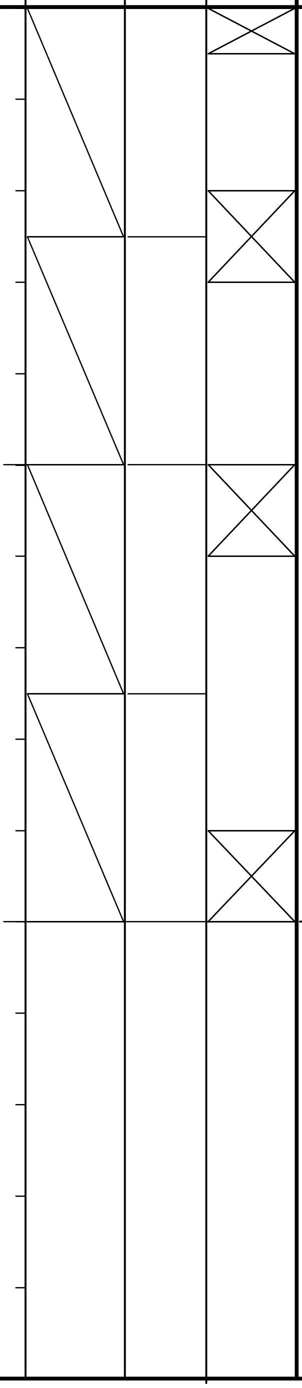
DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SANDY SILT (ML): light brown (7.5YR 6/3), dry, no odor, (10% gravel/40% sand/50% fines), max gravel diameter =5cm, angular to subangular, metamorphic.	Drilled three borings approximately 1.5 ft apart in order to collect sufficient soil volume. Backfilled with bentonite chips and hydrated.
5		
10		
	Total Depth at 10 ft below ground surface	
15		

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC10c-4 **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2100603.8 N, 7616145.6 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.
DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig
WATER LEVELS : N/A
START : 1:15:00 PM 10/1/2008
END : 3:00:00 PM 10/1/2008
LOGGER : R. Tweidt



DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SANDY SILT (ML) with gravel: light brown (7.5YR 6/3), dry, no odor, (15% gravel/30% sand/55% fines), max gravel diameter =10cm, angular to subangular, metamorphic.	Hand auger to 1 ft before refusal. Drilled two borings approximately 1 ft apart to collect sufficient soil volume. Backfilled with bentonite pellets and hydrated.
5		
10		
	Total Depth at 10 ft below ground surface	
15		

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10c-5 SHEET 1 OF 1

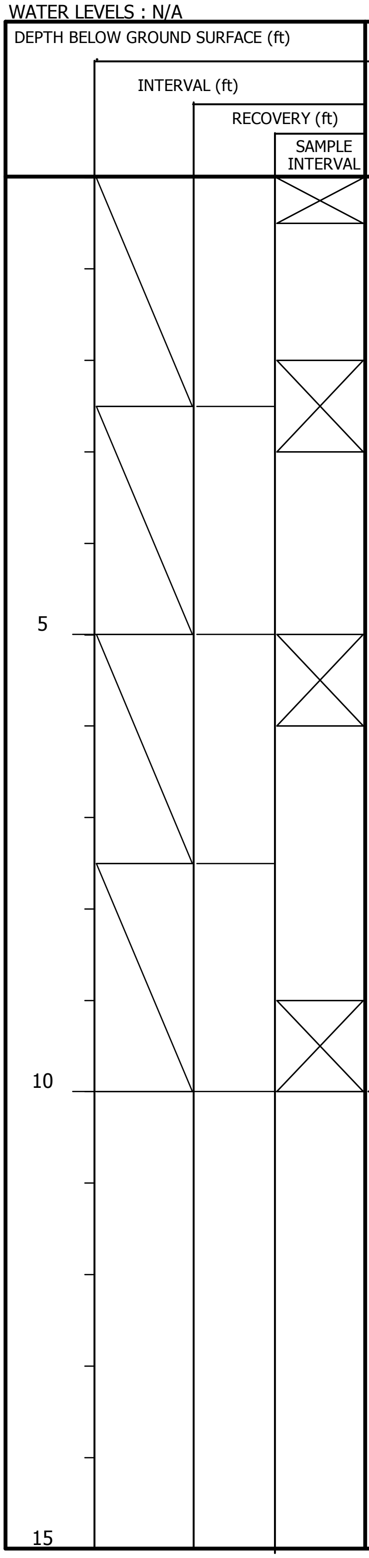
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100633.8 N, 7616083.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 1:05:00 PM 10/1/2008 END : 2:00:00 PM 10/1/2008 LOGGER : R. Tweidt



SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SANDY SILT (ML): light brown (7.5YR 6/3), dry, no odor, (10% gravel/30% sand/60% fines), max gravel diameter =7cm, angular to subangular, metamorphic.	Drilled two borings approximately 1 ft apart to collect sufficient soil volume. Backfilled with bentonite pellets and hydrated.
Total Depth at 10 ft below ground surface	

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC10d-1

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2100715.3 N, 7616294.6 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

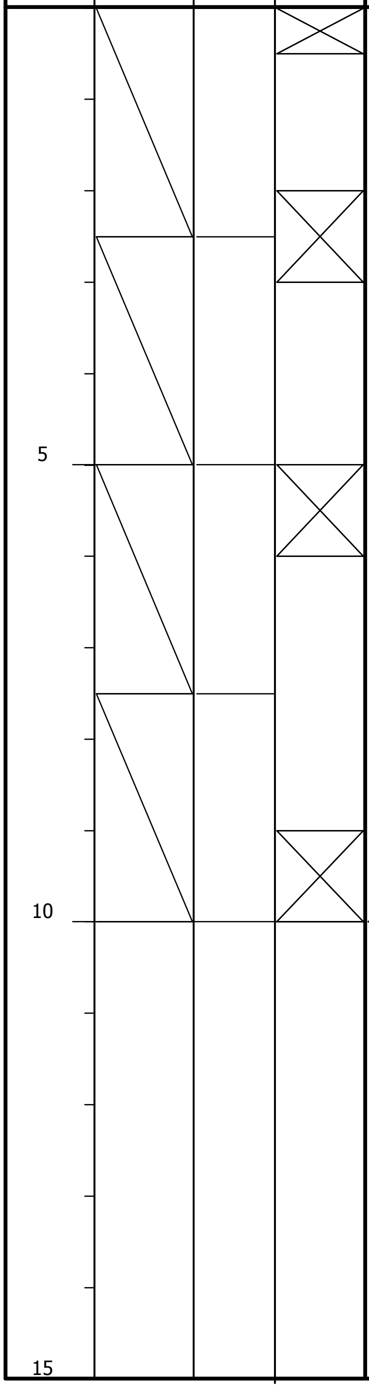
WATER LEVELS : N/A

START : 3:40:00 PM 9/18/2008

END : 9/18/2008

LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0–10	SANDY SILT (ML): light brown (7.5YR 6/3), poorly sorted, dry, no odor, (10% gravel/30% sand/60% fines), max diameter =6cm, angular to subangular, metamorphic.	Hand augered to 2 ft after collecting surface sample. Drilled 2 borings to collect sufficient soil volume.
10	Total Depth at 10 ft below ground surface	



PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10d-2 SHEET 1 OF 1

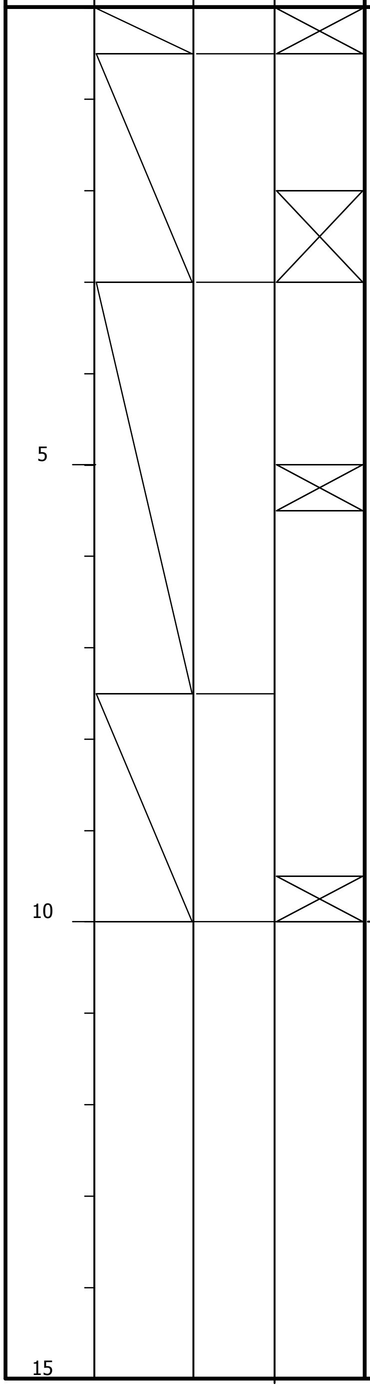
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100854.4 N, 7616314.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 11:10:00 AM 9/17/2008 END : 1:40:00 PM 9/17/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SANDY SILT (ML) with gravel: light brown (7.5YR 6/3), poorly sorted, dry, no odor, (20% gravel/20% sand/60% fines), max gravel diameter =5cm, angular to subangular, metamorphic. At 9.25 ft bgs: thin white lens, approximately 1/4 cm thick. Total Depth at 10 ft below ground surface	Drilled two holes to 10 feet within 1 foot of each other. Needed to collect enough soil for sampling.

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC10d-3** SHEET 1 OF 1

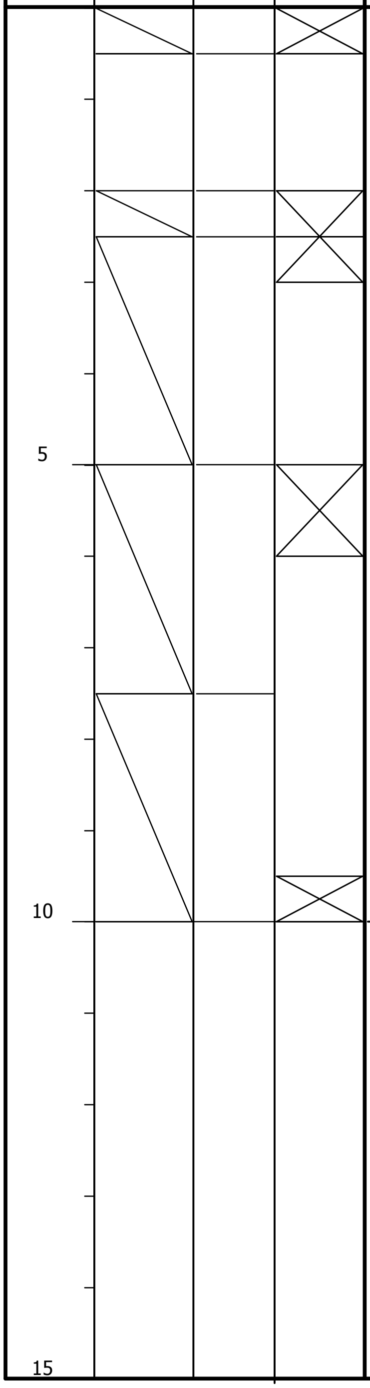
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100868.0 N, 7616332.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 4:00:00 PM 9/18/2008 END : 9/18/2008 LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SANDY SILT (ML) with gravel: light brown (7.5YR 6/3), poorly sorted, dry, no odor, (15% gravel/20% sand/65% fines), max gravel diameter =4cm, angular to subangular, metamorphic. At 5 ft bgs: gravel content varies between 10-20%. Gravel pulverized in spots due to drilling process. Causes whitish powder to be present. Total Depth at 10 ft below ground surface	Stopped drilling at 16:00 9/17/08 and resumed work at 10:00 on 9/18/08. Hand auger to 2 ft bgs. Drilled three locations to collect sufficient soil volume for sample jars, all within 2 feet of stake. Backfilled with bentonite pellets and hydrated.

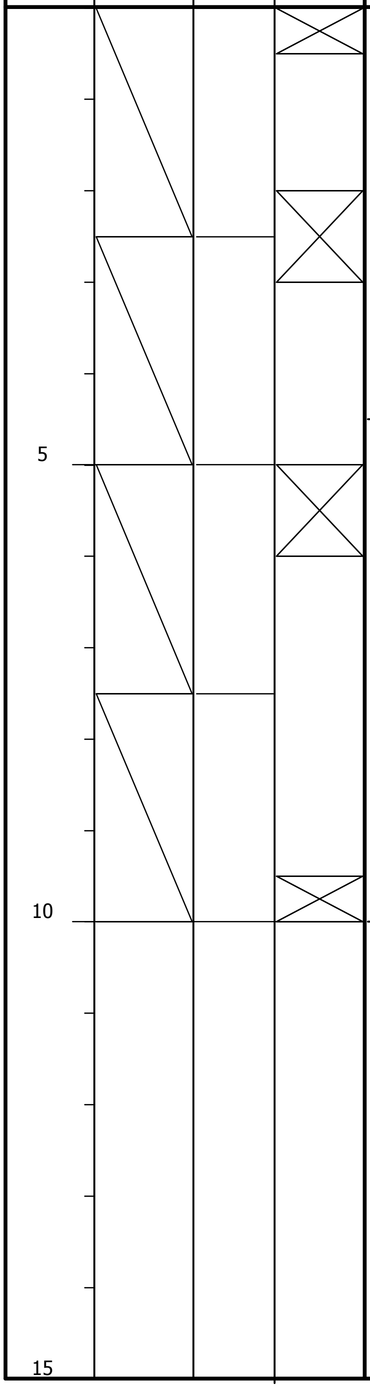
CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC10d-4 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2100873.6 N, 7616374.7 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Gregg Drilling and Testing, Inc.
DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig
WATER LEVELS : N/A
START : 1:00:00 PM 9/18/2008
END : 2:45:00 PM 9/18/2008
LOGGER : R. Tweidt

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION	COMMENTS
INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILT (ML): light brown (7.5YR 6/3), dry, no odor, minor fine sand (<5%).	Hand auger to 2 ft bgs after collecting surface sample. Drilled two borings to collect sufficient soil for samples. Second boring located approximately one foot south of stake and original boring.
	At 2 ft bgs: thin lens of white material (GLEY 8/10Y).	
	At 3 ft bgs: appearance of fine gravel (<10%) max diameter =2 cm. Angular to subangular, metamorphic.	
5	SILT (ML) with gravel: light brown (7.5YR 6/3), poorly to moderately sorted, dry, no odor, (5% gravel/20% sand/75% fines), max gravel diameter =4cm, angular to subangular, metamorphic. At 5.5 ft bgs: thin lens of white material (GLEY 8/10Y).	
	At 7.5 ft bgs: increase in gravel content to approx 10-15%.	
10		
	Total Depth at 10 ft below ground surface	
15		



CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC11a-1

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2101415.5 N, 7615940.5 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A

START : 7:05:00 AM 9/21/2008

END : 1:25:00 PM 9/21/2008

LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel.	Hand auger to 1 foot until refusal. Drilled two borings to collect sufficient soil volume for samples. Backfilled with bentonite chips and hydrated.
		1.3	☒	SANDY SILT (ML) with gravel: light brown (7.5YR 6/4), dry, no odor, (20% gravel/20% sand/ 60% fines), max diameter gravel = 4 cm, angular to subangular, metamorphic.	
		1.8			
5		2.5	☒		
		2.3	☒	8 feet bgs: pieces of old asphalt present from approximately 8-8.25 ft.	
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC11a-2**	**SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101399.0 N, 7616032.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 7:40:00 AM 9/21/2008 END : 9/21/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel.	Hand auger to 1.5 ft before refusal. Drilled two borings. Boring terminated at 10 ft bgs.
		1.8		SANDY SILT (ML) with gravel: light brown (7.5YR 6/4), dry, no odor, (15% gravel/25% sand/ 60% fines), max diameter gravel = 4 cm, angular to subangular, metamorphic.	
			☒		
		2.5			
5			☒		
		2.3			
		2.5			
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC11a-3** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101425.1 N, 7615995.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 2:30:00 PM 9/20/2008 END : 4:15:00 PM 9/20/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel.	Hand auger to 1.5 ft. Boring terminated at 10 feet.
		1.5		SANDY SILT (ML): light brown (7.5YR 6/4), dry, no odor, (10% gravel/30% sand/60% fines), gravel max diameter 5 cm, angular to subangular, metamorphic.	
		2.5	☒		
5		2.3	☒		
		2.5	☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	**BORING NUMBER:**
354948.FP.08.FW.SC	**AOC11a-4** **SHEET** 1 **OF** 1

SOIL BORING LOG

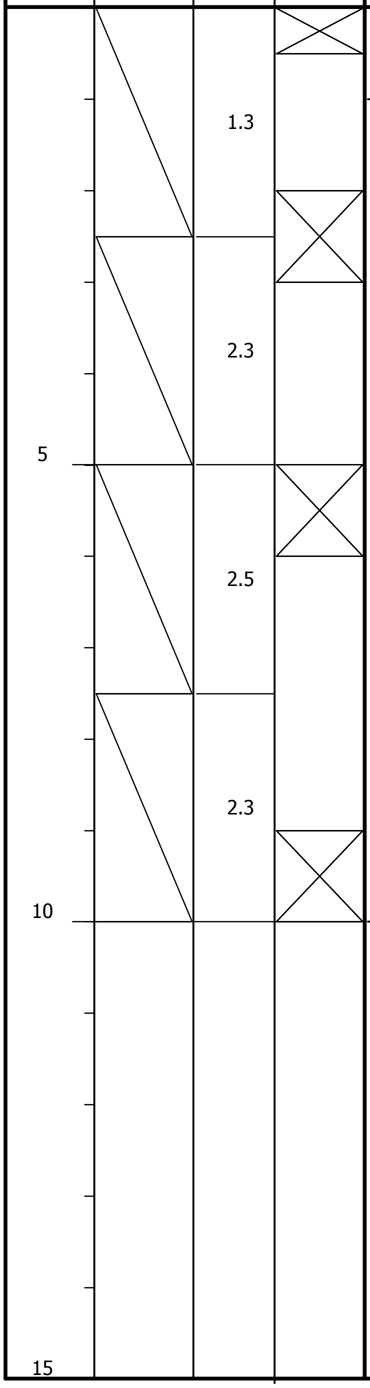
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station   LOCATION : (2101426.1 N, 7616048.8 E)

ELEVATION : ft. ()   DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A   START : 1:00:00 PM 9/20/2008   END : 2:20:00 PM 9/20/2008   LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft) / INTERVAL (ft) / RECOVERY (ft) / SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel.	Drilled two borings to collect sufficient soil sample volume. Boring terminated at 10 feet.
	SANDY SILT (ML) with gravel: light brown (7.5YR 6/4), dry, no odor, (15% gravel/ 25% sand/ 60% fines), gravel max diameter=4 cm, angular to subangular, metamorphic.	
	Total Depth at 10 ft below ground surface	



PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC11a-5** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101378.2 N, 7616022.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 9/21/2008 END : 9:50:00 AM 9/21/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.5	☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel. SANDY SILT (ML) with gravel: light brown (7.5YR 6/4), dry, no odor, (15% gravel/ 25% sand/ 60% fines), gravel max diameter=5 cm, angular to subangular, metamorphic.	Drilled two borings one foot apart to collect sufficient volume of soil. Boring terminated at 10 feet.
			☒		
		2.3			
5			☒		
		2.5			
		2.5	☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC11a-ss1** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101483.0 N, 7615916.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 1:40:00 PM 9/21/2008 END : 3:10:00 PM 9/21/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.0	☒ ☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel. GRAVELLY SILT with sand (ML): light brown (7.5YR 6/4), dry, no odor, (25% gravel/20% sand/55% fines), gravel max diameter=4 cm, angular to subangular, metamorphic.	Drilled two borings to collect sufficient soil volume for samples. Two borings are approximately one foot apart. Boring terminated at 10 ft bgs. Backfilled with bentonite chips and hydrated.
		1.8			
5		2.0	☒		
		2.0	☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC11a-ss2** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101576.0 N, 7615873.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 3:20:00 PM 9/21/2008 END : 3:40:00 PM 9/21/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.5	☒ ☒	GRAVELLY SILT with sand (ML): light brown (7.5YR 6/4), dry, no odor, gravel max diameter=9 cm, angular to subangular, predominantly metamorphic with some sedimentary.	Location located within a narrow wash. Bottom of wash is three feet deep. The surface sample was collected in sidewall of wash. Collected 3 ft sample from several inches below bottom of ravine floor. Refusal at 3.5 ft.
				3.5 feet bgs: refusal.	
5				<u>Total Depth at 3.5 ft below ground surface</u>	
10					
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC11a-ss3** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101382.1 N, 7616115.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 11:00:00 AM 9/20/2008 END : 12:20:00 PM 9/20/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.8	☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel. SANDY SILT (ML): light brown (7.5YR 6/4), dry, no odor, (10% gravel/ 20% sand/ 70% fines), gravel max diameter=3 cm, angular to very angular, metamorphic.	Hand auger to 1 ft before refusal. Drilled two borings to collect sufficient soil sample volume. Boring terminated at 10 ft bgs.
			☒		
		2.3			
5			☒		
		2.5			
		2.5	☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC11b-1 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101349.9 N, 7616265.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 1:00:00 PM 9/17/2008 END : 2:45:00 PM 9/17/2008 LOGGER : T.Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML) with sand: light brown, well-graded, dry, no odor, approximately 50% fines, non-fines are rounded and angular gravel to cobble.	Debris removed from 3-6 ft containing metal signs, ceramic plates and glass resistors. Lightning terminated location before photograph could be taken. Excavation terminated at 10 ft bgs. Pothole filled.
			☒		
5		10.0	☒		
			☒		
10				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC11b-2** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101318.4 N, 7616304.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 8:30:00 AM 9/17/2008 END : 11:45:00 AM 9/17/2008 LOGGER : T.Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML) with sand: light brown, well-graded, dry, no odor, approximately 50% fines, non-fines are rounded, angular, gravel to cobble.	Split sampling of cemented material with black and red specks requested. Excavation terminated at 10 ft bgs, pothole backfilled
			☒		
5		10.0	☒		
			☒		
10					
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC11c-1** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101278.0 N, 7615864.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 3:50:00 PM 9/21/2008 END : 2:05:00 PM 9/22/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.0		SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel.	Stopped work for the day on 9/21/08 at 3:50 pm and resumed on 9/22/08. Drilled three borings to collect sufficient soil volume. Borings are approximately within a 2- foot radius. Boring terminated at 10 ft bgs. Backfilled with bentonite chips and hydrated.
		2.0		GRAVELLY SILT (ML) with sand: light brown, (7.5YR 6/4), dry, no odor, (20% gravel/15% sand/65% fines), max diameter size = 4 cm, angular to subangular, metamorphic.	
5		1.5			
		2.5			
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC11c-2** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101258.0 N, 7615857.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 3:40:00 PM 9/21/2008 END : 10:05:00 AM 9/22/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.0	☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel.	Stopped work on 9/21 and resumed on 9/22/08 after surface sampling. Drilled two borings to collect sufficient soil volume for samples. Borings are approximately 1 foot apart. Boring terminated at 10 ft bgs and backfilled with bentonite chips.
		1.5	☒		
5		1.5	☒		
		1.8	☒	GRAVELLY SILT (ML) with sand: light brown, (7.5YR 6/4), dry, no odor, (25% gravel/20% sand/55% fines), max diameter size = 3.5 cm, angular to subangular, metamorphic.	
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC11c-ss1** **SHEET** 1 **OF** 1

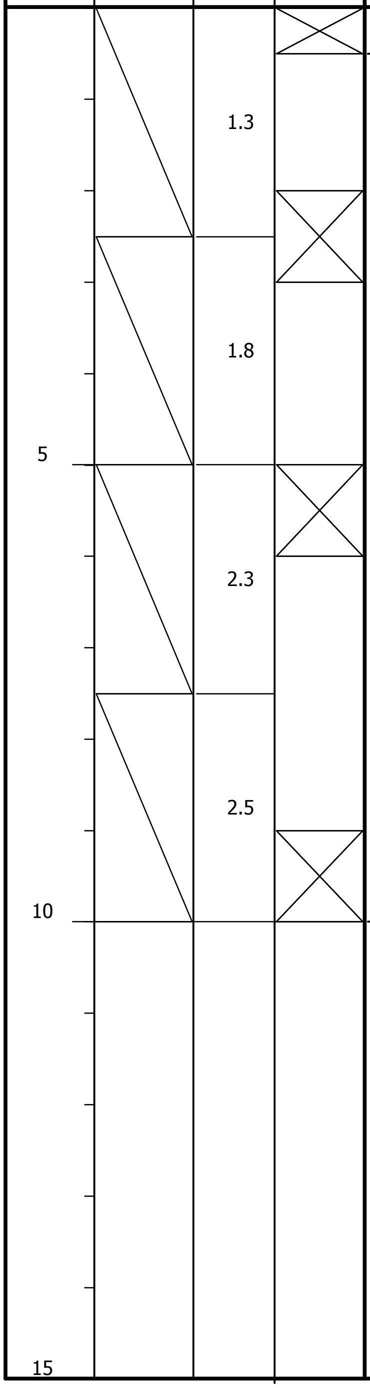
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101242.5 N, 7615783.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 4:20:00 PM 9/21/2008 END : 3:30:00 PM 9/22/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel. SANDY SILT (ML): light brown, (7.5YR 6/4), dry, no odor, (10% gravel/20% sand/70% fines), max gravel diameter size = 4 cm, angular to subangular, metamorphic. Total Depth at 10 ft below ground surface	Collected surface sample on 9/21/08 and resumed drilling on 9/22/08. Drilled two borings to collect sufficient soil volume. Borings are approximately 2 ft apart. Boring terminated at 10 ft bgs, backfilled with bentonite chips and hydrated.

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC11c-ss2 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101242.5 N, 7615790.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 9:50:00 AM 9/22/2008 END : 11:40:00 AM 9/22/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		1.5	☒	SILT (ML): light brown (7.5YR 6/4), dry, no odor, minor sand and gravel.	Hand augered to three feet. Drilled two borings to collect sufficient soil volume. Borings are approximately 1.5 ft apart. Boring terminated at 10 ft bgs. Backfilled with bentonite chips and hydrated.
		2.0	☒	GRAVELLY SILT (ML) with sand: light brown, (7.5YR 6/4), dry, no odor, (30% gravel/20% sand/50% fines), max gravel diameter size = 4 cm, angular to subangular, metamorphic.	
5		1.8	☒	CLAY (CL) with silt: brown, (7.5YR 5/4), soft, moist to very moist, no odor.	
				SANDY SILT (ML) with gravel: light brown, (7.5YR 5/4),moist, no odor, (25% gravel/25% sand/50% fines), max gravel diameter size = 4 cm, angular to subangular, metamorphic.	
		2.0	☒		
10				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC11d-1**	**SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101119.4 N, 7615798.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 11:00:00 AM 9/23/2008 END : 11:55:00 AM 9/23/2008 LOGGER : T.Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILT (ML): light brown, dry, crusty, no odor	Pothole terminated at 10 ft and backfilled.
			☒	SANDY SILT (ML) with gravel: light brown, angular and rounded gravel to cobbles.	
5		10.0			
			☒		
				8 feet bgs: gravel.	
			☒		
10				Hard pan.	
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC11e-1 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101127.3 N, 7615559.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 2:22:00 PM 9/23/2008 END : 5:30:00 PM 9/23/2008 LOGGER : T.Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM): light brown with crust, very few gravel.	Pothole terminated at 10 ft and backfilled.
			☒	SANDY SILT (ML) with gravel: angular and rounded gravel to cobbles. Reddish layer on sidewall at 2.5 ft.	
5		10.0	☒		
				Hard layer with large angular slab-like cobbles to boulders.	
10			☒		
				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC11e-2 **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101125.0 N, 7615580.8 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 8:30:00 AM 9/24/2008 END : 9:30:00 AM 9/24/2008 LOGGER : T.Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM) and vegetation from 0-10". Thin white layer at 12". Homogenous silty sand from 12" to 2.5 ft.	Pothole terminated at 10 ft and backfilled.
			☒	2.5 to 4.0 feet bgs: light brown layers	
				4.0 to 4.5 feet bgs: layer of large cobbles	
5		10.0			
			☒	5 to 10 feet bgs: large rocks and cobbles, moisture increasing with depth.	
			☒		
10				10 feet bgs: very coarse sand, moist, cobbles and gravel.	
				Total Depth at 10 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC11e-ss1 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station
LOCATION : (2101153.8 N, 7615538.4 E)
ELEVATION : ft. ()
DRILLING CONTRACTOR : Turnkey Construction
DRILLING METHOD AND EQUIPMENT : Excavation, Excavator
WATER LEVELS : N/A
START : 2:25:00 PM 9/23/2008
END : 5:00:00 PM 9/23/2008
LOGGER : T.Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM): light brown with crust, very little gravel.	Pothole terminated at 10 ft and backfilled.
			☒	SANDY SILT (ML): native soil, angular and rounded gravel to cobbles.	
5		10.0	☒		
			☒	Hard layer: large piece of concrete at 6'. Sample collected just below concrete.	
10					
				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC11e-ss2 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101123.6 N, 7615532.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Turnkey Construction

DRILLING METHOD AND EQUIPMENT : Excavation, Excavator

WATER LEVELS : N/A START : 2:20:00 PM 9/23/2008 END : 5:30:00 PM 9/23/2008 LOGGER : T.Frank

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM): very little gravel, loose consistency, dry.	Pothole terminated at 10 ft and backfilled.
			☒	SANDY SILT (ML): native soil, angular and rounded gravel to cobbles.	
5		10.0	☒		
				Hard pan from 7-10 ft.	
10			☒		
				Total Depth at 10 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	AOC14-1 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101843.8 N, 7615079.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 11:56:00 AM 9/30/2008 END : 12:35:00 PM 9/30/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML): yellowish brown (10YR 5/4), (30% gravel/10% sand/60% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =40mm.	Drill rate quick and constant, borehole structure was sound. Backfilled with hydrated medium bentonite chips.
			☒		
5			☒		
		15.0			
			☒		
10				SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (50% gravel/10% sand/40% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, clast-or matrix-supported, dry, max clast size=20mm.	
			☒	Total Depth at 15 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-2** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101850.0 N, 7615062.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

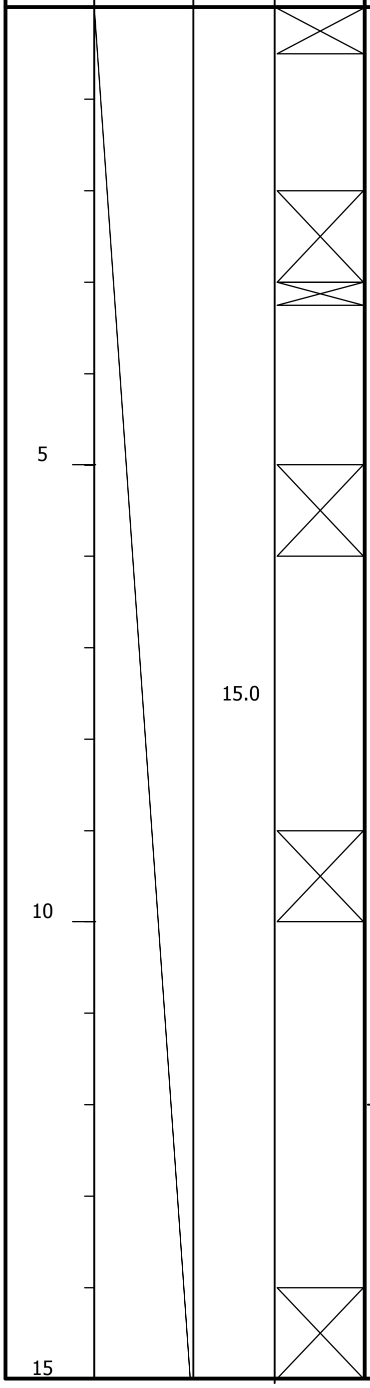
WATER LEVELS : N/A START : 1:36:00 PM 9/30/2008 END : 2:02:00 PM 9/30/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)

INTERVAL (ft)

RECOVERY (ft)

SAMPLE INTERVAL



SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
GRAVELLY SILT (ML): yellowish brown (10YR 5/4), (20% gravel/10% sand/70% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =100mm. 2-3 ft bgs: white powder mixed with existing silt matrix 3-3.25 ft bgs: solid layer of white powder	Drill rate quick and constant, borehole integrity sound. Backfilled with hydrated medium bentonite chips.
SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (50% gravel/10% sand/40% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, clast-or matrix-supported, dry, max clast size=20mm. Total Depth at 15 ft below ground surface	

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-3** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101967.5 N, 7615011.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 7:05:00 AM 10/1/2008 END : 7:28:00 AM 10/1/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (65% gravel/10% sand/25% fines), poorly graded, subangular, no dominant mineralogy, loose density, clast-supported, dry, max clast size=40mm.	Drill rate quick and constant, borehole structure was sound. Backfilled with hydrated medium bentonite chips.
			☒		
5			☒		
		15.0			
			☒		
10					
			☒	Total Depth at 15 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC14-4

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102008.8 N, 7615113.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 8:33:00 AM 10/1/2008 END : 9:11:00 AM 10/1/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILT (ML): yellowish brown (10YR 5/4), (5% gravel/5% sand/90% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =10mm.	Drill rate quick and constant, borehole integrity sound. Backfilled with hydrated medium bentonite chips.
				SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (40% gravel, 10% sand, 50% fines), poorly graded, subangular, no dominant mineralogy, loose density, no structure, dry, max clast size=20mm.	
				SILT (ML): yellowish brown (10YR 5/4), (5% gravel/5% sand/90% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size =10mm.	
5				SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (40% gravel, 10% sand, 50% fines), poorly graded, subangular, no dominant mineralogy, loose density, no structure, dry, max clast size=20mm.	
10		15.0		SILT (ML): yellowish brown, (10YR 5/4), (5% gravel/5% sand/90% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=10mm.	
15				SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (40% gravel, 10% sand, 50% fines), poorly graded, subangular, no dominant mineralogy, loose density, no structure, dry, max clast size=20mm. Total Depth at 15 ft below ground surface	

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-5** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102083.1 N, 7615100.7 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 8:40:00 AM 10/2/2008 END : 9:15:00 AM 10/2/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY SAND (SM) with gravel: reddish brown (5YR 5/4), (25% gravel/55% sand/20% fines), poorly graded, angular to subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=20mm.	Drill rate quick and constant, borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5			☒		
				POORLY GRADED GRAVEL (GP-GM) with silt and sand: yellowish brown, (10YR5/4), (60% gravel/20% sand/10% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, clast-supported, dry, max clast size= 30 mm.	
		15.0			
			☒		
10					
			☒	Total Depth at 15 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-6** SHEET 1 OF 1

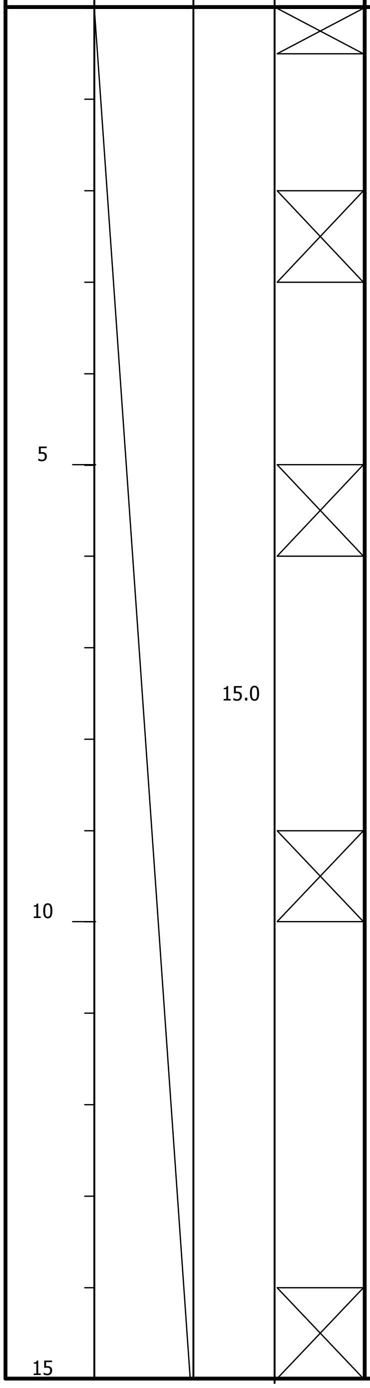
SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102038.7 N, 7615140.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 12:20:00 PM 10/2/2008 END : 1:06:00 PM 10/2/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft) INTERVAL (ft) RECOVERY (ft) SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	SILTY GRAVEL (GM) with sand: reddish brown, (5YR5/4), 0-1 ft bgs, yellowish brown (10YR 5/4), 1-15 ft bgs: (60% gravel/25% sand/15% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, clast-supported, dry, max clast size= 50 mm. Total Depth at 15 ft below ground surface	Drill rate quick and constant, borehole integrity sound. Backfilled with hydrated medium bentonite chips.

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-7** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102083.2 N, 7615244.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 7:25:00 AM 10/2/2008 END : 7:56:00 AM 10/2/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY SAND (SM) with gravel: reddish brown (5YR 5/4), (25% gravel/55% sand/20% fines), poorly graded, angular to subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=20mm.	Drill rate quick and constant, borehole integrity sound. Difficulty recovering last five feet of sediment. Backfilled with hydrated medium bentonite chips.
5					
		15.0		POORLY GRADED GRAVEL (GP-GM) with silt and sand: yellowish brown, (10YR5/4), (60% gravel/20% sand/10% fines), poorly graded, subangular to subrounded, no dominant mineralogy, very loose density, clast-supported, dry, max clast size= 30 mm.	
10					
15				<u>Total Depth at 15 ft below ground surface</u>	

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-8** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102036.7 N, 7615236.2 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 2:32:00 PM 10/2/2008 END : 3:05:00 PM 10/2/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SANDY SILT (ML) with gravel and sand: reddish brown (5YR5/4), (20% gravel/20% sand/60% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size= 20mm.	Drill rate quick and constant. Borehole integrity sound. Recovery difficult in 13-15' bgs zone. Backfilled with hydrated medium bentonite chips.
			☒	SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (70% gravel/10% sand/20% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, clast-supported, dry, max clast size =40mm.	
5			☒		
		15.0			
10			☒		
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel, 30% sand, 30% fines), poorly graded, subangular to subrounded, no dominant mineralogy, very loose density, matrix-supported, dry, max clast size=30mm. Total Depth at 15 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-9** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101941.5 N, 7615263.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 10:35:00 AM 10/1/2008 END : 11:12:00 AM 10/1/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒ ☒	GRAVELLY SILT (ML): yellowish brown (10YR 5/4), (40% gravel, 10% sand, 50% fines), poorly graded, subangular, no dominant mineralogy, loose density, no structure, dry, max clast size=30mm.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5			☒	SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (60% gravel/10% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, clast-supported, dry, max clast size =40mm.	
10		15.0	☒	GRAVELLY SILT (ML): yellowish brown (10YR5/4), (20% gravel/10% sand/70% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size= 20mm.	
15			☒	Total Depth at 15 ft below ground surface	

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-10** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101839.8 N, 7615271.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 12:50:00 PM 10/1/2008 END : 1:19:00 PM 10/1/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				GRAVELLY SILT (ML): yellowish brown (10YR 5/4). (40% gravel/10% sand/50% fines), poorly graded, subangular, no dominant mineralogy, loose density, no structure, dry, max clast size=30mm.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
		15.0			
10					
				Total Depth at 15 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	BORING NUMBER: **AOC14-11** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101910.4 N, 7615174.8 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 12:04:00 AM 10/1/2008 END : 10:08:00 AM 10/1/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel, 30% sand, 30% fines), poorly graded, subangular, no dominant mineralogy but primarily quartz, fine-grained sand, loose density, matrix-supported, dry, max clast size=30mm.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
			☒		
5			☒		
		15.0			
			☒		
10					
				GRAVELLY SILT (ML): yellowish brown (10YR5/4), (20% gravel/10% sand/70% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size= 30mm.	
			☒	Total Depth at 15 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC14-12** **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101870.6 N, 7615042.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 2:21:00 PM 9/30/2008 END : 2:57:00 PM 9/30/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				GRAVELLY SILT (ML): reddish brown (5YR 5/4), (35% gravel/10% sand/55% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=40mm.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5			☒		
		15.0		At 7.5 feet bgs: color change to yellowish brown (10YR 5/4).	
			☒		
10					
			☒	Total Depth at 15 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: AOC14-13 **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101909.3 N, 7615068.4 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 3:25:00 PM 9/30/2008 END : 3:47:00 PM 9/30/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			☒	GRAVELLY SILT (ML): yellowish brown (10YR 5/4), (30% gravel/5% sand/65% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=20 mm. 0.5 -1.5 ft bgs: presence of asbestos fibers.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5			☒		
		15.0			
			☒		
10					
			☒	Total Depth at 15 ft below ground surface	
15					

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-ss1** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101920.5 N, 7614987.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 7:43:00 AM 10/1/2008 END : 8:13:00 AM 10/1/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM): yellowish brown (10YR 5/4), (80% gravel/0% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, clast-supported, dry, max clast size=40 mm.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
				GRAVELLY SILT (ML): yellowish brown (10 YR 5/4), (40% gravel/0% sand/60% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size= 20mm.	
		15.0			
10					
				Total Depth at 15 ft below ground surface	
15					

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **AOC14-ss2** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2101995.9 N, 7615272.0 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 1:42:00 PM 10/1/2008 END : 2:10:00 PM 10/1/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown (10YR 5/4), (40% gravel/30% sand/30% fines), poorly graded, subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=40mm.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
		15.0			
10					
				Total Depth at 15 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-ss3** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102033.1 N, 7615063.5 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 10:53:00 AM 10/2/2008 END : 11:51:00 AM 10/2/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY GRAVEL (GM) with sand: yellowish brown, (10YR 5/4), (60% gravel/25% sand/15% fines), poorly graded, subangular to subrounded, no dominant mineralogy, loose density, clast-supported, dry, max clast size=50mm	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5					
		15.0			
10					
				Total Depth at 15 ft below ground surface	
15					

PROJECT NUMBER:	BORING NUMBER:
354948.FP.08.FW.SC	**AOC14-ss4** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2102037.4 N, 7614997.3 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Boart Longyear

DRILLING METHOD AND EQUIPMENT : Rotosonic, Spider w/ 4core barrel

WATER LEVELS : N/A START : 9:45:00 AM 10/2/2008 END : 10:18:00 AM 10/2/2008 LOGGER : A. Brewster

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
				SILTY SAND (SM) with gravel: yellowish brown (10YR 5/4), (25% gravel/55% sand/20% fines), poorly graded, angular to subangular, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=20mm.	Drill rate quick and constant. Borehole integrity sound. Backfilled with hydrated medium bentonite chips.
5				GRAVELLY SILT (ML) with sand: yellowish brown (10YR 5/4), (25% gravel/15% sand/60% fines), poorly graded, angular to subrounded, no dominant mineralogy, loose density, matrix-supported, dry, max clast size=30 mm.	
		15.0		SILTY GRAVEL (GM) with sand: yellowish brown, (10YR 5/4), (60% gravel/20% sand/20% fines), poorly graded, subangular, no dominant mineralogy, loose density, clast-supported, dry, max clast size=40mm	
10					
15				Total Depth at 15 ft below ground surface	

PROJECT NUMBER: **354948.FP.08.FW.SC**	**BORING NUMBER:** **300B-2** **SHEET 1 OF 1**

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100969.7 N, 7616611.1 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 11:55:00 AM 10/3/2008 END : 12:40:00 PM 9/21/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.3	☒	SANDY SILT (ML): brown (7.5YR 5/3), dry, no odor, poorly sorted (10% gravel/30% sand/ 60% fines), max gravel diameter =8cm, angular to subangular, metamorphic.	Hand auger to 1 ft before encountering refusal. Drilled two borings in unsuccessful effort to drill down to 6 ft bgs. Encountered drilling refusal at 5 ft bgs in first drilling attempt. Encountered drilling refusal at 3 ft refusal in second drilling attempt. Backfilled with bentonite chips and hydrated.
		1.8	☒		
5				5.0 feet bgs: refusal	
				Total Depth at 5 ft below ground surface	
10					
15					

PROJECT NUMBER: 354948.FP.08.FW.SC	**BORING NUMBER:** 300B-3 **SHEET** 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100961.1 N, 7616598.6 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 11:00:00 AM 10/3/2008 END : 11:50:00 AM 10/3/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		3.0		SANDY SILT (ML): brown (7.5YR 5/3), dry, no odor, poorly sorted (10% gravel/30% sand/ 60% fines), max gravel diameter =8cm, angular to subangular, metamorphic.	Hand auger to 1 ft before refusal. Drilled three borings approximately 1 ft apart to collect sufficient soil volume. Boring terminated at 6 ft bgs. Backfilled with bentonite chips and hydrated.
		2.7			
5					
				Total Depth at 6 ft below ground surface	
10					
15					

PROJECT NUMBER: 354948.FP.08.FW.SC

BORING NUMBER: 300B-4

SHEET 1 **OF** 1

SOIL BORING LOG

PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station

LOCATION : (2100958.4 N, 7616609.8 E)

ELEVATION : ft. ()

DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A

START : 9:40:00 AM 10/3/2008

END : 10:55:00 AM 10/3/2008

LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.3	☒ ☒	SANDY SILT (ML): brown (7.5YR 5/3), dry, no odor, poorly sorted (10% gravel/30% sand/ 60% fines), max gravel diameter =6cm, angular to subangular, metamorphic.	Hand auger to .5 ft before refusal. Hit refusal in first boring at 4.5 bgs. Hit refusal in 2nd boring at 5 ft bgs. Hit refusal at 2.5 ft in 3rd boring. Drilled three borings in attempt to get to 6 ft bgs.
		1.5	☒		
5				5.0 feet bgs: refusal	
				Total Depth at 5 ft below ground surface	
10					
15					

CH2MHILL	**PROJECT NUMBER:** **354948.FP.08.FW.SC**	**BORING NUMBER:** **300B-5** **SHEET 1 OF 1**

SOIL BORING LOG

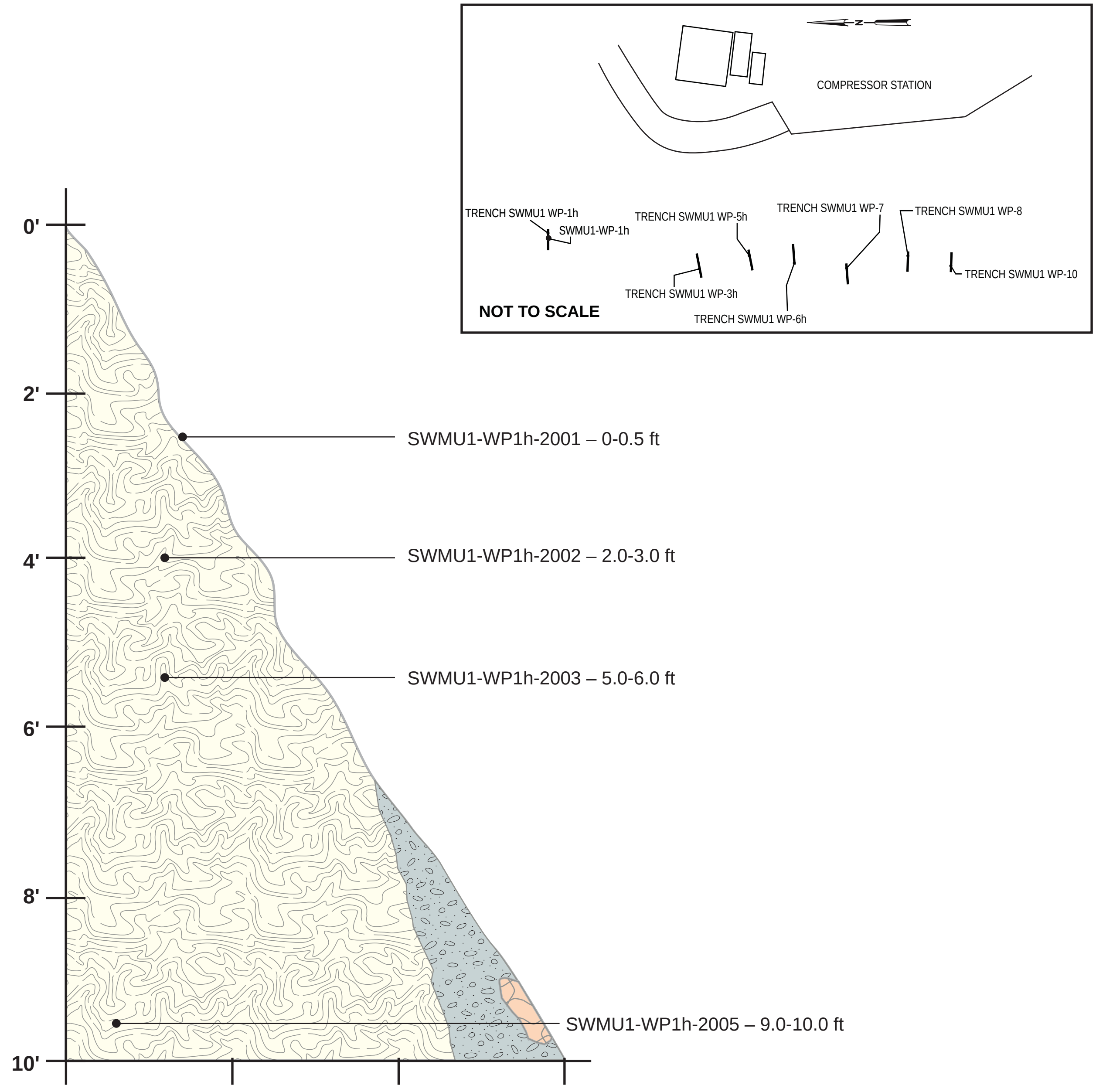
PROJECT : TOPOCK - SOIL PART A, PHASE 1, PG&E Compressor Station LOCATION : (2100969.7 N, 7616620.9 E)

ELEVATION : ft. () DRILLING CONTRACTOR : Gregg Drilling and Testing

DRILLING METHOD AND EQUIPMENT : Geoprobe, Rhino Rig

WATER LEVELS : N/A START : 8:30:00 AM 10/3/2008 END : 9:40:00 AM 10/3/2008 LOGGER : R.Tweidt

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	SAMPLE INTERVAL	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		2.3		SANDY SILT (ML): brown (7.5YR 5/3), dry, no odor, poorly sorted (10% gravel/40% sand/ 50% fines), max gravel diameter =7cm, angular to subangular, metamorphic.	First boring terminated at 5.5 ft bgs. Second boring terminated at 2.5 ft bgs. Third boring terminated at 3 ft bgs. Attempted three times to drill to 6 ft bgs. Locations drilled within 2 ft radius of stake location. Boring backfilled with bentonite chips and hydrated.
		2.1			
5				5.5 feet bgs: refusal.	
				Total Depth at 5.5 ft below ground surface	
10					
15					



SCALE: 1" = 2'

LEGEND

▨	HARDPAN: NATIVE HIGHLY CONSOLIDATED SILTY SAND (SM) WITH GRAVEL AND COBBLES
▨	ROCKY RUBBLE
▨	GREEN STAINED ROCKY RUBBLE AND DEBRIS
●	SAMPLE LOCATION

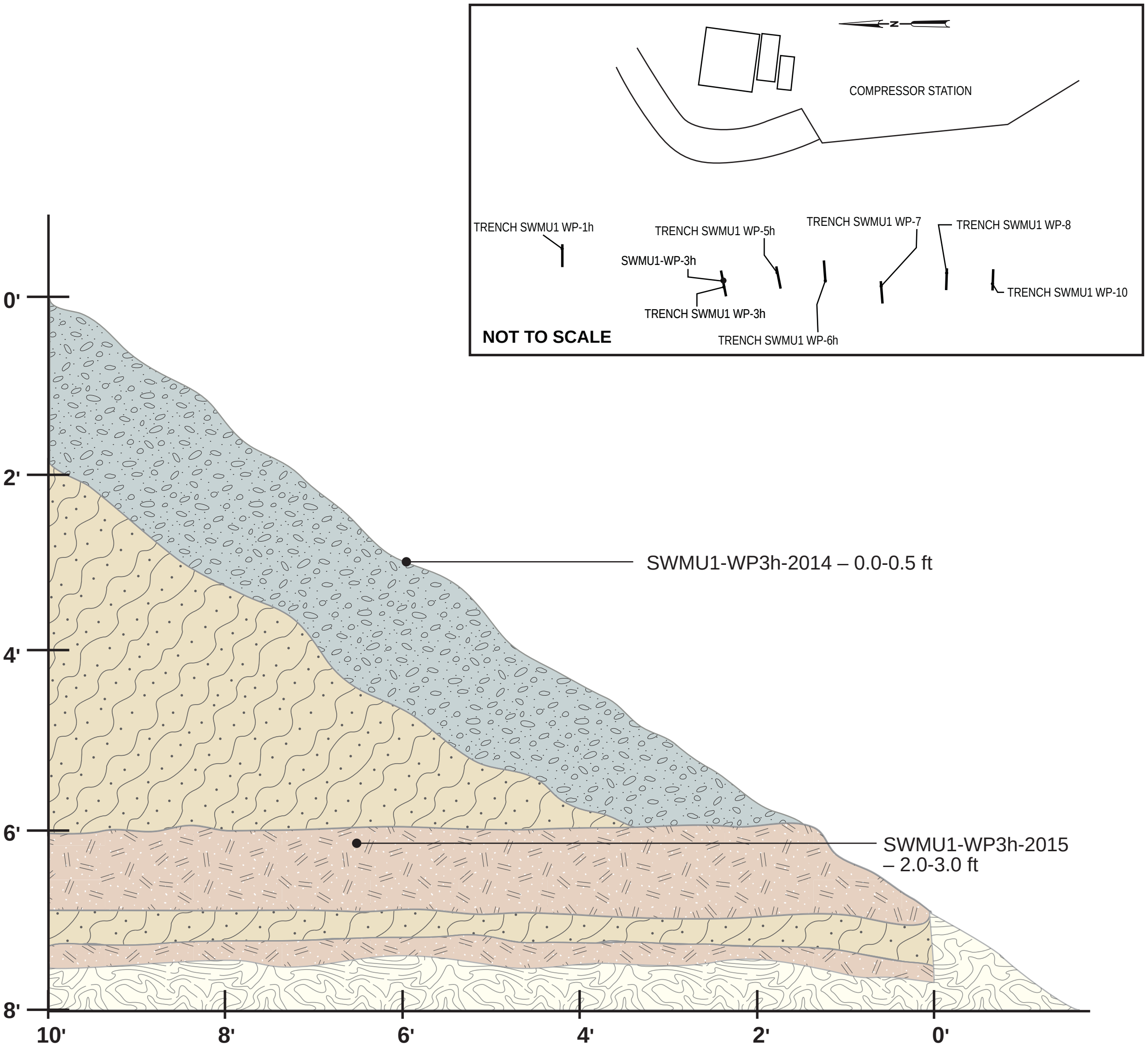
TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING SOUTH   DATE: 10/7/08

NOTES:
1. EXCAVATION TRENCH TO INVESTIGATE EXTENT OF WHITE MATERIAL TO SOUTH OF SITE
2. SAMPLES COLLECTED FROM EXCAVATOR BUCKET

FIGURE B-1
TRENCH SWMU1 WP-1h

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



SCALE: 1" = 2'

LEGEND

▨ HARDPAN: NATIVE HIGHLY CONSOLIDATED SILTY SAND (SM) WITH GRAVEL AND COBBLES

▨ LIGHT BROWN SANDY SILT (ML) WITH WHITE POWDER MATERIAL

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL

▨ ROCKY RUBBLE

● SAMPLE LOCATION

TRENCH SIDEWALL RECORD

TRENCH VIEW: LOOKING SOUTH DATE: 10/7/08

NOTES:

1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. TRENCH EXTENDS 10' INTO SLOPE
3. SIDE WALL COMPETENT
4. ROCKY RUBBLE FROM ROCK FALLS ON SURFACE, LIGHT BROWN SANDY SILT BELOW RUBBLE
5. LAYER OF CONSOLIDATED WHITE POWDERY MATERIAL JUST BELOW SURFACE AT TOE OF SLOPE, 10"-12" THICK
6. NO GROUNDWATER OR ODORS ENCOUNTERED, TRENCH BACKFILLED

FIGURE B-2
TRENCH SWMU1 WP-3h

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
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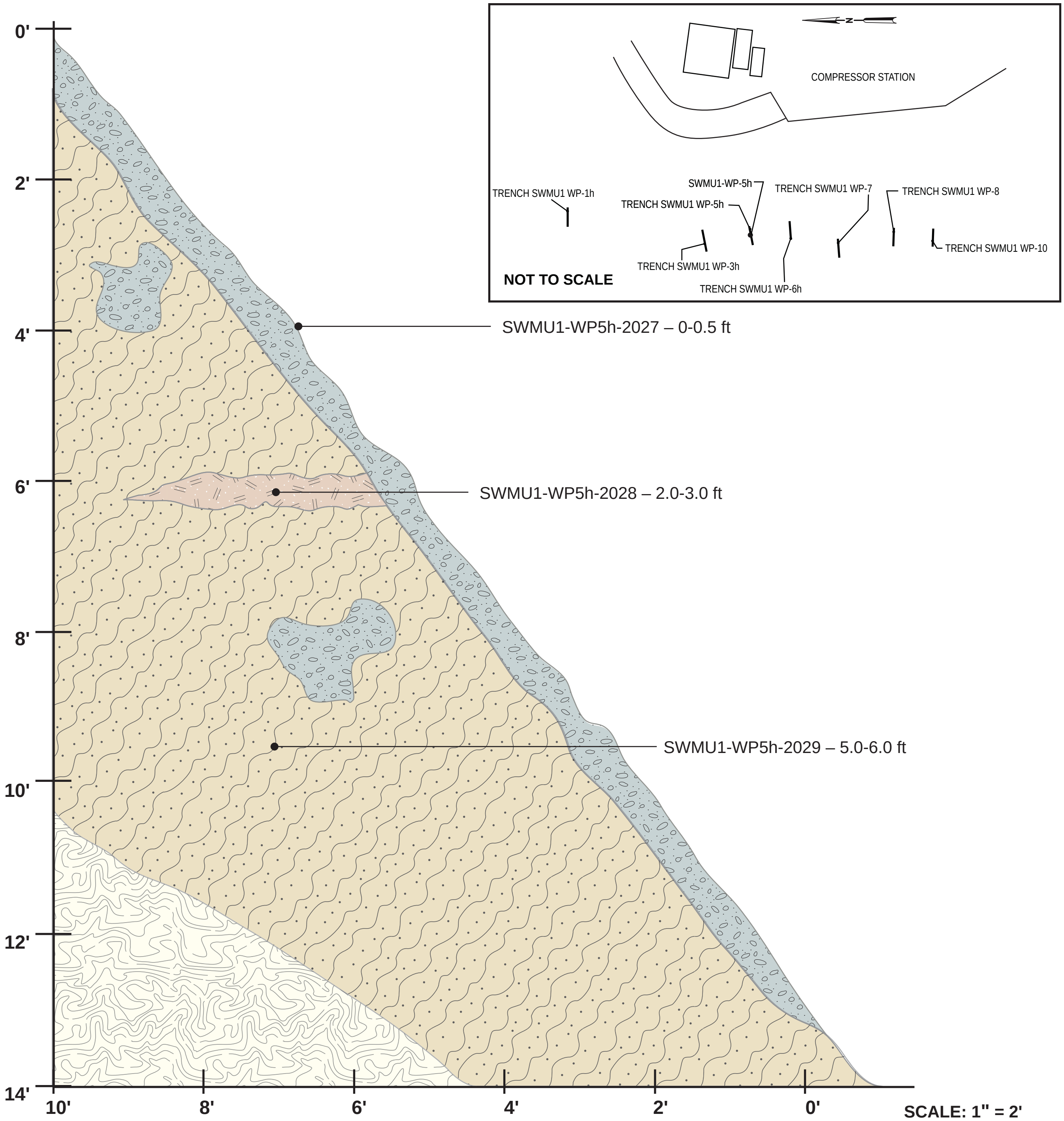

LEGEND

▨ HARDPAN: NATIVE HIGHLY CONSOLIDATED SILTY SAND (SM) WITH GRAVEL AND COBBLES

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL

● SAMPLE LOCATION

▨ LIGHT BROWN SANDY SILT (ML) WITH WHITE POWDER MATERIAL

▨ ROCKY RUBBLE

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING SOUTH DATE: 10/7/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. TRENCH EXTENDS 10' INTO SLOPE
3. SIDE WALL COMPETENT, SURFACE LAYER ROCKY RUBBLE OVER HETEROGENEOUS LIGHT BROWN SILTY SAND WITH ONE LENSE OF WHITE POWDER AND POCKETS OF ROCKY RUBBLE
4. NO GROUNDWATER OR ODORS ENCOUNTERD, TRENCH BACKFILLED

FIGURE B-3
TRENCH SWMU1 WP-5h
RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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NEEDLES, CALIFORNIA

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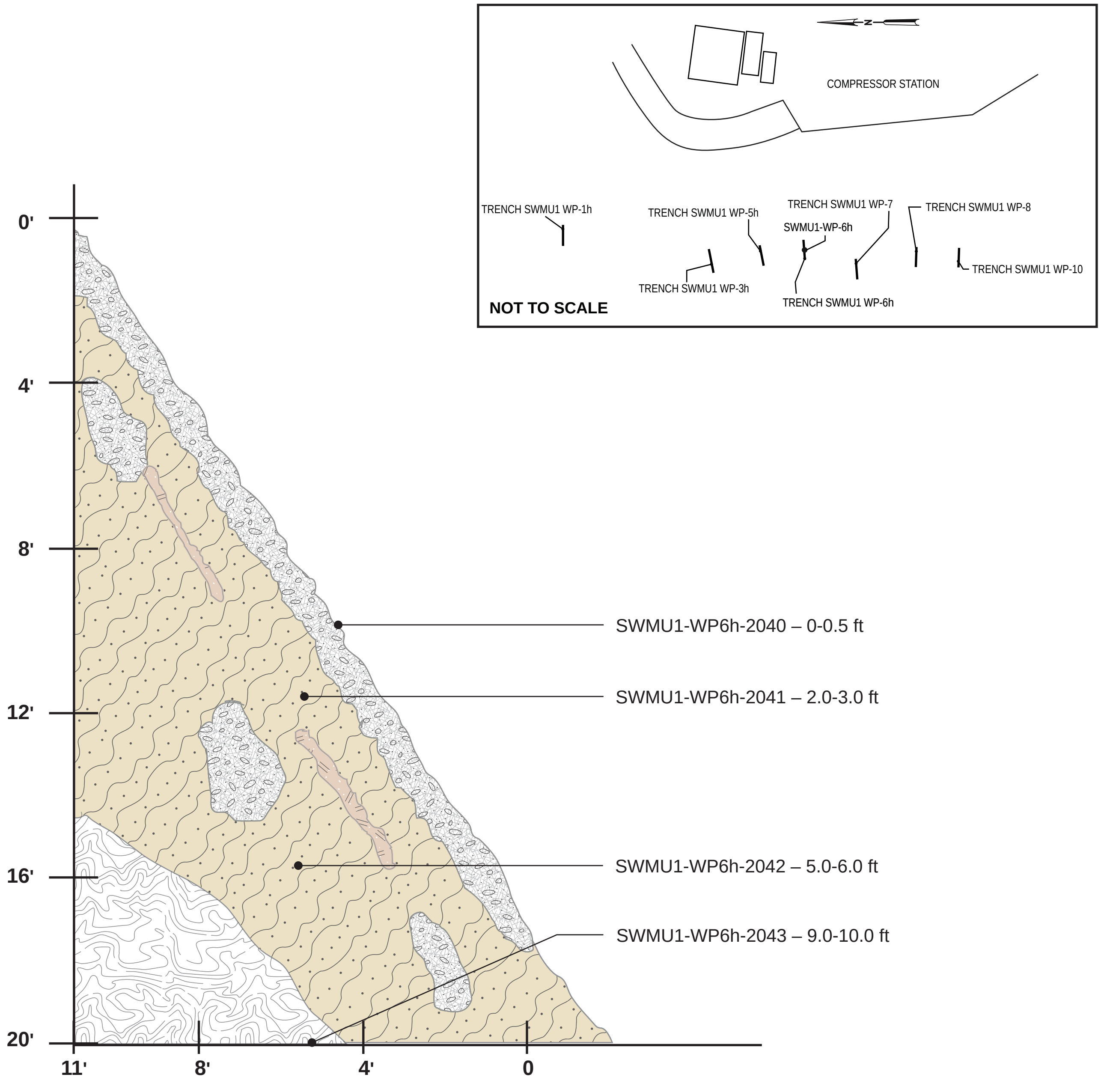

SCALE: 1" = 4'

LEGEND

▨ HARDPAN: NATIVE HIGHLY CONSOLIDATED SILTY SAND (SM) WITH GRAVEL AND COBBLES

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL

● SAMPLE LOCATION

▨ LIGHT BROWN SANDY SILT (ML) WITH WHITE POWDER MATERIAL

▨ ROCKY RUBBLE AND DEBRIS

TRENCH SIDEWALL RECORD

TRENCH VIEW: LOOKING SOUTH DATE: 10/6/08

NOTES:

1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. TRENCH EXTENDS 11' INTO SLOPE
3. SIDE WALL COMPETENT
4. SURFACE LAYER CONTAINS ROCKS, GRAVEL, COBBLES AND DEBRIS INCLUDING WIRE, GLASS, ETC., CONTAINING SOME LENSES OF WHITE POWDERY MATERIAL
5. TRENCH MAINLY LIGHT BROWN SANDY SILT WITH GRAVEL CONTAINING THIN LENSES OF WHITE POWDERY MATERIAL. SOME POCKETS OF COARSER GROUND GRAVEL
6. NO GROUNDWATER OR ODORS ENCOUNTERED, TRENCH BACKFILLED

FIGURE B-4
TRENCH SWMU1 WP-6h

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PACIFIC GAS AND ELECTRIC COMPANY
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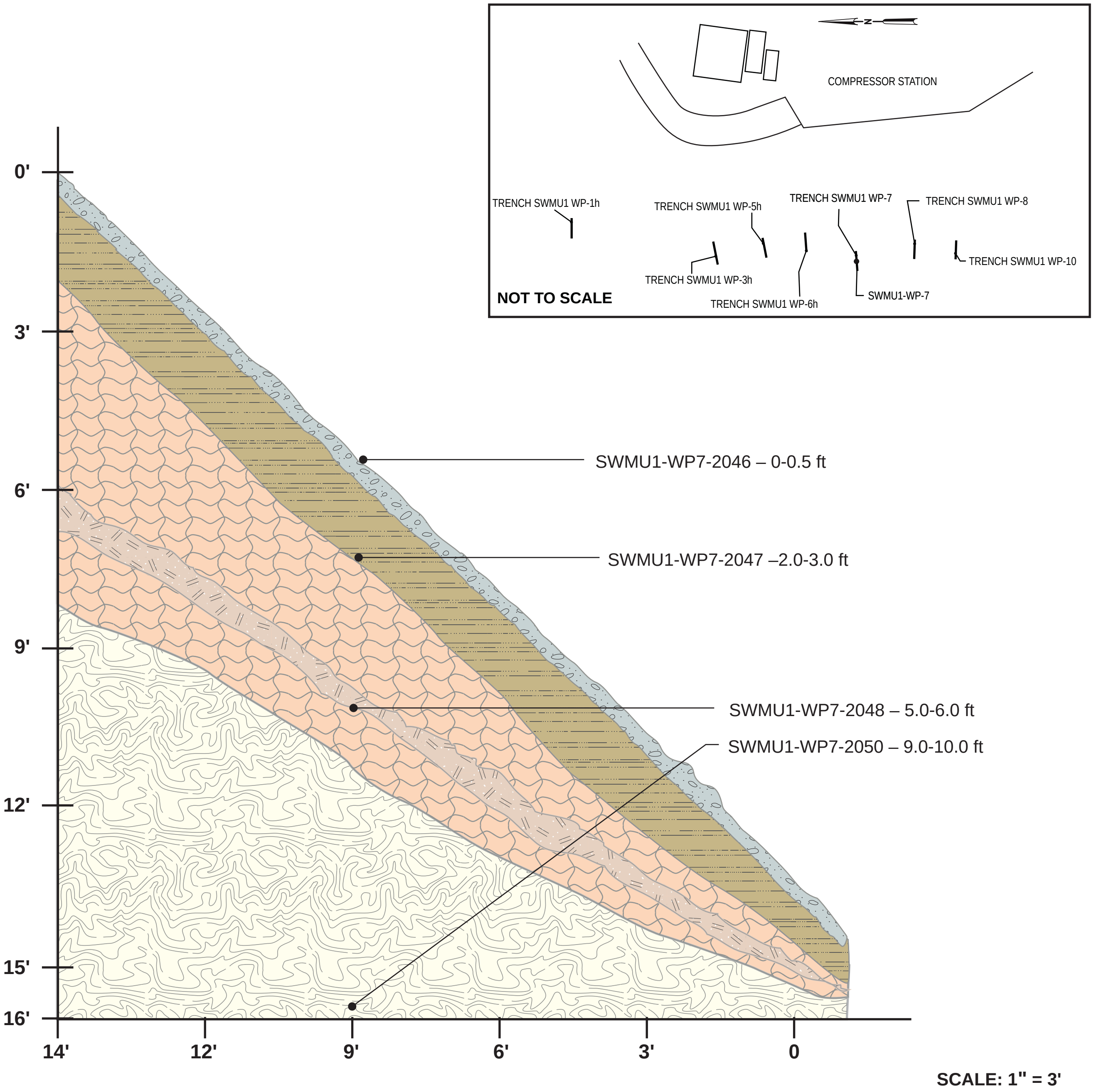

LEGEND

▨ HARDPAN: NATIVE HIGHLY CONSOLIDATED SILTY SAND (SM) WITH GRAVEL, AND COBBLES

▨ GREEN STAINED LIGHT BROWN SILTY SAND (SM) WITH GRAVEL

▨ LIGHT BROWN SANDY SILT (ML) WITH WHITE POWDER MATERIAL

▨ CONSOLIDATED WHITE CHALKY MATERIAL STAINED IN SOME PLACES 2 RED STREAKS

▨ ROCKY RUBBLE

● SAMPLE LOCATION

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING SOUTH DATE: 10/6/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. TRENCH EXTENDS 14' INTO SLOPE
3. SIDE WALL COMPETENT, SURFACE LAYER OF ROCKY RUBBLE
4. OVER 2' THICK LAYER OF CONSOLIDATED WHITE MATERIAL STAINED 2 RED STREAKS
5. OVER LENSES OF WHITE MATERIAL MIXED IN NATIVE LIGHT BROWN SANDY SILT AND MOST GREENISH SAND
6. NO GROUNDWATER OR ODORS ENCOUNTERED, TRENCH BACKFILLED

FIGURE B-5
TRENCH SWMU1 WP-7

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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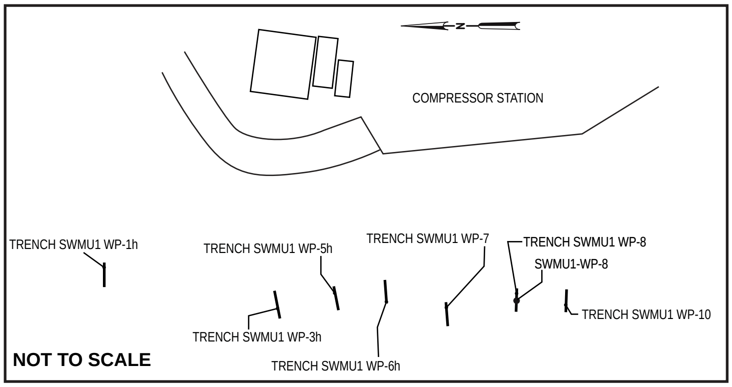

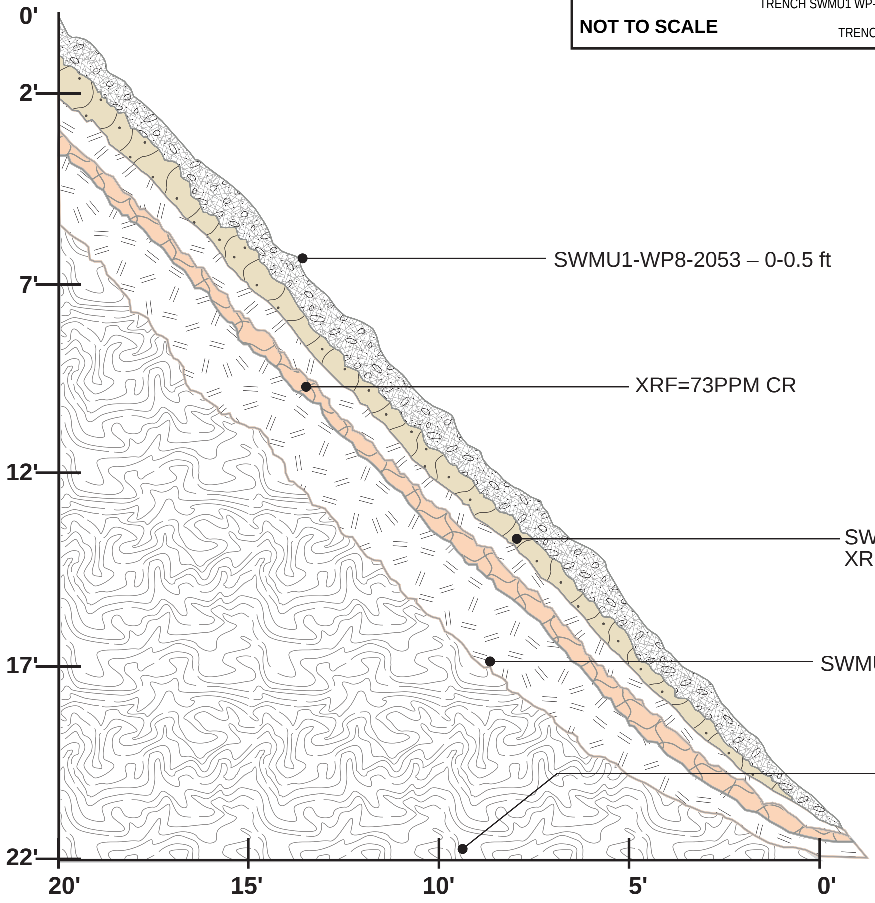

SCALE: 1" = 5'

LEGEND

▨ GREEN STAINED LIGHT BROWN SILTYSAND (SM) WITH GRAVEL

▨ WHITE POWDER MATERIAL WITH LIGHT BROWN SILTY SAND (SM) WITH GRAVEL

▨ LIGHT BROWN SILTY SAND (SM) WITH GRAVEL

▨ RUBBLE & DEBRIS

▨ HARDPAN: NATIVE HIGHLY CONSOLIDATED SILTY SAND (SM) WITH GRAVEL, AND COBBLES

● SAMPLE LOCATION

PPM = PARTS PER MILLION

TRENCH SIDEWALL RECORD

TRENCH VIEW: LOOKING SOUTH   DATE: 10/6/08

NOTES:

1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. TRENCH EXTENDS 20' INTO SLOPE
3. SIDE WALLS COMPETENT, LAYERS OF RUBBLE AT SURFACE CONTAINING DEBRIS INCLUDING CHICKEN WIRE, A ROAD SIGN, REDDISH GRITTY MATERIAL, POORLY SORTED GRAVEL AND COBBLES
4. NO GROUNDWATER OR ODOR ENCOUNTERED, TRENCH BACKFILLED

FIGURE B-6
TRENCH SWMU1 WP-8

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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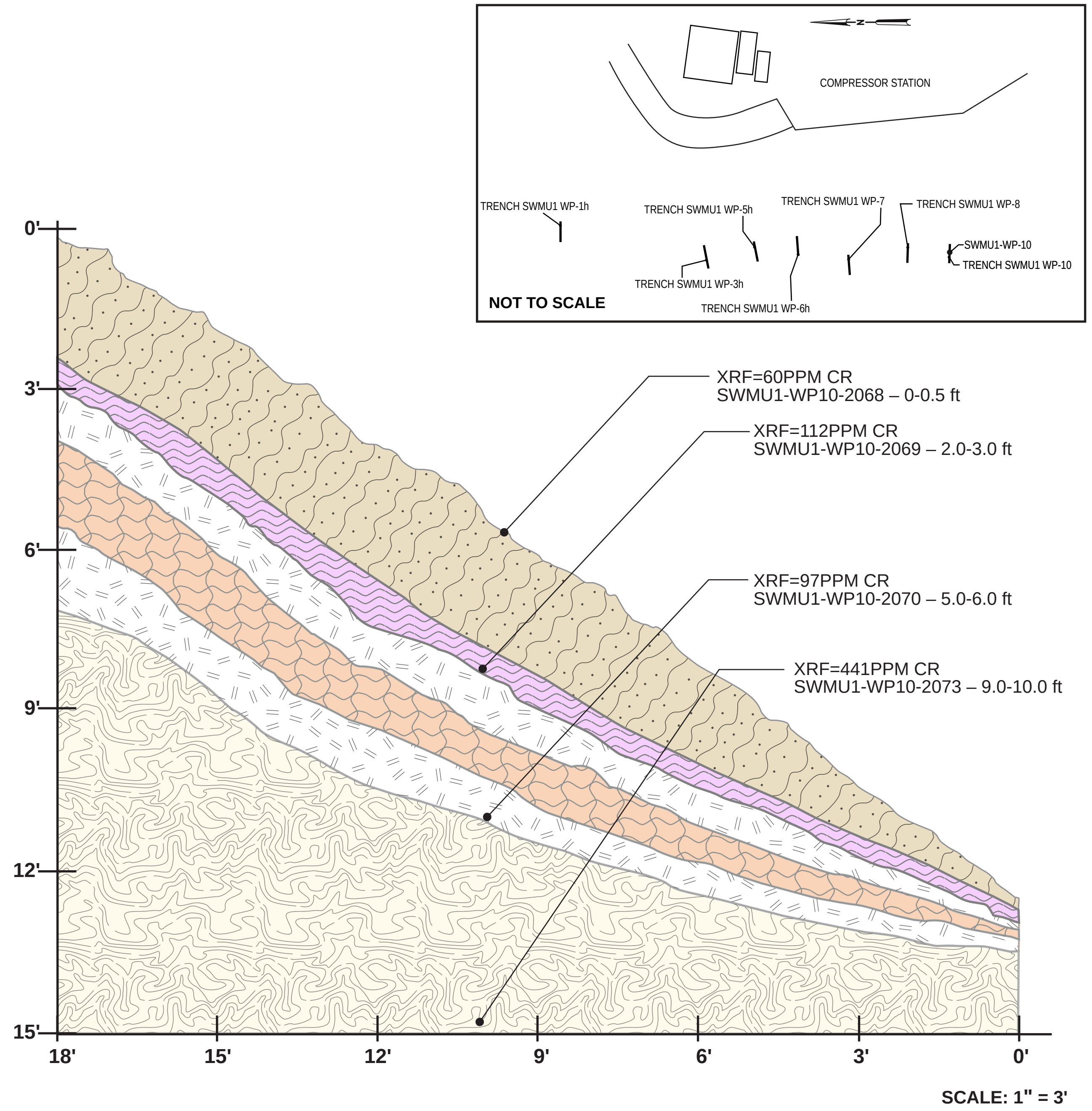

XRF=60PPM CR
SWMU1-WP10-2068 – 0-0.5 ft

XRF=112PPM CR
SWMU1-WP10-2069 – 2.0-3.0 ft

XRF=97PPM CR
SWMU1-WP10-2070 – 5.0-6.0 ft

XRF=441PPM CR
SWMU1-WP10-2073 – 9.0-10.0 ft

SCALE: 1" = 3'

LEGEND

▨ GREEN STAINED LIGHT BROWN SILTY SAND (SM) WITH GRAVEL

▨ WHITE POWDER MATERIAL WITH LIGHT BROWN SILTY SAND (SM) WITH GRAVEL

▨ LIGHT BROWN SILTY SAND (SM) WITH GRAVEL

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL WITH WHITE POWDER MATERIAL

▨ HARDPAN: NATIVE HIGHLY CONSOLIDATED SILTY SAND (SM) WITH GRAVEL, AND COBBLES

● SAMPLE LOCATION

PPM = PARTS PER MILLION

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING SOUTH DATE: 10/5/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. TRENCH EXTENDS 18' INTO SLOPE
3. SIDE WALLS COMPETENT, SOME SMALL AREAS OF SLIDING. LAYERS OF WHITE POWDER AND GREEN STAINED SOIL UNCOVERED, WATER USED LIBERALLY TO CONTAIN DUST
4. NO GROUNDWATER OR ODORS ENCOUNTERED, TRENCH BACKFILLED

FIGURE B-7
TRENCH SWMU1 WP-10
RCRA FACILITY INVESTIGATION/REMEDIAL
INVESTIGATION SOIL INVESTIGATION PART A,
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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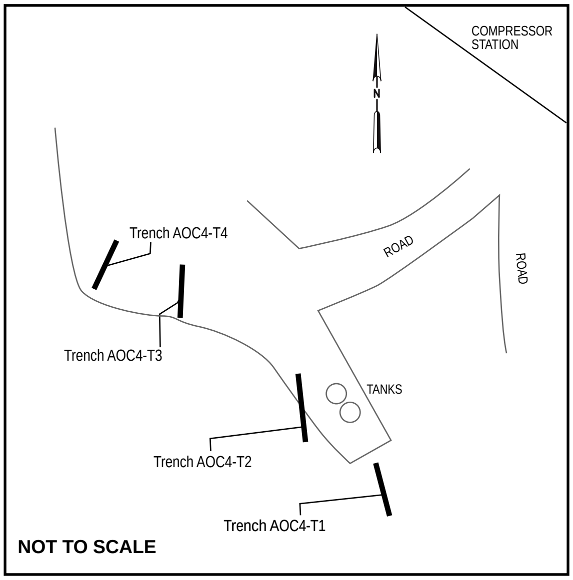

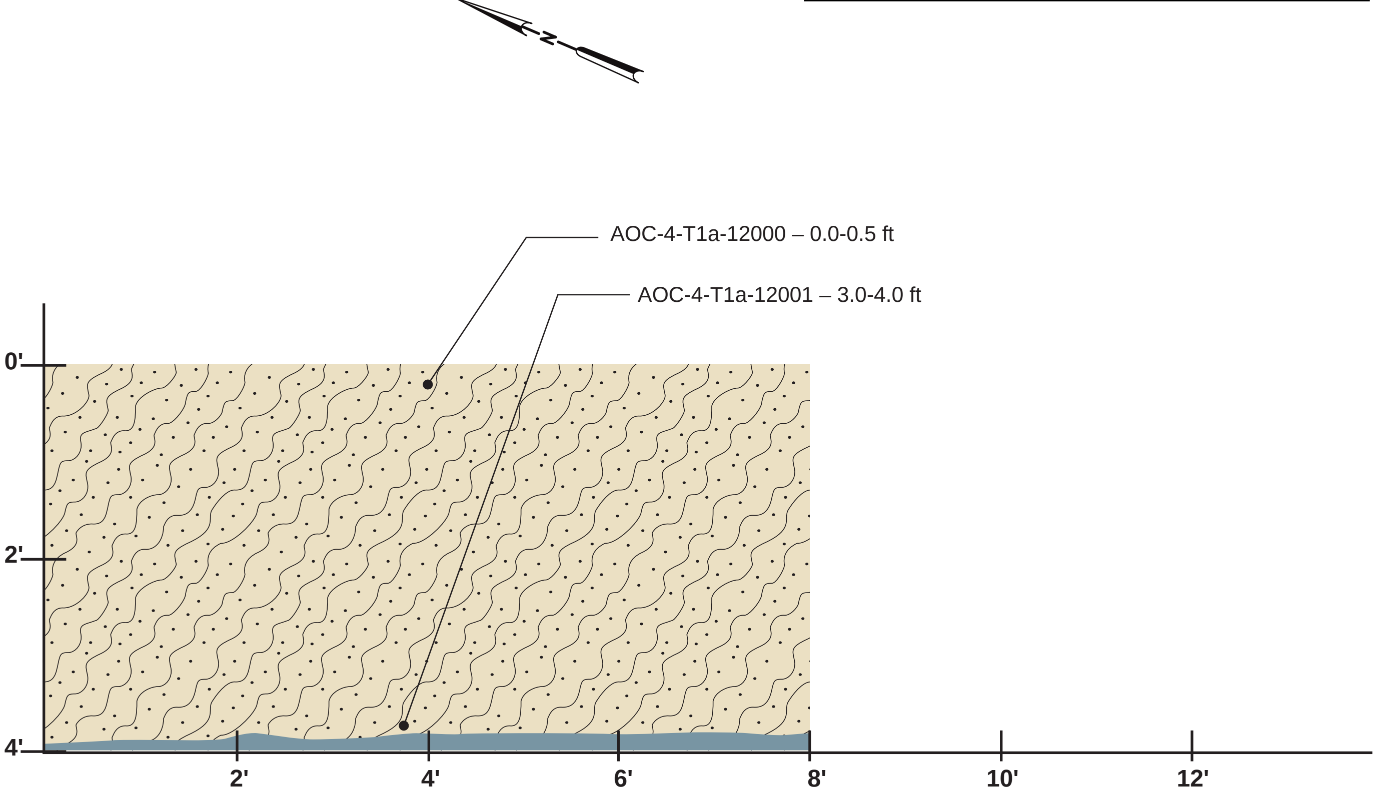

SCALE: 1" = 2'

LEGEND

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL - FILL MATERIAL

■ BEDROCK

● SAMPLE LOCATION

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING EAST DATE: 10/22/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-8
TRENCH AOC4-T1

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE I DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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NEEDLES, CALIFORNIA

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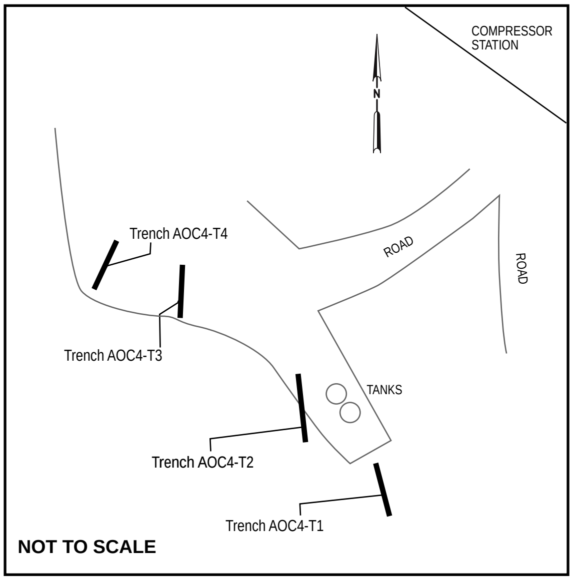

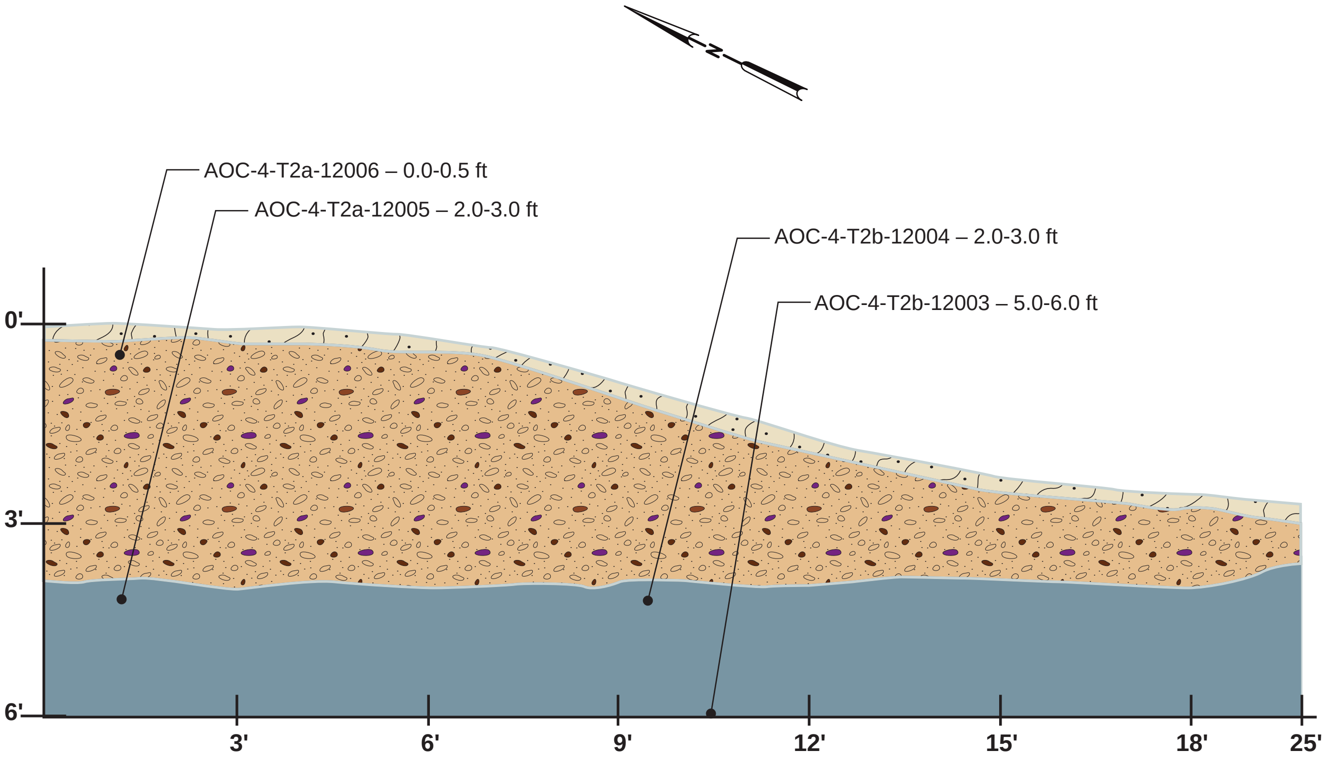

SCALE: 1" = 3'

LEGEND

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL

▨ FILL MATERIAL - TRASH, INCLUDING HOUSEHOLD TRASH, BURNED TRASH, GLASSWARE, TILES, ROPE, PLASTIC, ETC.

■ BEDROCK

● SAMPLE LOCATION

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING EAST   DATE: 10/22/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-9
TRENCH AOC4-T2

RCRA FACILITY INVESTIGATION/REMEDIAL
INVESTIGATION SOIL INVESTIGATION PART A,
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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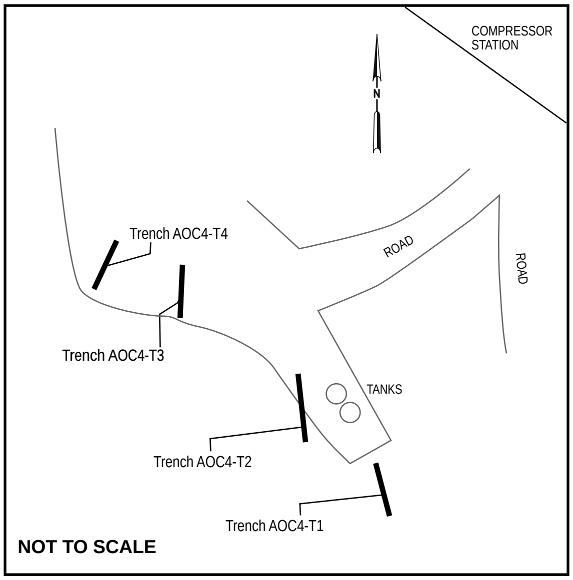

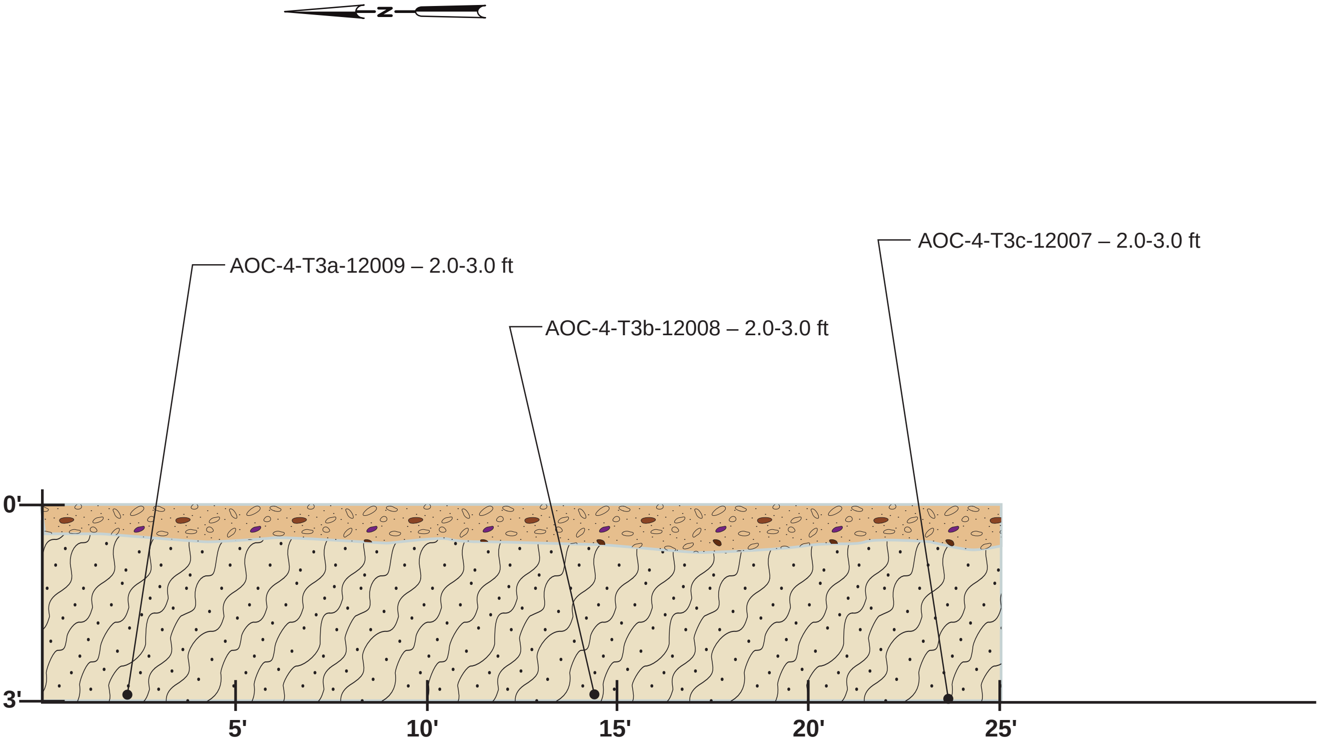

VERTICAL SCALE: 1" = 3'
HORIZONTAL SCALE: 1" = 5'

LEGEND

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL - FILL MATERIAL

● SAMPLE LOCATION

▨ FILL MATERIAL - TRASH, INCLUDING HOUSEHOLD TRASH, BURNED TRASH, GLASSWARE, TILES, ROPE, PLASTIC, ETC.

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING NORTH DATE: 10/24/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-10
TRENCH AOC4-T3

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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NEEDLES, CALIFORNIA

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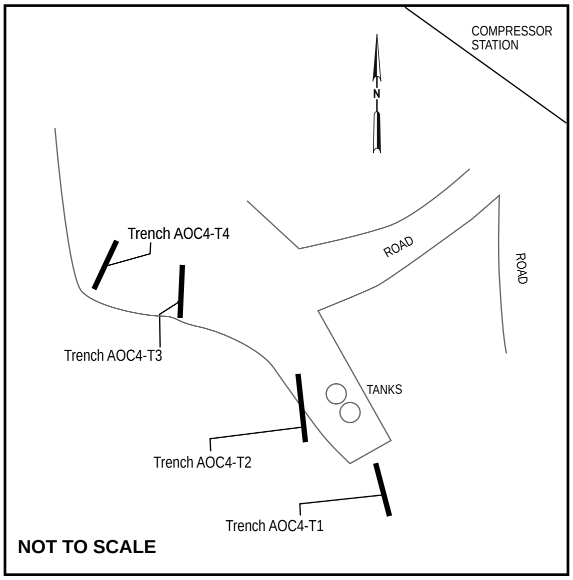

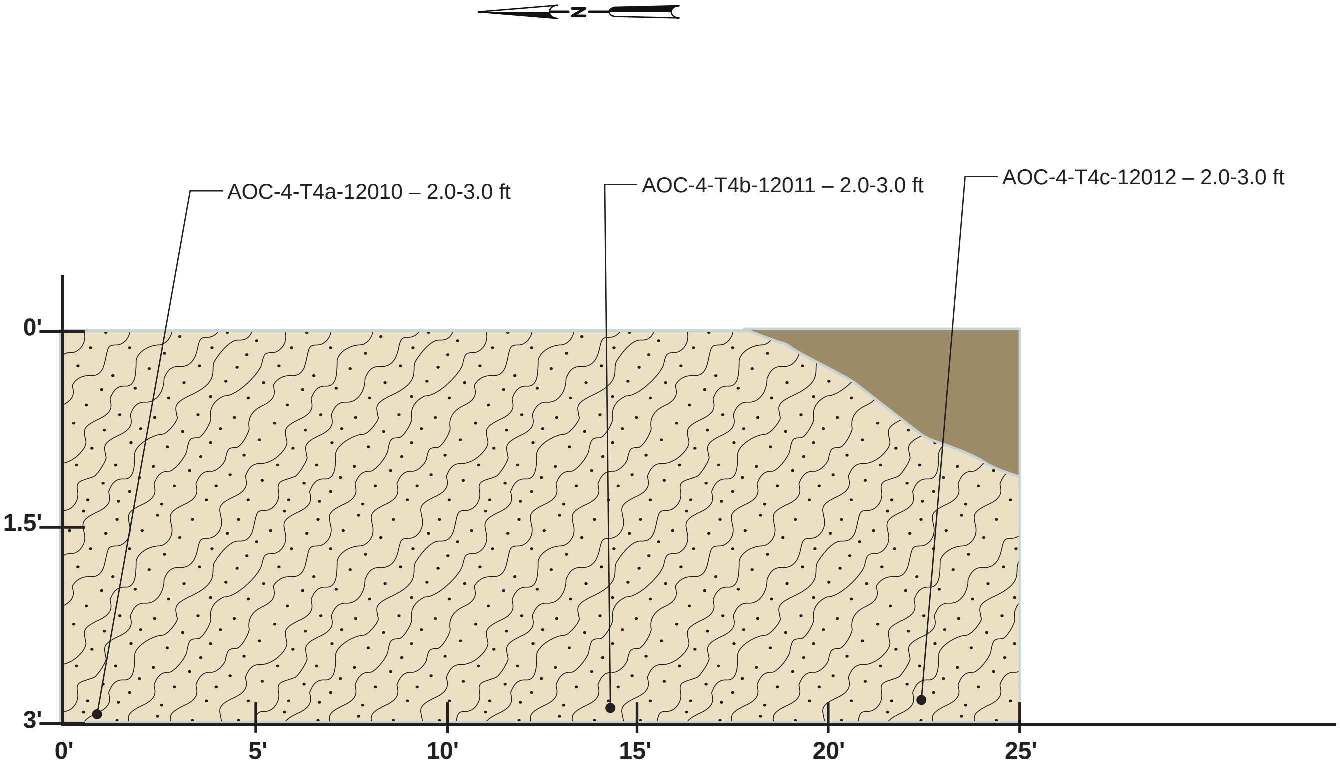

VERTICAL SCALE: 1" = 1.5'
HORIZONTAL SCALE: 1" = 5'

LEGEND

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL

● SAMPLE LOCATION

■ FILL MATERIAL

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING NORTH DATE: 10/24/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-11
TRENCH AOC4-T4

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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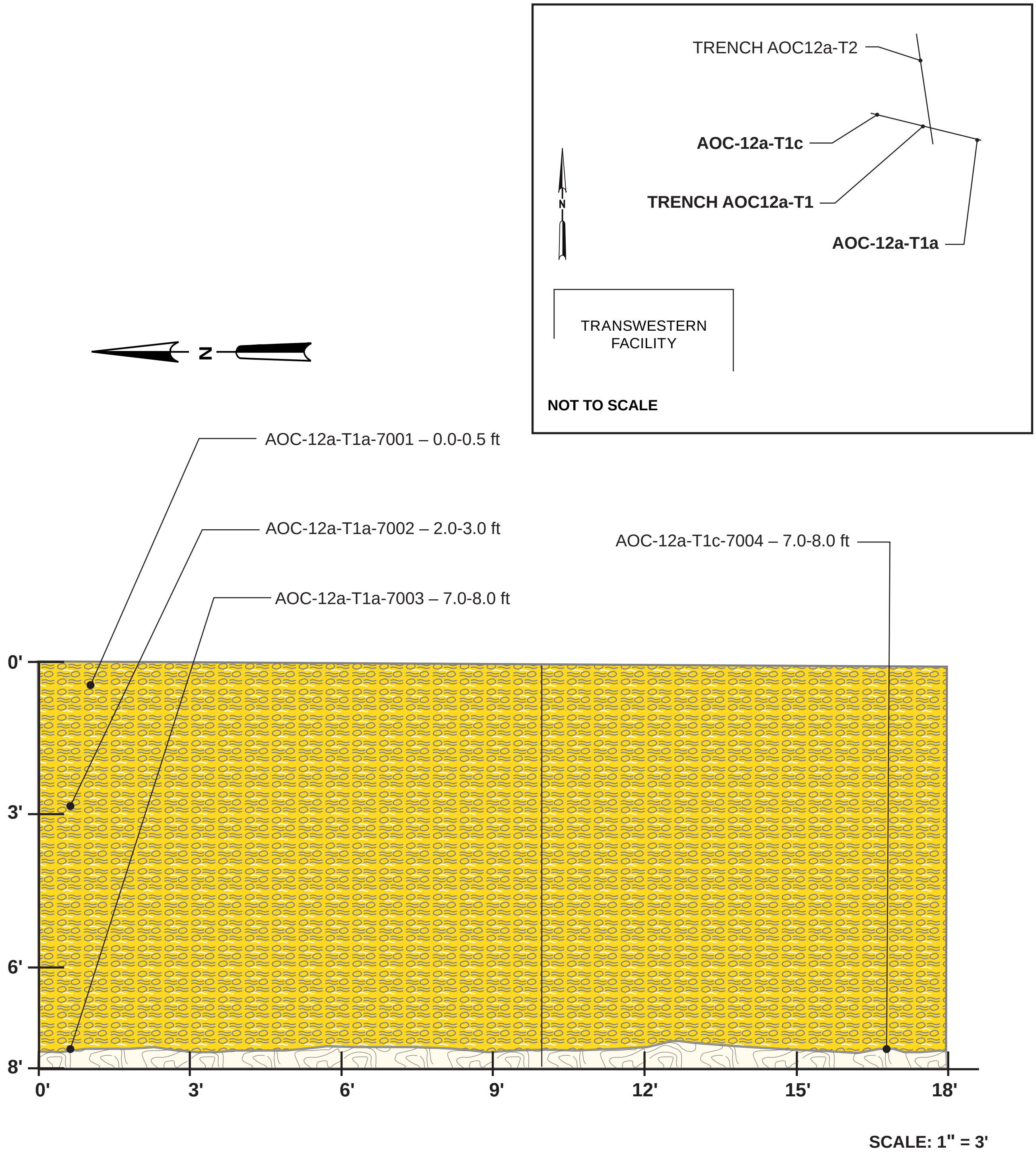

LEGEND

▨ HARDPAN

▨ LIGHT BROWN SAND (SP) WITH WELL ROUNDED COBBLES - LOOSE CONSISTENCY - FINES INCREASING WITH DEPTH TO ~10%

● SAMPLE LOCATION

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING EAST DATE: 9/22/08

NOTES:
1. AOC 12 -T1 RUNS PARALLEL TO PIPELINE
2. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
3. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-12
TRENCH AOC12a-T1

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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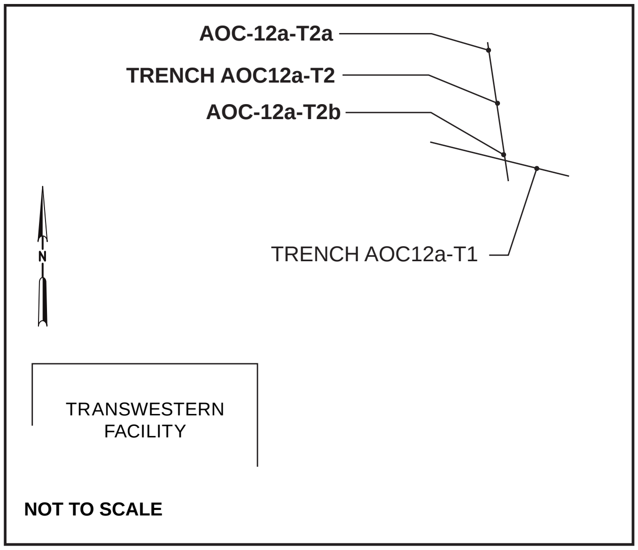

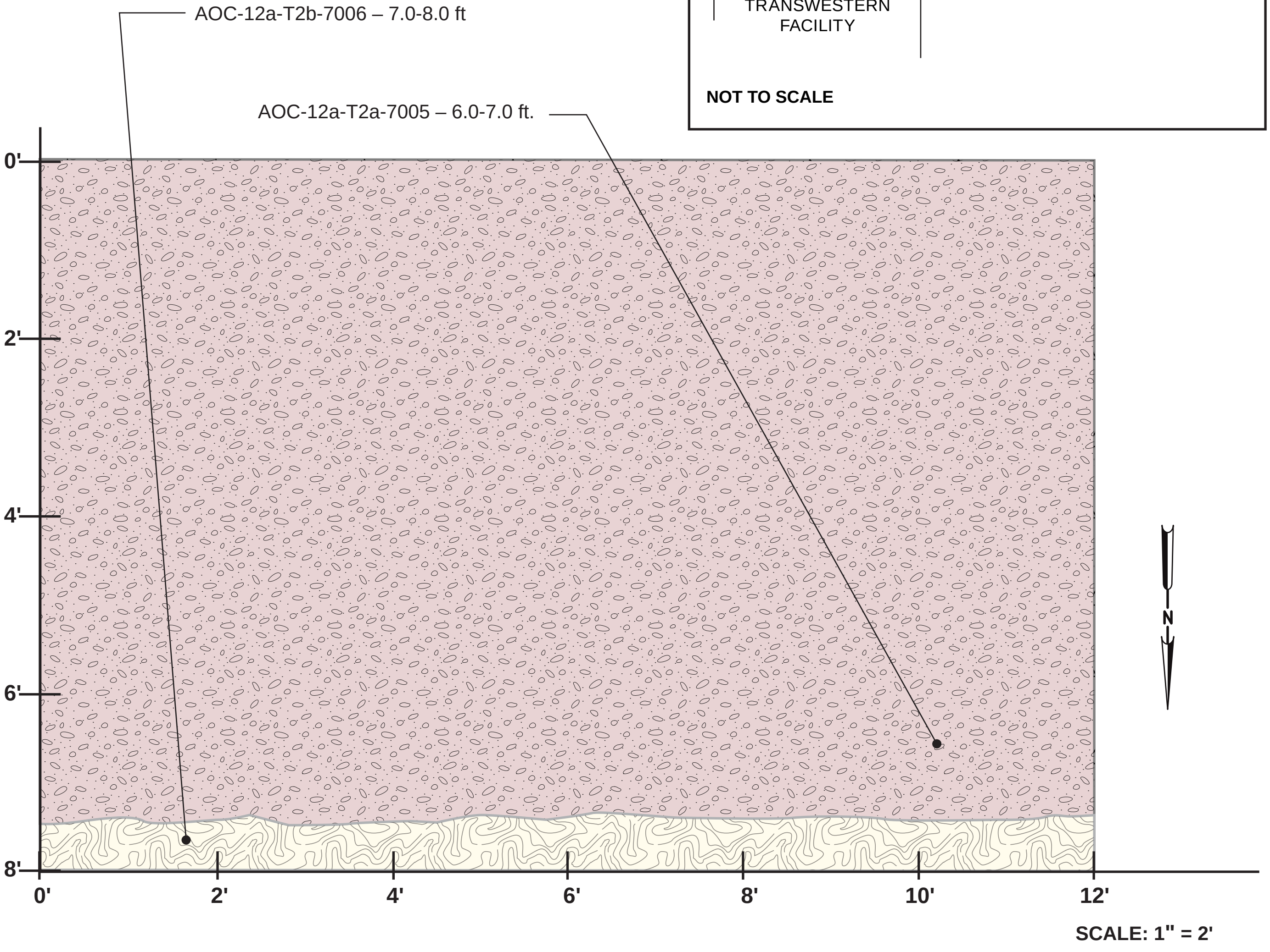

LEGEND

▨	LIGHT BROWN SAND (SP) WITH WELL-ROUNDED COBBLES LOOSE CONSISTENCY FINES INCREASING WITH DEPTH ~10%	●	SAMPLE LOCATION
▨	HARDPAN		

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING NORTH   DATE: 9/22/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-13
TRENCH AOC12a-T2

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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NEEDLES, CALIFORNIA

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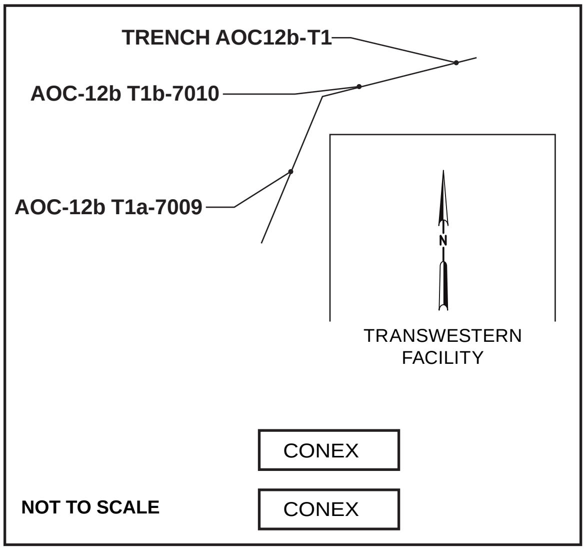

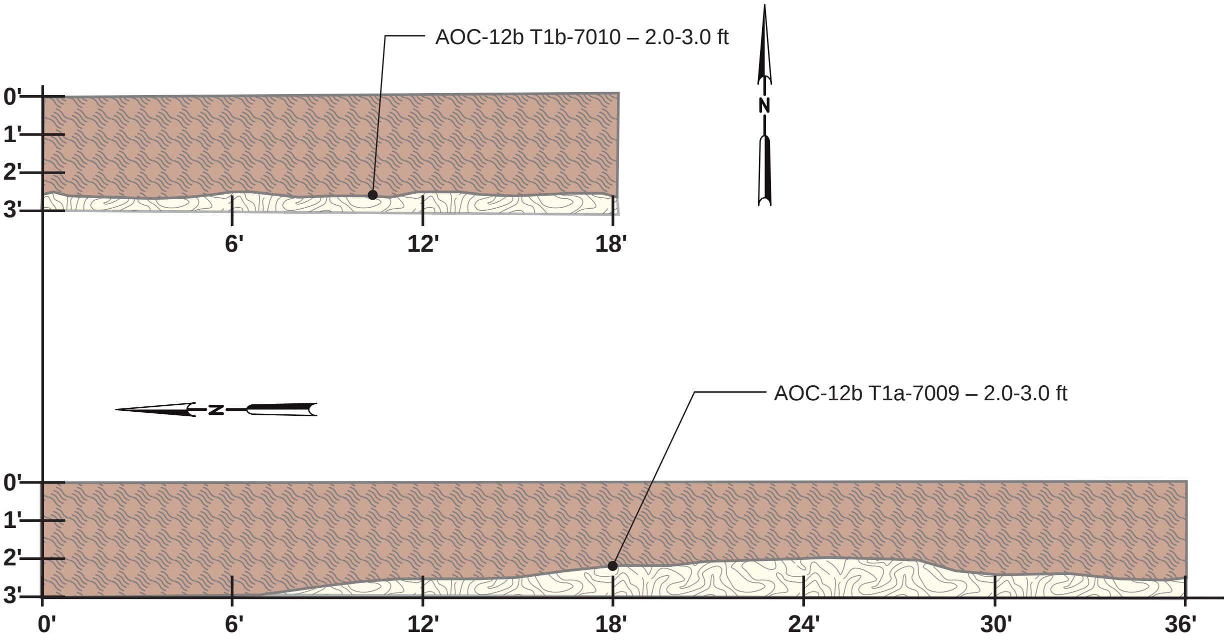

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 6'

LEGEND

▨	HARDPAN
●	SAMPLE LOCATION
▨	LIGHT BROWN POORLY GRADED SAND (SP) WITH GRAVEL FILL MATERIAL

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING NORTH DATE: 9/20/08

NOTES:
1. AOC 12b-T1 RUNS ALONG THE NORTH SIDE OF THE GRAVEL LOT-LOOKING NORTH ALONG THE WEST SIDE OF THE GRAVEL LOT-LOOKING EAST
2. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
3. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-14
TRENCH AOC12b–T1

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
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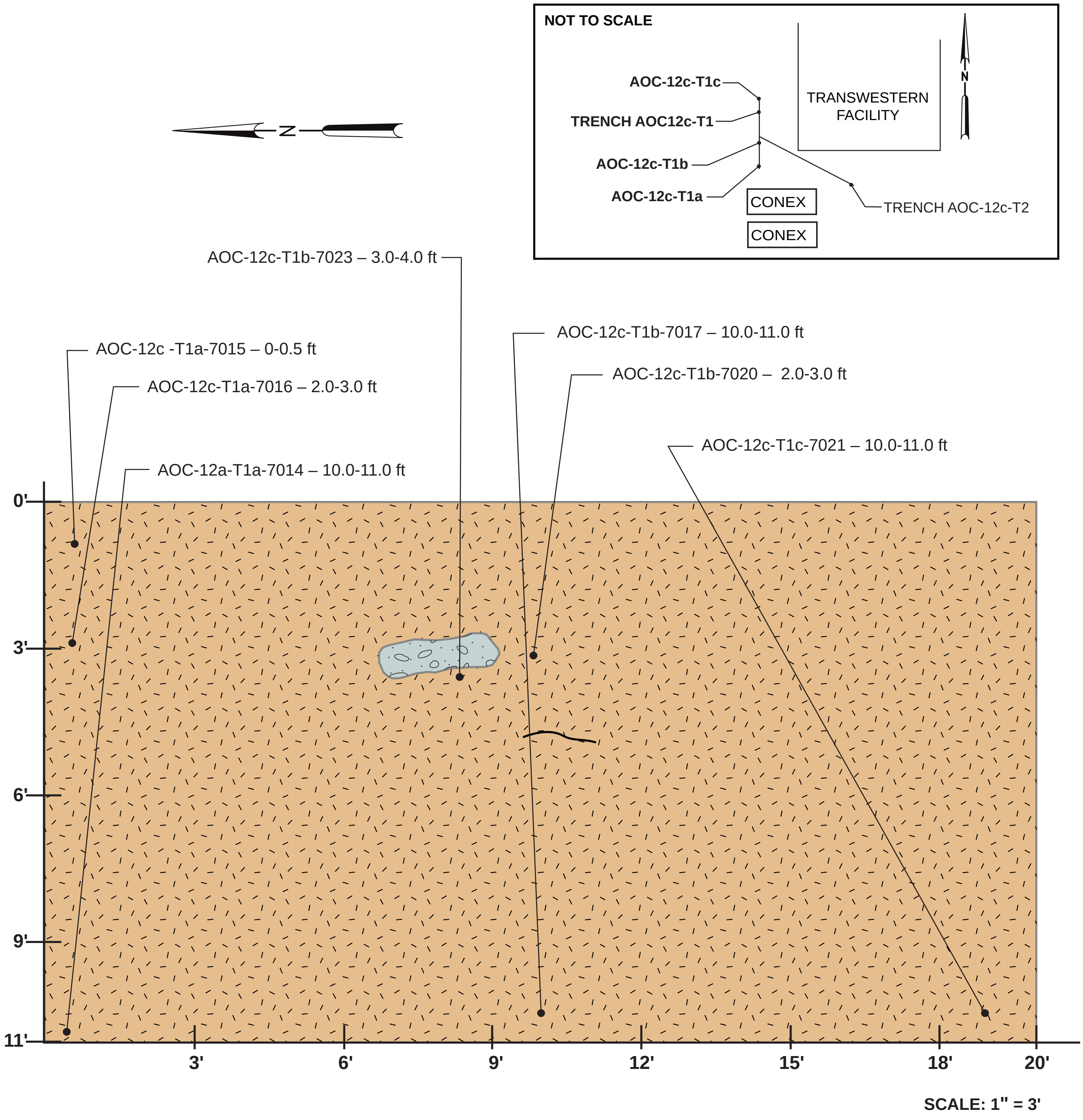

LEGEND

▨ MEDIUM BROWN SANDY SILT (ML) WITH GRAVEL- FILL MATERIAL

▨ DEBRIS: BURNED SLATS OF WOOD, CONCRETE, ROCK, PLASTIC SHEETING, CAULKING TUBE, SAFETY GOGGLE CONTAINER

〰 SMALL GAUGE WIRE

● SAMPLE LOCATION

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING SOUTH DATE: 9/20/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-15
TRENCH AOC12c-T1

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
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NEEDLES, CALIFORNIA

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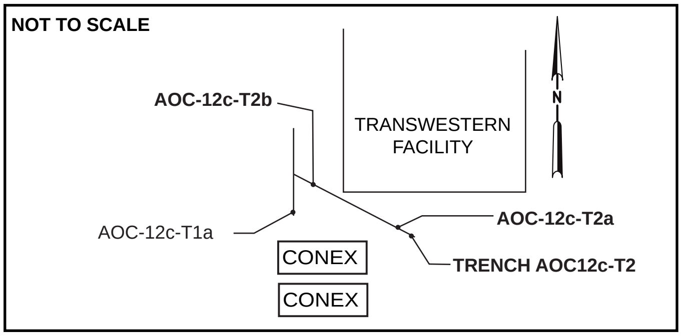

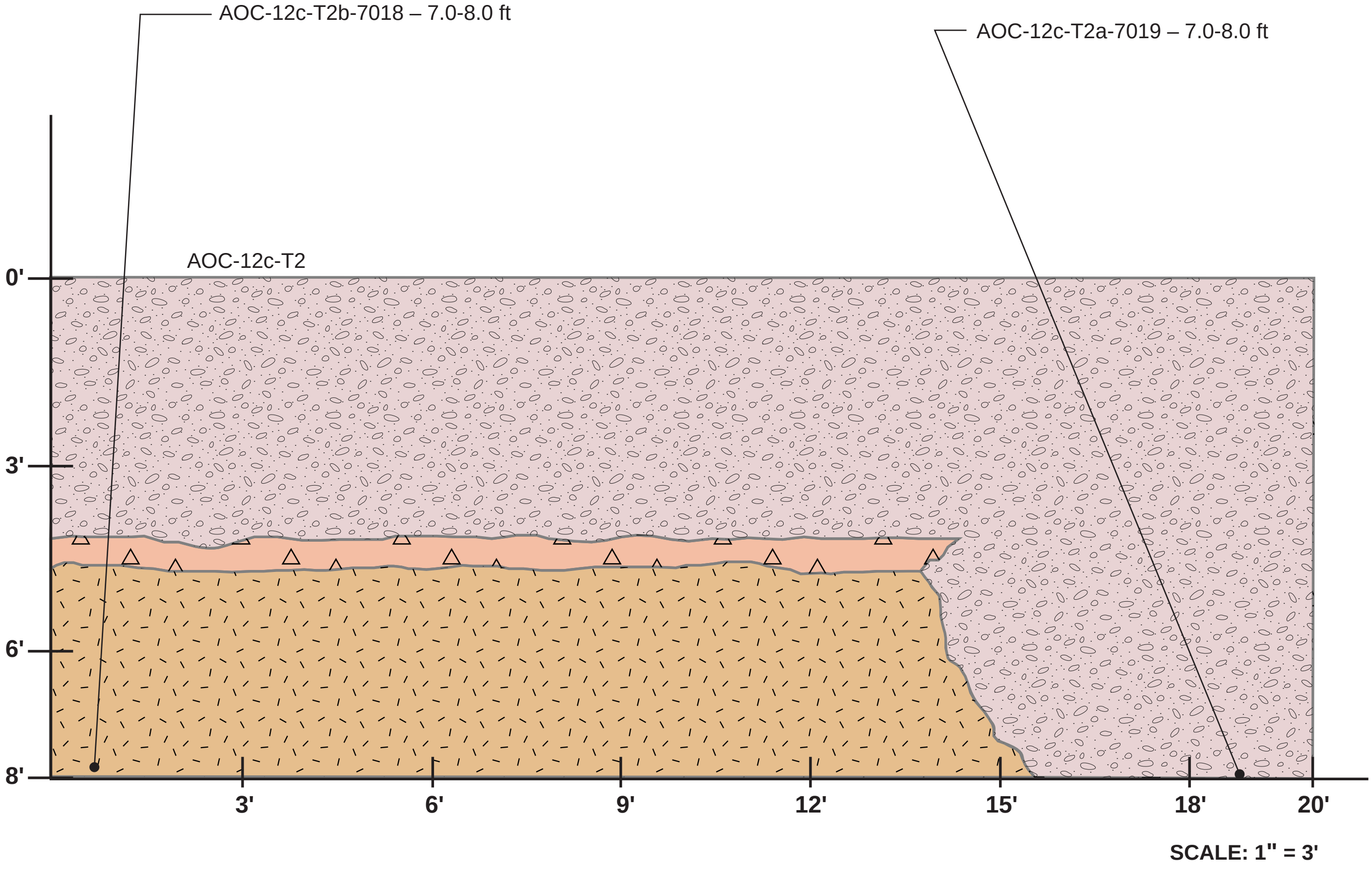

LEGEND

▨ MEDIUM BROWN COMPACTED IN THE FIELD HARDPAN AND REGULAR COBBLES

▨ LIGHT BROWN SANDY SILT (ML) WITH GRAVEL TO COBBLES FILL MATERIAL - SIDEWALL EXPOSURE SHOWS FILLED CHANNELS OF MEDIUM BROWN SANDY SILT (ML) WITH GRAVEL

▨ VERY HARD LAYER

● SAMPLE LOCATION

TRENCH SIDEWALL RECORD
TRENCH VIEW: LOOKING EAST DATE: 9/20/08

NOTES:
1. SAMPLES COLLECTED FROM EXCAVATOR BUCKET
2. NO GROUNDWATER OR ODORS ENCOUNTERED; TRENCH BACKFILLED

FIGURE B-16
TRENCH AOC12c-T2

RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Attachment B2
Investigation-derived Waste Analytical Results and Manifest

January 15, 2009

Shawn P. Duffy
CH2M HILL
155 Grand Avenue, Suite 1000
Oakland, CA 94612

TEL: (530) 229-3303
FAX: (530) 339-3303

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N002424

RE: PG&E Topock

Attention: Shawn P. Duffy

Enclosed are the results for sample(s) received on December 12, 2008 by Advanced Technology Laboratories - Las Vegas . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

The attached report is the final hard copy pertaining to the subcontracted tests for the above project.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

This cover letter is an integral part of this analytical report.

Advanced Technology Laboratories - Las Vegas **Date:** *15-Jan-09*

CLIENT:	CH2M HILL
Project:	PG&E Topock
Lab Order:	N002424

CASE NARRATIVE

Subcontracted Analysis:

STLC-Chromium was subcontracted to Advanced Technology Laboratories-Signal Hill, CA.

January 14, 2009

Marlon Cartin
Advanced Technology Laboratory-Las Vegas
3151 W Post Rd.
Las Vegas, NV 89118
TEL: (702) 307-2659
FAX: (702) 307-2691

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
Arizona: AZ0689
CSDLAC No.: 10196
Workorder No.: 103157

RE:

Attention: Marlon Cartin

Enclosed are the results for sample(s) received on January 08, 2009 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

Advanced Technology Laboratories **Date:** *14-Jan-09*

CLIENT: Advanced Technology Laboratory-Las Vega
Project:
Lab Order: 103157

CASE NARRATIVE

Sample Receiving/General Comments

1. All sample containers were received intact with proper chain of custody documentation.
2. Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.
3. Sample preservation were verified upon receipt of samples, if applicable.
4. All samples were analyzed within method holding times.

Analytical Comments for Method 6010B

1. For sample 103157-001A, dilution was necessary due to sample matrix.

CLIENT: Advanced Technology Laboratory-Las Vega
Project:
Lab Order: 103157
Contract No:

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Date Reported
103157-001A	N002424-001B / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	1/8/2009	1/14/2009

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *14-Jan-09*

CLIENT:	Advanced Technology Laboratory-Las Vega	**Client Sample ID:**	N002424-001B / IDW-SOIL-12001
Lab Order:	103157	**Collection Date:**	12/11/2008 3:10:00 PM
Project:		**Matrix:**	SOIL
Lab ID:	103157-001A		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ICP METALS BY STLC							
			WET/ EPA 6010B				
RunID: **ICP8_090114A**	QC Batch: **R104382**				PrepDate:		Analyst: **CL**
Chromium	1.6	0.018	1.0		mg/L	20	1/14/2009 12:07 PM

Qualifiers:

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- E Value above quantitation range
- ND Not Detected at the Reporting Limit

Results are wet unless otherwise specified

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 103157
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: R104382

Sample ID: **MB-52049** SampType: **MBLK** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **104382**
Client ID: **PBS** Batch ID: **R104382** TestNo: **WET/ EPA 60** Analysis Date: **1/14/2009** SeqNo: **1631852**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	ND	0.050									

Sample ID: **LCS-52049** SampType: **LCS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **104382**
Client ID: **LCSS** Batch ID: **R104382** TestNo: **WET/ EPA 60** Analysis Date: **1/14/2009** SeqNo: **1631853**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	0.921	0.050	1.000	0	92.1	85	115				

Sample ID: **103157-001AMS** SampType: **MS** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **104382**
Client ID: **N002424-001B / IDW** Batch ID: **R104382** TestNo: **WET/ EPA 60** Analysis Date: **1/14/2009** SeqNo: **1631858**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	3.843	1.0	2.500	1.649	87.8	77	116				

Sample ID: **103157-001AMSD** SampType: **MSD** TestCode: **6010_ST** Units: **mg/L** Prep Date: RunNo: **104382**
Client ID: **N002424-001B / IDW** Batch ID: **R104382** TestNo: **WET/ EPA 60** Analysis Date: **1/14/2009** SeqNo: **1631861**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chromium	3.846	1.0	2.500	1.649	87.9	77	116	3.843	0.0844	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories - Las V
3151-3153 W Post Rd.
Las Vegas, NV 89118
TEL: *7023072659* FAX: *7023072691*

CHAIN-OF-CUSTODY RECORD

QC Level: ~~Level IV~~ LEVEL II

Subcontractor:
Advanced Technology Laboratories - Signal Hill
3283 Walnut Ave.
Signal Hill, California

TEL: (562) 989-4045
FAX: (562) 989-4045
Acct #:

Field Sampler: BARRY COLLOM

08-Jan-09

Sample ID	Matrix	Date Collected	Bottle Type	Requested Tests		
				WET/ EPA 6010B		
N002424-001B / IDW-SOIL-12001 103157-001	Soil	12/11/2008 3:10:00 PM	8OZG	1		

General Comments: Please use PO#: LV00718 Please fax results by: ~~5 Day TAT~~ 4 DAY TAT

Please analyze for Cr only by 6010 STLC.

1/9/9

		Date/Time			Date/Time
Relinquished by:		1/8/9	**Received by:**		1/9/09
Relinquished by:			**Received by:**		

CHAIN OF CUSTODY RECORD

COC Number
TURNAROUND TIME
DATE 12-12-08 PAGE 1 OF 1

COMPANY E2 / CH2M Hill
PROJECT NAME PG&E Topock
PHONE (530) 229-3303 FAX (530) 339-3303
ADDRESS 155 Grand Ave Ste 1000
Oakland, CA 94612
P.O. NUMBER 354948.FP.08.FW.SC TEAM 1
SAMPLERS (SIGNATURE

SAMPLE I.D.	DATE	TIME	DESCRIPTION	8081 A	8082	6010B/7471 title 22	8270 C	7199										NUMBER OF CONTAINERS	COMMENTS
IDW-soil-12001	12-11-08	1510	soil	X	X	X	X	X										6	

CHAIN OF CUSTODY SIGNATURE RECORD

Signature (Relinquished)	Printed Name Barry Collom	Company/ Agency CH2M Hill	Date/ Time 12-12-08 1030
Signature (Received)	Printed Name ALLEGAERT	Company/ Agency ATL	Date/ Time 12-12-08 1030
Signature (Relinquished)	Printed Name ALLEGAERT	Company/ Agency ATL	Date/ Time 12-12-08
Signature (Received)	Printed Name MBCARTHW	Company/ Agency ATL	Date/ Time 12/12/8
Signature (Relinquished)	Printed Name	Company/ Agency	Date/ Time
Signature (Received)	Printed Name	Company/ Agency	Date/ Time

SAMPLE CONDITIONS

RECEIVED COOL ☐ WARM ☐ ____ °F

CUSTODY SEALED YES ☐ NO ☐

SPECIAL REQUIREMENTS:

Advanced Technology Laboratories

Please review the checklist below. Any NO and/or NA signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (562) 989-4045.

Change Order Checklist

Client Name: ATL-LV

Work Order Number: 103157

Date / Time Created: 1/8/2009 5:06:38 PM

Created by: MP

Checklist completed by: Signature 1/8/09 Date

Reviewed by: Initials 1/9/09 Date

1. All samples within holding time? Yes ☑ No ☐

2. Refrigerator temperature in compliance? Yes ☑ No ☐

3. Change Order documents present? Yes ☑ No ☐

Comments:

December 29, 2008

Shawn P. Duffy
CH2M HILL
155 Grand Avenue, Suite 1000
Oakland, CA 94612

TEL: (530) 229-3303
FAX: (530) 339-3303

CA-ELAP No.: 2676
NV Cert. No.: NV-009222007A

Workorder No.: N002424

RE: PG&E Topock

Attention: Shawn P. Duffy

Enclosed are the results for sample(s) received on December 12, 2008 by Advanced Technology Laboratories - Las Vegas . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (702) 307-2659 if I can be of further assistance to your company.

Sincerely,

Jose Tenorio Jr.
Laboratory Director

Advanced Technology Laboratories - Las Vega **Date:** *29-Dec-08*

CLIENT: CH2M HILL
Project: PG&E Topock
Lab Order: N002424

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS

All sample containers were received intact with proper chain of custody documentation.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Samples were analyzed within method holding time.

Subcontracted Analysis:

Mercury (EPA 7471A), SVOC (EPA 8270C), Pesticides (EPA 8081A) and PCBs (EPA 8082) were subcontracted to Advanced Technology Laboratories-Signal Hill, CA.

Analytical Comments for EPA 6010B:

Matrix Spike Duplicate (MSD) recovery for Chromium was out of recovery criteria for sample N002424-001AMSD possibly due to matrix interference. A post digestion spike was performed on the sample and demonstrated recoveries within acceptance limits. Laboratory Control Sample (LCS) and Laboratory Control Sample Duplicate (LCSD) were within acceptance crtieria.

CLIENT: CH2M HILL
Project: PG&E Topock
Lab Order: N002424
Contract No:

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Date Reported
N002424-001A	IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	12/12/2008	12/29/2008
N002424-001B	IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	12/12/2008	12/29/2008
N002424-001C	IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	12/12/2008	12/29/2008
N002424-001D	IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	12/12/2008	12/29/2008

CHAIN OF CUSTODY RECORD

COC Number
TURNAROUND TIME
DATE 12-12-08 PAGE 1 OF 1

COMPANY E2 / CH2M Hill
PROJECT NAME PG&E Topock
PHONE (530) 229-3303 FAX (530) 339-3303
ADDRESS 155 Grand Ave Ste 1000
Oakland, CA 94612
P.O. NUMBER 354948.FP.08.FW.SC TEAM 1
SAMPLERS (SIGNATURE

SAMPLE I.D.	DATE	TIME	DESCRIPTION	8081 A	8082	6010B/7471 title 22	8270 C	7199										NUMBER OF CONTAINERS	COMMENTS
IDW-soil-12001	12-11-08	1510	soil	X	X	X	X	X										6	

CHAIN OF CUSTODY SIGNATURE RECORD

Signature (Relinquished)	Printed Name Barry Collom	Company/ Agency CH2M Hill	Date/ Time 12-12-08 1030
Signature (Received)	Printed Name ALLEGAERT	Company/ Agency ATL	Date/ Time 12-12-08 1030
Signature (Relinquished)	Printed Name ALLEGAERT	Company/ Agency ATL	Date/ Time 12-12-08
Signature (Received)	Printed Name MBCARTHN	Company/ Agency ATL	Date/ Time 12/12/8
Signature (Relinquished)	Printed Name	Company/ Agency	Date/ Time
Signature (Received)	Printed Name	Company/ Agency	Date/ Time

SAMPLE CONDITIONS

RECEIVED COOL ☒ WARM ☐ 1.2 °C ~~°F~~

CUSTODY SEALED YES ☐ NO ☒

SPECIAL REQUIREMENTS:

Advanced Technology Laboratories - Las V
3151-3153 W Post Rd.
Las Vegas, NV 89118
TEL: *7023072659* FAX: *7023072691*

CHAIN-OF-CUSTODY RECORD

QC Level: **Level IV**

Subcontractor:
Advanced Technology Laboratories - Signal Hill
3283 Walnut Ave.
Signal Hill, California

TEL: (562) 989-4045
FAX: (562) 989-4045
Acct #:

Field Sampler: Barry Collom

12-Dec-08

Sample ID	Matrix	Date Collected	Bottle Type	Requested Tests		
				EPA 7471A	**EPA 8081A**	**EPA 8082**
N002424-001B / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG	1		
N002424-001C / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG		1	1
N002424-001D / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG			

General Comments: Please use PO#: LV00698 Please fax results by: Normal TAT

Please see attached copy of COC from client.

	Date/Time		Date/Time
Relinquished by:	12/12/8	**Received by:**	
Relinquished by:		**Received by:**	

Advanced Technology Laboratories - Las V
3151-3153 W Post Rd.
Las Vegas, NV 89118
TEL: *7023072659* FAX: *7023072691*

CHAIN-OF-CUSTODY RECORD

QC Level: Level IV

Subcontractor:
Advanced Technology Laboratories - Signal Hill
3283 Walnut Ave.
Signal Hill, California

TEL: (562) 989-4045
FAX: (562) 989-4045
Acct #:

Field Sampler: Barry Collom

12-Dec-08

Sample ID	Matrix	Date Collected	Bottle Type	Requested Tests		
				EPA 8270C		
N002424-001B / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG			
N002424-001C / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG			
N002424-001D / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG	1		

General Comments: Please use PO#: LV00698 Please fax results by: Normal TAT

Please see attached copy of COC from client.

	Date/Time		Date/Time
Relinquished by:	12/12/08	**Received by:**	
Relinquished by:		**Received by:**	

Advanced Technology Laboratories - Las Vegas

Please review the checklist below. Any NO and/or NA signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (562) 989-4045.

Sample Receipt Checklist

Client Name: **CH2M HILL-OAKLAND**

Date Time Received: **12/12/2008 2:28:04 PM**

Work Order Number: **N002424**

Received by: **MBC**

Cooler Temp (Deg C): 1.7

Checklist completed by: Signature 12/12/8 Date

Reviewed by: M Initials 12/15/8 Date

Carrier name: ATL

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
13. Water - VOA vials have zero headspace?	Yes ☐	No ☐	NA ☑
14. Water - pH acceptable upon receipt? pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑

Comments:

Advanced Technology Laboratories - Las Vegas

WORK ORDER Summary

12-Dec-08

Work Order N002424

Client ID: CH2M HILL-OAKLAND

Project: PG&E Topock

QC Level: Level IV

Date Received: 12/12/2008 2:28:04 PM

Comments:

Sample ID	Client Sample ID	Date Collected	Date Due	Matrix	Test No	Test Name	Hld	MS	SEL	Sub	Storage
N002424-001A	IDW-SOIL-12001	12/11/2008 3:10:00 PM	12/18/2008	Soil	EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	☐	WS
			12/18/2008		EPA 3060A	Prep for Hexavalend Chromium	☐	☐	☐	☐	WS
			12/18/2008		EPA 6010B	ICP METALS	☐	☐	☑	☐	WS
			12/18/2008		EPA 7199	Hexavalent Chromium by IC	☐	☐	☐	☐	WS
			12/18/2008		D2216	PERCENT MOISTURE	☐	☐	☐	☐	WS
N002424-001B			12/18/2008		EPA 7471	MERCURY PREP	☐	☐	☐	☐	WS
			12/18/2008		EPA 7471A	MERCURY BY COLD VAPOR TECHNIQUE	☐	☐	☐	☑	WS
N002424-001C			12/18/2008		EPA 3550B	ULTRASONIC EXTRACTION: PESTICIDES/PCB	☐	☐	☐	☐	SUB
			12/18/2008		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☑	☑	SUB
			12/18/2008		EPA 8082	PCBs BY GC/ECD	☐	☐	☐	☑	SUB
N002424-001D			12/18/2008		EPA 3550B	ULTRASONIC EXTRACTION: 8270C	☐	☐	☐	☐	SUB
			12/18/2008		EPA 8270C	SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS	☐	☐	☑	☑	SUB
N002424-002A	Folder		12/18/2008		Folder	Folder	☐	☐	☐	☐	LAB

ANALYTICAL RESULTS

Print Date: *29-Dec-08*

CLIENT:	CH2M HILL	**Client Sample ID:**	IDW-SOIL-12001
Lab Order:	N002424	**Collection Date:**	12/11/2008 3:10:00 PM
Project:	PG&E Topock	**Matrix:**	SOIL
Lab ID:	N002424-001		

ICP METALS

EPA 3050B **EPA 6010B**

RunID: **ICP1_081222A** QC Batch: **32927** PrepDate: **12/16/2008** Analyst: **JPA**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
Antimony	ND	0.14	2.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Arsenic	3.0	0.29	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Barium	150	0.018	2.0		mg/Kg-dry	2	12/22/2008 11:34 AM
Beryllium	ND	0.010	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Cadmium	ND	0.010	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Chromium	210	0.15	2.0		mg/Kg-dry	2	12/22/2008 11:34 AM
Cobalt	7.4	0.060	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Copper	11	0.025	2.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Lead	4.3	0.084	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Molybdenum	1.8	0.060	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Nickel	13	0.039	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Selenium	ND	0.39	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Silver	ND	0.026	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Thallium	ND	0.25	2.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Vanadium	30	0.044	1.0		mg/Kg-dry	1	12/22/2008 11:43 AM
Zinc	52	0.21	2.0		mg/Kg-dry	2	12/22/2008 11:34 AM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: CH2M HILL
Work Order: N002424
Project: PG&E Topock

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPGE

Sample ID: **MB-32927** SampType: **MBLK** TestCode: **6010_SPGE** Units: **mg/Kg** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **PBS** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105679**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	ND	2.0									
Arsenic	ND	1.0									
Barium	ND	1.0									
Beryllium	ND	1.0									
Cadmium	ND	1.0									
Chromium	ND	1.0									
Cobalt	ND	1.0									
Copper	ND	2.0									
Lead	ND	1.0									
Molybdenum	ND	1.0									
Nickel	0.040	1.0									
Selenium	ND	1.0									
Silver	ND	1.0									
Thallium	ND	2.0									
Vanadium	ND	1.0									
Zinc	0.126	1.0									

Sample ID: **LCS-32927** SampType: **LCS** TestCode: **6010_SPGE** Units: **mg/Kg** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **LCSS** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.291	2.0	50.00	0	94.6	85	115				
Arsenic	47.931	1.0	50.00	0	95.9	85	115				
Barium	49.503	1.0	50.00	0	99.0	85	115				
Beryllium	47.922	1.0	50.00	0	95.8	85	115				
Cadmium	47.323	1.0	50.00	0	94.6	85	115				
Chromium	50.384	1.0	50.00	0	101	85	115				
Cobalt	49.092	1.0	50.00	0	98.2	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: CH2M HILL
Work Order: N002424
Project: PG&E Topock

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPGE

Sample ID: **LCS-32927** SampType: **LCS** TestCode: **6010_SPGE** Units: **mg/Kg** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **LCSS** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105680**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	50.734	2.0	50.00	0	101	85	115				
Lead	49.202	1.0	50.00	0	98.4	85	115				
Molybdenum	50.186	1.0	50.00	0	100	85	115				
Nickel	48.053	1.0	50.00	0	96.1	85	115				
Selenium	45.036	1.0	50.00	0	90.1	85	115				
Silver	48.055	1.0	50.00	0	96.1	85	115				
Thallium	49.046	2.0	50.00	0	98.1	85	115				
Vanadium	50.672	1.0	50.00	0	101	85	115				
Zinc	47.144	1.0	50.00	0	94.3	85	115				

Sample ID: **LCSD-32927** SampType: **LCSD** TestCode: **6010_SPGE** Units: **mg/Kg** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **LCSS02** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105681**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	47.145	2.0	50.00	0	94.3	85	115	47.29	0.310	20	
Arsenic	47.644	1.0	50.00	0	95.3	85	115	47.93	0.601	20	
Barium	49.101	1.0	50.00	0	98.2	85	115	49.50	0.817	20	
Beryllium	47.487	1.0	50.00	0	95.0	85	115	47.92	0.914	20	
Cadmium	46.584	1.0	50.00	0	93.2	85	115	47.32	1.57	20	
Chromium	50.040	1.0	50.00	0	100	85	115	50.38	0.685	20	
Cobalt	48.388	1.0	50.00	0	96.8	85	115	49.09	1.44	20	
Copper	50.412	2.0	50.00	0	101	85	115	50.73	0.637	20	
Lead	48.791	1.0	50.00	0	97.6	85	115	49.20	0.839	20	
Molybdenum	49.874	1.0	50.00	0	99.7	85	115	50.19	0.624	20	
Nickel	47.610	1.0	50.00	0	95.2	85	115	48.05	0.926	20	
Selenium	44.347	1.0	50.00	0	88.7	85	115	45.04	1.54	20	
Silver	47.748	1.0	50.00	0	95.5	85	115	48.05	0.639	20	
Thallium	48.279	2.0	50.00	0	96.6	85	115	49.05	1.58	20	
Vanadium	50.437	1.0	50.00	0	101	85	115	50.67	0.464	20	
Zinc	46.463	1.0	50.00	0	92.9	85	115	47.14	1.45	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: CH2M HILL
Work Order: N002424
Project: PG&E Topock

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPGE

Sample ID: **N002424-001AMS** SampType: **MS** TestCode: **6010_SPGE** Units: **mg/Kg-dry** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **ZZZZZZ** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	95.804	10	125.5	0	76.3	75	125				
Arsenic	122.574	5.0	125.5	2.985	95.3	75	125				
Beryllium	117.235	5.0	125.5	0	93.4	75	125				
Cadmium	112.777	5.0	125.5	0	89.8	75	125				
Cobalt	126.355	5.0	125.5	7.389	94.8	75	125				
Copper	134.119	10	125.5	10.57	98.4	75	125				
Lead	122.651	5.0	125.5	4.252	94.3	75	125				
Molybdenum	120.846	5.0	125.5	1.766	94.9	75	125				
Nickel	132.886	5.0	125.5	13.25	95.3	75	125				
Selenium	108.781	5.0	125.5	0	86.6	75	125				
Silver	112.583	5.0	125.5	0	89.7	75	125				
Thallium	118.554	10	125.5	0	94.4	75	125				
Vanadium	159.491	5.0	125.5	29.91	103	75	125				

Sample ID: **N002424-001AMSD** SampType: **MSD** TestCode: **6010_SPGE** Units: **mg/Kg-dry** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **ZZZZZZ** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Antimony	95.533	10	125.7	0	76.0	75	125	95.80	0.284	20	
Arsenic	121.977	5.0	125.7	2.985	94.7	75	125	122.6	0.489	20	
Beryllium	116.732	5.0	125.7	0	92.9	75	125	117.2	0.429	20	
Cadmium	110.874	5.0	125.7	0	88.2	75	125	112.8	1.70	20	
Cobalt	125.325	5.0	125.7	7.389	93.8	75	125	126.4	0.818	20	
Copper	141.339	10	125.7	10.57	104	75	125	134.1	5.24	20	
Lead	121.370	5.0	125.7	4.252	93.2	75	125	122.7	1.05	20	
Molybdenum	120.665	5.0	125.7	1.766	94.6	75	125	120.8	0.151	20	
Nickel	133.635	5.0	125.7	13.25	95.8	75	125	132.9	0.562	20	
Selenium	107.480	5.0	125.7	0	85.5	75	125	108.8	1.20	20	
Silver	111.605	5.0	125.7	0	88.8	75	125	112.6	0.872	20	
Thallium	118.742	10	125.7	0	94.5	75	125	118.6	0.158	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: CH2M HILL
Work Order: N002424
Project: PG&E Topock

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_SPGE

Sample ID: **N002424-001AMSD** SampType: **MSD** TestCode: **6010_SPGE** Units: **mg/Kg-dry** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **ZZZZZZ** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vanadium	159.576	5.0	125.7	29.91	103	75	125	159.5	0.0537	20	

Sample ID: **N002424-001AMS** SampType: **MS** TestCode: **6010_SPGE** Units: **mg/Kg-dry** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **ZZZZZZ** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	278.764	5.0	125.5	150.5	102	75	125				
Chromium	356.328	5.0	125.5	214.0	113	75	125				
Zinc	167.544	5.0	125.5	52.26	91.8	75	125				

Sample ID: **N002424-001AMSD** SampType: **MSD** TestCode: **6010_SPGE** Units: **mg/Kg-dry** Prep Date: **12/16/2008** RunNo: **73520**
Client ID: **ZZZZZZ** Batch ID: **32927** TestNo: **EPA 6010B** **EPA 3050B** Analysis Date: **12/22/2008** SeqNo: **1105717**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	279.756	5.0	125.7	150.5	103	75	125	278.8	0.355	20	
Chromium	373.692	5.0	125.7	214.0	127	75	125	356.3	4.76	20	S
Zinc	166.645	5.0	125.7	52.26	91.0	75	125	167.5	0.538	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories - Las Vegas

ANALYTICAL RESULTS

Print Date: *29-Dec-08*

CLIENT:	CH2M HILL	**Client Sample ID:**	IDW-SOIL-12001
Lab Order:	N002424	**Collection Date:**	12/11/2008 3:10:00 PM
Project:	PG&E Topock	**Matrix:**	SOIL
Lab ID:	N002424-001		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
HEXAVALENT CHROMIUM BY IC							
EPA 3060A					**EPA 7199**		
RunID: **IC1_081223A**	QC Batch: **32957**				PrepDate: **12/20/2008**		Analyst: **QBM**
Hexavalent Chromium	3.4	0.056	0.32		mg/Kg-dry	2	12/23/2008 01:42 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Advanced Technology Laboratories - Las Vegas

Date: *29-Dec-08*

CLIENT: CH2M HILL
Work Order: N002424
Project: PG&E Topock

ANALYTICAL QC SUMMARY REPORT

TestCode: 7199_S_PGE

Sample ID: **MB-32957** SampType: **MBLK** TestCode: **7199_S_PGE** Units: **mg/Kg** Prep Date: **12/20/2008** RunNo: **73530**
Client ID: **PBS** Batch ID: **32957** TestNo: **EPA 7199** **EPA 3060A** Analysis Date: **12/23/2008** SeqNo: **1106221**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexavalent Chromium	ND	0.16									

Sample ID: **LCS-32957** SampType: **LCS** TestCode: **7199_S_PGE** Units: **mg/Kg** Prep Date: **12/20/2008** RunNo: **73530**
Client ID: **LCSS** Batch ID: **32957** TestNo: **EPA 7199** **EPA 3060A** Analysis Date: **12/23/2008** SeqNo: **1106222**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexavalent Chromium	3.860	0.32	4.000	0	96.5	80	120				

Sample ID: **N002424-001AMS** SampType: **MS** TestCode: **7199_S_PGE** Units: **mg/Kg-dry** Prep Date: **12/20/2008** RunNo: **73530**
Client ID: **ZZZZZZ** Batch ID: **32957** TestNo: **EPA 7199** **EPA 3060A** Analysis Date: **12/23/2008** SeqNo: **1106225**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexavalent Chromium	6.874	0.32	4.027	3.439	85.3	85	115				

Sample ID: **N002424-001AMSD** SampType: **MSD** TestCode: **7199_S_PGE** Units: **mg/Kg-dry** Prep Date: **12/20/2008** RunNo: **73530**
Client ID: **ZZZZZZ** Batch ID: **32957** TestNo: **EPA 7199** **EPA 3060A** Analysis Date: **12/23/2008** SeqNo: **1106226**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexavalent Chromium	7.381	0.32	4.027	3.439	97.9	85	115	6.874	7.12	20	

Sample ID: **N002424-001AMSB** SampType: **MS** TestCode: **7199_S_PGE** Units: **mg/Kg-dry** Prep Date: **12/20/2008** RunNo: **73530**
Client ID: **ZZZZZZ** Batch ID: **32957** TestNo: **EPA 7199** **EPA 3060A** Analysis Date: **12/23/2008** SeqNo: **1106227**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Hexavalent Chromium	10389.448	160	10070	3.439	103	85	115				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories - Las Vegas

ANALYTICAL RESULTS

Print Date: *29-Dec-08*

CLIENT: CH2M HILL
Lab Order: N002424
Project: PG&E Topock
Lab ID: N002424-001

Client Sample ID: IDW-SOIL-12001
Collection Date: 12/11/2008 3:10:00 PM
Matrix: SOIL

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
PERCENT MOISTURE							
					D2216		
RunID: **WETCHEM_081219A**	QC Batch: **R73513**				PrepDate:		Analyst: **SWT**
Percent Moisture	0.6800	0.1000	0.1000		wt%	1	12/18/2008

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: CH2M HILL
Work Order: N002424
Project: PG&E Topock

ANALYTICAL QC SUMMARY REPORT

TestCode: PMOIST

Sample ID: **MB-R73513** SampType: **MBLK** TestCode: **PMOIST** Units: **wt%** Prep Date: RunNo: **73513**
Client ID: **PBS** Batch ID: **R73513** TestNo: **D2216** Analysis Date: **12/18/2008** SeqNo: **1105589**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	ND	0.1000									

Sample ID: **N002424-001ADUP** SampType: **DUP** TestCode: **PMOIST** Units: **wt%** Prep Date: RunNo: **73513**
Client ID: **ZZZZZZ** Batch ID: **R73513** TestNo: **D2216** Analysis Date: **12/18/2008** SeqNo: **1105591**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Percent Moisture	0.660	0.1000						0.6800	2.99	30	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

December 23, 2008

Marlon Cartin
Advanced Technology Laboratory-Las Vegas
3151 W Post Rd.
Las Vegas, NV 89118
TEL: (702) 307-2659
FAX: (702) 307-2691

ELAP No.: 1838
NELAP No.: 02107CA
NEVADA.: CA-401
Arizona: AZ0689
CSDLAC No.: 10196
Workorder No.: 102700

RE:

Attention: Marlon Cartin

Enclosed are the results for sample(s) received on December 13, 2008 by Advanced Technology Laboratories . The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562)989-4045 if I can be of further assistance to your company.

Sincerely,

Eddie F. Rodriguez
Laboratory Director

Advanced Technology Laboratories **Date:** *23-Dec-08*

CLIENT: Advanced Technology Laboratory-Las Vega
Project:
Lab Order: 102700

CASE NARRATIVE

Sample Receiving/General Comments

1. All sample containers were received intact with proper chain of custody documentation.
2. Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.
3. Sample preservation were verified upon receipt of samples, if applicable.
4. All samples were analyzed within method holding times.

Analytical Comments for EPA 8270C

1. For samples 102700-003AMS and 102700-003AMSD, LCS-51263 and LCSD-51263, 4-Bromophenyl-phenylether recovery was biased high. Sample results were non-detects (ND) for these analytes therefore reanalysis of the sample was not necessary.

CLIENT:	Advanced Technology Laboratory-Las Vega
Project:	
Lab Order:	102700
Contract No:	

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Date Reported
102700-001A	N002424-001B / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	12/13/2008	12/23/2008
102700-002A	N002424-001C / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	12/13/2008	12/23/2008
102700-003A	N002424-001D / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	12/13/2008	12/23/2008

ANALYTICAL RESULTS

Print Date: *23-Dec-08*

CLIENT:	Advanced Technology Laboratory-Las Vega	**Client Sample ID:**	N002424-001C / IDW-SOIL-12001
Lab Order:	102700	**Collection Date:**	12/11/2008 3:10:00 PM
Project:		**Matrix:**	SOIL
Lab ID:	102700-002A		

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3550B **EPA 8081A**

RunID: **GC9_081218A** QC Batch: **51229** PrepDate: **12/17/2008** Analyst: **VLT**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.060	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
4,4´-DDE	ND	0.061	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
4,4´-DDT	ND	0.070	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Aldrin	ND	0.064	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
alpha-BHC	ND	0.064	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
alpha-Chlordane	ND	0.060	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
beta-BHC	ND	0.14	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
delta-BHC	ND	0.092	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Dieldrin	ND	0.058	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Endosulfan I	ND	0.055	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Endosulfan II	ND	0.061	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Endosulfan sulfate	ND	0.079	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Endrin	ND	0.065	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Endrin aldehyde	ND	0.11	2.0		µg/Kg-dry	1	12/18/2008 03:33 PM
gamma-BHC	ND	0.095	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
gamma-Chlordane	ND	0.079	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Heptachlor	ND	0.072	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Heptachlor epoxide	ND	0.062	1.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Methoxychlor	ND	0.21	5.0		µg/Kg-dry	1	12/18/2008 03:33 PM
Toxaphene	ND	11	50		µg/Kg-dry	1	12/18/2008 03:33 PM
Surr: Tetrachloro-m-xylene	70.6	0	36-124		%REC	1	12/18/2008 03:33 PM
Surr: Decachlorobiphenyl	115	0	26-125		%REC	1	12/18/2008 03:33 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51229

Sample ID: **MB-51229** SampType: **MBLK** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **PBS** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610718**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	5.0									
Toxaphene	ND	50									
Surr: Tetrachloro-m-xylene	13.390		16.67		80.3	36	124				
Surr: Decachlorobiphenyl	15.933		16.67		95.6	26	125				

Sample ID: **LCS-51229** SampType: **LCS** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **LCSS** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610719**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	14.699	2.0	16.67	0	88.2	50	139				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51229

Sample ID: **LCS-51229** SampType: **LCS** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **LCSS** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610719**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDE	14.568	2.0	16.67	0	87.4	68	126				
4,4´-DDT	13.351	2.0	16.67	0	80.1	46	135				
Aldrin	13.760	1.0	16.67	0	82.5	47	120				
alpha-BHC	14.098	1.0	16.67	0	84.6	62	125				
alpha-Chlordane	13.295	1.0	16.67	0	79.8	63	121				
beta-BHC	12.639	1.0	16.67	0	75.8	62	127				
delta-BHC	15.088	1.0	16.67	0	90.5	57	130				
Dieldrin	14.106	2.0	16.67	0	84.6	67	125				
Endosulfan I	14.463	1.0	16.67	0	86.8	41	147				
Endosulfan II	14.971	2.0	16.67	0	89.8	37	141				
Endosulfan sulfate	14.863	2.0	16.67	0	89.2	62	135				
Endrin	14.768	2.0	16.67	0	88.6	61	133				
Endrin aldehyde	15.311	2.0	16.67	0	91.8	37	147				
gamma-BHC	13.646	1.0	16.67	0	81.9	59	123				
gamma-Chlordane	13.508	1.0	16.67	0	81.0	48	124				
Heptachlor	14.056	1.0	16.67	0	84.3	51	140				
Heptachlor epoxide	13.385	1.0	16.67	0	80.3	66	130				
Methoxychlor	16.409	5.0	16.67	0	98.4	57	143				
Surr: Tetrachloro-m-xylene	12.582		16.67		75.5	36	124				
Surr: Decachlorobiphenyl	15.230		16.67		91.4	26	125				

Sample ID: **LCSD-51229** SampType: **LCSD** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **LCSS02** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610720**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	14.477	2.0	16.67	0	86.8	50	139	14.70	1.52	50	
4,4´-DDE	14.242	2.0	16.67	0	85.4	68	126	14.57	2.26	50	
4,4´-DDT	13.487	2.0	16.67	0	80.9	46	135	13.35	1.01	50	
Aldrin	13.660	1.0	16.67	0	81.9	47	120	13.76	0.727	50	
alpha-BHC	14.052	1.0	16.67	0	84.3	62	125	14.10	0.323	50	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51229

Sample ID: **LCSD-51229** SampType: **LCSD** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **LCSS02** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610720**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-Chlordane	13.199	1.0	16.67	0	79.2	63	121	13.30	0.730	50	
beta-BHC	12.550	1.0	16.67	0	75.3	62	127	12.64	0.707	50	
delta-BHC	14.973	1.0	16.67	0	89.8	57	130	15.09	0.765	50	
Dieldrin	13.900	2.0	16.67	0	83.4	67	125	14.11	1.47	50	
Endosulfan I	13.907	1.0	16.67	0	83.4	41	147	14.46	3.92	50	
Endosulfan II	14.772	2.0	16.67	0	88.6	37	141	14.97	1.34	50	
Endosulfan sulfate	14.637	2.0	16.67	0	87.8	62	135	14.86	1.53	50	
Endrin	14.659	2.0	16.67	0	87.9	61	133	14.77	0.742	50	
Endrin aldehyde	14.805	2.0	16.67	0	88.8	37	147	15.31	3.36	50	
gamma-BHC	13.584	1.0	16.67	0	81.5	59	123	13.65	0.449	50	
gamma-Chlordane	13.414	1.0	16.67	0	80.5	48	124	13.51	0.700	50	
Heptachlor	13.883	1.0	16.67	0	83.3	51	140	14.06	1.24	50	
Heptachlor epoxide	13.286	1.0	16.67	0	79.7	66	130	13.39	0.749	50	
Methoxychlor	15.754	5.0	16.67	0	94.5	57	143	16.41	4.07	50	
Surr: Tetrachloro-m-xylene	12.533		16.67		75.2	36	124		0	0	
Surr: Decachlorobiphenyl	14.865		16.67		89.2	26	125		0	0	

Sample ID: **LCS-51229TOX** SampType: **LCS** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **LCSS** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610721**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toxaphene	159.999	50	166.7	0	96.0	31	136				
Surr: Tetrachloro-m-xylene	15.030		16.67		90.2	36	124				
Surr: Decachlorobiphenyl	18.529		16.67		111	26	125				

Sample ID: **LCSD-51229TOX** SampType: **LCSD** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **LCSS02** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610722**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: **51229**

Sample ID: **LCSD-51229TOX** SampType: **LCSD** TestCode: **8081_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **LCSS02** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610722**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toxaphene	160.124	50	166.7	0	96.1	31	136	160.0	0.0778	50	
Surr: Tetrachloro-m-xylene	14.906		16.67		89.4	36	124		0	0	
Surr: Decachlorobiphenyl	18.444		16.67		111	26	125		0	0	

Sample ID: **102700-002AMS** SampType: **MS** TestCode: **8081_S_PGE** Units: **µg/Kg-dry** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **N002424-001C / IDW** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610723**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	11.156	2.0	16.78	0	66.5	50	139				
4,4´-DDE	12.490	2.0	16.78	0	74.4	68	126				
4,4´-DDT	13.677	2.0	16.78	0	81.5	46	135				
Aldrin	12.518	1.0	16.78	0	74.6	47	120				
alpha-BHC	13.948	1.0	16.78	0	83.1	62	125				
alpha-Chlordane	10.603	1.0	16.78	0	63.2	63	121				
beta-BHC	11.425	1.0	16.78	0	68.1	62	127				
delta-BHC	12.420	1.0	16.78	0	74.0	57	130				
Dieldrin	11.971	2.0	16.78	0	71.3	67	125				
Endosulfan I	12.219	1.0	16.78	0	72.8	41	147				
Endosulfan II	13.232	2.0	16.78	0	78.8	37	141				
Endosulfan sulfate	12.339	2.0	16.78	0	73.5	62	135				
Endrin	13.557	2.0	16.78	0	80.8	61	133				
Endrin aldehyde	12.828	2.0	16.78	0	76.4	37	147				
Endrin ketone	12.833	2.0	16.78	0	76.5	73	140				
gamma-BHC	13.245	1.0	16.78	0	78.9	59	123				
gamma-Chlordane	11.975	1.0	16.78	0	71.3	48	124				
Heptachlor	13.866	1.0	16.78	0	82.6	51	140				
Heptachlor epoxide	12.330	1.0	16.78	0	73.5	66	130				
Methoxychlor	14.800	5.0	16.78	0	88.2	57	143				
Surr: Tetrachloro-m-xylene	12.922		16.78		77.0	36	124				
Surr: Decachlorobiphenyl	20.507		16.78		122	26	125				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51229

Sample ID: **102700-002AMSD** SampType: **MSD** TestCode: **8081_S_PGE** Units: **µg/Kg-dry** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **N002424-001C / IDW** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610724**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	10.787	2.0	16.78	0	64.3	50	139	11.16	3.36	50	
4,4´-DDE	12.506	2.0	16.78	0	74.5	68	126	12.49	0.124	50	
4,4´-DDT	13.249	2.0	16.78	0	78.9	46	135	13.68	3.18	50	
Aldrin	12.595	1.0	16.78	0	75.0	47	120	12.52	0.609	50	
alpha-BHC	13.960	1.0	16.78	0	83.2	62	125	13.95	0.0902	50	
alpha-Chlordane	10.591	1.0	16.78	0	63.1	63	121	10.60	0.114	50	
beta-BHC	11.504	1.0	16.78	0	68.5	62	127	11.43	0.686	50	
delta-BHC	12.629	1.0	16.78	0	75.2	57	130	12.42	1.66	50	
Dieldrin	11.478	2.0	16.78	0	68.4	67	125	11.97	4.20	50	
Endosulfan I	11.741	1.0	16.78	0	70.0	41	147	12.22	3.99	50	
Endosulfan II	12.799	2.0	16.78	0	76.3	37	141	13.23	3.33	50	
Endosulfan sulfate	12.038	2.0	16.78	0	71.7	62	135	12.34	2.47	50	
Endrin	13.062	2.0	16.78	0	77.8	61	133	13.56	3.71	50	
Endrin aldehyde	12.630	2.0	16.78	0	75.3	37	147	12.83	1.55	50	
Endrin ketone	12.615	2.0	16.78	0	75.2	73	140	12.83	1.71	50	
gamma-BHC	13.285	1.0	16.78	0	79.1	59	123	13.24	0.301	50	
gamma-Chlordane	11.786	1.0	16.78	0	70.2	48	124	11.98	1.59	50	
Heptachlor	13.621	1.0	16.78	0	81.2	51	140	13.87	1.78	50	
Heptachlor epoxide	12.390	1.0	16.78	0	73.8	66	130	12.33	0.486	50	
Methoxychlor	14.266	5.0	16.78	0	85.0	57	143	14.80	3.67	50	
Surr: Tetrachloro-m-xylene	12.921		16.78		77.0	36	124		0	0	
Surr: Decachlorobiphenyl	20.567		16.78		123	26	125		0	0	

Sample ID: **102700-002AMSTOX** SampType: **MS** TestCode: **8081_S_PGE** Units: **µg/Kg-dry** Prep Date: **12/17/2008** RunNo: **103240**
Client ID: **N002424-001C / IDW** Batch ID: **51229** TestNo: **EPA 8081A** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1610725**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toxaphene	116.977	50	167.8	0	69.7	31	136				
Surr: Tetrachloro-m-xylene	12.724		16.78		75.8	36	124				
Surr: Decachlorobiphenyl	20.382		16.78		121	26	125				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51229

Sample ID: **102700-002AMSDTO**	SampType: **MSD**	TestCode: **8081_S_PGE**	Units: **µg/Kg-dry**	Prep Date: **12/17/2008**	RunNo: **103240**
Client ID: **N002424-001C / IDW**	Batch ID: **51229**	TestNo: **EPA 8081A**	**EPA 3550B**	Analysis Date: **12/18/2008**	SeqNo: **1610726**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Toxaphene	121.983	50	167.8	0	72.7	31	136	117.0	4.19	50	
Surr: Tetrachloro-m-xylene	12.836		16.78		76.5	36	124		0	0	
Surr: Decachlorobiphenyl	20.957		16.78		125	26	125		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank
ND	Not Detected at the Reporting Limit
DO	Surrogate Diluted Out
E	Value above quantitation range
R	RPD outside accepted recovery limits
	Calculations are based on raw values
H	Holding times for preparation or analysis exceeded
S	Spike/Surrogate outside of limits due to matrix interference

CLIENT:	Advanced Technology Laboratory-Las Vega	**Client Sample ID:**	N002424-001C / IDW-SOIL-12001
Lab Order:	102700	**Collection Date:**	12/11/2008 3:10:00 PM
Project:		**Matrix:**	SOIL
Lab ID:	102700-002A		

PCBS BY GC/ECD

EPA 3550B **EPA 8082**

RunID: **GC4_081218A** QC Batch: **51229** PrepDate: **12/17/2008** Analyst: **HL**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
Aroclor 1016	ND	8.6	17		µg/Kg-dry	1	12/18/2008 02:39 PM
Aroclor 1221	ND	2.5	33		µg/Kg-dry	1	12/18/2008 02:39 PM
Aroclor 1232	ND	4.0	17		µg/Kg-dry	1	12/18/2008 02:39 PM
Aroclor 1242	ND	3.5	17		µg/Kg-dry	1	12/18/2008 02:39 PM
Aroclor 1248	ND	2.5	17		µg/Kg-dry	1	12/18/2008 02:39 PM
Aroclor 1254	ND	1.8	17		µg/Kg-dry	1	12/18/2008 02:39 PM
Aroclor 1260	ND	4.2	17		µg/Kg-dry	1	12/18/2008 02:39 PM
Surr: Decachlorobiphenyl	123	0	26-125		%REC	1	12/18/2008 02:39 PM
Surr: Tetrachloro-m-xylene	88.2	0	48-121		%REC	1	12/18/2008 02:39 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51229

Sample ID: **MB-51229** SampType: **MBLK** TestCode: **8082_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103192**
Client ID: **PBS** Batch ID: **51229** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1609927**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	16									
Aroclor 1221	ND	33									
Aroclor 1232	ND	16									
Aroclor 1242	ND	16									
Aroclor 1248	ND	16									
Aroclor 1254	ND	16									
Aroclor 1260	ND	16									
Surr: Decachlorobiphenyl	11.512		16.67		69.1	26	125				
Surr: Tetrachloro-m-xylene	12.503		16.67		75.0	48	121				

Sample ID: **LCSA-51229** SampType: **LCS** TestCode: **8082_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103192**
Client ID: **LCSS** Batch ID: **51229** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1609928**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	139.577	16	166.7	0	83.7	41	138				
Aroclor 1260	152.893	16	166.7	0	91.7	61	131				
Surr: Decachlorobiphenyl	13.395		16.67		80.4	26	125				
Surr: Tetrachloro-m-xylene	14.912		16.67		89.5	48	121				

Sample ID: **LCSDA-51229** SampType: **LCSD** TestCode: **8082_S_PGE** Units: **µg/Kg** Prep Date: **12/17/2008** RunNo: **103192**
Client ID: **LCSS02** Batch ID: **51229** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1609929**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	145.972	16	166.7	0	87.6	41	138	139.6	4.48	50	
Aroclor 1260	160.420	16	166.7	0	96.3	61	131	152.9	4.80	50	
Surr: Decachlorobiphenyl	13.995		16.67		84.0	26	125		0	0	
Surr: Tetrachloro-m-xylene	15.765		16.67		94.6	48	121		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51229

Sample ID: **102700-002AMSA** SampType: **MS** TestCode: **8082_S_PGE** Units: **µg/Kg-dry** Prep Date: **12/17/2008** RunNo: **103192**
Client ID: **N002424-001C / IDW** Batch ID: **51229** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1609930**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	135.265	17	167.8	0	80.6	41	138				
Aroclor 1260	152.700	17	167.8	11.71	84.0	61	131				
Surr: Decachlorobiphenyl	19.519		16.78		116	26	125				
Surr: Tetrachloro-m-xylene	13.926		16.78		83.0	48	121				

Sample ID: **102700-002AMSDA** SampType: **MSD** TestCode: **8082_S_PGE** Units: **µg/Kg-dry** Prep Date: **12/17/2008** RunNo: **103192**
Client ID: **N002424-001C / IDW** Batch ID: **51229** TestNo: **EPA 8082** **EPA 3550B** Analysis Date: **12/18/2008** SeqNo: **1609931**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	143.405	17	167.8	0	85.5	41	138	135.3	5.84	50	
Aroclor 1260	155.237	17	167.8	11.71	85.5	61	131	152.7	1.65	50	
Surr: Decachlorobiphenyl	19.583		16.78		117	26	125		0	0	
Surr: Tetrachloro-m-xylene	14.059		16.78		83.8	48	121		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *23-Dec-08*

CLIENT:	Advanced Technology Laboratory-Las Vega	**Client Sample ID:**	N002424-001D / IDW-SOIL-12001
Lab Order:	102700	**Collection Date:**	12/11/2008 3:10:00 PM
Project:		**Matrix:**	SOIL
Lab ID:	102700-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: **MS6_081219A** QC Batch: **51263** PrepDate: **12/18/2008** Analyst: **DMP**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
1,2,4-Trichlorobenzene	ND	68	330		µg/Kg-dry	1	12/19/2008 12:09 PM
1,2-Dichlorobenzene	ND	43	330		µg/Kg-dry	1	12/19/2008 12:09 PM
1,3-Dichlorobenzene	ND	55	330		µg/Kg-dry	1	12/19/2008 12:09 PM
1,4-Dichlorobenzene	ND	46	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2,4,5-Trichlorophenol	ND	78	1600		µg/Kg-dry	1	12/19/2008 12:09 PM
2,4,6-Trichlorophenol	ND	71	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2,4-Dichlorophenol	ND	76	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2,4-Dimethylphenol	ND	52	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2,4-Dinitrophenol	ND	190	1600		µg/Kg-dry	1	12/19/2008 12:09 PM
2,4-Dinitrotoluene	ND	76	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2,6-Dinitrotoluene	ND	100	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2-Chloronaphthalene	ND	59	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2-Chlorophenol	ND	48	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2-Methylnaphthalene	ND	63	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2-Methylphenol	ND	61	330		µg/Kg-dry	1	12/19/2008 12:09 PM
2-Nitroaniline	ND	90	1600		µg/Kg-dry	1	12/19/2008 12:09 PM
2-Nitrophenol	ND	88	330		µg/Kg-dry	1	12/19/2008 12:09 PM
3,3´-Dichlorobenzidine	ND	260	330		µg/Kg-dry	1	12/19/2008 12:09 PM
3-Nitroaniline	ND	68	1600		µg/Kg-dry	1	12/19/2008 12:09 PM
4,6-Dinitro-2-methylphenol	ND	200	1700		µg/Kg-dry	1	12/19/2008 12:09 PM
4-Bromophenyl-phenylether	ND	90	330		µg/Kg-dry	1	12/19/2008 12:09 PM
4-Chloro-3-methylphenol	ND	60	660		µg/Kg-dry	1	12/19/2008 12:09 PM
4-Chloroaniline	ND	170	330		µg/Kg-dry	1	12/19/2008 12:09 PM
4-Chlorophenyl-phenylether	ND	64	330		µg/Kg-dry	1	12/19/2008 12:09 PM
4-Methylphenol	ND	61	330		µg/Kg-dry	1	12/19/2008 12:09 PM
4-Nitroaniline	ND	120	1600		µg/Kg-dry	1	12/19/2008 12:09 PM
4-Nitrophenol	ND	160	1600		µg/Kg-dry	1	12/19/2008 12:09 PM
Acenaphthene	ND	70	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Acenaphthylene	ND	73	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Anthracene	ND	55	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Benzo(a)anthracene	ND	87	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Benzo(a)pyrene	ND	88	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Benzo(b)fluoranthene	ND	97	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Benzo(g,h,i)perylene	ND	76	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Benzo(k)fluoranthene	ND	110	330		µg/Kg-dry	1	12/19/2008 12:09 PM

Qualifiers:				
	B	Analyte detected in the associated Method Blank	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
	S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
	DO	Surrogate Diluted Out		

CLIENT:	Advanced Technology Laboratory-Las Vega	**Client Sample ID:**	N002424-001D / IDW-SOIL-12001
Lab Order:	102700	**Collection Date:**	12/11/2008 3:10:00 PM
Project:		**Matrix:**	SOIL
Lab ID:	102700-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: **MS6_081219A** QC Batch: **51263** PrepDate: **12/18/2008** Analyst: **DMP**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
Benzoic acid	ND	160	1700		µg/Kg-dry	1	12/19/2008 12:09 PM
Benzyl alcohol	ND	58	660		µg/Kg-dry	1	12/19/2008 12:09 PM
Bis(2-chloroethoxy)methane	ND	72	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Bis(2-chloroethyl)ether	ND	47	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Bis(2-chloroisopropyl)ether	ND	64	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Bis(2-ethylhexyl)phthalate	ND	250	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Butylbenzylphthalate	ND	320	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Chrysene	ND	78	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Di-n-butylphthalate	ND	63	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Di-n-octylphthalate	ND	320	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Dibenz(a,h)anthracene	ND	77	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Dibenzofuran	ND	60	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Diethylphthalate	ND	100	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Dimethylphthalate	ND	75	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Fluoranthene	ND	83	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Fluorene	ND	57	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Hexachlorobenzene	ND	76	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Hexachlorobutadiene	ND	54	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Hexachloroethane	ND	62	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Indeno(1,2,3-cd)pyrene	ND	74	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Isophorone	ND	62	330		µg/Kg-dry	1	12/19/2008 12:09 PM
N-Nitrosodi-n-propylamine	ND	86	330		µg/Kg-dry	1	12/19/2008 12:09 PM
N-Nitrosodiphenylamine	ND	76	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Naphthalene	ND	54	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Nitrobenzene	ND	70	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Pentachlorophenol	ND	130	1600		µg/Kg-dry	1	12/19/2008 12:09 PM
Phenanthrene	ND	66	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Phenol	ND	59	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Pyrene	ND	83	330		µg/Kg-dry	1	12/19/2008 12:09 PM
Surr: 1,2-Dichlorobenzene-d4	80.2	0	25-110		%REC	1	12/19/2008 12:09 PM
Surr: 2,4,6-Tribromophenol	111	0	36-126		%REC	1	12/19/2008 12:09 PM
Surr: 2-Chlorophenol-d4	90.7	0	30-100		%REC	1	12/19/2008 12:09 PM
Surr: 2-Fluorobiphenyl	91.8	0	43-125		%REC	1	12/19/2008 12:09 PM
Surr: 2-Fluorophenol	89.8	0	37-125		%REC	1	12/19/2008 12:09 PM
Surr: 4-Terphenyl-d14	110	0	32-125		%REC	1	12/19/2008 12:09 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT:	Advanced Technology Laboratory-Las Vega	**Client Sample ID:**	N002424-001D / IDW-SOIL-12001
Lab Order:	102700	**Collection Date:**	12/11/2008 3:10:00 PM
Project:		**Matrix:**	SOIL
Lab ID:	102700-003A		

SEMIVOLATILE ORGANIC COMPOUNDS BY GC/MS

EPA 3550B **EPA 8270C**

RunID: **MS6_081219A** QC Batch: **51263** PrepDate: **12/18/2008** Analyst: **DMP**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
Surr: Nitrobenzene-d5	85.1	0	37-125		%REC	1	12/19/2008 12:09 PM
Surr: Phenol-d5	93.0	0	40-125		%REC	1	12/19/2008 12:09 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **MB-51263** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **PBS** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610649**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	ND	330									
1,2-Dichlorobenzene	ND	330									
1,3-Dichlorobenzene	ND	330									
1,4-Dichlorobenzene	ND	330									
2,4,5-Trichlorophenol	ND	1600									
2,4,6-Trichlorophenol	ND	330									
2,4-Dichlorophenol	ND	330									
2,4-Dimethylphenol	ND	330									
2,4-Dinitrophenol	ND	1600									
2,4-Dinitrotoluene	ND	330									
2,6-Dinitrotoluene	ND	330									
2-Chloronaphthalene	ND	330									
2-Chlorophenol	ND	330									
2-Methylnaphthalene	ND	330									
2-Methylphenol	ND	330									
2-Nitroaniline	ND	1600									
2-Nitrophenol	ND	330									
3,3´-Dichlorobenzidine	ND	330									
3-Nitroaniline	ND	1600									
4,6-Dinitro-2-methylphenol	ND	1600									
4-Bromophenyl-phenylether	ND	330									
4-Chloro-3-methylphenol	ND	660									
4-Chloroaniline	ND	330									
4-Chlorophenyl-phenylether	ND	330									
4-Methylphenol	ND	330									
4-Nitroaniline	ND	1600									
4-Nitrophenol	ND	1600									
Acenaphthene	ND	330									

Qualifiers:

B Analyte detected in the associated Method Blank
ND Not Detected at the Reporting Limit
DO Surrogate Diluted Out

E Value above quantitation range
R RPD outside accepted recovery limits
Calculations are based on raw values

H Holding times for preparation or analysis exceeded
S Spike/Surrogate outside of limits due to matrix interference

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **MB-51263** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **PBS** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610649**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthylene	ND	330									
Anthracene	ND	330									
Benzo(a)anthracene	ND	330									
Benzo(a)pyrene	ND	330									
Benzo(b)fluoranthene	ND	330									
Benzo(g,h,i)perylene	ND	330									
Benzo(k)fluoranthene	ND	330									
Benzoic acid	ND	1600									
Benzyl alcohol	ND	660									
Bis(2-chloroethoxy)methane	ND	330									
Bis(2-chloroethyl)ether	ND	330									
Bis(2-chloroisopropyl)ether	ND	330									
Bis(2-ethylhexyl)phthalate	ND	330									
Butylbenzylphthalate	ND	330									
Chrysene	ND	330									
Di-n-butylphthalate	ND	330									
Di-n-octylphthalate	ND	330									
Dibenz(a,h)anthracene	ND	330									
Dibenzofuran	ND	330									
Diethylphthalate	ND	330									
Dimethylphthalate	ND	330									
Fluoranthene	ND	330									
Fluorene	ND	330									
Hexachlorobenzene	ND	330									
Hexachlorobutadiene	ND	330									
Hexachloroethane	ND	330									
Indeno(1,2,3-cd)pyrene	ND	330									
Isophorone	ND	330									
N-Nitrosodi-n-propylamine	ND	330									
N-Nitrosodiphenylamine	ND	330									

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **MB-51263** SampType: **MBLK** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **PBS** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610649**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	330									
Nitrobenzene	ND	330									
Pentachlorophenol	ND	1600									
Phenanthrene	ND	330									
Phenol	ND	330									
Pyrene	ND	330									
Surr: 1,2-Dichlorobenzene-d4	2829.000		3330		85.0	25	110				
Surr: 2,4,6-Tribromophenol	3386.000		3330		102	36	126				
Surr: 2-Chlorophenol-d4	2979.667		3330		89.5	30	100				
Surr: 2-Fluorobiphenyl	2934.333		3330		88.1	43	125				
Surr: 2-Fluorophenol	2943.667		3330		88.4	37	125				
Surr: 4-Terphenyl-d14	3748.000		3330		113	32	125				
Surr: Nitrobenzene-d5	2897.333		3330		87.0	37	125				
Surr: Phenol-d5	3017.333		3330		90.6	40	125				

Sample ID: **LCS-51263** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610650**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	2998.333	330	3330	0	90.0	44	125				
1,2-Dichlorobenzene	2833.333	330	3330	0	85.1	45	125				
1,3-Dichlorobenzene	2954.333	330	3330	0	88.7	39	125				
1,4-Dichlorobenzene	2893.667	330	3330	0	86.9	35	125				
2,4,5-Trichlorophenol	3720.333	1600	3330	0	112	49	125				
2,4,6-Trichlorophenol	3600.333	330	3330	0	108	43	125				
2,4-Dichlorophenol	3478.333	330	3330	0	104	45	125				
2,4-Dimethylphenol	3157.667	330	3330	0	94.8	32	125				
2,4-Dinitrophenol	3389.667	1600	3330	0	102	25	132				
2,4-Dinitrotoluene	3720.333	330	3330	0	112	48	125				
2,6-Dinitrotoluene	3680.667	330	3330	0	111	48	125				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **LCS-51263** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610650**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2-Chloronaphthalene	3219.000	330	3330	0	96.7	45	125				
2-Chlorophenol	3143.667	330	3330	0	94.4	44	125				
2-Methylnaphthalene	3317.000	330	3330	0	99.6	47	125				
2-Methylphenol	3273.667	330	3330	0	98.3	40	125				
2-Nitroaniline	3819.333	1600	3330	0	115	44	125				
2-Nitrophenol	3400.000	330	3330	0	102	42	125				
3,3´-Dichlorobenzidine	3107.333	330	3330	0	93.3	25	128				
3-Nitroaniline	3360.667	1600	3330	0	101	27	125				
4,6-Dinitro-2-methylphenol	4090.000	1600	3330	0	123	29	137				
4-Bromophenyl-phenylether	4373.000	330	3330	0	131	46	125				S
4-Chloro-3-methylphenol	3781.333	660	3330	0	114	46	125				
4-Chloroaniline	3212.000	330	3330	0	96.5	10	125				
4-Chlorophenyl-phenylether	3777.667	330	3330	0	113	47	125				
4-Methylphenol	3421.667	330	3330	0	103	41	125				
4-Nitroaniline	3916.000	1600	3330	0	118	34	125				
4-Nitrophenol	4031.333	1600	3330	0	121	25	138				
Acenaphthene	3517.000	330	3330	0	106	46	125				
Acenaphthylene	3410.667	330	3330	0	102	44	125				
Anthracene	3784.667	330	3330	0	114	53	125				
Benzo(a)anthracene	3528.667	330	3330	0	106	52	125				
Benzo(a)pyrene	3999.667	330	3330	0	120	50	125				
Benzo(b)fluoranthene	3848.667	330	3330	0	116	45	125				
Benzo(g,h,i)perylene	3701.667	330	3330	0	111	38	126				
Benzo(k)fluoranthene	3904.667	330	3330	0	117	45	125				
Benzoic acid	3476.333	1600	3330	0	104	25	125				
Benzyl alcohol	3431.667	660	3330	0	103	25	125				
Bis(2-chloroethoxy)methane	3191.333	330	3330	0	95.8	43	125				
Bis(2-chloroethyl)ether	2978.000	330	3330	0	89.4	38	125				
Bis(2-chloroisopropyl)ether	2870.333	330	3330	0	86.2	25	125				
Bis(2-ethylhexyl)phthalate	3542.333	330	3330	0	106	47	127				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **LCS-51263** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610650**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Butylbenzylphthalate	3693.000	330	3330	0	111	49	125				
Chrysene	3542.667	330	3330	0	106	53	125				
Di-n-butylphthalate	4061.667	330	3330	0	122	56	125				
Di-n-octylphthalate	4193.333	330	3330	0	126	41	132				
Dibenz(a,h)anthracene	3849.333	330	3330	0	116	41	215				
Dibenzofuran	3525.000	330	3330	0	106	51	125				
Diethylphthalate	3367.667	330	3330	0	101	50	125				
Dimethylphthalate	3636.333	330	3330	0	109	49	125				
Fluoranthene	3725.333	330	3330	0	112	54	125				
Fluorene	3618.333	330	3330	0	109	49	125				
Hexachlorobenzene	3929.667	330	3330	0	118	47	125				
Hexachlorobutadiene	2866.333	330	3330	0	86.1	40	125				
Hexachloroethane	2897.000	330	3330	0	87.0	34	125				
Indeno(1,2,3-cd)pyrene	3815.000	330	3330	0	115	38	125				
Isophorone	3010.000	330	3330	0	90.4	43	125				
N-Nitrosodi-n-propylamine	3416.333	330	3330	0	103	40	125				
N-Nitrosodiphenylamine	3913.000	330	3330	0	118	49	125				
Naphthalene	3066.333	330	3330	0	92.1	40	125				
Nitrobenzene	2970.667	330	3330	0	89.2	41	125				
Pentachlorophenol	3977.000	1600	3330	0	119	25	125				
Phenanthrene	3690.333	330	3330	0	111	50	125				
Phenol	3237.667	330	3330	0	97.2	39	125				
Pyrene	3700.667	330	3330	0	111	46	125				
Surr: 1,2-Dichlorobenzene-d4	2826.667		3330		84.9	25	110				
Surr: 2,4,6-Tribromophenol	3999.667		3330		120	36	126				
Surr: 2-Chlorophenol-d4	2949.333		3330		88.6	30	100				
Surr: 2-Fluorobiphenyl	3091.333		3330		92.8	43	125				
Surr: 2-Fluorophenol	2891.000		3330		86.8	37	125				
Surr: 4-Terphenyl-d14	3484.333		3330		105	32	125				
Surr: Nitrobenzene-d5	2888.000		3330		86.7	37	125				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **LCS-51263** SampType: **LCS** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610650**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Phenol-d5	3006.667		3330		90.3	40	125				

Sample ID: **102700-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **N002424-001D / IDW** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610651**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3034.636	330	3353	0	90.5	44	125				
1,2-Dichlorobenzene	2760.102	330	3353	0	82.3	45	125				
1,2-Diphenylhydrazine	3614.244	330	3353	0	108	62	122				
1,3-Dichlorobenzene	2843.335	330	3353	0	84.8	39	125				
1,4-Dichlorobenzene	2851.725	330	3353	0	85.1	35	125				
2,4,5-Trichlorophenol	3845.483	1600	3353	0	115	49	125				
2,4,6-Trichlorophenol	3734.394	330	3353	0	111	43	125				
2,4-Dichlorophenol	3581.018	330	3353	0	107	45	125				
2,4-Dimethylphenol	3192.039	330	3353	0	95.2	32	125				
2,4-Dinitrophenol	2733.588	1600	3353	0	81.5	25	132				
2,4-Dinitrotoluene	3865.955	330	3353	0	115	48	125				
2,6-Dinitrotoluene	3804.538	330	3353	0	113	48	125				
2-Chloronaphthalene	3370.922	330	3353	0	101	45	125				
2-Chlorophenol	3176.265	330	3353	0	94.7	44	125				
2-Methylnaphthalene	3368.573	330	3353	0	100	47	125				
2-Methylphenol	3273.594	330	3353	0	97.6	40	125				
2-Nitroaniline	3968.318	1600	3353	0	118	44	125				
2-Nitrophenol	3425.963	330	3353	0	102	42	125				
3,3´-Dichlorobenzidine	2971.540	330	3353	0	88.6	25	128				
3-Nitroaniline	3564.572	1600	3353	0	106	27	125				
4,6-Dinitro-2-methylphenol	3936.434	1700	3353	0	117	29	137				
4-Bromophenyl-phenylether	4445.899	330	3353	0	133	46	125				S
4-Chloro-3-methylphenol	3822.325	660	3353	0	114	46	125				
4-Chloroaniline	2812.794	330	3353	0	83.9	10	125				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: **51263**

Sample ID: **102700-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **N002424-001D / IDW** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610651**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Chlorophenyl-phenylether	3867.969	330	3353	0	115	47	125				
3/4-Methylphenol	3419.587	330	3353	0	102	62	114				
4-Methylphenol	3419.587	330	3353	0	102	41	125				
4-Nitroaniline	3981.071	1600	3353	0	119	34	125				
4-Nitrophenol	4042.153	1600	3353	0	121	25	138				
Acenaphthene	3503.155	330	3353	0	104	46	125				
Acenaphthylene	3498.121	330	3353	0	104	44	125				
Aniline	2955.766	330	3353	0	88.2	56	106				
Anthracene	3752.853	330	3353	0	112	53	125				
Benzidine (M)	1285.072	1700	3353	0	38.3	0	108				
Benzo(a)anthracene	3597.798	330	3353	0	107	52	125				
Benzo(a)pyrene	3999.530	330	3353	0	119	50	125				
Benzo(b)fluoranthene	3919.318	330	3353	0	117	45	125				
Benzo(g,h,i)perylene	3838.770	330	3353	0	114	38	126				
Benzo(k)fluoranthene	3794.469	330	3353	0	113	45	125				
Benzoic acid	999.463	1700	3353	0	29.8	25	125				
Benzyl alcohol	3427.641	660	3353	0	102	25	125				
Bis(2-chloroethoxy)methane	3207.478	330	3353	0	95.7	43	125				
Bis(2-chloroethyl)ether	3021.211	330	3353	0	90.1	38	125				
Bis(2-chloroisopropyl)ether	2828.903	330	3353	0	84.4	25	125				
Bis(2-ethylhexyl)phthalate	3613.237	330	3353	0	108	47	127				
Butylbenzylphthalate	3813.264	330	3353	0	114	49	125				
Carbazole	3814.942	330	3353	0	114	70	130				
Chrysene	3608.202	330	3353	0	108	53	125				
Di-n-butylphthalate	4226.406	330	3353	84.91	124	56	125				
Di-n-octylphthalate	4082.763	330	3353	0	122	41	132				
Dibenz(a,h)anthracene	3965.633	330	3353	0	118	41	215				
Dibenzofuran	3616.257	330	3353	0	108	51	125				
Diethylphthalate	3492.079	330	3353	0	104	50	125				
Dimethylphthalate	3769.969	330	3353	0	112	49	125				

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **102700-003AMS** SampType: **MS** TestCode: **8270_S_FUL** Units: **µg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **N002424-001D / IDW** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610651**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoranthene	3814.942	330	3353	0	114	54	125				
Fluorene	3708.887	330	3353	0	111	49	125				
Hexachlorobenzene	3966.975	330	3353	0	118	47	125				
Hexachlorobutadiene	2885.622	330	3353	0	86.1	40	125				
Hexachlorocyclopentadiene	3285.005	660	3353	0	98.0	57	108				
Hexachloroethane	2841.992	330	3353	0	84.8	34	125				
Indeno(1,2,3-cd)pyrene	3940.126	330	3353	0	118	38	125				
Isophorone	2999.396	330	3353	0	89.5	43	125				
N-Nitrosodi-n-propylamine	3325.950	330	3353	0	99.2	40	125				
N-Nitrosodimethylamine	2643.979	330	3353	0	78.9	49	120				
N-Nitrosodiphenylamine	3996.845	330	3353	0	119	49	125				
Naphthalene	3078.601	330	3353	0	91.8	40	125				
Nitrobenzene	2964.156	330	3353	0	88.4	41	125				
Pentachlorophenol	3817.962	1600	3353	0	114	25	125				
Phenanthrene	3683.045	330	3353	0	110	50	125				
Phenol	3245.066	330	3353	0	96.8	39	125				
Pyrene	3796.147	330	3353	0	113	46	125				
Surr: 1,2-Dichlorobenzene-d4	2793.328		3353		83.3	25	110				
Surr: 2,4,6-Tribromophenol	4114.646		3353		123	36	126				
Surr: 2-Chlorophenol-d4	3026.916		3353		90.3	30	100				
Surr: 2-Fluorobiphenyl	3265.875		3353		97.4	43	125				
Surr: 2-Fluorophenol	2952.745		3353		88.1	37	125				
Surr: 4-Terphenyl-d14	3502.484		3353		104	32	125				
Surr: Nitrobenzene-d5	2899.718		3353		86.5	37	125				
Surr: Phenol-d5	3084.978		3353		92.0	40	125				

Sample ID: **102700-003AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **N002424-001D / IDW** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610652**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **102700-003AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **N002424-001D / IDW** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610652**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3001.745	330	3353	0	89.5	44	125	3035	1.09	30	
1,2-Dichlorobenzene	2740.301	330	3353	0	81.7	45	125	2760	0.720	30	
1,2-Diphenylhydrazine	3395.422	330	3353	0	101	62	122	3614	6.24	30	
1,3-Dichlorobenzene	2813.129	330	3353	0	83.9	39	125	2843	1.07	30	
1,4-Dichlorobenzene	2822.191	330	3353	0	84.2	35	125	2852	1.04	30	
2,4,5-Trichlorophenol	3772.318	1600	3353	0	113	49	125	3845	1.92	30	
2,4,6-Trichlorophenol	3666.600	330	3353	0	109	43	125	3734	1.83	30	
2,4-Dichlorophenol	3507.853	330	3353	0	105	45	125	3581	2.06	30	
2,4-Dimethylphenol	3196.067	330	3353	0	95.3	32	125	3192	0.126	30	
2,4-Dinitrophenol	2372.130	1600	3353	0	70.8	25	132	2734	14.2	30	
2,4-Dinitrotoluene	3619.613	330	3353	0	108	48	125	3866	6.58	30	
2,6-Dinitrotoluene	3689.757	330	3353	0	110	48	125	3805	3.06	30	
2-Chloronaphthalene	3281.313	330	3353	0	97.9	45	125	3371	2.69	30	
2-Chlorophenol	3135.991	330	3353	0	93.5	44	125	3176	1.28	30	
2-Methylnaphthalene	3258.155	330	3353	0	97.2	47	125	3369	3.33	30	
2-Methylphenol	3263.525	330	3353	0	97.3	40	125	3274	0.308	30	
2-Nitroaniline	3798.496	1600	3353	0	113	44	125	3968	4.37	30	
2-Nitrophenol	3430.326	330	3353	0	102	42	125	3426	0.127	30	
3,3´-Dichlorobenzidine	2914.150	330	3353	0	86.9	25	128	2972	1.95	30	
3-Nitroaniline	3411.532	1600	3353	0	102	27	125	3565	4.39	30	
4,6-Dinitro-2-methylphenol	3721.305	1700	3353	0	111	29	137	3936	5.62	30	
4-Bromophenyl-phenylether	4372.063	330	3353	0	130	46	125	4446	1.67	30	S
4-Chloro-3-methylphenol	3665.593	660	3353	0	109	46	125	3822	4.19	30	
4-Chloroaniline	2774.869	330	3353	0	82.8	10	125	2813	1.36	30	
4-Chlorophenyl-phenylether	3719.291	330	3353	0	111	47	125	3868	3.92	30	
3/4-Methylphenol	3347.765	330	3353	0	99.8	62	114	3420	2.12	30	
4-Methylphenol	3347.765	330	3353	0	99.8	41	125	3420	2.12	30	
4-Nitroaniline	3732.716	1600	3353	0	111	34	125	3981	6.44	30	
4-Nitrophenol	3677.675	1600	3353	0	110	25	138	4042	9.44	30	
Acenaphthene	3364.881	330	3353	0	100	46	125	3503	4.03	30	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

ANALYTICAL QC SUMMARY REPORT

BatchID: **51263**

Sample ID: **102700-003AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **N002424-001D / IDW** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610652**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Acenaphthylene	3376.628	330	3353	0	101	44	125	3498	3.53	30	
Aniline	2928.917	330	3353	0	87.4	56	106	2956	0.913	30	
Anthracene	3677.339	330	3353	0	110	53	125	3753	2.03	30	
Benzidine (M)	1314.606	1700	3353	0	39.2	0	108	1285	0	30	
Benzo(a)anthracene	3479.997	330	3353	0	104	52	125	3598	3.33	30	
Benzo(a)pyrene	3877.366	330	3353	0	116	50	125	4000	3.10	30	
Benzo(b)fluoranthene	3834.407	330	3353	0	114	45	125	3919	2.19	30	
Benzo(g,h,i)perylene	3674.654	330	3353	0	110	38	126	3839	4.37	30	
Benzo(k)fluoranthene	3705.531	330	3353	0	111	45	125	3794	2.37	30	
Benzoic acid	1021.949	1700	3353	0	30.5	25	125	999.5	0	30	
Benzyl alcohol	3396.093	660	3353	0	101	25	125	3428	0.925	30	
Bis(2-chloroethoxy)methane	3138.005	330	3353	0	93.6	43	125	3207	2.19	30	
Bis(2-chloroethyl)ether	2913.143	330	3353	0	86.9	38	125	3021	3.64	30	
Bis(2-chloroisopropyl)ether	2753.054	330	3353	0	82.1	25	125	2829	2.72	30	
Bis(2-ethylhexyl)phthalate	3518.929	330	3353	0	105	47	127	3613	2.64	30	
Butylbenzylphthalate	3721.640	330	3353	0	111	49	125	3813	2.43	30	
Carbazole	3654.853	330	3353	0	109	70	130	3815	4.29	30	
Chrysene	3487.045	330	3353	0	104	53	125	3608	3.42	30	
Di-n-butylphthalate	4059.941	330	3353	84.91	119	56	125	4226	4.02	30	
Di-n-octylphthalate	3961.270	330	3353	0	118	41	132	4083	3.02	30	
Dibenz(a,h)anthracene	3845.818	330	3353	0	115	41	215	3966	3.07	30	
Dibenzofuran	3493.086	330	3353	0	104	51	125	3616	3.47	30	
Diethylphthalate	3300.443	330	3353	0	98.4	50	125	3492	5.64	30	
Dimethylphthalate	3625.654	330	3353	0	108	49	125	3770	3.90	30	
Fluoranthene	3602.833	330	3353	0	107	54	125	3815	5.72	30	
Fluorene	3520.942	330	3353	0	105	49	125	3709	5.20	30	
Hexachlorobenzene	3899.181	330	3353	0	116	47	125	3967	1.72	30	
Hexachlorobutadiene	2876.225	330	3353	0	85.8	40	125	2886	0.326	30	
Hexachlorocyclopentadiene	3216.539	660	3353	0	95.9	57	108	3285	2.11	30	
Hexachloroethane	2756.075	330	3353	0	82.2	34	125	2842	3.07	30	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **102700-003AMSD** SampType: **MSD** TestCode: **8270_S_FUL** Units: **µg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **N002424-001D / IDW** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610652**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	3809.907	330	3353	0	114	38	125	3940	3.36	30	
Isophorone	2935.629	330	3353	0	87.6	43	125	2999	2.15	30	
N-Nitrosodi-n-propylamine	3258.827	330	3353	0	97.2	40	125	3326	2.04	30	
N-Nitrosodimethylamine	2539.267	330	3353	0	75.7	49	120	2644	4.04	30	
N-Nitrosodiphenylamine	3920.325	330	3353	0	117	49	125	3997	1.93	30	
Naphthalene	3044.033	330	3353	0	90.8	40	125	3079	1.13	30	
Nitrobenzene	2947.711	330	3353	0	87.9	41	125	2964	0.556	30	
Pentachlorophenol	3737.750	1600	3353	0	111	25	125	3818	2.12	30	
Phenanthrene	3588.401	330	3353	0	107	50	125	3683	2.60	30	
Phenol	3199.423	330	3353	0	95.4	39	125	3245	1.42	30	
Pyrene	3565.915	330	3353	0	106	46	125	3796	6.25	30	
Surr: 1,2-Dichlorobenzene-d4	2786.616		3353		83.1	25	110		0	0	
Surr: 2,4,6-Tribromophenol	3931.736		3353		117	36	126		0	0	
Surr: 2-Chlorophenol-d4	3021.211		3353		90.1	30	100		0	0	
Surr: 2-Fluorobiphenyl	3208.149		3353		95.7	43	125		0	0	
Surr: 2-Fluorophenol	2946.033		3353		87.9	37	125		0	0	
Surr: 4-Terphenyl-d14	3396.765		3353		101	32	125		0	0	
Surr: Nitrobenzene-d5	2915.828		3353		87.0	37	125		0	0	
Surr: Phenol-d5	3050.074		3353		91.0	40	125		0	0	

Sample ID: **LCSD-51263** SampType: **LCSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS02** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610728**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,2,4-Trichlorobenzene	3203.333	330	3330	0	96.2	44	125	2998	6.61	20	
1,2-Dichlorobenzene	2982.667	330	3330	0	89.6	45	125	2833	5.14	20	
1,3-Dichlorobenzene	3084.000	330	3330	0	92.6	39	125	2954	4.29	20	
1,4-Dichlorobenzene	3027.000	330	3330	0	90.9	35	125	2894	4.50	20	
2,4,5-Trichlorophenol	3769.333	1600	3330	0	113	49	125	3720	1.31	20	
2,4,6-Trichlorophenol	3684.000	330	3330	0	111	43	125	3600	2.30	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **LCSD-51263** SampType: **LCSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS02** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610728**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,4-Dichlorophenol	3677.667	330	3330	0	110	45	125	3478	5.57	20	
2,4-Dimethylphenol	3368.000	330	3330	0	101	32	125	3158	6.45	20	
2,4-Dinitrophenol	3212.000	1600	3330	0	96.5	25	132	3390	5.38	20	
2,4-Dinitrotoluene	3655.667	330	3330	0	110	48	125	3720	1.75	20	
2,6-Dinitrotoluene	3650.667	330	3330	0	110	48	125	3681	0.818	20	
2-Chloronaphthalene	3348.000	330	3330	0	101	45	125	3219	3.93	20	
2-Chlorophenol	3331.667	330	3330	0	100	44	125	3144	5.81	20	
2-Methylnaphthalene	3437.000	330	3330	0	103	47	125	3317	3.55	20	
2-Methylphenol	3442.333	330	3330	0	103	40	125	3274	5.02	20	
2-Nitroaniline	3791.000	1600	3330	0	114	44	125	3819	0.745	20	
2-Nitrophenol	3614.667	330	3330	0	109	42	125	3400	6.12	20	
3,3´-Dichlorobenzidine	3050.333	330	3330	0	91.6	25	128	3107	1.85	20	
3-Nitroaniline	3216.667	1600	3330	0	96.6	27	125	3361	4.38	20	
4,6-Dinitro-2-methylphenol	3973.667	1600	3330	0	119	29	137	4090	2.89	20	
4-Bromophenyl-phenylether	4371.667	330	3330	0	131	46	125	4373	0.0305	20	S
4-Chloro-3-methylphenol	3743.667	660	3330	0	112	46	125	3781	1.00	20	
4-Chloroaniline	3284.333	330	3330	0	98.6	10	125	3212	2.23	20	
4-Chlorophenyl-phenylether	3704.667	330	3330	0	111	47	125	3778	1.95	20	
4-Methylphenol	3568.333	330	3330	0	107	41	125	3422	4.20	20	
4-Nitroaniline	3777.667	1600	3330	0	113	34	125	3916	3.60	20	
4-Nitrophenol	3792.667	1600	3330	0	114	25	138	4031	6.10	20	
Acenaphthene	3556.333	330	3330	0	107	46	125	3517	1.11	20	
Acenaphthylene	3451.667	330	3330	0	104	44	125	3411	1.19	20	
Anthracene	3695.000	330	3330	0	111	53	125	3785	2.40	20	
Benzo(a)anthracene	3457.333	330	3330	0	104	52	125	3529	2.04	20	
Benzo(a)pyrene	3885.667	330	3330	0	117	50	125	4000	2.89	20	
Benzo(b)fluoranthene	3566.000	330	3330	0	107	45	125	3849	7.62	20	
Benzo(g,h,i)perylene	3752.667	330	3330	0	113	38	126	3702	1.37	20	
Benzo(k)fluoranthene	3840.667	330	3330	0	115	45	125	3905	1.65	20	
Benzoic acid	3603.000	1600	3330	0	108	25	125	3476	3.58	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: **51263**

Sample ID: **LCSD-51263** SampType: **LCSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS02** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610728**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzyl alcohol	3610.333	660	3330	0	108	25	125	3432	5.07	20	
Bis(2-chloroethoxy)methane	3335.000	330	3330	0	100	43	125	3191	4.40	20	
Bis(2-chloroethyl)ether	3122.000	330	3330	0	93.8	38	125	2978	4.72	20	
Bis(2-chloroisopropyl)ether	2980.000	330	3330	0	89.5	25	125	2870	3.75	20	
Bis(2-ethylhexyl)phthalate	3539.333	330	3330	0	106	47	127	3542	0.0847	20	
Butylbenzylphthalate	3754.667	330	3330	0	113	49	125	3693	1.66	20	
Chrysene	3479.000	330	3330	0	104	53	125	3543	1.81	20	
Di-n-butylphthalate	4011.333	330	3330	0	120	56	125	4062	1.25	20	
Di-n-octylphthalate	4047.333	330	3330	0	122	41	132	4193	3.54	20	
Dibenz(a,h)anthracene	3895.000	330	3330	0	117	41	215	3849	1.18	20	
Dibenzofuran	3521.333	330	3330	0	106	51	125	3525	0.104	20	
Diethylphthalate	3288.333	330	3330	0	98.7	50	125	3368	2.38	20	
Dimethylphthalate	3614.667	330	3330	0	109	49	125	3636	0.598	20	
Fluoranthene	3568.333	330	3330	0	107	54	125	3725	4.31	20	
Fluorene	3531.333	330	3330	0	106	49	125	3618	2.43	20	
Hexachlorobenzene	3883.333	330	3330	0	117	47	125	3930	1.19	20	
Hexachlorobutadiene	3072.000	330	3330	0	92.3	40	125	2866	6.93	20	
Hexachloroethane	3046.000	330	3330	0	91.5	34	125	2897	5.01	20	
Indeno(1,2,3-cd)pyrene	3868.667	330	3330	0	116	38	125	3815	1.40	20	
Isophorone	3090.667	330	3330	0	92.8	43	125	3010	2.64	20	
N-Nitrosodi-n-propylamine	3510.667	330	3330	0	105	40	125	3416	2.72	20	
N-Nitrosodiphenylamine	3875.667	330	3330	0	116	49	125	3913	0.959	20	
Naphthalene	3253.000	330	3330	0	97.7	40	125	3066	5.91	20	
Nitrobenzene	3136.667	330	3330	0	94.2	41	125	2971	5.44	20	
Pentachlorophenol	3878.667	1600	3330	0	116	25	125	3977	2.50	20	
Phenanthrene	3577.667	330	3330	0	107	50	125	3690	3.10	20	
Phenol	3382.333	330	3330	0	102	39	125	3238	4.37	20	
Pyrene	3535.333	330	3330	0	106	46	125	3701	4.57	20	
Surr: 1,2-Dichlorobenzene-d4	2950.333		3330		88.6	25	110		0	0	
Surr: 2,4,6-Tribromophenol	3906.667		3330		117	36	126		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51263

Sample ID: **LCSD-51263** SampType: **LCSD** TestCode: **8270_S_FUL** Units: **µg/Kg** Prep Date: **12/18/2008** RunNo: **103233**
Client ID: **LCSS02** Batch ID: **51263** TestNo: **EPA 8270C** **EPA 3550B** Analysis Date: **12/19/2008** SeqNo: **1610728**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 2-Chlorophenol-d4	3142.667		3330		94.4	30	100		0	0	
Surr: 2-Fluorobiphenyl	3224.333		3330		96.8	43	125		0	0	
Surr: 2-Fluorophenol	3048.333		3330		91.5	37	125		0	0	
Surr: 4-Terphenyl-d14	3441.000		3330		103	32	125		0	0	
Surr: Nitrobenzene-d5	3028.333		3330		90.9	37	125		0	0	
Surr: Phenol-d5	3128.667		3330		94.0	40	125		0	0	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories

ANALYTICAL RESULTS

Print Date: *23-Dec-08*

CLIENT:	Advanced Technology Laboratory-Las Vega	**Client Sample ID:**	N002424-001B / IDW-SOIL-12001
Lab Order:	102700	**Collection Date:**	12/11/2008 3:10:00 PM
Project:		**Matrix:**	SOIL
Lab ID:	102700-001A		

MERCURY BY COLD VAPOR TECHNIQUE

EPA 7471A

RunID: **AA1_081221A** QC Batch: **51259** PrepDate: **12/18/2008** Analyst: **AMT**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
Mercury	ND	0.038	0.10		mg/Kg-dry	1	12/21/2008 05:15 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference		Results are wet unless otherwise specified
DO	Surrogate Diluted Out		

Advanced Technology Laboratories

Date: *23-Dec-08*

CLIENT: Advanced Technology Laboratory-Las Vegas
Work Order: 102700
Project:

ANALYTICAL QC SUMMARY REPORT

BatchID: 51259

Sample ID: **MB-51259** SampType: **MBLK** TestCode: **7471_S_PGE** Units: **mg/Kg** Prep Date: **12/18/2008** RunNo: **103322**
Client ID: **PBS** Batch ID: **51259** TestNo: **EPA 7471A** Analysis Date: **12/21/2008** SeqNo: **1612276**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10									

Sample ID: **LCS-51259** SampType: **LCS** TestCode: **7471_S_PGE** Units: **mg/Kg** Prep Date: **12/18/2008** RunNo: **103322**
Client ID: **LCSS** Batch ID: **51259** TestNo: **EPA 7471A** Analysis Date: **12/21/2008** SeqNo: **1612277**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.846	0.10	0.8300	0	102	75	125				

Sample ID: **102700-001A-MS** SampType: **MS** TestCode: **7471_S_PGE** Units: **mg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103322**
Client ID: **N002424-001B / IDW** Batch ID: **51259** TestNo: **EPA 7471A** Analysis Date: **12/21/2008** SeqNo: **1612278**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.867	0.10	0.8357	0	104	75	125				

Sample ID: **102700-001A-MSD** SampType: **MSD** TestCode: **7471_S_PGE** Units: **mg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103322**
Client ID: **N002424-001B / IDW** Batch ID: **51259** TestNo: **EPA 7471A** Analysis Date: **12/21/2008** SeqNo: **1612279**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	0.864	0.10	0.8357	0	103	75	125	0.8668	0.320	20	

Sample ID: **102700-001A-DUP** SampType: **DUP** TestCode: **7471_S_PGE** Units: **mg/Kg-dry** Prep Date: **12/18/2008** RunNo: **103322**
Client ID: **N002424-001B / IDW** Batch ID: **51259** TestNo: **EPA 7471A** Analysis Date: **12/21/2008** SeqNo: **1612281**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Mercury	ND	0.10						0	0	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike/Surrogate outside of limits due to matrix interference
DO	Surrogate Diluted Out		Calculations are based on raw values		

Advanced Technology Laboratories - Las V
3151-3153 W Post Rd.
Las Vegas, NV 89118
TEL: *7023072659* FAX: *7023072691*

CHAIN-OF-CUSTODY RECORD

QC Level: Level IV

Subcontractor:

Advanced Technology Laboratories - Signal Hill
3283 Walnut Ave.
Signal Hill, California

TEL: (562) 989-4045
FAX: (562) 989-4045
Acct #:

Field Sampler: Barry Collom

12-Dec-08

Sample ID		Matrix	Date Collected	Bottle Type	Requested Tests		
					EPA 7471A	EPA 8081A	EPA 8082
N002424-001B / IDW-SOIL-12001	102400-001	Soil	12/11/2008 3:10:00 PM	8OZG	1		
N002424-001C / IDW-SOIL-12001	2	Soil	12/11/2008 3:10:00 PM	8OZG		1	1
N002424-001D / IDW-SOIL-12001	3	Soil	12/11/2008 3:10:00 PM	8OZG			

General Comments: Please use PO#: LV00698 Please fax results by: Normal TAT

Please see attached copy of COC from client.

	Date/Time			Date/Time
Relinquished by:	12/12/8	**Received by:**	Marge	12/13/08 11:00
Relinquished by:		**Received by:**		

3.8 Ontrac

Advanced Technology Laboratories - Las V
3151-3153 W Post Rd.
Las Vegas, NV 89118
TEL: *7023072659* FAX: *7023072691*

CHAIN-OF-CUSTODY RECORD

Page 2 of 2

QC Level: **Level IV**

Subcontractor:
Advanced Technology Laboratories - Signal Hill
3283 Walnut Ave.
Signal Hill, California

TEL: (562) 989-4045
FAX: (562) 989-4045
Acct #:

Field Sampler: Barry Collom

12-Dec-08

				Requested Tests		
Sample ID	**Matrix**	**Date Collected**	**Bottle Type**	**EPA 8270C**		
N002424-001B / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG			
N002424-001C / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG			
N002424-001D / IDW-SOIL-12001	Soil	12/11/2008 3:10:00 PM	8OZG	1		

General Comments: Please use PO#: LV00698 Please fax results by: Normal TAT
Please see attached copy of COC from client.

	Date/Time		Date/Time
Relinquished by:	12/12/8	**Received by:** Marge	12/12/08 11.00
Relinquished by:		**Received by:**	

CHAIN OF CUSTODY RECORD

COC Number
TURNAROUND TIME
DATE 12-12-08 PAGE 1 OF 1

COMPANY E2 / CH2M Hill
PROJECT NAME PG&E Topock
PHONE (530) 229-3303 FAX (530) 339-3303
ADDRESS 155 Grand Ave Ste 1000
Oakland, CA 94612
P.O. NUMBER 354948.FP.08.FW.SC TEAM 1
SAMPLERS (SIGNATURE

SAMPLE I.D.	DATE	TIME	DESCRIPTION	8081 A	8082	6010B/7471 title 22	8270 C	7199	NUMBER OF CONTAINERS	COMMENTS
IDW-soil-12001	12-11-08	1510	soil	X	X	X	X	X	6	

CHAIN OF CUSTODY SIGNATURE RECORD

Signature (Relinquished)	Printed Name Barry Collom	Company/ Agency CH2M Hill	Date/ Time 12-12-08 1030
Signature (Received)	Printed Name ALLEGAERT	Company/ Agency ATL	Date/ Time 12-12-08 1030
Signature (Relinquished)	Printed Name ALLEGAERT	Company/ Agency ATL	Date/ Time 12-12-08
Signature (Received)	Printed Name MBCARTHW	Company/ Agency ATL	Date/ Time 12/12/8
Signature (Relinquished)	Printed Name	Company/ Agency	Date/ Time
Signature (Received)	Printed Name	Company/ Agency	Date/ Time

SAMPLE CONDITIONS

RECEIVED COOL ☐ WARM ☐ °F

CUSTODY SEALED YES ☐ NO ☐

SPECIAL REQUIREMENTS:

Advanced Technology Laboratories

Please review the checklist below. Any NO and/or NA signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (562) 989-4045.

Sample Receipt Checklist

Client Name: ATL-LV

Date Time Received: 12/13/2008 11:00:00 AM

Work Order Number: 102700

Received by: **MP**

Cooler Temp (Deg C): 3.8

Checklist completed by Signature Date 12/15/08

Reviewed by: Initials Date 12/16/08

Carrier name: CA Overnight

1 Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2 Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3 Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4 Chain of custody present?	Yes ☑	No ☐	
5 Sampler's name present in COC?	Yes ☑	No ☐	
6 Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7 Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8 Samples in proper container/bottle?	Yes ☑	No ☐	
9 Sample containers intact?	Yes ☑	No ☐	
10 Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11 All samples received within holding time?	Yes ☑	No ☐	
12 Container/Temp Blank temperature within acceptance limit?	Yes ☑	No ☐	NA ☐
13 Water - VOA vials have zero headspace?	Yes ☐	No ☐	NA ☑
14 Water - pH acceptable upon receipt? Example pH > 12 for (CN,S), pH<2 for Metals	Yes ☐	No ☐	NA ☑

Comments

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. CAR000151118
Manifest Document No. 00018
2. Page 1 of 1

3. Generator's Name and Mailing Address
PG&E
PO BOX 337
NEEDLES, CA. 92363
TOPOCK GROUNDWATER EXTRACTION SITE

4. Generator's Phone (760) 258-7899

5. Transporter 1 Company Name MP ENVIRONMENTAL
6. US EPA ID Number CAT000624247
A. Transporter's Phone 602-278-6233

7. Transporter 2 Company Name
8. US EPA ID Number
B. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT
35251 OLD SKYLINE RD.
KETTLEMAN CITY, CA. 93239
10. US EPA ID Number CAT000646117
C. Facility's Phone 800-222-2764

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. NON HAZARDOUS, IDW DRILLING WASTE WITH TRACE METALS	001	CM	15	Y
b.				
c.				
d.				

D. Additional Descriptions for Materials Listed Above
a) PROFILE #: 101985CA

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information
WEAR PROPER PPE + EYEWEAR AS NEEDED
PO#: 2500121155 (DISPOSAL)
(SOIL STUDY-PART A)

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.
Printed/Typed Name CHRIS SMITH
Signature C Smith
Month 03 Day 05 Year [illegible]

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name [illegible]
Signature
Month [illegible] Day [illegible] Year [illegible]

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of waste materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Month Day Year

GENERATOR
TRANSPORTER
FACILITY

Attachment B3
AOC 4 Surface Debris Mapping Photograph Log

Photograph 1: View from East to West in the bottom of the ravine. Note pile of wooden slats and large slabs of concrete near the top of the slope.

Photograph 2: View from West to East in the bottom of the ravine. Note wooden slat pile in the ravine bottom and two large slabs of concrete on the slope.

Photograph 3: Close up debris in bottom of ravine.

Photograph 4: View from West to East at top of the ravine.

Photograph 5: Grid sections A, B, and C. Note the three large pieces of concrete, rusted drum lids, metal scraps, and wooden slats in section A. Also, note the large slab of debris in section B

Photograph 6: Close up of grid section A

Photograph 7: Extent of debris in grid section A

Photograph 7: Extent of debris in grid section A

Photograph 8: Close up of grid section B

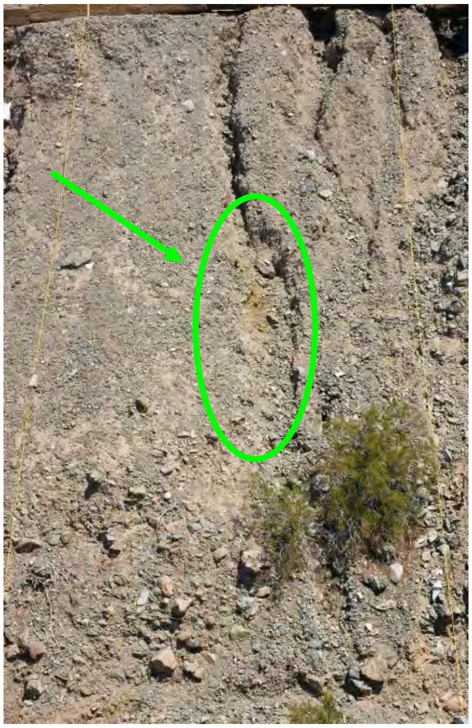
Photograph 9: B30 White soil close up

Photograph 10: Close up of grid section C

Photograph 11: Close up of grid section D

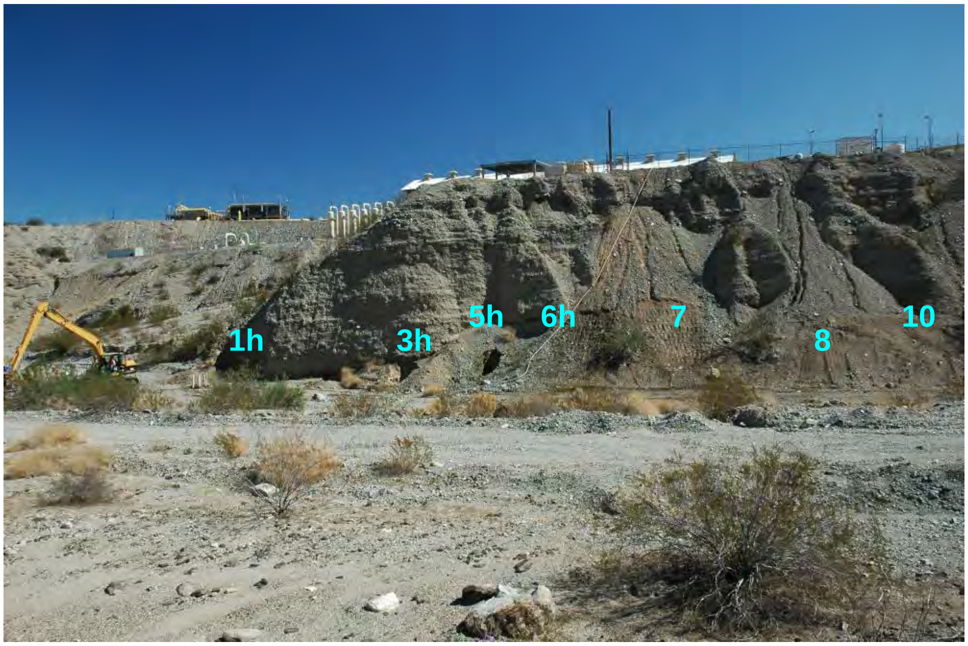
Photograph 12: Close up wooden slats at the bottom of grid sections C and D

*Photograph 13: Grid sections E through I. Note the stained soil in grid section G***.**



Photograph 14: Close up grid section G. Note stained soil.

Attachment B4
SWMU 1 Surface Debris Mapping and Trenching Photograph Log



Photograph 1: Approximate areas of the seven trench locations.

Photograph 2: Trench SWMU-WP-1h. Note that there is no white powder visible in this trench.

Photograph 3: Trench SWMU1-WP-1h south side wall at bottom

Photograph 4: SWMU1-WP-1h trench bottom

Photograph 5: SWMU1-WP-1h trench middle

Photograph 6: SWMU1-WP-1h trench top

Photograph 7: SWMU1-WP-1h green soil

Photograph 8: SWMU1-WP-1h green soil close

Photograph 9: Trench *SWMU1*-WP-3h open. Note layer of white powdery material.

Photograph 10: Trench SWMU1-WP-3h North sidewall. Note white powdery material.

Photograph 11: Trench SWMU1-WP-3h south sidewall. Note white layer.

Photograph 12: Observation trench SWMU1-WP-2h to investigate extent of white layer found in Trench SWMU1-WP-3h.

Photograph 13: WP-5h open. Note white powdery material.

Photograph 14: Trench SWMU1-WP-5h trench bottom

Photograph 15: Trench SWMU1-WP-5h trench middle

Photograph 16: Trench SWMU1-WP-5h trench top

Photograph 17: Trench SWMU1-WP-6h open. Note small outcrops of white material.

Photograph 18: Trench SWMU1-WP7 center. Note consolidated layer of white chalky material.

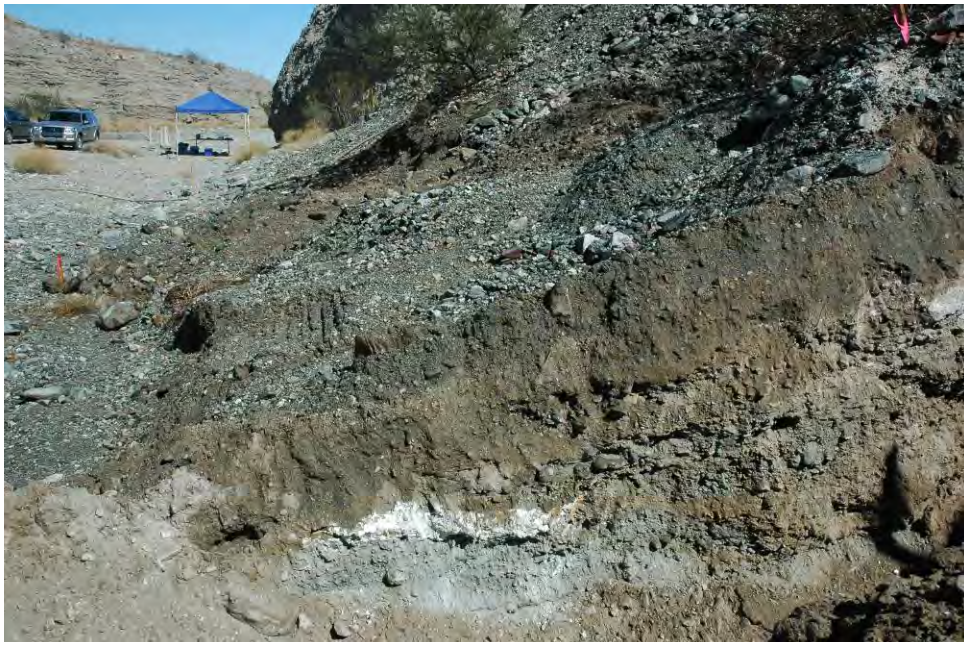
Photograph 19: Trench SWMU1-WP-7 north sidewall. Note close up of white chalky material.

Photograph 20: Trench SWMU1-WP-7 south sidewall. Note white chalky material.

Photograph 21: Trench SWMU1-WP-7h red soil

Photograph 22: Horizontal lens of white powder in small observation trench located between trenching locations SWMU1-WP-6a and SWMU1-WP-7

Photograph 23: Trench SWMU1-WP-8

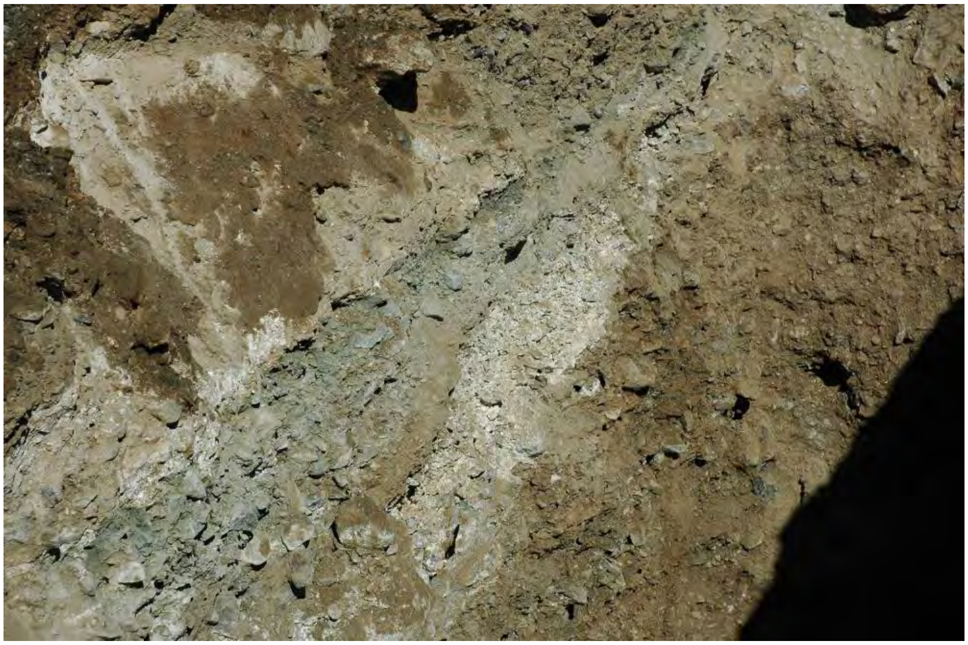


Photograph 24: Trench SWMU1-WP-8 Trench view north

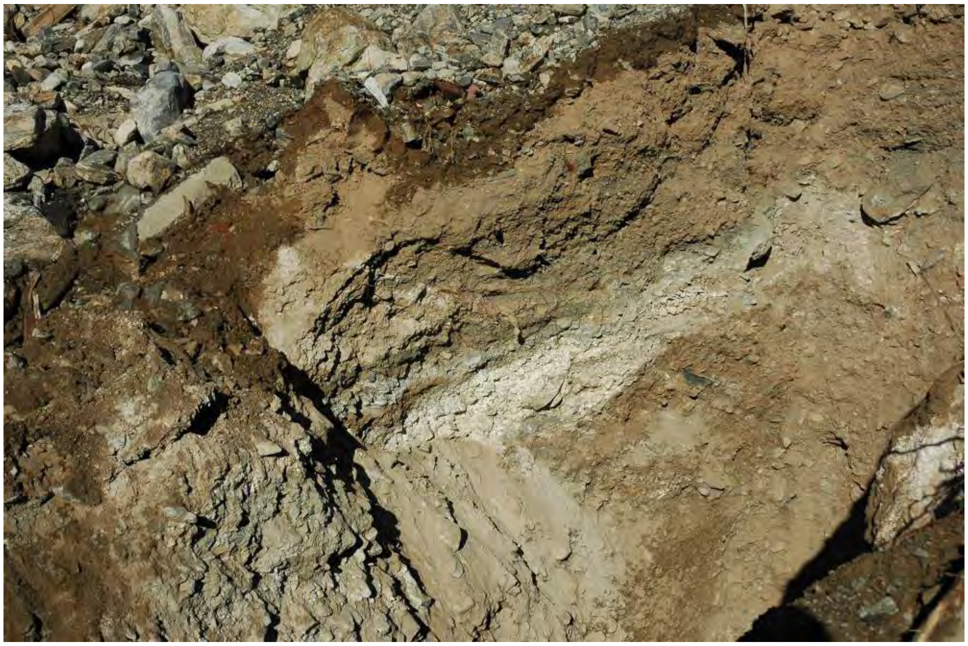
Photograph 25: SWMU1-WP-8 Trench view south

Photograph 26: SWMU1-WP-8 white with red soil south sidewall

Photograph 27: Trench SWMU1-WP-10 Trench



Photograph 28: Trench SWMU1-WP-10 North sidewall close



Photograph 29: Trench SWMU1-WP-10 Trench north sidewall

Photograph 30: Trench SWMU1-WP-10 south sidewall

Attachment B5
AOC 4 Trenching Photograph Log

Photograph 1: View of trench AOC4-T1

Photograph 2: Trench AOC4-T1 East sidewall. Note piece of wire debris.

Photograph 3: Trench AOC4-T2 south view

Photograph 4: Trench AOC4-T2 debris up close

Photograph 5: Trench AOC4-T2 west sidewall upper portion

Photograph 6: Trench AOC4-T3 west view

Photograph 7: Trench AOC4-T3 south view

Photograph 8: Note pipe in west sidewall of Trench AOC4-T3.

Photograph 9: Trench AOC4-T4 view south

Attachment B6
Geophysical Results

NORCAL GEOPHYSICAL CONSULTANTS, INC.

October 1, 2008

Mr. Mike Cavaliere
CH2M Hill Inc.
155 Grand Avenue, Suite 1000
Oakland, CA 94612

Subject: Geophysical Survey
PG&E Topock Compressor Station, Needles, CA
NORCAL Job Number 08-106.47

Dear Mr. Cavaliere:

This letter presents the findings of a geophysical investigation performed by NORCAL Geophysical Consultants, Inc. on the property located at the PG&E Topock Compressor Station, Needles, CA. The field survey was conducted on September 4 - 5, 2008 by NORCAL Professional Geophysicist Sierra Boyd and Geophysical Technician Travis Black. Logistical support and background information were provided by Mike Cavaliere, CH2M Hill Inc., and Barry Collum, Site Coordinator/On-Site Safety Officer, Topock Compressor Station.

SITE DESCRIPTION

The PG&E Topock Compressor Station is located off of Highway 40, west of the Colorado River, California/Arizona border, approximately 14 miles southeast of Needles, CA. The facility provides pressure to natural gas which is piped from Texas to central and northern California. The Compressor Station is located in dry rocky terrain with sparse desert vegetation.

The geophysical survey was conducted in several regions known as Areas of Concern (AOC), as shown on Plates 1 and 2. The regions include AOC–12A, AOC-12B and AOC-12C in the vicinity of the Transwestern Gas Pipeline Intertie. An additional survey area, called AOC UA-1 Potential Pipe Disposal Area, is located approximately 2600 feet to the southwest from the Transwestern Gas Pipeline Intertie. Details of each survey area are described below.

AOC-12A

The area of concern is located in a small ravine northeast of the Transwestern Gas Pipeline Intertie, as shown on Plate 1. The terrain is rocky and uneven with a steep slope in the southern portion of the survey area. Site features include several bushes and pin flags delineating two suspected pipelines crossing the region.

AOC-12B&C

These two small areas are located along the western perimeter of the Transwestern Gas Pipeline Intertie, as shown on Plate 1. To simplify data acquisition, these two areas were combined into AOC-12B & C. There is a steep drop-off to the west and an earthen mound to the north which create an irregularly shaped survey area. The facility is surrounded by chain link fencing which was removed in the vicinity of the survey area. The metal fence posts surrounding the former Above-ground Storage Tank (AST) pad and AST bunker were left in place, as shown on Plate 1.The AST pad and bunker are enclosed by cement retaining walls. In the south there is a large metal container with miscellaneous pipes and rolls of chain link fencing stored nearby.

AOC UA-1 Potential Pipe Disposal Area

This area is located approximately 2600 feet to the southwest of the Transwestern Gas Pipeline Intertie. The region is flat and bordered by a dirt road to the south, a steep drop-off to the west and a steep slope to the east, as shown on Plate 2. There are two monitoring wells surrounded by metal bollards located in the southeast and southwest as well as several large bushes. The surface appears uneven, perhaps due to differences in fill materials.

PURPOSE

Future plans for AOC-12A, AOC-12B and AOC-12C include trenching. The purpose of the geophysical surveys is to locate detectable utilities and buried metallic debris in the vicinity of the proposed trenching sites. The purpose of the survey in AOC UA-1 is to locate possible buried pipes, utilities and buried metallic debris.

FIELD INVESTIGATIONS

Methodology

We used vertical magnetic gradient (VMG), electromagnetic (EM), metal detection-electromagnetic line locating (MD-EMLL) and ground penetrating radar (GPR) methods to investigate for detectable subsurface features and debris.

The VMG method is used to determine the presence of buried ferrous metal objects. These objects could include various metallic debris and utilities. We used a Geometrics G-858 cesium vapor magnetometer to obtain the vertical magnetic gradient data, since it provides high sensitivity and rapid data acquisition.

The EM instrument records terrain conductivity (TC). TC values represent the electrical conductivity of the subsurface to a depth of approximately 12 to 15 feet. These values can be affected by both metallic and nonmetallic debris. The effect that ferrous or nonferrous metal will have on the TC readings is dependent upon the depth and size of the metal object. In addition, subsurface properties such as differences in soil compaction, composition and water content of fill materials can also affect TC values. We performed the TC survey using a Geonics EM31-DL ground conductivity meter connected to an Omnidata recorder.

The MD-EMLL methods are used to scan for near surface metal objects and the presence of metallic utilities. We used the Fischer TW-6 M-Scope to perform the MD survey and the Radio Detection 4000 for the EMLL portion of the survey.

The GPR method is used to aid in further characterizing the source of detected VMG, TC and MD-EMLL anomalies or for additional information where these methods experienced interference from above ground sources. We used a Geophysical Survey Systems, Inc. SIR-3000 Subsurface Interface Radar System equipped with a 400 megaHertz (MHz) transducer. This transducer is near the center of the available frequency range and is used to provide high resolution at shallow depths. Descriptions of the VMG, TC, MD-EMLL, and GPR methods are provided in Appendix A.

Geophysical Surveys

Prior to proceeding with the geophysical work, we established a survey grid to provide horizontal control for each of the areas. The grids are based on a rectangular coordinate system with the origin (0E, 0N) located in the southwest corner of the survey areas. We established the grid in the field using a fiberglass measuring tape and wooden survey lath. The lath was used in lieu of spray paint at the request of CH2M Hill. The grids were then used to guide the VMG, TC, MD-EMLL and GPR surveys.

VMG and TC data were obtained at 5-ft. intervals along south-north trending traverses spaced 5 feet apart. Following data acquisition, we transferred the VMG and TC data to a personal computer and contoured the respective data sets to produce VMG and TC contour maps. Each contour map was analyzed to determine potential locations of buried metallic debris, utilities and other subsurface features. Further processing was completed at our Cotati office.

We also scanned each of the survey areas with the MD-EMLL equipment to further characterize detectable subsurface features. Further investigations over suspect VMG, TC and MD-EMLL anomalies were conducted using GPR along south-north and/or west-east trending traverses. The GPR records were examined for reflection patterns characteristic of buried pipes and other subsurface features.

Following the geophysical data acquisition, we used a Trimble GeoExplorer 2005 Series global positioning system (GPS) to survey selected grid nodes and site features. The limits of the survey areas are shown on Plates 1 and 2.

RESULTS and INTERPRETATION

The results of the geophysical investigation of the respective survey areas are presented on Plates 3, 4 and 5. These plates show pertinent site features, limits of the VMG-TC survey areas, and the respective VMG Contour and TC Color Image Maps. The VMG Contour Map shows variations of the VMG values. Typically, closely spaced contours or contours forming localized contour closures are normally caused by specific metallic sources. Variations that can not be associated with known above or below ground features are considered anomalous. The TC

Color Image Map shows variations in terrain conductivity ranging from low values (blue shades) to high values (red shades), as indicated by the color scale shown with the map. Also shown are the lateral extents of suspected MD-EMLL anomalies that are typically caused by near surface metallic sources.

AOC–12A Geophysical Results, Plate 3

Magnetic Survey

The VMG results show numerous closely spaced contour closures extending across the central portion of the survey area, as shown on Plate 3. This anomalous zone is approximately 30 feet wide and consists of an alignment of densely spaced contour closures with both positive and negative peaks. The areal extent of the contour closures is large, and the peaks have extreme high and low values, suggesting a large source buried near the surface. There is an alignment of less intense, loosely spaced contour closures to the north, suggestive of a possible additional metallic source. Due to the linearity, these anomalies may represent pipelines.

Terrain Conductivity Survey

The TC Color Image Map shows two linear features, extending across the central portion of the survey area, which correlates with the VMG results. One linear feature is shaded yellow and is located between 15 and 25 feet north of another linear feature shaded blue. The difference in color corresponds to a difference in conductivity values. Blue shades correspond to extreme negative conductivity values and yellows correspond to mid-range conductivity values. The southern linear anomaly is larger and has more extreme conductivity values, suggestive of a larger source buried closer to the surface in relation to the northern anomaly.

Metal Detector – Electromagnetic Line Locating Survey

The MD emitted a strong continuous tone in the vicinity of the southern linear anomaly, suggestive of a metallic pipeline. There was no audible signal in the vicinity of the suspected anomaly to the north. The EMLL equipment detected both linear anomalies that appear to be due to pipelines or tracer lines associated with possible pipelines.

Ground Penetrating Radar Survey

Four GPR profiles were collected across the suspected pipelines, as shown on Plate 1. The profiles over the southern pipeline display characteristics typical of a large buried pipe with an approximate diameter of 3.0 to 4.0 ft., buried less than one foot below the surface. There were no indications of a buried pipeline to the north.

AOC–12B & C Geophysical Results, Plate 4

Magnetic Survey

The VMG contour map shows numerous closely spaced contour closures throughout the area. They correlate with above ground surface features as shown on Plate 4. There is a north-south trending linear alignment of closely spaced circular contour closures that correlates with the north-south equally-spaced fence posts. Additional fence posts extending to the east and remnants of the chain link fence stored nearby also contribute to the numerous contour closures in the north and south.

Terrain Conductivity Survey

The TC Color Image Map shows very uniform conductivity variations over the site. The only color variations are caused by the former AST pad and the AST bunker. There appears to be no evidence of UST's or buried debris.

Metal Detector-Electromagnetic Line Locating Survey

Two suspected undifferentiated utilities (UU's) extending east from two AST pipe stub-outs were detected.

AOC UA-1 Potential Pipe Disposal Area Geophysical Results, Plate 5

Magnetic Survey

The VMG Contour Map shows numerous closely spaced contour closures throughout the site. The strongest variations are associated with the two monitoring wells, and along the southern boundary. Additional scattered anomalies appear to be related to small scattered debris observed on the ground surface.

Terrain Conductivity Survey

The TC Color Image Map shows subtle TC variations throughout the site. Lower conductivity values are shown along the eastern and western boundaries where there are steep elevation changes. High conductivities are shown along the southern boundary bordering the dirt road.

Metal Detector – Electromagnetic Line Locating Survey

The MD-EMLL survey delineated two linear anomalies suspected to be pipelines, as shown on Plate 5. The north trending pipeline bends to the east where it appears to be truncated, and extends out of the survey area in the south. The EMLL depth estimate for the north-south trending portion is shallow, ranging from 11 to 16 inches below the surface. The east-west trending pipeline along the southern boundary of the site may truncate to the east and west as shown. There is no evidence for additional pipelines within the survey area.

SUMMARY

Several geophysical methods including vertical magnetic gradient, terrain conductivity, metal detection, electromagnetic line locating and ground penetrating radar were used to investigate portions of the PG&E Topock Compressor Station (Plates 1 and 2) for buried debris, undifferentiated utilities (UU's) and buried pipes.

- The results of the geophysical surveys found two alignments crossing AOC-12A, as shown on Plate 3. The southern alignment is an interpreted large pipeline, approximately 3 to 4 feet in diameter, buried within the upper 1 foot of the surface. The northern alignment is a suspected pipeline or UU, buried deeper, within 3 to 4 feet below the surface.
- In AOC-12B&C, the geophysical results indicate two suspected UU's extending east from two AST Bunker pipe stub outs, as shown on Plate 4. There is no evidence for additional buried debris within this survey area.
- In AOC UA-1 two suspected UU's were detected, as shown on Plate 5. The north to south trending UU appears to be buried within 1.5 ft. below the surface. The suspected UU appears to be truncated in the north and extends out of the survey area in the south. Another suspected UU is located in the southern portion of the survey area and trends east-west. The ends appear to be truncated. There were no indications of buried debris or pipes other than those mentioned above.

STANDARD CARE AND WARRANTY

Please note that all geophysical methods have limitations that may not allow for the detection of certain subsurface features or targets. These limitations may be related to the target being deeper than instrument detection capabilities; target not providing sufficient contrast with the surrounding materials; or other features or structures causing instrumental interference that masks the detection of a target of interest. Therefore it is possible that not all subsurface features/targets may be located or characterized.

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the shallow subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide our services to CH2M Hill Inc. for this investigation.

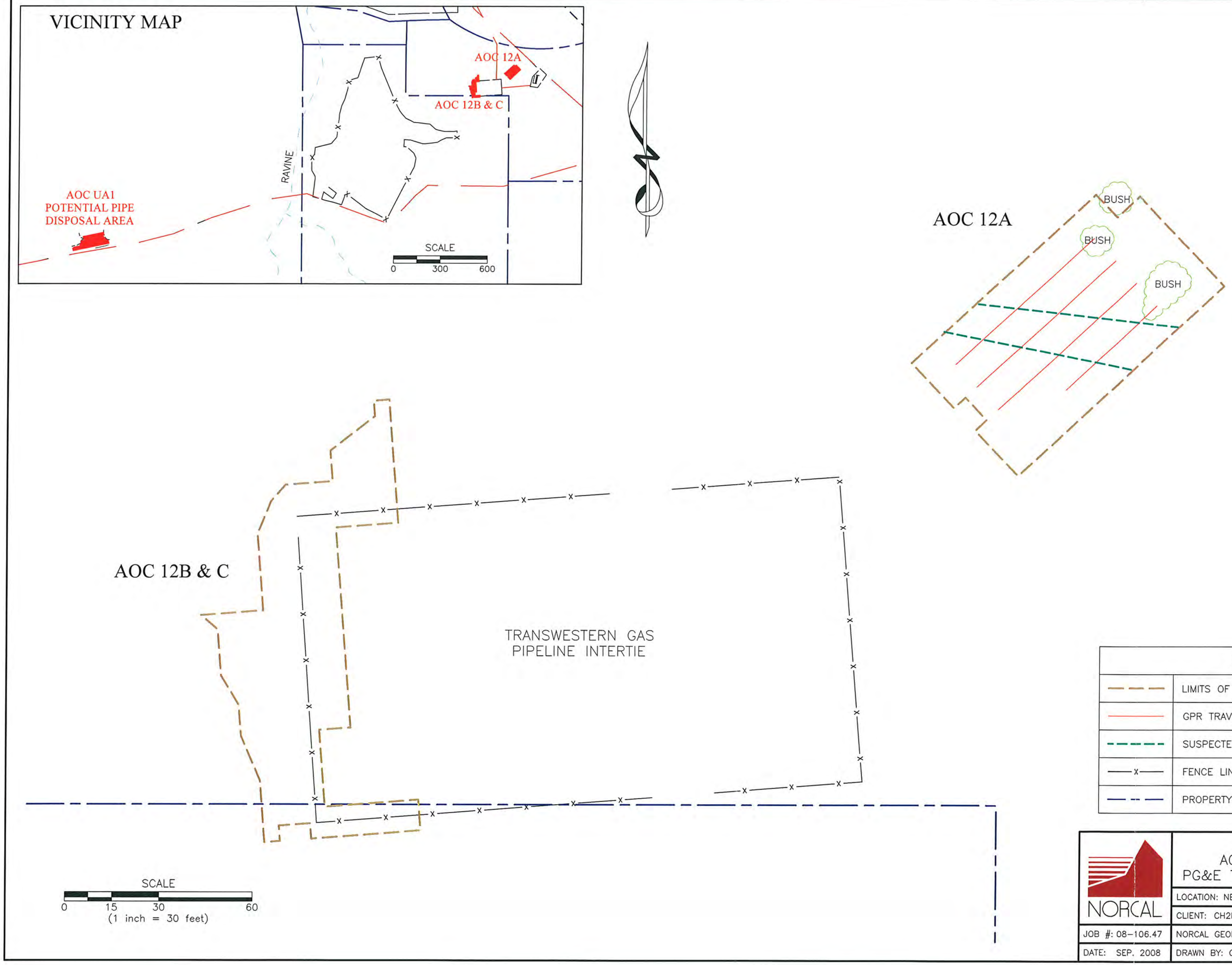
Respectfully,

NORCAL Geophysical Consultants, Inc.

O. Sierra Boyd
Professional Geophysicist, PGp: 1060

OSB/KGB/tt

Enclosure:
Plate 1 Site Map AOC-12A, AOC-12B & C
Plate 2 Site Map AOC UA-1 Potential Pipe Disposal Area
Plate 3 AOC–12A Geophysical Survey Results
Plate 4 AOC–12B & C Geophysical Survey Results
Plate 5 AOC UA-1 Potential Pipe Disposal Area Geophysical Survey Results
Appendix A Geophysical Methodology, Instrumentation, Data Analysis, and Limitations



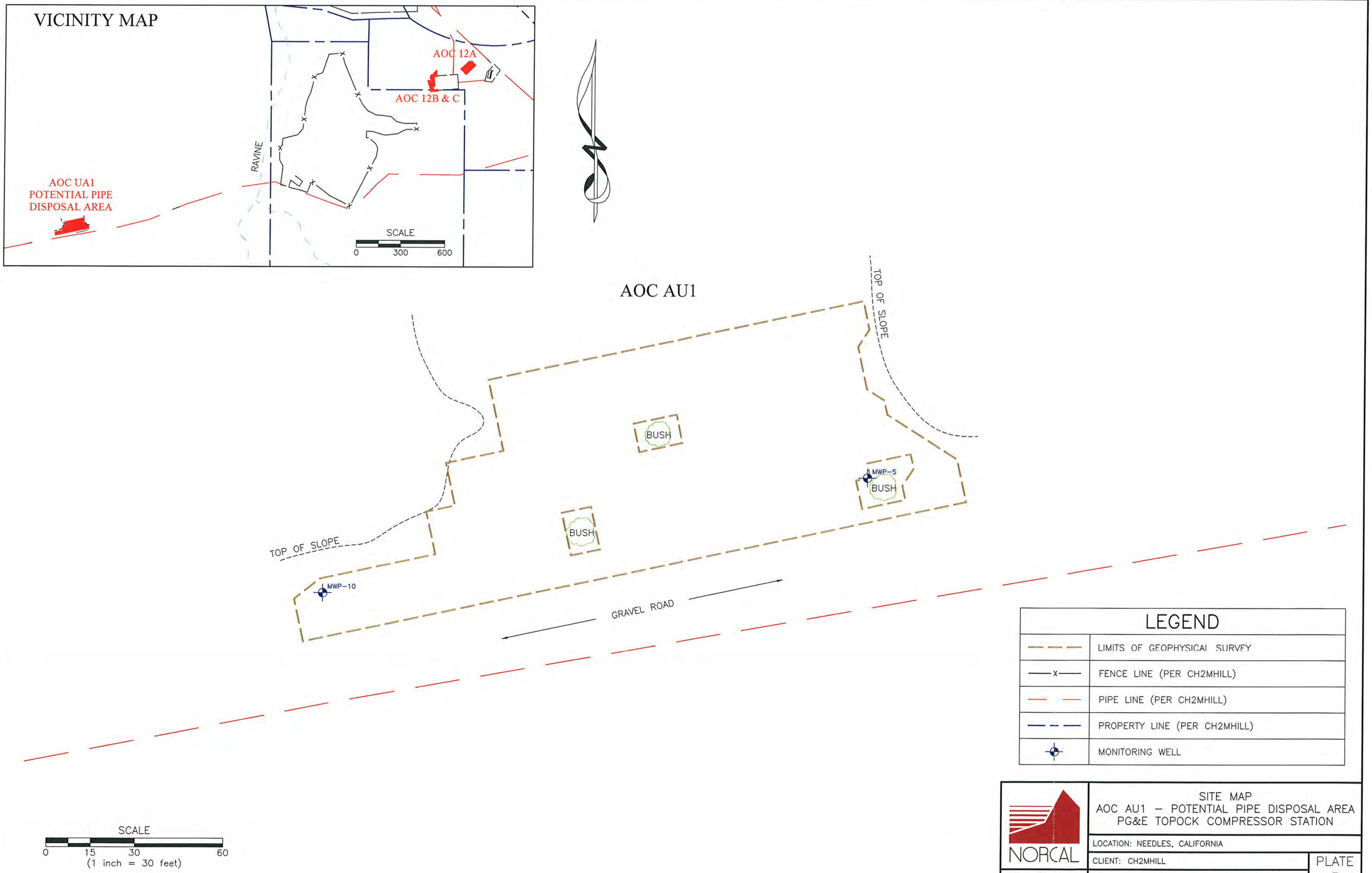
LEGEND

— — —	LIMITS OF GEOPHYSICAL SURVEY
——	GPR TRAVERSE
- - - -	SUSPECTED PIPELINE
—x—	FENCE LINE (PER CH2MHILL)
— - —	PROPERTY LINE (PER CH2MHILL)

NORCAL

SITE MAP
AOC 12A & AOC 12B & C
PG&E TOPOCK COMPRESSOR STATION

LOCATION: NEEDLES, CALIFORNIA
CLIENT: CH2MHILL
NORCAL GEOPHYSICAL CONSULTANTS INC.
JOB #: 08-106.47
DATE: SEP. 2008
DRAWN BY: G.RANDALL
APPROVED BY: OSB
PLATE 1



SITE MAP
AOC AU1 – POTENTIAL PIPE DISPOSAL AREA
PG&E TOPOCK COMPRESSOR STATION

NORCAL

LOCATION: NEEDLES, CALIFORNIA

CLIENT: CH2MHILL

JOB #: 08-106.47

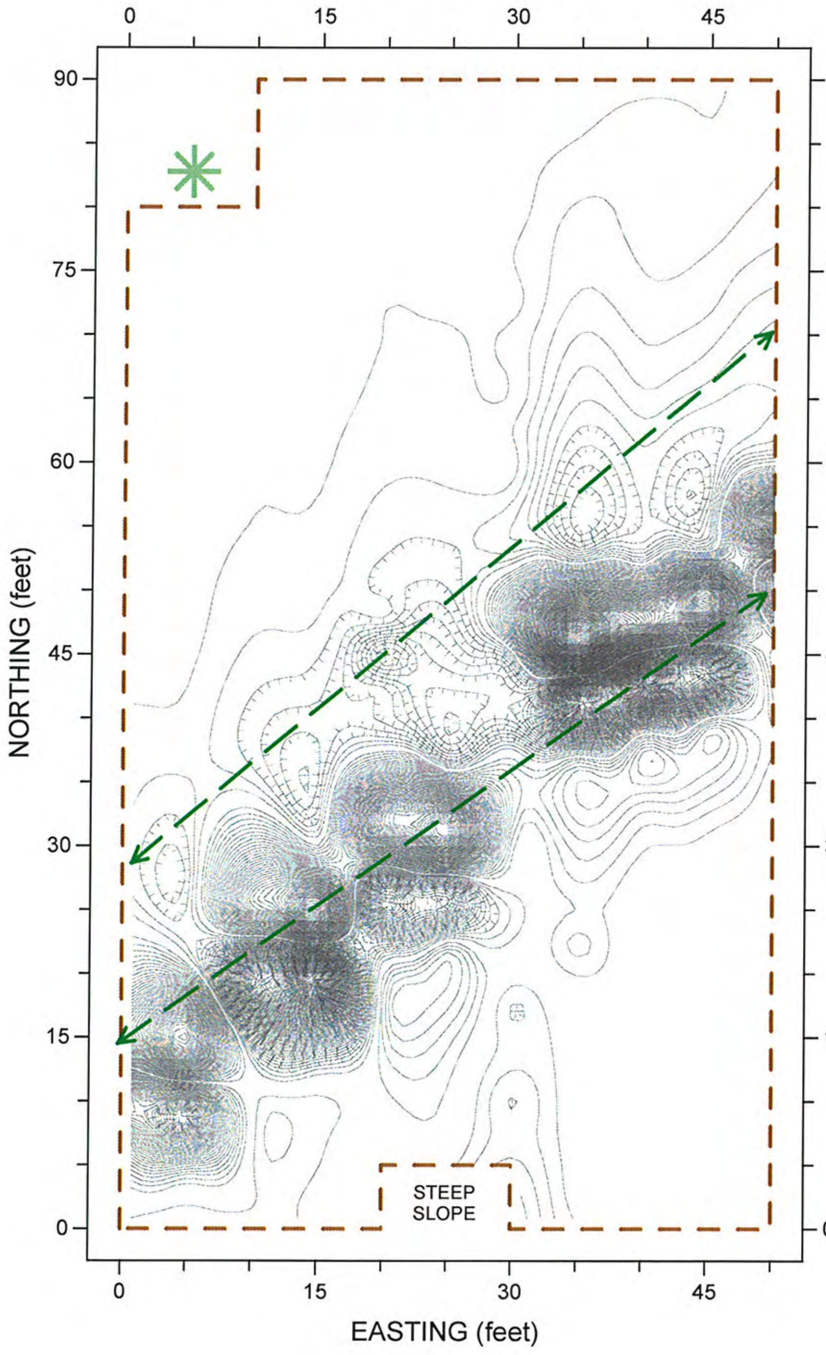
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: SEP. 2008

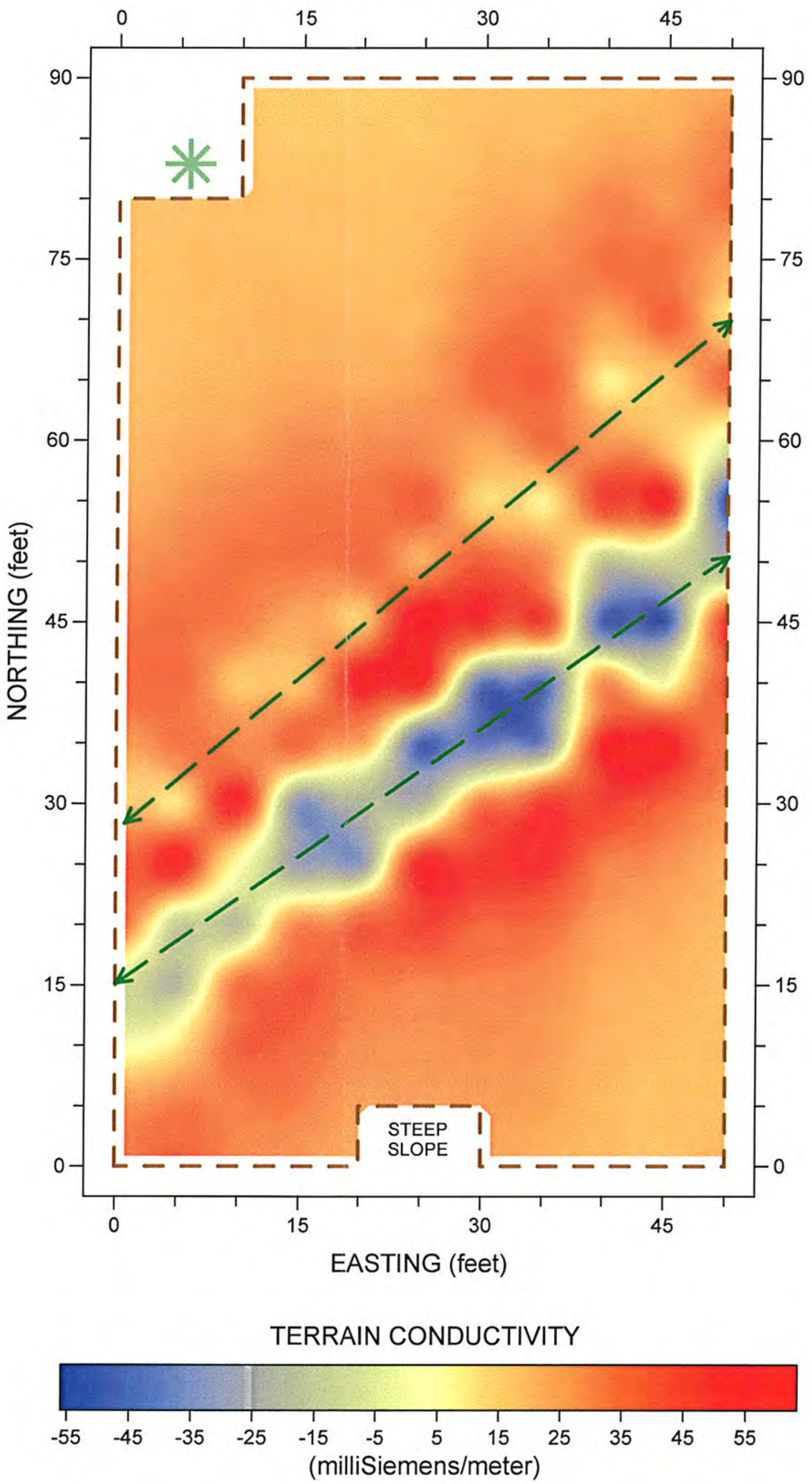
DRAWN BY: G.RANDALL

APPROVED BY: OSB

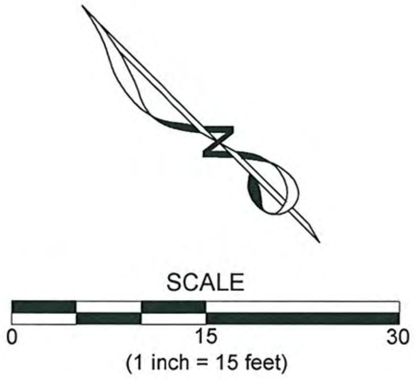
PLATE
2



VERTICAL MAGNETIC GRADIENT CONTOUR MAP



TERRAIN CONDUCTIVITY COLOR IMAGE MAP



LEGEND

— — —	LIMITS OF GEOPHYSICAL SURVEY
~	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 50 nT/m)
← — — →	SUSPECTED PIPELINE
✳	BUSH

NORCAL

GEOPHYSICAL SURVEY RESULTS
AOC 12A
PG&E TOPOCK COMPRESSOR STATION

LOCATION: NEEDLES, CALIFORNIA

CLIENT: CH2MHILL

NORCAL GEOPHYSICAL CONSULTANTS INC.

JOB #: 08-106.47

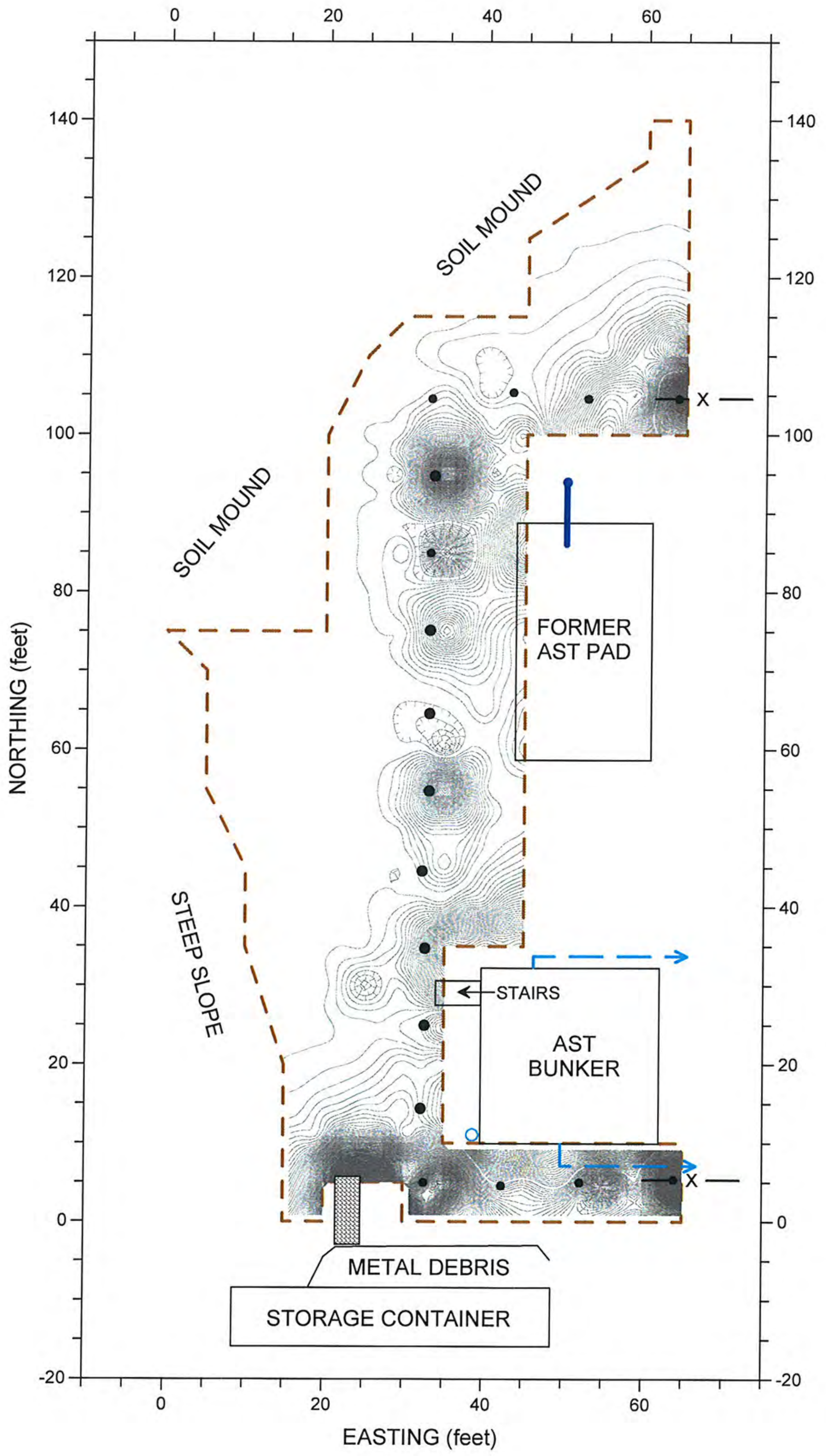
DATE: SEP. 2008

DRAWN BY: G.RANDALL

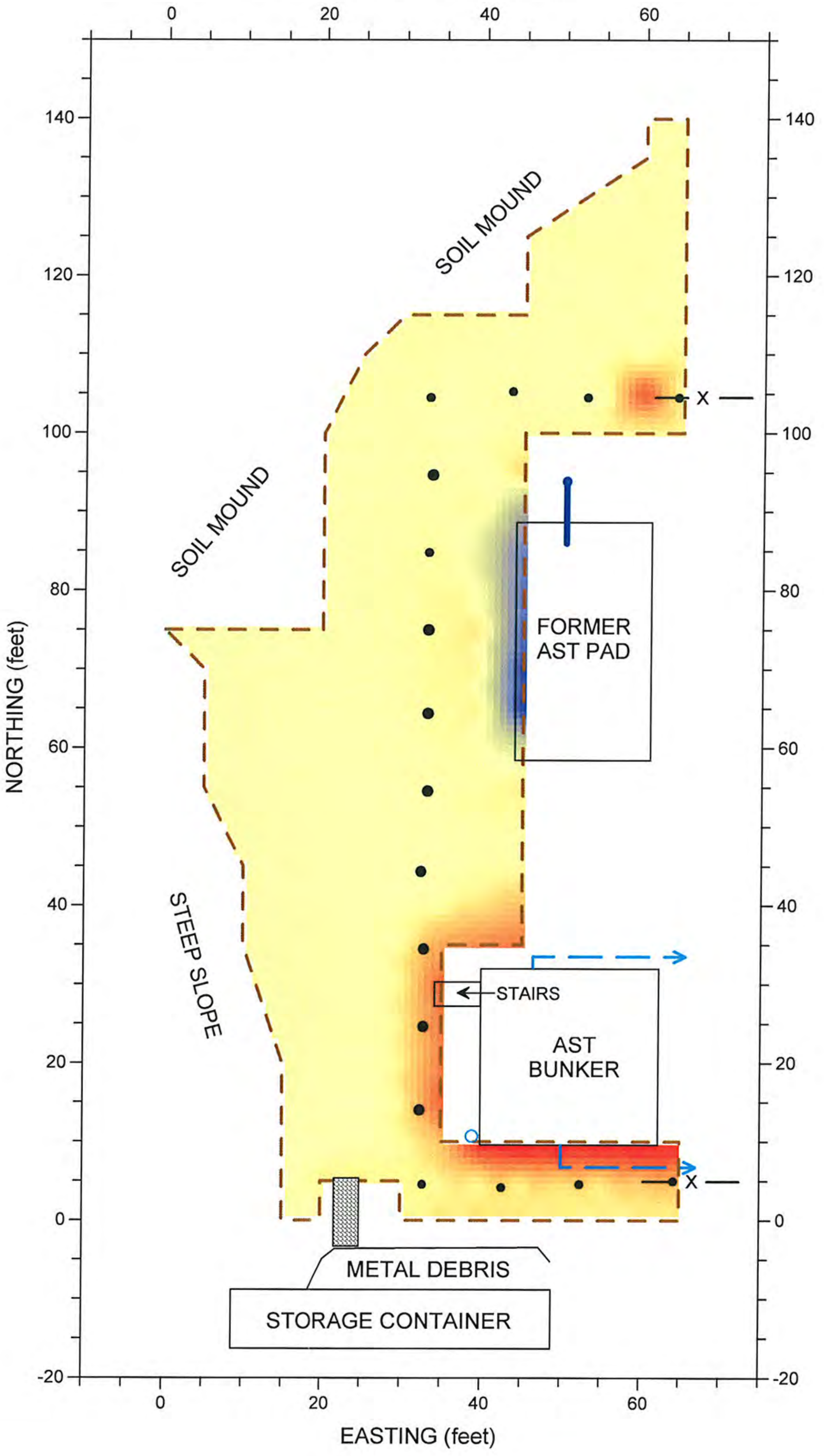
APPROVED BY: OSB

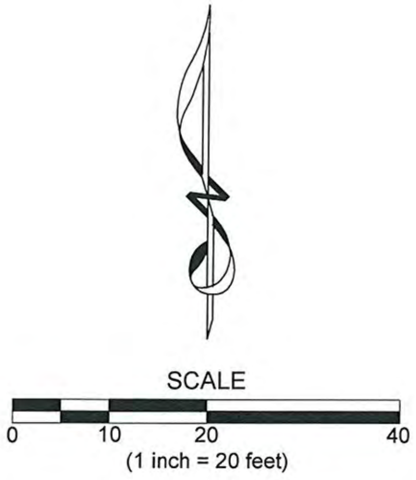
PLATE
3

VERTICAL MAGNETIC GRADIENT CONTOUR MAP



TERRAIN CONDUCTIVITY COLOR IMAGE MAP

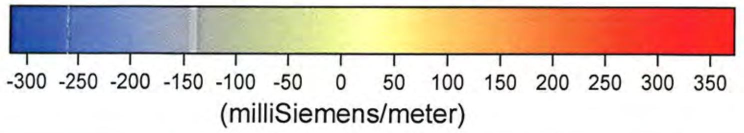




LEGEND

— — —	LIMITS OF GEOPHYSICAL SURVEY
~	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 50 nT/m)
— —	SUSPECTED UTILITY LINE
○	PIPE STUB OUT
● —	LARGE PIPE
— X —	CHAIN-LINK FENCE
•	FENCE POST
▨	BUNDLED FENCING

TERRAIN CONDUCTIVITY



NORCAL

GEOPHYSICAL SURVEY RESULTS
AOC 12B & C
PG&E TOPOCK COMPRESSOR STATION

LOCATION: NEEDLES, CALIFORNIA

CLIENT: CH2MHILL

JOB #: 08-106.47

NORCAL GEOPHYSICAL CONSULTANTS INC.

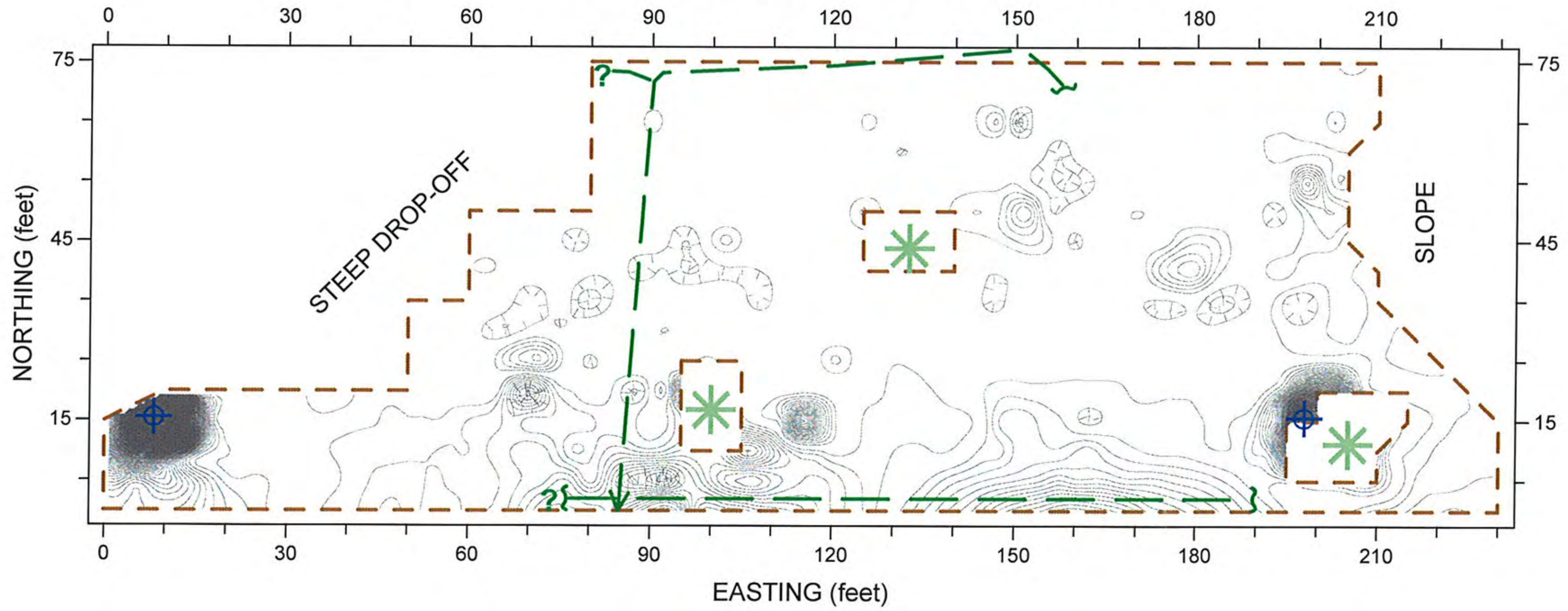
DATE: SEP. 2008

DRAWN BY: G.RANDALL

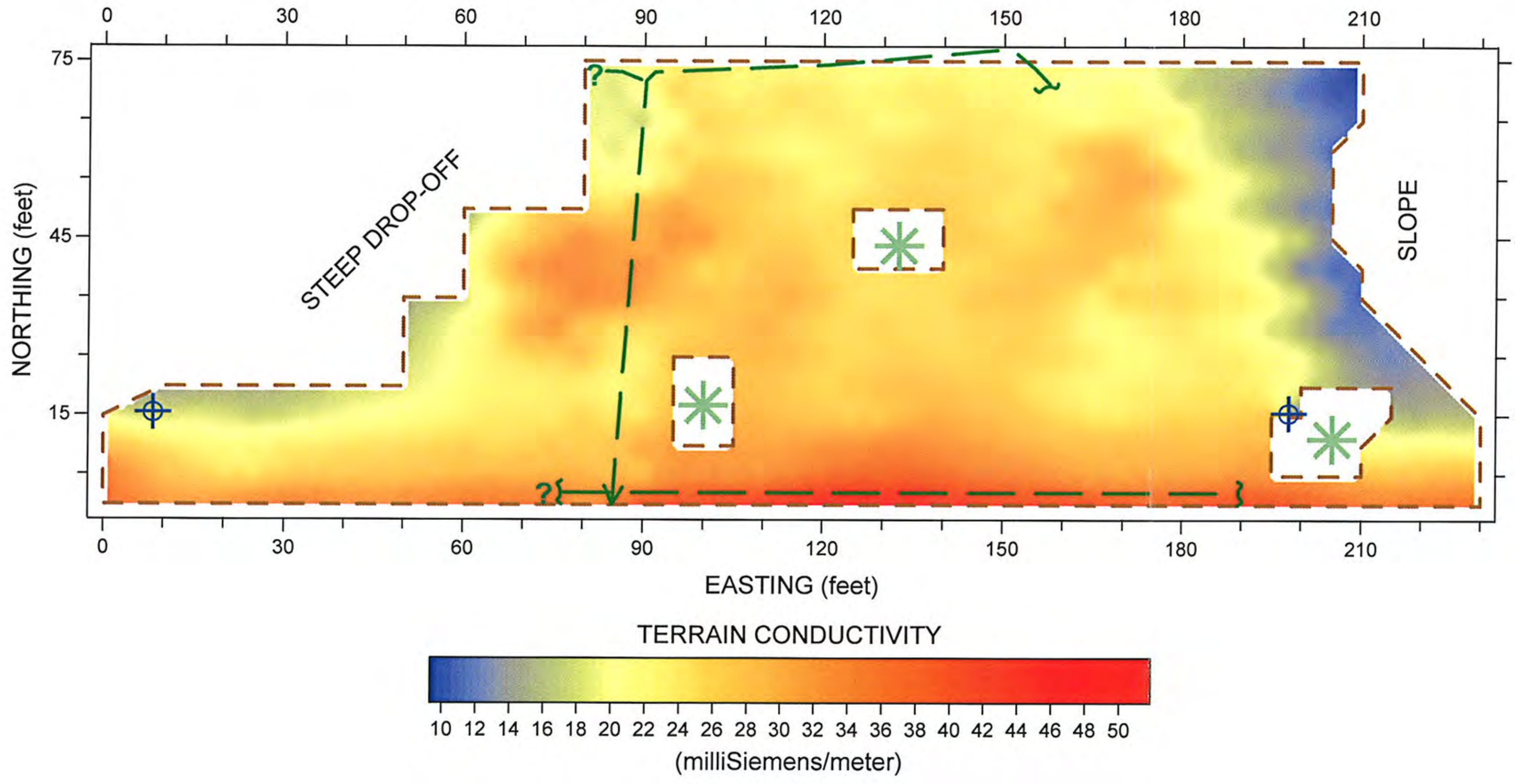
APPROVED BY: OSB

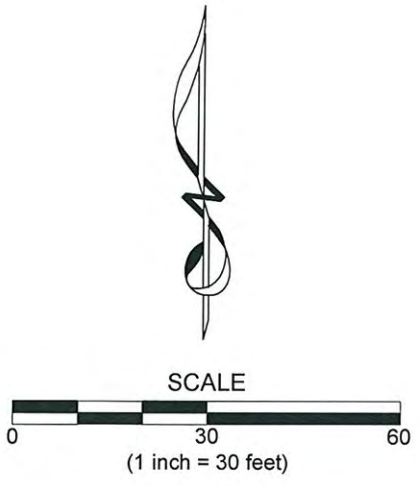
PLATE
4

VERTICAL MAGNETIC GRADIENT CONTOUR MAP



TERRAIN CONDUCTIVITY COLOR IMAGE MAP





LEGEND

- - -	LIMITS OF GEOPHYSICAL SURVEY
～	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 10 nT/m)
— —	SUSPECTED PIPELINE
⌖	MONITORING WELL
✳	BUSH

NORCAL

GEOPHYSICAL SURVEY RESULTS
AOC UA1 - POTENTIAL PIPE DISPOSAL AREA
PG&E TOPOCK COMPRESSOR STATION

LOCATION: NEEDLES, CALIFORNIA

CLIENT: CH2MHILL

JOB #: 08-106.47

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: SEP. 2008

DRAWN BY: G.RANDALL

APPROVED BY: OSB

PLATE
5

Appendix A

GEOPHYSICAL METHODOLOGY, INSTRUMENTATION, DATA ANALYSIS and LIMITATIONS

VERTICAL MAGNETIC GRADIENT (VMG)

VMG Methodology

Vertical magnetic gradient surveys are used to determine the presence of buried ferrous objects. A magnetic gradiometer measures the vertical gradient of the earth's magnetic field. It consists of two total field magnetic sensors separated vertically by one-half meter. The magnetic field strength is measured simultaneously at both of these sensors. The difference in magnetic intensity between these measurements is proportional to the vertical gradient of the earth's magnetic field. Because the vertical gradient is constant with respect to time, the effect of diurnal variations is eliminated. Therefore, a gradiometer provides higher sensitivity and better resolution of near surface sources than total field magnetometers. Areas with significant amounts of buried metal typically produce anomalously steep magnetic gradients. Since it is sensitive to ferrous metal sources both above and below ground, site and vicinity surface conditions can affect survey results.

We typically use a Geometrics G-858 cesium vapor magnetometer to obtain vertical magnetic gradient data. This instrument features a built-in memory that stores the vertical magnetic gradient and survey grid information. The information can be down loaded to a computer for further processing.

Data Analysis

Computer Processing

The VMG data are down loaded to a lap-top computer and converted it into a format for contouring. The contouring program (SURFER Version 8.0 by Golden Software) calculates an evenly spaced array of values (grid) based on the observed field data. Finally, these gridded values are contoured to produce a VMG contour map.

Contour Map Interpretation

The VMG contour map illustrates the variations in the vertical magnetic gradient across the site. Areas without below or above ground ferrous metal are characterized by very low magnetic gradients. In these areas, there are very few contours. In areas with above or below ground ferrous metal, the magnetic gradient is relatively steep. These areas are characterized by numerous closely spaced contours and are considered anomalous. If the source of the anomaly is linear (e.g. underground utilities or fence lines), then the contours tend to be parallel and evenly distributed. If the source of the anomaly is localized (e.g. sign post, buried drum, etc.), then the contours tend to form circular or elliptical closures proportional to the size of the object. The larger the object and the closer it is to the magnetometer, the denser the concentrations of contours. Magnetic anomalies that cannot be attributed to above ground objects (fences, vehicles, buildings, etc.) are probably caused by buried objects.

USTs are often characterized by circular to elliptical contour closures. These closures have magnitudes ranging from several hundred to several thousand nano-Tesla per meter (nT/m) depending on the size and depth of the tank. If the UST is cylindrical and lying horizontally, it will often produce a bi-polar VMG anomaly. This consists of two adjacent contour closures. One has VMG values that increase towards the center of the closure and is referred to as a positive lobe. The second has VMG values that decrease towards the center of the closure and is referred to as a negative lobe. Typically, the positive lobe is situated directly above the UST and the negative lobe is to the north of the UST. Utilities and scattered metal debris, on the other hand, are generally characterized by single circular or irregular shaped negative lobes, or a group of alternating positive and negative lobes (closures). These closures typically have magnitudes ranging from less than fifty to several hundred nano-Tesla per meter (nT/m) depending on the size, depth, and amount of utilities and debris in a given area.

Limitations

Below ground metal ferrous objects produce localized variations in the earth's magnetic field. The magnetic intensity associated with buried metal depends on the mass of the metal and the distance the metal object is from the magnetometer sensor. As the distance between the object and the magnetometer sensor increases, the intensity of the associated field decreases, thereby making detection more difficult. In addition, the ability to detect a buried metal object is based on the intensity of these variations versus the intensity of the background variations. Background variations can be caused by other nearby above or below ground metallic sources. Cultural features such as chain link fences, buildings, debris, railroad spurs, utilities, above ground electric lines, etc. typically produce numerous magnetic variations with high intensities. These variations may mask effects from buried metal objects, or make it very difficult to determine whether the magnetic variations are associated with below ground metal or above/below ground cultural features.

ELECTROMAGNETIC (EM)

EM Methodology

The electromagnetic method is used to measure variations in subsurface electrical conductivity that may be due to buried foreign objects or changes in subsurface materials. The electromagnetic system utilizes two coils separated by a specified distance. One of these coils transmits a time-varying electromagnetic signal (primary magnetic field) which induces current flow in the earth. This in turn creates a secondary magnetic field which is detected by the receiver coil. The secondary signal is complex and has both quadrature and in-phase components. The amplitude of the quadrature component is proportional to the electrical conductivity of the subsurface materials. The in-phase component is proportional to conductivity, but is also affected by electrical properties associated with metal objects. The instrument displays the quadrature component in units of milliSiemens/meter (mS/m). Since this measurement represents the conductivity of the volume of material sampled, rather than individual layers, it is an apparent value and is referred to as terrain conductivity (TC). The instrument displays the in-phase component (IPC) value in units of parts per thousand (ppt).

Electromagnetic surveys are typically conducted using a Geonics EM31-DL ground conductivity meter connected to an Omnidata data recorder. The EM31 has a fixed coil separation of 12 feet, which results in a total depth of investigation of approximately 10 to 15 feet depending upon local site conditions. The data recorder automatically stores the EM values as well as station locations and annotations regarding cultural features.

Data Analysis:

Computer Processing

The EM data are downloaded to a lap-top computer and converted into a format for contouring. The contouring program (SURFER Version 8.0 by Golden Software) calculates an evenly spaced array of values (grid) based on the observed field data. Finally, these gridded values are contoured to produce TC and IPC contour maps.

Contour Map Interpretation

The TC and IPC contour maps show the variations in the electromagnetic terrain conductivity and in-phase component values within the survey area. The contour map is characterized by a series of contour lines that represent specific values. Areas that lack contour lines, or where the contours are spaced far apart, indicate a minimal change or variation in the respective values. This is indicative of relatively uniform conditions. Areas where contours are closely spaced indicate variations that are not uniform and probably caused by local sources.

In areas where there are significant quantities of above or below ground metal objects, the measured values are relatively large. These areas are characterized by numerous closely spaced contours. If the source of the anomaly is linear (e.g. underground utilities, railroad spurs, culvert, etc.), then the contours tend to parallel the object, and are closely spaced in close proximity to the object. If the below ground source is localized (e.g. UST, buried drum, isolated metal debris, etc.), then the contours tend to form circular or elliptical closures that enclose the object. The larger the object and the closer it is to the geophysical instrument, the more contours there are in a given area.

Buried landfill material is often characterized by circular to elliptical contour closures. These closures can vary from large circular closures that cover broad areas, to clusters of small closures that occur in zones. If the composition of the landfill is generally homogenous and nonmetallic, the contours tend to form large closures representing a decrease in value. If the fill material consists of both nonmetallic and metallic debris that varies significantly throughout the landfill, the contours tend to occur as numerous small closures representing both high and low values.

Limitations

There are inherent limitations associated with EM techniques that may not allow for the detection of all subsurface features of interest. These limitations are related to the composition of the subsurface feature, its size and depth of burial, and its proximity to other above or below ground features. In general, as the distance between a subsurface object and the respective geophysical instrument increases, the intensity of the associated field decreases, thereby making detection more difficult. In addition, above and below ground objects, such as buildings, debris, utilities, above ground electric lines, etc., typically produce interference that may mask effects from nearby buried features (targets).

Apart from the physical limitations of the instrument and the unwanted effects from secondary objects, the ability to detect subsurface features is also dependent upon the density of data acquisition points. If the distance between data acquisition points is significantly larger than the size of the subsurface feature, then this object may not be detectable.

METAL DETECTION (MD)

MD Methodology

This method uses the principle of electromagnetic induction to detect shallowly buried metal objects such as USTs, metal utility conduits, rebar in concrete, manhole covers, and various metallic debris. This is done by carrying a hand-held radio transmitter-receiver unit above the ground and continuously scanning the surface. A primary coil broadcasts a radio signal from a transmitter which induces secondary electrical currents in metal objects. These secondary currents in turn produce a magnetic field which is detected by the receiver.

Instrumentation

The MD instrument that we typically use for shallow subsurface investigations is a Fisher TW-6 pipe and cable locator. This instrument is expressly designed to detect metallic pipes, cables, USTs, manhole covers, and other large, shallowly buried metallic objects. The instrument operates by generating both a meter reading (unitless) and an audible response when near a metal object. The peak instrument response usually occurs when the unit is directly over the object. The TW-6 does not provide a recordable data output that can be used for later computer processing. Results are generally limited to marking the interpreted outlines of detected objects in the field and mapping their locations.

Limitations

In general, the response of the MD instrument is roughly proportional to the horizontal surface area of near surface buried objects (typically in the upper three or four feet). This relationship can be used to advantage in discriminating between metal debris, reinforced concrete pads, and pipelines. However, in the presence of above ground metal objects such as fences, walls, parked cars, and metal debris, this is no longer valid. In some instances, the presence of such objects can make it very difficult to determine whether the instrument responses are associated with below ground targets or above ground cultural features. When multiple sources are present it may not be possible to identify individual targets. Also, relatively large objects that have a limited horizontal cross-section such as well casing and fence posts are sometimes difficult to detect.

GROUND PENETRATING RADAR (GPR)

GPR Methodology

Ground penetrating radar is a method that provides a continuous, high resolution graphical cross-section of the shallow subsurface. The method entails repeatedly radiating an electromagnetic pulse into the ground from an antenna as it is moved along a traverse. Reflected signals are received by an antenna (often the same one used to generate the signal) and sent to a control unit for processing. The control unit then converts the varying amplitude of reflected radar signals as a function of time into a cross-sectional image showing signal amplitude as a function of depth.

GPR is particularly sensitive to variations of two electrical properties. One property is conductivity (the ability of a material to conduct a charge when a field is applied) and the other is permittivity (the ability of a material to hold a charge when a field is applied). These two properties determine how far a signal can propagate. They also determine the strength of reflected signals that can be generated at material boundaries. Most soil and earthen-like materials such as concrete are electrically resistive and have a relatively low permittivity. As a result, they are relatively transparent to electromagnetic energy. This means that only a portion of the radar signal incident upon them is reflected back to the surface. On the other hand, when the signal encounters an object composed of a material that has the opposite electrical properties, especially one with a high permittivity (such as metal) much of the incident energy is reflected.

Instrumentation

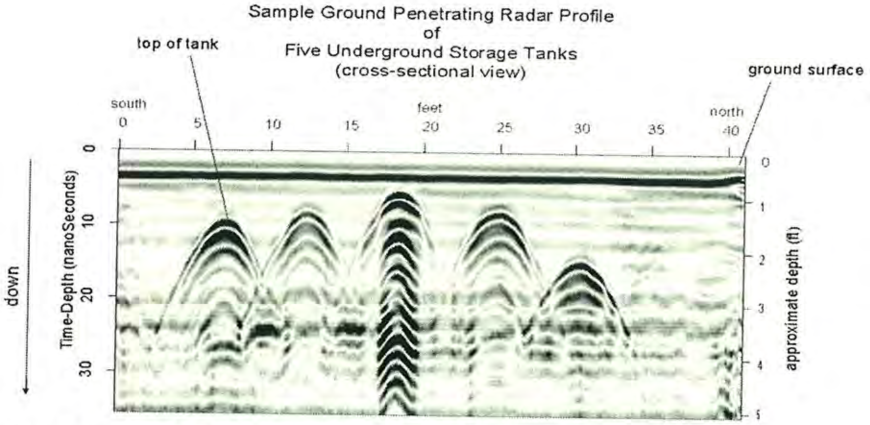
We typically perform GPR surveys using a Geophysical Survey Systems, Inc. SIR-3000 Subsurface Interface Radar System equipped with a 500 megahertz (MHz) transducer. This unit is comprised of a combined control/data recording console that is connected by a telemetry cable to the antenna. This system is often chosen for investigating environmental sites since it usually provides both the resolution and depth penetration needed for characterizing the upper three to four feet of the subsurface.

Data Interpretation

The interpretation of GPR data involves examining the graphical records for reflections from buried objects. GPR records display changes in reflected signal strength and arrival time with changes in horizontal position. Strong signals appear dark and weak reflections appear light. Reflections that arrive earlier in time are placed in the upper portions of the record and reflections that arrive later are placed lower, towards the bottom of the records. Horizontal position is across the top of the record.

In areas with relatively uniform conditions, with no buried objects producing reflections, the records typically appear as a series of alternating dark and light horizontal bands. In areas where there are subsurface objects producing reflections, the horizontal banding is disrupted. Discrete objects typically produce reflections having the appearance of inverted "U"s, forming what are known as "hyperbolic reflections". Metallic objects often produce markedly strong reflections, in many cases forming multiple reflections appearing as a series of inverted U's cascading down the record. Non-metallic objects can produce similar reflections, but the multiples are typically much weaker.

A sample profile from a different site with five adjacent steel USTs is presented below:



Sample Ground Penetrating Radar Profile
of
Five Underground Storage Tanks
(cross-sectional view)

Note: the "Time Depth" of 35 nanoSeconds at the bottom of this profile corresponds to a true depth of approximately 5 feet for this example only. Actual depth to bottom of other profiles may be different.

An object's burial depth may also be estimated from GPR profiles. As mentioned above, GPR measures signal amplitude as a function of time. However, the translation of the radar signal's travel time (technically known as time-depth) to an actual distance (true depth) is not always a simple one. Strictly speaking, in order to translate from time-depth to true depth the signal velocity within each time interval must be known. Since this is not routinely determined in the field, estimated velocities are often used for determining the approximate depth to a reflector. The empirical values for GPR signal propagation velocities within commonly encountered soils are obtained from published tables.

Limitations

The ability to detect subsurface targets is dependent on specific site conditions. These conditions include depth of burial, the size or diameter of the target, the condition of the specific target in question, the type of backfill material associated with the target, and the surface conditions over the target. Typically, the depth of detection will be reduced as the clay and/or moisture content in the subsurface increases. As a result, depths of detection (using a 500 Mhz antenna) typically range from as deep as six feet to as little as a few inches.

Attachment B7
AOC 12 Trenching Photograph Log

Photo 1: Digging central region of AOC12a-T1 with AOC12a-T2 in foreground

Photo 2 AOC12b-T1

Photo 3: AOC12B-T1 central view west

Photo 4: AOC12c-T1 west; east view

Photo 5: AOC12c-T2 south; south view

Photo 6: AOC12c-T2 north

Photo 7: AOC12c-T1 east part of trench concrete chunk

Photo 8: AOC12c-T1 east; wooden slat recovered from trench

Appendix C

Part A Phase 1 Soil Investigation Data Gaps Evaluation Results

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
BaP	benzo(a)pyrene
bgs	below ground surface
BTV	background threshold value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CHHSL	California human health screening level
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyl trichloroethene
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ECV	ecological comparison value
mg/kg	milligrams per kilogram
NOAEL	no observed adverse effect level
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TPH	total petroleum hydrocarbons
UA	undesignated area
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit

APPENDIX C

Part A Phase 1 Soil Investigation Data Gaps Evaluation Results

This appendix presents the results of the Part A Phase 1 Data Gaps Evaluation for the following areas:

- Solid Waste Management Unit (SWMU) 1 – Former Percolation Bed
- Area of Concern (AOC) 1 – Area Around Former Percolation Bed
- AOC 4 – Debris Ravine
- AOC 9 – Southeast Fence Line
- AOC 10 – East Ravine
- AOC 11 – Topographic Low Areas
- AOC 12 – Fill Area
- AOC 14 – Railroad Debris Area
- Undesignated Area (UA) 1 – Potential Pipeline Disposal Area
- UA 2 – Former 300B Pipeline Liquids Tank Area

In addition, at the California Environmental Protection Agency, Department of Toxic Substances (DTSC) and the United States Department of Interior's direction, the data gaps evaluation incorporated the newly identified debris, historic burn, and white powder areas. The evaluation and agreed upon sampling for these new areas is integrated into the sections regarding the appropriate SWMU/AOC.

C.1 Organization of Appendix C

The data gaps evaluation is presented in sub-appendices to this appendix. One sub-appendix is provided for each unit (i.e., there are 10 sub-appendices, covering SWMU 1, AOC 1, AOC 4, AOC 9, AOC 10, AOC 11, AOC 12, AOC 14, UA 1, and UA 2).

Each sub-appendix is organized as follows:

- **Section 1.0, Introduction and Background,** contains background, history, and a summary of the combined data set.
- **Section 2.0, Decision 1 – Nature and Extent,** presents an evaluation of the nature and extent of chemicals of potential concern/chemicals of potential ecological concern (COPCs/COPECs) and a description of data gaps associated with the nature and extent of COPCs/COPECs. Soil results are discussed first, followed by data for any debris or white powder material, if present and sampled at that unit.
- **Section 3.0, Decision 2 – Data Sufficiency to Estimate Representative Exposure Point Concentrations,** presents the results of the data sufficiency evaluation with regard to estimation of representative exposure point concentrations for use in the human health and ecological risk assessments.

- **Section 4.0, Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations,** presents the results of the assessment of current and potential impacts to groundwater from contaminants in soils.
- **Section 5.0, Data Summary for Decision 4 – Data Sufficiency to Support the Corrective Measure Study/Feasibility Study,** presents the evaluation data needs for the corrective measures study/feasibility study for each specific unit.
- **Section 6.0, Potential Part A Phase 2 Sample Locations,** presents agreed upon Part A Phase 2 sample locations and rationale. This includes the specific samples to be analyzed for soil physical properties. In addition, this section also identifies any access restrictions that may impact sample collection.
- **Section 7.0, References,** presents a list of works cited during preparation of these documents.

Section C.2 evaluates if newly detected Part A Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Contract Laboratory Program Target Analyte List/Target Compound List (TAL/TCL) constituents should be considered COPCs and/or COPECs for the purposes of Decision 1. A separate evaluation of COPCs/COPECs will be conducted in the soil risk assessment as described in the approved Risk Assessment Work Plan (ARCADIS, 2008). In accordance with the Risk Assessment Work Plan, all detected chemicals (including TAL/TCL constituents) will be considered in the data evaluation for the risk assessment. Therefore, detections of TAL/TCL constituents were retained for evaluation of Decision 2, regardless of the outcome of Decision 1.

Section C.3, discusses the distribution of lead and polycyclic aromatic hydrocarbons (PAHs) across the Part A SWMU, AOCs, and UAs.

Section C.4, provides additional detail regarding the modeling approach used to support Decision 3. References are provided in Section C.5.

C.2 Identification of Newly Detected Compounds

At the United States Department of the Interior's direction, 10 percent of Part A Phase 1 soil samples were analyzed for the full inorganic and organic suites per the CERCLA TAL/TCL. Sample collected in AOC 4 for TAL/TCL constituents were removed during the AOC 4 2010 Time-Critical Removal Action, except location AOC 4-1 which has been included in the discussion below. Table C-1, presented at the end of this appendix, presents a statistical summary of the soil samples analyzed for TAL/TCL constituents. As shown in Table C-1, the TAL/TCL constituents detected include:

- Seven inorganic compounds: aluminum, calcium, iron, magnesium, manganese, potassium, and sodium.
- Three semivolatile organic compounds (SVOCs): 4-methylphenol, bis(2-ethylhexyl)phthalate, and di-n-butyl phthalate.
- One volatile organic compound: methyl acetate.

- Two polychlorinated biphenyls (PCBs): Aroclor 1254 and Aroclor 1260. Total PCBs were also calculated.
- Five pesticides: 4,4-dichlorodiphenyldichloroethylene [4,4-DDE], 4,4-dichlorodiphenyl trichloroethane [4,4-DDT], alpha-chlordane, gamma-chlordane, and dieldrin.

Of the detected compounds listed above, aluminum, the three SVOCs, methyl acetate, the two PCBs, and the five pesticides are newly detected compounds resulting from the TAL/TCL analysis.

As described in the Soil Part A Data Quality Objectives Technical Memorandum (Appendix A of this Report), the decision about whether a detected compound may represent a new COPC and/or COPEC for the purposes of defining nature and extent in Decision 1 will be based on multiple factors, including:

- Potential for the compound to be related to the compressor station (e.g., potential for the compound to be associated with past activities at the compressor station and/or to be a breakdown product of constituents known to have originated at the compressor station).
- Frequency of detection.
- Concentration detected.
- Distribution of detections.

The evaluation of the detected TAL/TCL compounds is presented below.

C.2.1 Inorganic Compounds

As described above, aluminum, calcium, iron, magnesium, manganese, potassium, and sodium were detected in the Part A Phase 1 and historical soil samples analyzed for the complete TAL/TCL suite of compounds. These inorganic compounds are discussed below.

- Aluminum was detected in 59 of 59 samples collected during the Part A Phase 1 soil investigation. Detected concentrations slightly exceeded the interim screening level (background threshold value [BTV]) of 16,400 milligrams per kilogram (mg/kg) in one soil sample (18,000 mg/kg) collected in AOC 10 and in two soil samples (19,000 and 20,000 mg/kg) collected in AOC 11. None of the detected concentrations exceeded the residential and commercial/industrial California human health screening levels (CHHSLs) (77,000 mg/kg and 990,000 mg/kg, respectively). A numerical ecological comparison value (ECV) was not established for aluminum; however, aluminum is identified as a COPEC only for those soils with a soil pH less than 5.5 (ARCADIS, 2008; United States Environmental Protection Agency [USEPA], 2003). Soil pH results for the Part A SWMU, AOCs, and UAs range from 7.48 to 10.49. Soil pH results for the units included in Part A are presented in the individual sub-appendices to this appendix.
- Calcium was detected in 64 of 64 samples collected as part of Part A Phase 1. Detected concentrations of calcium exceeded the interim screening level of 66,500 mg/kg (BTV) in four soil samples collected in SWMU 1 and in one soil sample collected in AOC 10. The maximum detected concentration of calcium was 280,000 mg/kg collected in SWMU 1. There are no residential and commercial/industrial CHHSLs or USEPA regional

screening levels (RSLs) for calcium. An ECV has not been established for calcium. Although ecological toxicity data are available for essential nutrients (e.g., for calcium), the likelihood of calcium and other inorganic constituents that are essential nutrients (iron, magnesium, potassium, and sodium) being risk ecological drivers at the site is remote. Therefore, based on agency agreement, ECVs were not developed for iron, calcium, magnesium, potassium, and sodium (ARCADIS, 2009).

- Iron was detected in 91 of 91 samples collected as part of Part A Phase 1. The maximum detected concentration of iron was 32,000 mg/kg, which is below the interim screening level of 55,000 mg/kg (residential RSL). There are no residential and commercial/ industrial CHHSLs or USEPA RSLs for iron, and a BTV has not been established.
- Magnesium was detected in 64 of 64 samples collected as part of Part A Phase 1. Detected concentrations of magnesium slightly exceeded the interim screening level of 12,100 mg/kg (BTV) in two soil samples collected in SWMU 1 and in one soil sample collected in AOC 10. The maximum detection of magnesium was 14,700 mg/kg collected in SWMU 1. There are no residential and commercial/industrial CHHSLs or USEPA RSLs for magnesium. An ECV has not been established for magnesium.
- Manganese was detected in 89 of 89 samples collected as part of Part A Phase 1. Detected concentrations of manganese exceeded the interim screening level of 402 mg/kg (BTV/ECV) in one soil sample collected in each in SWMU 1, AOC1, and AOC 11; in two soil samples collected in AOC 10; and in two soil samples collected from UA 2. The maximum detected concentration of manganese was 1,300 mg/kg collected in AOC 10. None of the detected concentrations exceeded the residential and commercial/ industrial CHHSLs (1,800 mg/kg and 23,000 mg/kg, respectively).
- Potassium was detected in 63 of 63 samples collected as part of Part A Phase 1. Detected concentrations of potassium slightly exceeded the interim screening level of 4,400 mg/kg (BTV) in one soil sample collected in SWMU 1 and in two soil samples collected from AOC 11. The maximum detected concentration of potassium was 5,300 mg/kg collected in AOC 11. There are no residential and commercial/industrial CHHSLs or USEPA RSLs for potassium. An ECV has not been established for potassium.
- Sodium was detected in 52 of 64 samples collected as part of Part A Phase 1. The maximum detected concentration of sodium was 1,800 mg/kg in one soil sample collected in SWMU 1, which is below the interim screening level of 2,070 mg/kg (BTV). Residential and commercial/industrial CHHSLs and an ECV have not been established for sodium.

As expected, except for sodium, these naturally occurring inorganic compounds were detected in all soil samples collected as part of the Part A soil investigation. These compounds are among the most common elements that make up the rocks in Earth's crust. Elevated manganese is also common in desert soils and rock surfaces in the form of desert varnish (Dorn, 2007). Based on chemical inventory lists presented in the *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*, there is no current indication that manganese-containing compounds were used at the Topock Compressor Station (CH2M HILL, 2007).

Dehydrated lime sludge from the Permutit® water-conditioning system was produced at the compressor station (Pacific Gas and Electric Company [PG&E], 1962, 1968). Elevated levels of calcium may have been present in this sludge.

Based on the reasons stated above, PG&E does not recommend that these inorganic compounds be identified as new COPCs/COPECs. The distribution of these compounds at each unit is also discussed in the individual sub-appendices to this appendix.

C.2.2 Semivolatile Organic Compounds

Three SVOCs (4-methylphenol, bis(2-ethylhexyl)phthalate, and di-n-butyl phthalate) were detected in the Part A Phase 1 soil and historical samples analyzed for the complete TAL/TCL suite of constituents, as shown in Table C-1. These SVOCs are discussed below.

- 4-methylphenol was detected in two of 518 soil samples collected during the Part A soil investigation: 430 micrograms per kilogram (µg/kg) at AOC14-2 at 0 to 0.5 feet below ground surface (bgs) and 460 µg/kg at UA2-300B-1 at 2.5 to 3 feet bgs. The two detected concentrations are below the interim screening level of 500 µg/kg (ECV) and well below the residential and commercial/industrial RSLs (310,000 µg/kg and 3,100,000 µg/kg, respectively).
- Bis(2-ehtylhexyl)phthalate was detected in four of 518 soil samples collected during the Part A soil investigation. The maximum detected concentration was 1,300 µg/kg at UA2-300B-1 at 2.5 to 3 feet bgs, which is below the interim screening level of 2,870 µg/kg and well below the residential and commercial/industrial RSLs (35,000 µg/kg and 120,000 µg/kg, respectively). Bis(2-ehtylhexyl)phthalate was also detected at AOC1-T3c at 5 to 6 feet bgs (370 µg/kg), AOC4-1 at 2 to 3 feet bgs (810 µg/kg), and AOC14-3 at 0 to 0.5 foot bgs (640 µg/kg), which are also below the interim screening level.
- Di-n-butyl phthalate was only detected in one of 518 soil samples collected at a concentration of 1,100 µg/kg in AOC12c-T1c at 10 to 11 feet bgs. The detected concentration of di-n-butyl phthalate exceeded the interim screening level (46.9 µg/kg) (ECV). The basis for the ECV was potential risk to the cactus wren using a no observed adverse effect level (NOAEL) and a home range of 4.8 acres; di-n-butyl phthalate screening levels for other ecological receptors were not exceeded (ARCADIS, 2009). The single detection of di-n-butyl phthalate does not appear significant when the range of ecological screening values and the basis for the ECV is considered. The detected di-n-butyl phthalate concentration is several orders of magnitude below the residential and commercial/industrial RSLs (6,100,000 µg/kg and 62,000,000 µg/kg, respectively).

The above SVOCs were detected in soil samples collected at sample locations AOC1-T3c, AOC4-1, AOC12c-T1c, AOC14-2, AOC14-3, and UA2-300B-1. To evaluate whether the detections of these SVOCs can be correlated with the presence of other constituents detected in these samples, PG&E considered all compounds detected in each of these six samples. The following is a summary of all compounds detected in these samples:

- AOC1-T3c (collected at 2 to 3 feet bgs): bis(2-ehtylhexyl)phthalate, total petroleum hydrocarbon (TPH) as motor oil, arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, and zinc. Of these detected compounds, total chromium (89 mg/kg), hexavalent chromium (1.65 mg/kg), molybdenum (1.4 mg/kg), and zinc (65 mg/kg) were detected at concentrations exceeding their respective interim screening levels.

- AOC4-1 (collected at 2 to 3 feet bgs): bis(2-ehtylhexyl)phthalate, methyl acetate, arsenic, barium, total chromium, cobalt, copper, lead, nickel, vanadium, zinc, and Aroclor 1254. Of the detected compounds, lead (17 mg/kg) was the only compound detected above respective interim screening levels.
- AOC12c-T1c (collected at 10 to 11 feet bgs): bis (2-ethylhexyl) phthalate, TPH-motor oil, arsenic, barium, total chromium, cobalt, copper, lead, nickel, vanadium, and zinc. Only bis(2-ehtylhexyl)phthalate was detected at a concentration exceeding the interim screening level.
- AOC14-2 (surface soil sample): 4,4-DDE, 4,4-DDT, 4-methylphenol, TPH-diesel, TPH-motor oil, arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, nickel, vanadium, zinc, and PAHs. Of the detected compounds, 4,4-DDE (2.0 µg/kg), 4,4-DDT (3 µg/kg), copper (44 mg/kg), and lead (18 mg/kg) were detected at concentrations exceeding their respective interim screening levels.
- AOC14-3 (surface soil sample): bis (2ethylhexyl) phthalate, TPH-motor oil, arsenic, barium, total chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, zinc, and PAHs. Of the detected compounds, only lead (8.4 mg/kg), and molybdenum (1.6 mg/kg) were detected at concentrations exceeding their respective interim screening levels.
- UA2-300B-1 (collected at 2.5 to 3 feet bgs): 4-methylphenol, bis(2-ethylhexyl)phthalate, TPH-diesel, TPH-motor oil, arsenic, barium, total chromium, cobalt, copper, lead, nickel, vanadium, zinc, and PAHs. Of the detected compounds, only arsenic (16 mg/kg) and zinc (59 mg/kg) were detected at concentrations exceeding respective interim screening levels.

After review of other compounds detected in the soil samples where SVOCs were detected, there does not appear to be a discernable pattern or correlation between the other compounds detected at these locations and the detected SVOCs. Phthalates, including di-n-butyl phthalate and bis (2-ethylhexyl) phthalate are common ingredients in polyvinyl chloride plastics. Phthalates are used to make common items such as carpets, paints, glue, insect repellents, hair spray, and nail polish (United States Department of Human Health Services, 2001).

4-methylphenol is a very common chemical and is a component in everyday items, such as cleaning and disinfectant products (i.e., Lysol), wood preservatives, road tar, and tobacco smoke.

For the above reasons, PG&E does not recommend that any of these three SVOCs be identified as a new COPC/COPEC. These compounds are also discussed in the individual SWMU, AOCs, and UAs discussions in the sub-appendices to this appendix.

C.2.3 Volatile Organic Compounds

As described above, methyl acetate was the only VOC detected in the Part A Phase 1 soil samples analyzed for the complete TAL/TCL suite of compounds, as shown in Table C-1.

During the Part A soil investigation, methyl acetate was detected in three of 56 soil samples collected at 2 to 3 feet bgs at sample locations AOC1-T3a, AOC4-1 and AOC11e-2 at concentrations of 6.6 µg/kg, 12 µg/kg, and 17 µg/kg, respectively. The detected concentrations are six orders of magnitude below the interim screening level of 22,000,000 µg/kg (residential RSL).

Other compounds present in samples containing methyl acetate were evaluated as for the samples containing SVOCs. The following is a summary of other compounds detected in these samples:

- AOC1-T3a (collected at 2 to 3 feet bgs): bis (2-ethylhexyl) phthalate, TPH as motor oil, arsenic, barium, total chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, and zinc. None of the detected compounds were detected at concentrations exceeding their respective interim screening levels.
- AOC4-1 (collected at 2 to 3 feet bgs): bis (2-ehtylhexyl) phthalate, arsenic, barium, total chromium, cobalt, copper, lead, nickel, vanadium, zinc, and Aroclor 1254. Of the detected compounds, lead (17 mg/kg) was the only compound detected above respective interim screening levels.
- AOC11e-2 (collected at 2 to 3 feet bgs): TPH-motor oil, arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, zinc, PAHs, and Aroclor 1254. Of these detected concentrations, total chromium (130 mg/kg), hexavalent chromium (3.78 mg/kg), copper (19 mg/kg), lead (11 mg/kg), molybdenum (2.9 mg/kg), and zinc (120 mg/kg) were detected at concentrations exceeding their respective interim screening levels.

After review of other compounds detected in the soil samples where methyl acetate was detected, there does not appear to be a discernable pattern or correlation between the other compounds detected at these locations and the detected VOCs.

Methyl acetate is infrequently detected at extremely low concentrations and is also a common laboratory contaminant; therefore, PG&E does not recommend that this VOC be identified as a COPC/COPEC.

C.2.4 Polychlorinated Biphenyls

As described above, Aroclor 1254 and Aroclor 1260 were detected above interim screening levels in the Part A Phase 1 soil samples analyzed for the complete TAL/TCL suite of compounds, as shown in Table C-1.

- Aroclor 1254 was detected in 36 of 104 soil samples collected as part of Part A Phase 1. Aroclor 1254 was detected in SWMU 1, AOC 1, AOC 4, AOC 9, AOC 10, AOC 11, and AOC 12. Detected concentrations of Aroclor 1254 only exceeded the interim screening level (220 µg/kg) (residential RSL) in three soil samples collected near the mouth of AOC 4 – Debris Ravine where it drains into Bat Cave Wash, as shown in Figure C-1 provided at the end of this appendix. These samples were collected as part of the time-critical removal action currently being implemented at AOC 4 to stabilize and mitigate the threat of release of contaminated material that was historically disposed of in AOC 4. The maximum detected concentration of Aroclor 1254 was 900 µg/kg, exceeding the commercial/industrial RSL (740 µg/kg).

- Aroclor 1260 was detected in only one of 104 soil samples (in AOC 11) collected as part of Part A Phase 1 at a concentration of 240 µg/kg, slightly exceeding the interim screening level (220 µg/kg) (residential RSL), as shown in Figure C-1. The detected concentration did not exceed the commercial/industrial RSL (740 µg/kg).

To assist with evaluation of PCBs for Decision 2, total PCB values were calculated.[1] Total PCBs were detected in 37 of 105 soil samples collected as part of Part A Phase 1. The total PCB concentrations exceeded the interim screening level of 204 µg/kg (ECV) in three soil samples collected near the mouth of AOC 4 where it drains into Bat Cave Wash and in one soil sample collected in AOC 11, as shown in Table C-2. The maximum calculated concentration of total PCBs was 900 µg/kg collected in AOC 4.

There were four types of equipment within the compressor station in which PCBs may have been present at the Topock Compressor Station in the past. The types of equipment were the Natural Gas Transmission Line 300,[2] gas scrubbers, former compressor and generator engine oil bath air filters, and former electrical equipment (e.g., transformers and capacitors), which may have contained PCB fluids. Transformers are identifiable at the compressor station in several historical aerial photographs (DTSC, 2008) but are no longer in use, and no historical analyses of the former transformer contents are available. PCBs were not detected in soil samples collected directly beneath the former oil bath air filters.

Of the equipment at the Topock Compressor Station described in the above paragraph, the presence of PCBs has been detected in the past inside Natural Gas Line 300 and the scrubbers. PCBs, which were detected within Line 300 in the past, are known to be the result of contamination originating from Transwestern Pipeline Company in the late 1990s. PCBs were also detected in the liquid released from the gas transmission line 300A scrubbers during the annual blowdown event in March 2004 (CH2M HILL, 2007). Approximately 200 pounds of soil were removed during excavation and cleanup of this release.

PCBs have been added to the analyte lists for those AOCs and areas within the compressor station where used transformers or used oil may have been stored or in unpaved areas where pipeline liquids may have been applied to the ground surface. Information obtained from employees suggests that pipeline liquids historically may have been sprayed on unpaved areas for dust control (Russell, 2006). Based on available information, this practice ceased by 1975 and waste oil, including pipeline liquids, was sent offsite for reuse starting in 1975 (PG&E, 1980).

PCBs have been detected in all units, with the exception of AOC 14 and UA 2. Potential sources of the PCBs in AOC 1, AOC 9, AOC 10, AOC 11, and AOC 12 are runoff from the unpaved areas in the compressor station. Sources for the PCBs in Bat Cave Wash near the

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[1] Total PCB exposure point concentrations will be estimated for the ecological risk assessment.

[2] Only a small portion of Line 300 is located at the Topock Compressor Station; Line 300 is a linear facility which runs from the Arizona border to the San Francisco Bay Area.

mouth of AOC 4 are most likely a result of disposal activities in AOC 4. PCBs are discussed further in the individual SWMU, AOCs, and UAs discussions in the sub-appendices to this appendix.

C.2.5 Pesticides

4,4-DDE, 4,4-DDT, alpha-chlordane, gamma-chlordane, and dieldrin were detected in Part A Phase 1 soil samples analyzed for the complete TAL/TCL suite of compounds, as shown in Table C-1. These pesticides are discussed below:

- 4,4-DDT was detected at a concentration of 3 µg/kg in one of 59 soil samples collected as part of Part A Phase 1. The detected concentration of 4,4-DDT exceeded the interim screening level of 2.1 µg/kg (ECV) in one soil sample collected at AOC14-2 at 0 to 0.5 foot bgs. The basis for the ECV was potential reproductive risk to the red-tailed hawk using a NOAEL and a home range of 2,471 acres. The preliminary NOAEL-based ECV that was calculated for the cactus wren was also exceeded; the cactus wren home range is 4.8 acres. Screening levels for non-avian ecological receptors were not exceeded (ARCADIS, 2009). The detection of 4,4-DDT does not appear significant when the range of ecological screening values and the basis for the ECV is considered. When DDT and metabolites are combined and compared with the ECV, the detections are also not significant when the basis of the ECV and the range of potential risk estimates (i.e., other representative receptors and the range of available toxicity reference values) are considered. The detected concentration did not exceed the residential or commercial/ industrial CHHSLs (1,600 µg/kg and 6,300 µg/kg, respectively).

- 4,4-DDE, the daughter product of 4,4-DDT, was detected in three of 59 soil samples (3.2 µg/kg at AOC9-11 at 0 to 0.5 foot bgs, 6.1 µg/kg at AOC11d-1 at 0 to 0.5 foot bgs, and 2.9 µg/kg at AOC14-2 at 0 to 0.5 foot bgs) collected as part of Part A Phase 1. The three detected concentrations of 4,4-DDE exceeded the interim screening level of 2.1 µg/kg (ECV). The maximum detected concentration of 4,4-DDE is 6.1 µg/kg. As discussed above for 4,4-DDT, the three sporadic detections of 4,4-DDE do not appear significant when the range of ecological screening values and the basis for the ECV are considered. The detected concentration did not exceed the residential or commercial/ industrial CHHSLs (1,600 µg/kg and 6,300 µg/kg, respectively).

- Alpha-chlordane was detected in one of 59 soil samples collected as part of Part A Phase 1 at a concentration of 12J µg/kg collected at AOC11d-1 at 0 to 0.5 foot bgs, which is well below the interim screening level of 430 µg/kg (residential CHHSL) and the ECV of 470 µg/kg.

- Gamma-chlordane was detected in one of 59 soil samples collected as part of Part A Phase 1 at a concentration of 13J µg/kg collected at AOC11d-1 at 0 to 0.5 foot bgs, which is well below the interim screening level of 430 µg/kg (residential CHHSL) and the ECV of 470 µg/kg.

- Dieldrin was detected in one of 59 soil samples collected as part of Part A Phase 1 at a concentration of 6.7 µg/kg. The detected concentration of dieldrin exceeded the interim screening level (5 µg/kg) (ECV) and was collected at AOC11d-1 at 0 to 0.5 foot bgs. The basis for the ECV was potential risk to the desert shrew estimated using a geometric mean NOAEL for growth and reproduction and a home range of 0.1 acre; screening levels for other ecological receptors were not exceeded (ARCADIS, 2009). The single detection of dieldrin sitewide does not appear significant when the range of ecological screening values and the basis for the ECV are considered. The detected concentration did not exceed the residential or commercial/industrial CHHSLs (35 µg/kg and 130 µg/kg, respectively).

Pesticides were detected in the surface soil samples at sample locations AOC9-11, AOC11d-1 and AOC14-2. To assess potential patterns of compounds detected in association with pesticides, all other detected compounds in these three samples were also reviewed. The following is a summary of all compounds detected in these samples:

- AOC9-11 (surface soil sample): 4,4-DDE, TPH-motor oil, PAHs, arsenic, barium, total chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc were detected. Only mercury (0.13 mg/kg) was detected at a concentration above its interim screening level.
- AOC11d-1 (surface soil sample): 4,4-DDE, alpha-chlordane, gamma-chlordane, dieldrin, arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, nickel, vanadium, zinc, PAHs, TPH-motor oil, and Aroclor 1254. Of the detected compounds, 4,4-DDE, dieldrin, copper (19 mg/kg), lead (16 mg/kg), zinc (73 mg/kg), benzo(a)pyrene (44 µg/kg) and PAHs as benzo(a)pyrene equivalents (66 µg/kg) were detected at concentrations exceeding their respective interim screening levels.
- AOC14-2 (surface soil sample): 4,4-DDE, 4,4-DDT, 4-methylphenol, TPH-diesel, TPH-motor oil, arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, nickel, vanadium, zinc, and PAHs. Of the detected compounds, 4,4-DDE, 4,4-DDT, copper (44 mg/kg), and lead (18 mg/kg) were detected at concentrations exceeding their respective interim screening levels.

Several pesticides (4,4-DDE, alpha-chlordane, gamma-chlordane, and dieldrin) are collocated in the surface soil sample collected at location AOC11d-1. After review of other compounds detected in the soil samples where pesticides were detected, there does not appear to be a discernable pattern or correlation between the other compounds detected at these locations and the detected pesticides.

The only possible historical source of 4,4-DDT and its daughter products and dieldrin in the area would have been pest (insect) control.

The distribution of pesticides at each unit where detected is also discussed in the individual SWMU, AOCs, and UAs discussions in the sub-appendices to this appendix. Based on the reasons presented above, PG&E does not recommend that 4,4-DDE, 4,4-DDT, and dieldrin be identified as new COPCs/COPECs.

C.3 Lead and Polycyclic Aromatic Hydrocarbon Distribution

Lead and PAHs have been detected in soil samples collected across the Part A SWMU, AOCs, and UAs. Many of these detections exceed the interim screening levels; these exceedances are discussed in the individual sub-appendices to this appendix. Lead and

PAHs are found primarily in the surface and shallow soil samples, and exceedances in soil are not consistent with the conceptual site models developed for these sites (i.e., these exceedances are not found in areas where other elevated COPCs/COPECs are found or in areas with known or suspected contamination).

Many natural and anthropogenic sources of lead and PAHs exist. Particulate lead is commonly found in surface soil near roadways as a result of leaded gasoline use in vehicles until the 1970s. Former Route 66 and California Interstate Highway 40 are near most of the Part A sites. The site-specific background concentration of lead in soil is 8.39 mg/kg.

PAHs are ubiquitous in both urban and rural environments. The most notable natural and anthropogenic sources of PAHs are from combustion of fossil fuels, wild fires, volcanic activities, industrial facilities, petroleum oils, asphalt binders, and vehicle exhaust. However, because PAHs were not detected in site-specific background samples, a Topock site-specific background value was not calculated. Therefore, an interim screening level of 38 µg/kg benzo(a)pyrene (BaP) equivalents is based on the CHHSL. The Topock background samples were collected from areas away from the compressor station, Interstate 40, former Route 66, and the Burlington Northern Santa Fe railroad tracks, all of which are potential sources of PAHs.

To aid in the cleanup process at manufactured gas plant sites, DTSC developed the advisory *Use of the Northern and Southern California Polynuclear Aromatic Hydrocarbon (PAH) Studies in the Manufactured Gas Plant Site Cleanup Process* (DTSC, 2009). The advisory describes how ambient concentrations of PAHs identified by the southern and northern California background PAH studies can be used to help guide the cleanup process at manufactured gas plant sites. The advisory is to be used on a case-by-case basis for those sites that are similar to the sites that were used in the southern and northern California background PAH studies. The DTSC advisory suggests that for similar sites, a value of 900 µg/kg in BaP equivalents can be used as a pragmatic target for guiding soil excavation/remediation because 900 µg/kg BaP equivalents corresponds to the upper bounds of the southern and northern California ambient/background data sets. While anthropogenic sources of PAHs in the vicinity of the Compressor Station are likely less substantial than for some locations included in the Northern and Southern California PAH studies, some anthropogenic contribution of PAHs is likely due to the proximity of roads and railroad tracks.

Although lead and PAH detection distribution in soil are generally not consistent with the conceptual site models developed for the site and may be to the result of activities unrelated to the compressor station, soil samples collected during the Part A Phase 2 soil investigation will be analyzed for lead and PAHs in those areas where data gaps have been identified. The Part A Phase 2 proposed sample locations are presented in the sub-appendices to this appendix.

C.4 Additional Details on Modeling Approach (Decision 3)

This section presents the development and application of the models and assumptions used to simulate variably unsaturated flow and solute transport in the vadose zone associated with the third tier of the screening assessment of potential future threat to groundwater from COPCs in vadose zone.[3] Only those units where inorganic COPCs/COPECs exceeded the soil screening levels (Step 2 of the threat to groundwater screening process) and organics were simulated. The objective of the initial model simulations is intended as a conservative screening process to evaluate which COPCs can be ruled out as having the potential to leach to groundwater. The models were developed using conservative assumptions regarding infiltration rates and initial COPC/COPEC concentrations.

The analyses were performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, is needed to resolve Decision 3. Additional evaluations will be performed as appropriate as data are collected to resolve Decision 1. The HYDRUS-1D code version 4.14 (Simunek et al., 1998) was selected for the modeling effort because it can numerically solve the variably saturated flow equation (i.e., Richards Equation) and transport equations in one dimension (i.e., from the COPC/COPEC source area near land surface downward through the vadose zone to the top of the water table).

The mathematical model design is the result of converting the conceptual site model into a form that is suitable for numerical modeling. The following steps were associated with the mathematical model design:

1. Establish the vertical extent of the model.
2. Spatially distribute the subsurface hydraulic parameter values.
3. Spatially distribute the transport parameter values and initial COPC concentrations.
4. Select a time discretization approach appropriate for evaluating the field problem and fulfilling the modeling objectives.
5. Establish boundary conditions for flow (i.e., water budget terms through time).

The total thickness of the simulated vadose zone profiles in the HYDRUS-1D models was variable and was based on the depth to groundwater beneath each area. Profile depths ranged from 30 feet to 100 feet bgs and, except for AOC 1, SMWU 1, and AOC 11, were estimated from the groundwater flow model developed for the Topock site. AOC 1, SMWU 1, and AOC 11 are near wells MW-11, MW-10, and MW-12, respectively, and profile thicknesses were determined based on groundwater level data at those locations. Numerical models require the area being simulated to be discretized into separate cells or nodes. For this evaluation, all models comprised of 200 model nodes, resulting in a maximum cell thickness of 8 inches. The model simulated of 100 years of transport.

Boundary conditions are mathematical statements (i.e., rules) that specify water elevation, water flux, solute concentration, and solute flux at particular locations within the model domain, which can vary in time. The upper boundary condition for water flow in the HYDRUS-1D model was set as a specified-flux boundary equal to 0.1 inch of infiltration per year to simulate the estimated percolation rate, except for AOC 10a, AOC 10b, and AOC 10c, as discussed in Section C.4.1. The bottom boundary was set as a specified-pressure head

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[3] The details provided herein on the approach and assumptions of the vadose zone model were not included in the technical memorandum entitled *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station* (CH2M HILL, 2008).

equal to 0 feet, representing the water table. The model was initially run in transient mode until a steady-state moisture profile was achieved. The resulting equilibrium vertical moisture profile was then used for the initial moisture conditions for the transport simulation.

C.4.1 Model Parameters

HYDRUS-1D was set up to numerically solve the Richards equation using the van Genuchten (1980) model of soil hydraulic properties. The models were parameterized using the soil catalog (Carsel and Parrish, 1988). The soil catalog provides values for the van Genuchten parameters for a number of different soil types. For the current set of models for the Topock site, the soil texture was assumed to be a loamy sand. Table C-2 presents the van Genuchten parameters defined by the soil catalog for this type of soil that were used in all of the HYDRUS-1D models.

Except for models of AOC 10a, AOC 10b, and AOC 10c, a deep percolation rate of 0.1 inch per year was used. Diffuse natural recharge rates are assumed to be very low (< 0.1 inch per year) across the Mohave Desert at the elevation range of the Topock site, based on literature from similar terrain (Hevesi et al., 2003). The United States Geological Survey estimated recharge rates of Bat Cave Wash in an unpublished study following similar methods of Hevesi et al. (2003). The United States Geological Survey recharge rate estimate for Bat Cave Wash was 0.005 inch per year. This is the recharge rate estimated for the bottom of the wash where runoff is concentrated and surface water flows occur a few times per year. Recharge rates for upland sites would be considerably less than in Bat Cave Wash. PG&E chose to use a conservatively high rate of recharge of 0.1 inch per year in the screening model simulations.

At AOC 10a, AOC 10b, and AOC 10c, deep percolation rates were likely higher because of annual Topock Compressor Station fire pump tests, which reportedly discharged into East Ravine. Visual observations of soil wetness by site personnel following these tests suggest that areas AOC 10a, AOC 10b, and AOC 10c receive water from the fire pump test discharges. As a conservative estimate, the deep percolation rate for Areas AOC 10a, AOC 10b and AOC 10c was set at 1.3 inches per year, disregarding the effects of evapotranspiration. AOC 10d was not impacted by the fire pump tests.

Solute transport parameters used in the HYDRUS-1D model are shown in Table C-3. Dispersivity was a model-specific parameter and was calculated using the model of Xu and Eckstein (1995), in which dispersivity is correlated to the length of the flowpath (i.e., deeper soil profiles experience greater dispersion). The distribution coefficient (K_d) was COPC/COPEC-specific. K_d values used in the models were the mean value for each COPC/COPEC presented in United States Environmental Protection Agency (2005), except for hexavalent chromium. The K_d value used for hexavalent chromium was a Topock site-specific value of 0.318 milliliters per gram estimated by ARCADIS during the upland *in-situ* pilot test (Gillow, personal communication, 2009).

A conservative approach was used to establish the initial soil concentration profiles for the HYDRUS-1D simulations. For each modeled COPC/COPEC, soil samples at each unit or subarea were pooled. The initial concentration profile was established such that the maximum concentration detected within the unit or subarea over a given depth interval was assigned across the entire interval. For each modeled COPC/COPEC, the maximum concentration at the deepest sample depth was assigned from that depth to the water table. In cases where the maximum concentration for a given depth interval was a non-detect, a value equal to half of the maximum reporting limit was used. This highly conservative approach was used to remove COPCs in soil as a threat to groundwater with a high degree of confidence. If all sample results for a given COPC were nondetects at a specific unit or subarea, the COPC/COPEC was not modeled.

C.4.2 Model Application

HYDRUS-1D output is in the form of time-series COPC/COPEC concentration at the model's bottom boundary (i.e., the water table). To calculate the groundwater concentration projected to result from vadose zone leaching, the HYDRUS-1D output was input into a spreadsheet-based mixing-cell model. The mixing cell accounts for the mixing of the pore water leaching from the vadose zone as it enters the top 10 feet of the saturated zone. The mixing cell calculation accounts for fluxes of water and COPCs/COPECs from the vadose zone and the flux of groundwater through the uppermost 10 feet of the aquifer below each unit. Allowing mixing to occur only in the top 10 feet of aquifer is an additional conservative approach because COPCs at Topock are mixed across the entire thickness of the aquifer.

The calculation includes the following assumptions:

- The COPCs/COPECs leaching from the vadose zone will mix only in the uppermost 10 feet of the aquifer.
- Instantaneous mixing occurs within the mixing cell.
- Saturated conditions exist within the mixing cell.
- No decay or vapor-phase exchange occurs within the mixing cell.

Figure C-2 shows the dimensions of each mixing cell. Mixing cells were oriented such that they encompassed the entire unit or subarea of interest and so that they were orthogonal to the primary direction of groundwater flow as determined by the current Topock groundwater flow model. The water flux value representing subsurface inflow into the mixing cell was estimated using the current Topock groundwater flow model representing pre-pumping conditions. The upgradient concentration and initial concentration in the mixing cell were set to zero so that inputs from the vadose zone of the modeled unit only could be evaluated. An impact to groundwater by a COPC/COPEC was defined as a concentration in the mixing cell in excess of the groundwater upper tolerance limit (UTL) at any time during the 100-year simulation time. Groundwater UTLs are shown in Table C-4.

The results of the modeling effort for each unit are presented in the sub-appendices to this appendix.

C.4.3 Model Application for Organic Compounds

As shown in Table C-5, detected SVOCs, volatile organic compounds, Aroclor 1254, and dioxins/furans were modeled using the HYDRUS-1D model code as described above; however, the model for organics was constructed assuming a hypothetical worst-case scenario using a set of extremely conservative input parameters. For example, the distance to groundwater assumed the shortest distance observed across all SWMUs/AOCs or UAs (30 feet) and the highest infiltration rate (1.3 inches/year), and the initial concentration profile assumed the highest concentration detected at each depth interval, regardless of in which AOC the compound was detected. The analysis was conducted in this manner to show that even when an unrealistically conservative set of input parameters was used, organic compounds do not cause a significant increase in groundwater concentration when compared to regulatory standards.

Naphthalene was modeled as a conservative proxy for all PAHs because it is the most mobile of this class of chemicals. Similarly, Aroclor 1254 was modeled for all PCBs, and dioxin TCDD, 2,3,7,8- was modeled for dioxin/furans.

Table C-5 presents results of this analysis. Even using ultraconservative assumptions, none of the organic compounds detected in soil is a threat to groundwater.

C.5 References

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Tables

TABLE C-1

Statistical Summary of Newly Detected Contract Laboratory Target Analyte List/Target Compound List for
Part A Areas of Concern and Solid Waste Management Units
Soil Investigation Part A Phase 1 Data Gaps Evaluatioin Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences[7]**	**(BTV)**	**# of Exceedences[8]**	**(ECV)**	**# of Exceedences[8]**	**(Res SL)**	**# of Exceedences[8]**	**(ESL)**	**# of Exceedences[8]**	**(Com SL)**	**# of Exceedences[8]**	**(Int SL)**
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	59 / 59 (100%)	20,000	3	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	3	(16,400)
Calcium	mg/kg	64 / 64 (100%)	280,000	5	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	5	(66,500)
Iron	mg/kg	91 / 91 (100%)	32,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	64 / 64 (100%)	14,700	3	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	3	(12,100)
Manganese	mg/kg	89 / 89 (100%)	1,300	7	(402)	7	(220)	0	(1,800)	NA	(NE)	0	(23,000)	7	(402)
Potassium	mg/kg	63 / 63 (100%)	5,300	3	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	3	(4,400)
Sodium	mg/kg	52 / 64 (81%)	1,800	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 59 (0%)	ND (6.69) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Semivolatile Organic Compounds															
4-Methylphenol	µg/kg	2 / 518 (0.39%)	460	NA	(NE)	0	(500)	0	(310,000)	NA	(NE)	0	(3,100,000)	0	(500)
Bis (2-ethylhexyl) phthalate	µg/kg	4 / 518 (0.77%)	1,300	NA	(NE)	0	(2,870)	0	(35,000)	NA	(NE)	0	(120,000)	0	(2,870)
Di-N-butyl phthalate	µg/kg	1 / 518 (0.19%)	1,100	NA	(NE)	1	(46.9)	0	(6,100,000)	NA	(NE)	0	(62,000,000)	1	(46.9)
Volatile Organic Compounds															
Methyl acetate	µg/kg	3 / 56 (5.4%)	17	NA	(NE)	NA	(NE)	0	(22,000,000)	NA	(NE)	0	(92,000,000)	0	(22,000,000)
Polychlorinated biphenyls															
Aroclor 1254	µg/kg	36 / 104 (35%)	900	NA	(NE)	NA	(NE)	3	(220)	NA	(NE)	1	(740)	3	(220)
Aroclor 1260	µg/kg	1 / 104 (0.96%)	240	NA	(NE)	NA	(NE)	1	(220)	NA	(NE)	0	(740)	1	(220)
Total PCBs	µg/kg	37 / 105 (35%)	900	NA	(NE)	5	(204)	NA	(NE)	NA	(NE)	NA	(NE)	5	(204)
Pesticides															
4,4-DDE	µg/kg	3 / 59 (5.1%)	6.1	NA	(NE)	3	(2.1)	0	(1,600)	NA	(NE)	0	(6,300)	3	(2.1)
4,4-DDT	µg/kg	1 / 59 (1.7%)	3	NA	(NE)	1	(2.1)	0	(1,600)	NA	(NE)	0	(6,300)	1	(2.1)
alpha-Chlordane	µg/kg	1 / 59 (1.7%)	12	NA	(NE)	0	(470)	0	(430)	NA	(NE)	0	(1,700)	0	(430)
Dieldrin	µg/kg	1 / 59 (1.7%)	6.7	NA	(NE)	1	(5)	0	(35)	NA	(NE)	0	(130)	1	(5)
gamma-Chlordane	µg/kg	1 / 59 (1.7%)	13	NA	(NE)	0	(470)	0	(430)	NA	(NE)	0	(1,700)	0	(430)

TABLE C-1

Statistical Summary of Newly Detected Contract Laboratory Target Analyte List/Target Compound List for Part A Areas of Concern and Solid Waste Management Units

Soil Investigation Part A Phase 1 Data Gaps Evaluatioin Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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Notes

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USE

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C-2
Hydraulic Parameters Used in HYDRUS-1D Models
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

θ_r (-)	θ_s (-)	α (feet^{-1})	n (-)	K_s (ft/day)	Deep Percolation (in/yr)
0.057	0.377	3.8	2.28	11.5	0.1 (except in AOC 10 a, b, and c)

ft/day = feet per day.
in/yr = inches per year.
θ_s – Saturated soil water content.
θ_r – Residual soil water content.
α – van Genuchten's alpha parameter.
n - van Genuchten's n parameter.
K_s – Saturated hydraulic conductivity

TABLE C-3
Solute Transport Parameters Used in HYDRUS-1D Models
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

Dispersivity (feet)	K_d (mL/g)	Bulk Density (g/cm^3)	Water Diffusivity (cm^2/s)[a]
Model-Specific	COPC-Specific	1.65	7.37E-06

[a] Diffusivity value is average of the metal ions presented in Table 10.1 (Domenico and Schwartz, 1998).

K_d = distribution coefficient.
mL/g = milliliters per gram.
g/cm^3 = grams per cubic centimeter.
cm^2/s = square centimeters per second.

TABLE C-4
Background UTLs for Trace Metals in Groundwater
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

COPC	UTL (μg/L)
Antimony	1.22
Arsenic	24.3
Barium	195
Beryllium	0.663
Cadmium	--[a]
Chromium	34.1
Chromium, Hexavalent	31.8
Cobalt	0.843
Copper	10.5
Lead	1.91
Mercury	--[a]
Molybdenum	36.3
Nickel	10.6
Selenium	10.3
Silver	2.13
Thallium	0.908
Vanadium	59.9
Zinc	77.7

[a] The background values for cadmium and mercury are detection limits of 1.0 and 0.2 mg/L, respectively.

μg/L = microgram per liter.
NA = not applicable.

TABLE C-5
Results of Organic Compounds Threat to Groundwater Analysis
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

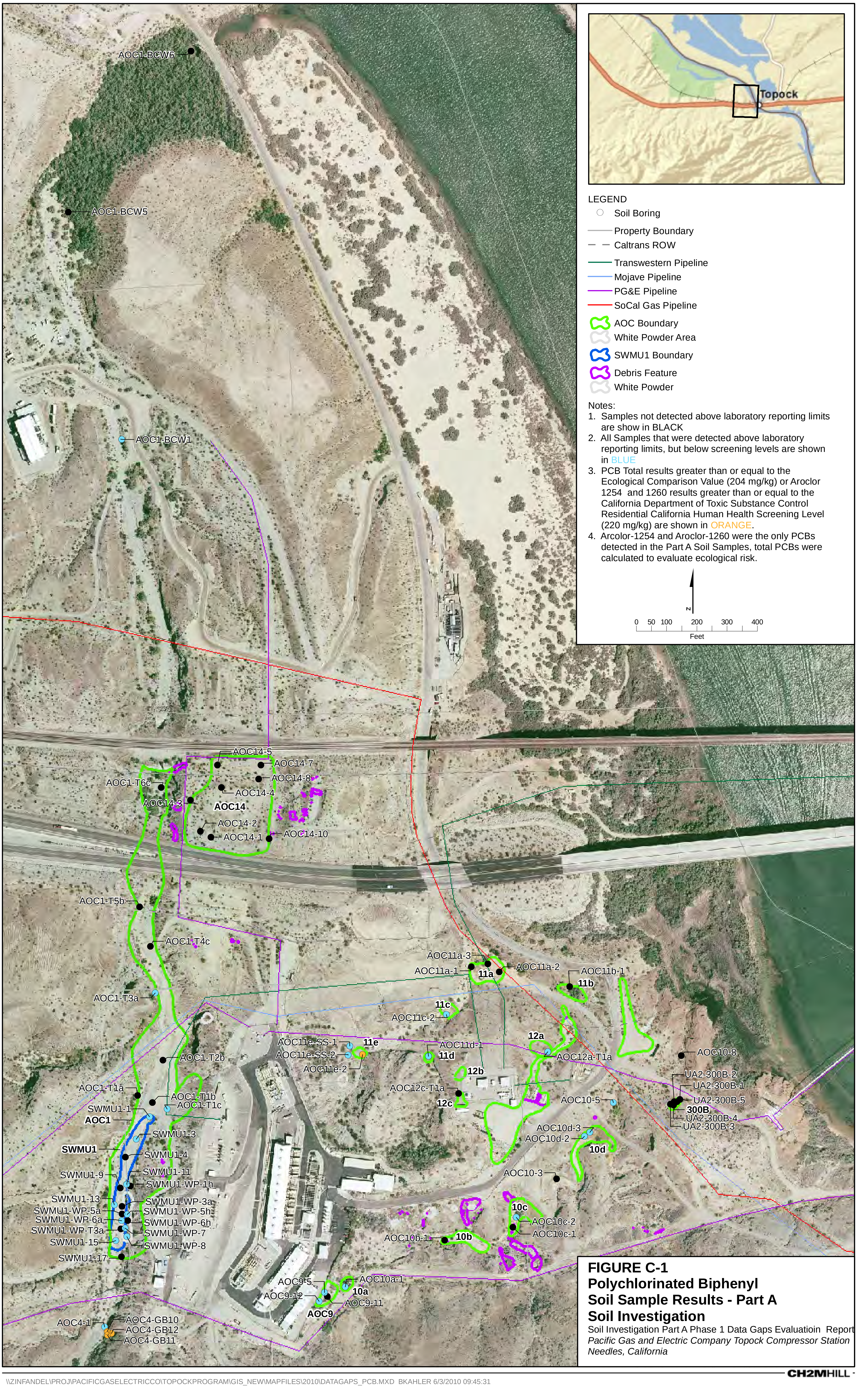
Constituent of Concern	Applicable Drinking Water Standard (μg/L)	Source for Standard	Model-Forecast Maximum Increase in Groundwater Mixing Cell (μg/L)
Methyl Acetate	37,000	USEPA tap water screening level (USEPA 2010)	1
Naphthalene	17	California Regional Water Quality Control Board, San Francisco Bay Region environmental screening level (Deep Soils – Potential Drinking Water Source) (Water Board, 2008)	2
4-Methylphenol	180	USEPA tap water screening level	9
Bis (2-ethylhexyl) phthalate	4	California maximum contaminant limit (California Department of Health Services, 2006)	< 1
Di-N-butyl phthalate	3,700	USEPA tap water screening level	6
PCB	0.5	California maximum contaminant limit (California Department of Health Services, 2006)	< 0.1
Dioxin	1.1E-05	USEPA tap water screening level	0

California Environmental Protection Agency, Department of Health Services. 2006. *Maximum Contaminant Levels and Regulation Dates for Drinking Water Contaminants*.

California Regional Water Quality Control Board, San Francisco Bay Region. 2008. *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater*. May.

United States Environmental Protection Agency (USEPA). 2010. Regions 3, 6, and 9. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. May.

Figures



LEGEND

- ○ Soil Boring
- Property Boundary
- Caltrans ROW
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- AOC Boundary
- White Powder Area
- SWMU1 Boundary
- Debris Feature
- White Powder

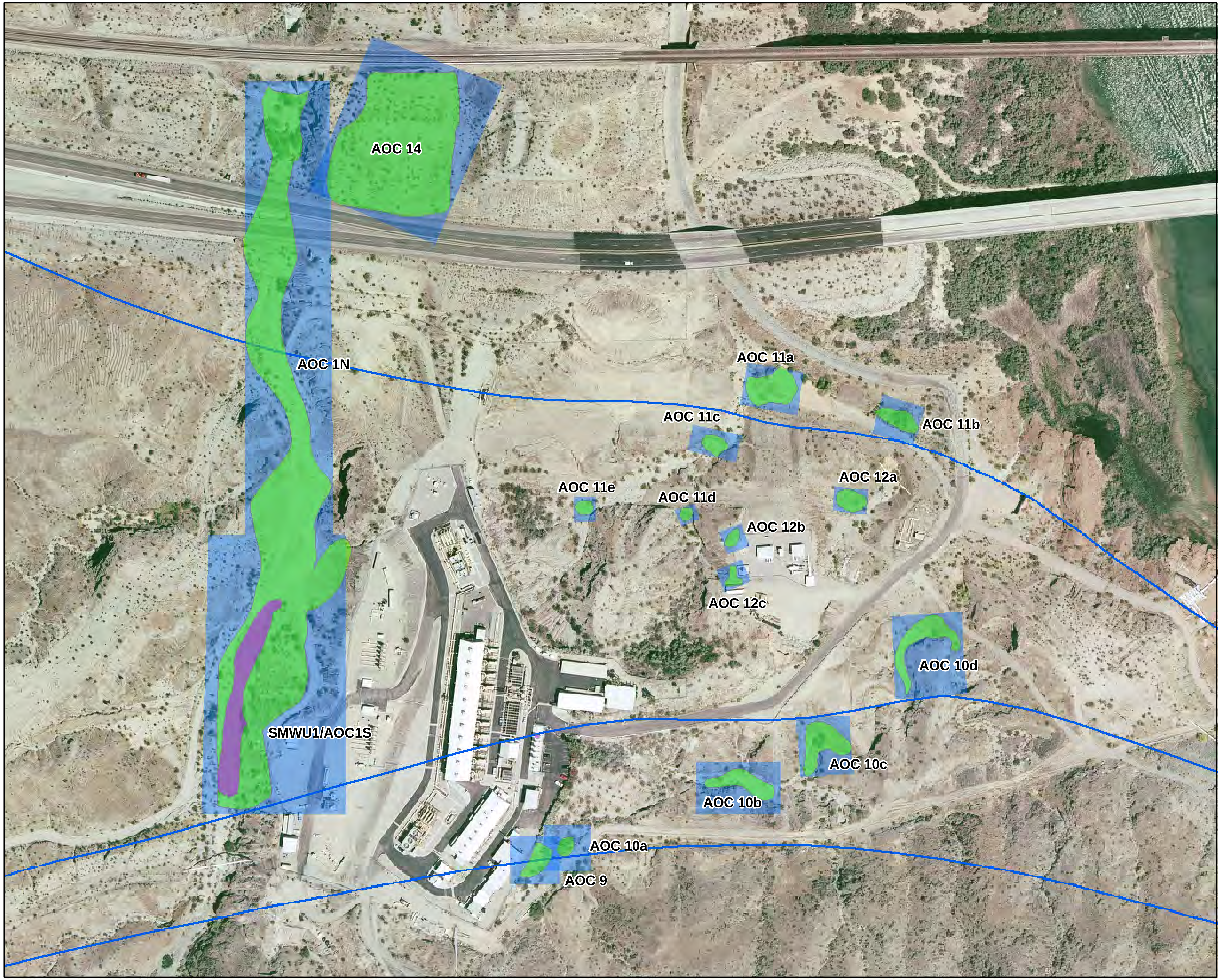
Notes:

1. Samples not detected above laboratory reporting limits are show in BLACK
2. All Samples that were detected above laboratory reporting limits, but below screening levels are shown in BLUE
3. PCB Total results greater than or equal to the Ecological Comparison Value (204 mg/kg) or Aroclor 1254 and 1260 results greater than or equal to the California Department of Toxic Substance Control Residential California Human Health Screening Level (220 mg/kg) are shown in ORANGE.
4. Arcolor-1254 and Aroclor-1260 were the only PCBs detected in the Part A Soil Samples, total PCBs were calculated to evaluate ecological risk.

FIGURE C-1
Polychlorinated Biphenyl Soil Sample Results - Part A Soil Investigation

Soil Investigation Part A Phase 1 Data Gaps Evaluatioin Report

Pacific Gas and Electric Company Topock Compressor Station
Needles, California



VICINITY MAP

LEGEND

〜	Groundwater Contour
🟩	Area of Concern (AOC)
🟪	Solid Waste Management Unit (SWMU)
🟦	Mixing Cell Extents

N

0 100 200
Feet

FIGURE C-2
Solid Waste Managment Units (SMWUs), Areas of Concern (AOCs), and Mixing Cell Extents

Soil Investigation Report Part A Phase I
Data Gap Evaluation Report
PG&E Topock Compressor Statoin
Needles, California

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CH2MHILL

Appendix C1

Solid Waste Management Unit 1 Data Gaps Evaluation Results

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
CMS/FS	corrective measures study/feasibility study
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DQO	data quality objective
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
VOC	volatile organic compound

APPENDIX C1

Solid Waste Management Unit 1 Data Gaps Evaluation Results

1.0 Introduction and Background

This sub-appendix presents the results of the Data Gaps Evaluation and the Part A Phase 2 Sampling Program for Solid Waste Management Unit (SWMU) 1 – Former Percolation Beds at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the Data Gaps Evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

SWMU 1, the Former Percolation Bed, is located outside the facility fence line in the bed of Bat Cave Wash, as depicted in Figure C1-1. (All tables and figures appear at the end of the sub-appendix.) SWMU 1 is located on both PG&E property and property owned by the Havasu National Wildlife Refuge and managed by the United States Fish and Wildlife Service. The southern boundary of SWMU 1 is roughly in line with the water treatment system in the lower yard of the compressor station, and the northern boundary of SWMU 1 is in the vicinity of the access road leading from the lower yard into Bat Cave Wash. PG&E completed closure of the former water treatment system that consisted of the sludge-drying beds (SWMU 5), chromate reduction tank (SWMU 6), process pump tank (SWMU 8), transfer sump (SWMU 9), transfer piping (Area of Concern [AOC] 18), the oil/water holding tank (Unit 4.3), the oil/water separator (Unit 4.4), and the portable waste oil storage tank (Unit 4.5). In the 1955 aerial photograph, an apparent round impoundment area with white powder material is located in the lower yard of the compressor station, south of the sludge-drying beds (SWMU 5). This area has been identified as potential new investigation area in Figure C1-2.

Based on historical aerial photographs, it appears that during the 1950s, the facility discharged wastewater containing chromium (cooling tower blowdown) wastewater into Bat Cave Wash without any impoundment. Wastewater was released to the wash through two pipes that ran from the sludge-drying beds (SWMU 5) area in the lower yard down the slope into Bat Cave Wash. These pipes are shown in Figure C1-2 as “historical discharge piping.” From about 1964 to approximately 1971, the facility discharged wastewater containing chromium to a percolation bed and allowed water to percolate into the ground and/or evaporate. The chromium-containing wastewater was combined with a small quantity (approximately 5 percent) of treated water from the oily waste treatment system discharged from the station.

Periodic storm (high runoff) events occur in Bat Cave Wash, making it difficult to assess the precise nature of erosion and deposition patterns. A 2006 storm event resulted in substantial erosion and deposition in portions of the wash in SWMU 1, and a January 2010 storm event resulted in the movement of large gravel and cobbles from south of SWMU 1/AOC 1 to the area near where the Debris Ravine (AOC 4) enters Bat Cave Wash and as far north as the pipeline overcrossing (in the vicinity of SSB-1). While there was considerable movement of rock south of SWMU 1, there appeared to be limited scouring in the wash and erosion of the wash walls within SWMU 1 during the January 2010 storm event. Although there was damage to well MW-38, (installed within Bat Cave Wash), most of the sample location survey markers (1/8-inch lathe stakes) were still in place following the 2010 run-off event. MW-38 is also located immediately downstream of a sizable feeder wash on the west side of Bat Cave Wash. Based on this visual reconnaissance of Bat Cave Wash, most of the soil samples collected during the Phase 1 sample locations and former sample locations included in the Soil Part A Work Plan are still considered to be representative. Surficial samples collected from locations within areas of highest energy during the 2010 event may not be representative of current conditions.

1.2 Conceptual Site Model

A graphical conceptual site model for SWMU 1 has been developed based on the above site history and background, as shown in Figure C1-2. Table C1-1 presents the primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for SWMU 1. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the Soil Part A Data Quality Objectives (DQO) Tech Memo, which is presented as Appendix A to the Data Gaps Evaluation Report.

For SWMU 1, the primary source of contamination is historical direct discharge of untreated wastewater into Bat Cave Wash and the Former Percolation Bed. Therefore, surface soil in SWMU 1 was the primary source medium. Contaminated wastewater infiltrated and impacted subsurface soil and groundwater, as evidenced by hexavalent chromium contamination in groundwater. From surface soil, soluble contaminants could have migrated to subsurface soils. Subsurface soil may act as a secondary source medium to groundwater.

Historically, chemicals of potential concern (COPCs) in surface soil in SWMU 1 may have been eroded and entrained in stormwater/surface water runoff during flow events and may have been subsequently re-deposited downstream in Bat Cave Wash (AOC 1). The thick vegetation, widening of the channel near the end of Bat Cave Wash, and blockage of flow by National Trails Highway greatly reduces the energy of flow during runoff events, resulting in deposition of entrained soil within the vegetated area in AOC 1 (downstream migration of contamination from SWMU 1 is addressed in AOC 1). Repeated erosion and deposition of soil at SWMU 1 may have resulted in mixing of surface and near-surface soils at SWMU 1. If released, volatile organic compounds (VOCs) in surface soils would be expected to have been degraded by heat and light and are likely no longer present.

Because chromium-containing wastewater from the facility was discharged to Bat Cave Wash and topography surrounding the wash confined wastewater and surface water flows to the bed of the wash, the potential lateral extent of soil contamination associated with SWMU 1 is constrained within the boundaries of SWMU 1 (contamination outside of SWMU 1 is addressed in AOC 1). The vertical extent of soil contamination within SWMU 1 is not defined.

Contamination associated with SWMU 1 may also exist on the eastern sidewall of Bat Cave Wash east of SWMU 1 based on results of samples collected from white powder material observed on the eastern sidewall. Two possible sources of white powder material in SWMU 1 are residual mineral salts from the percolation pond and water conditioning (lime treatment) sludge from the sludge-drying beds. Lime treatment is a chemically simple process involving the addition of lime (calcium hydroxide), sometimes soda ash (Na_2CO_3), and sometimes other flocculants or caustic chemicals to remove hardness (calcium and magnesium ions) from water. Both lime and soda ash were used at the compressor station. The lime treatment sludge produced is primarily calcium carbonate with smaller quantities of magnesium hydroxide, both of which are poorly soluble at normal pH (American Water Works Association, 1981). Lime treatment sludge is generally low in contaminant concentrations, whereas residual mineral salts from the percolation bed may contain higher concentrations of chromium.

Windblown contamination from SWMU 1 is influenced by wash topography. Windblown contaminant deposition, if any, is expected to be limited to surface soils. Windblown contaminant deposition, if any, outside of SWMU 1 is addressed in AOC 1.

Based on the site history and background and conceptual site models, Part A Phase 1 and historical soil samples were collected within areas of historical discharge of chromium-containing wastewater from the facility. Similarly, trench samples in the eastern wall of Bat Cave Wash were located in areas where white powder material was present.

1.3 SWMU 1 Data

Forty-four historical soil samples were collected from 15 locations (MW-9, SSB-2 through SSB-5, WP-1 through WP-6, WP-Blank1, WP-Blank2, T-3-B, and P-2) in SWMU 1, as shown in Figure C1-1. Samples were generally collected from 0 to 10 feet below ground surface (bgs); however, the MW-9 samples were collected to 87 feet bgs. Historical soil samples were analyzed for five constituents: total chromium, hexavalent chromium, copper, nickel, and zinc. A few historical samples were also analyzed for barium, lead, molybdenum, and vanadium.

During the 2008 Soil Part A Phase 1 investigation, 142 soil samples were collected from 29 sample locations (SWMU1-1 through SWMU1-17, SWMU1-SP-1h, SWMU1-WP-3a, SWMU1-WP-3h, SWMU1-WP-5a, SWMU1-WP-5h, SWMU1-WP-6a, SWMU1-WP-6h, SWMU1-WP-7, SWMU1-WP-8, SWMU1-WP-9, SWMU1-WP-10, and SWMU1-WP-T3a), as shown in Figure C1-1. The samples were generally collected at sample depths of 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs, with SWMU1-3 sampled down to 80 feet, and SWMU1-15 sampled down to 90 feet. Soil Part A Phase 1 soil samples were analyzed for Title 22 metals, hexavalent chromium, VOCs, semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), pH, pesticides, and polychlorinated biphenyls (PCBs). Surface soil samples were not analyzed for VOCs. Ten percent of the Phase 1 soil samples collected in SWMU 1 (16 soil samples) were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). In addition, synthetic precipitation leaching procedure (SPLP) extraction was performed on a soil sample collected at 2 to 3 feet bgs at location SWMU1-8 and soil samples collected at 5 to 6 feet bgs at sample locations SWMU1-1 and SWMU1-3, as shown in Table C1-2. The leachate from the SPLP extractions was analyzed for total and hexavalent chromium. Phase 1 data were validated and the data quality evaluation is included Appendix D to the Data Gaps Evaluation Report.

In addition, nine trenches (SWMU1-WP-1h, SWMU1-WP-2h, SWMU1-WP-3h, SWMU1-WP-5h, SWMU1-WP-6h, SWMU1-WP-7, SWMU1-WP-8, SWMU1-WP-9, and SWMU1-WP-10) were excavated on the eastern side of SWMU 1 to evaluate the extent of white powder, as shown in the inset of Figures C1-1 and C1-3 through C1-10. A photo log of the trenches is included as Appendix B4 of Appendix B to the Data Gaps Evaluation Report. Four samples of white powder material were collected from four trenches: SWMU1-WP-5h (collected at 2 to 3 feet bgs), SWMU1-WP-6h (collected at the surface [0 to 0.5 foot bgs]), SWMU1-WP-7 (collected at 2 to 3 feet bgs), and SWMU1-WP-10 (collected at 2 to 3 feet bgs). The white powder samples were analyzed for Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, TPH, and pH. One white powder material sample was also analyzed for the full inorganic and organic suites per TAL/TCL.

All historical and Part A Phase 1 data considered Category 1 were used as inputs to the four data quality objective decisions for SWMU 1.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and chemicals of potential ecological concern (COPECs) at SWMU 1. Laboratory analytical results for historical and Part A Phase 1 soil samples at SWMU 1 are presented in Tables C1-2 through C1-8. Suites of constituents that were 100 percent non-detect (SVOCs and VOCs) are not presented in the tables. Tables C1-2 through C1-8 also include data for white powder samples. Table C1-9 presents a statistical summary of soil analytical results for COPCs and COPECs that were detected in soil samples, as well as COPCs and COPECs which were all non-detect but for which one or more reporting limits exceeded the interim screening level. The white powder samples are not included in the statistical summary presented in Table C1-9. The results of the nature and extent evaluation for the white powder samples are presented separately below (see Section 2.3).

2.1 Summary of SWMU 1 Soil Data

Pesticides, SVOCs, VOCs, TPH-gasoline, antimony, beryllium, cadmium, mercury, silver, thallium, cyanide, several PAHs, and several congeners of PCBs were not detected in soil samples collected in SWMU 1.

Table C1-9 lists the 37 constituents detected at SWMU 1. These include four calculated quantities (benzo(a)pyrene equivalents, total low molecular weight PAHs, total high molecular weight PAHs, and total PCBs). Nine of these constituents (aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, and total PCBs) were detected in the TAL/TCL samples.

Twenty-one of these constituents (aluminum, iron, sodium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, total low molecular weight PAHs, total high molecular weight PAHs, benzo(a)pyrene equivalent, Aroclor-1254, total PCBs, TPH-diesel, and TPH-motor-oil) were detected at concentrations below their respective interim screening levels. Sixteen constituents (arsenic, barium, calcium, total chromium, hexavalent chromium, cobalt, copper, lead, magnesium, manganese, molybdenum, nickel, potassium, selenium, vanadium, and zinc) were detected one or more times at concentrations exceeding the interim screening levels and are discussed below.

Nine constituents (total chromium, hexavalent chromium, cobalt, copper, molybdenum, nickel, vanadium, zinc, and calcium) were detected at concentrations exceeding the interim screening level four or more times; the distributions of these constituents are shown in Figures C1-1 and C1-3 to C1-9. A figure has not been created for calcium since it is considered an essential nutrient, and residential and commercial/industrial California human health screening levels (CHHSLs) and an ecological comparison value (ECV) have not been established for this compound.

2.2 Nature and Extent Evaluation

This section describes the nature and extent of residual soil concentrations of COPCs and COPECs at SWMU 1. Laboratory analytical results for historical and Part A Phase 1 soil samples and the white powder samples at SWMU 1 are presented in Tables C1-2 through C1-8. Table C1-9 presents a statistical summary of soil analytical results for COPCs and COPECs that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one more samples was greater than the interim screening value. White powder data are not included in this soil data statistical summary. Soil data are discussed first, followed by a discussion of the white powder sample data.

As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Section 2.5 of this sub-appendix summarizes the constituents that may require further evaluation and Section 6.0 of this sub-appendix provides the rationale for proposed Phase 2 sample locations to fill identified data gaps.

2.2.1 Arsenic

Arsenic was detected in 134 of 141 soil samples collected at SWMU 1. At two locations (SWMU1-WP-3A at 9 to 10 feet bgs and SWMU1-WP-5a at 5 to 6 feet bgs), the detected concentrations of arsenic (12 milligrams per kilogram [mg/kg]) slightly exceeded the interim screening level of 11 mg/kg (background threshold value [BTV]) , as shown in Tables C1-3 and C1-9. The same two samples also exceeded the ECV of 11.4 mg/kg. These locations are located along the center of SWMU 1. Samples with concentrations below the screening levels surround these two locations laterally. At each location, concentrations in deeper samples are below the screening levels.

2.2.2 Barium

Barium was detected in 149 of 149 soil samples collected from SWMU 1. At two locations, the detected concentrations of barium exceeded the interim screening level of 410 mg/kg (BTV/ECV) (SWMU1-15 [560 mg/kg at 89 to 90 feet bgs] and SWMU1-WP-9 [1,900J mg/kg at 2 to 3 feet bgs]), as shown in Tables C1-3 and C1-9. None of the detected concentrations exceeded the residential and commercial/industrial CHHSL of 5,200 mg/kg and 63,000 mg/kg, respectively. The two locations with exceedances of the BTV/ECV are in the southwestern portion of SWMU 1. Samples with concentrations below the interim screening level are located to the north, east, and south of these locations, but not the west. At SWMU1-WP-9, concentrations in deeper samples are well below the interim screening level. At SWMU1-15, all other samples were located above 89 to 90 feet bgs. All of these samples had barium concentrations well below the BTV. Therefore, because the elevated concentration of barium detected at depth does not appear to be related to a surface release, no further characterization is needed for barium in this area. Also, while the concentration of barium in the deepest sample exceeds the BTV, it is well below the CHHSL.

2.2.3 Total Chromium

Total chromium was detected in 185 of 185 soil samples collected at SWMU 1. Detected concentrations of total chromium exceeded the interim screening level of 39.8 mg/kg (BTV/ECV) 73 times (with a maximum detected concentration of 3,200 mg/kg at SWMU1-1 at 5 to 6 feet bgs), as shown in Tables C1-3 and C1-9 and Figure C1-1. Twenty-six of the detected concentrations of total chromium exceeded the United States Environmental Protection Agency residential regional screening level (RSL) for residential use (280 mg/kg), and seven of the detected concentrations exceeded the RSL for commercial use (1,400 mg/kg). The lateral extent of samples with concentrations exceeding the BTV encompasses all of SWMU 1. At fifteen locations, the deepest samples have concentrations exceeding the BTV. Seven of these locations are along the eastern bank of Bat Cave Wash. In addition, five locations where only surface soil samples were collected (T-B-3, WP-1, WP-2, WP-Bank-1, and WP-Bank-2) showed concentrations above the BTV (three of these surface soil samples also exceeded the residential RSL). Samples with concentrations exceeding the residential RSL are located in the northern portion of SWMU 1 and the eastern bank of Bat Cave Wash. Exceedances of the residential RSL are generally vertically bounded, except at the three surface soil locations described above, and at location WP-6, where the deepest sample was collected at 2 feet bgs.

2.2.4 Hexavalent Chromium

Hexavalent chromium was detected in 48 of 185 soil samples collected at SWMU 1. Detected concentrations of hexavalent chromium exceeded the interim screening level of 0.83 mg/kg (BTV) 34 times (with a maximum detected concentration of 47.5 mg/kg at WP-1 at 0 feet bgs), as shown in Tables C1-3 and C1-9 and Figure C1-3. Four of the detected concentrations of hexavalent chromium exceeded the residential CHHSL (17 mg/kg), and one detected concentration exceeded the commercial/industrial CHHSL (37 mg/kg). None of the detected concentrations exceeded the ECV (139.6 mg/kg). The lateral extent of samples with hexavalent chromium concentrations exceeding the screening levels exist primarily along the northern portion of SWMU 1 and the eastern bank of Bat Cave Wash. At four subsurface locations, the deepest samples have concentrations exceeding screening levels. In addition, five surface soil samples (T-B-3, WP-1, WP-4, WP-Bank-1, and WP-Bank-2) and one shallow sample (WP-6 at 2 feet bgs) exceed the BTV, and deeper samples were not collected in these locations.

2.2.5 Cobalt

Cobalt was detected in 141 of 141 soil samples collected from SWMU 1. Detected concentrations of cobalt slightly exceeded the interim screening level of 12.7 mg/kg (BTV) 20 times and the ECV of 13 mg/kg 14 times (with a maximum detected concentration of 19 mg/kg at SWMU1-WP-6h), as shown in Table C1-3 and C1-9 and Figure C1-4. None of the detected concentrations exceeded residential or commercial/industrial RSLs (23 mg/kg and 300 mg/kg, respectively). The lateral extent of samples with concentrations exceeding screening levels appears to be limited to the southern half of SWMU 1. At five locations, the deepest samples have concentrations that slightly exceed the BTV and the ECV (the highest concentration is 16 mg/kg), but all detections are below the residential RSL.

2.2.6 Copper

Copper was detected in 184 of 185 soil samples collected at SWMU 1. Detected concentrations of copper exceeded the interim screening level of 16.8 mg/kg (BTV) 41 times (with a maximum detected concentrations of 61 mg/kg at SWMU1-WP-6h at 2 to 3 feet bgs), as shown in Tables C1-3 and C1-9 and Figure C1-5. Twenty-five detected concentrations exceeded the ECV (20.6 mg/kg), and no detected concentrations of copper exceeded the residential or commercial/industrial CHHSLs (3,000 mg/kg, and 38,000 mg/kg, respectively). The lateral extent of samples with concentrations exceeding the screening levels appears to be limited primarily to the southern half of SWMU 1, although one slight exceedance (22 mg/kg) of the ECV was identified at SWMU1-2 in the northern portion of SWMU 1. At seven locations, the deepest samples have concentrations exceeding the BTV and ECV. In addition, three surface samples (T-3-B, WP-2, and WP-BANK 2) have concentrations exceeding the BTV, and deeper samples were not collected at these locations.

2.2.7 Lead

Lead was detected in 148 of 149 soil samples collected at SWMU 1. Detected concentrations of lead exceeded the interim screening level of 8.39 mg/kg (BTV/ECV) at two locations (MW-9 [8.4 mg/kg at 87 feet] and SWMU1-WP-7 [13 mg/kg at the surface]), as shown in Tables C1-3 and C1-9. None of the detected concentrations exceeded the residential or commercial/industrial CHHSLs (80 mg/kg and 320 mg/kg, respectively). These locations are located in the southern portion of SWMU 1. Samples with concentrations below screening levels surround each of these two locations laterally. At MW-9, the deepest sample contains lead at 8.4 mg/kg compared to the BTV of 8.39 mg/kg. At SWMU1-WP-7, concentrations in deeper samples are below screening levels.

2.2.8 Molybdenum

Molybdenum was detected in 31 of 149 soil samples collected form SWMU 1. Detected concentrations of molybdenum exceeded the interim screening level of 1.37 mg/kg (BTV) 22 times (with maximum detected concentration of 7.8 mg/kg at SWMU1-1), as shown in Table C1-3 and C1-9 and Figure C1-6. Eleven detected concentrations exceeded the ECV (2.25 mg/kg), and no detected concentrations of molybdenum exceeded residential and commercial/industrial CHHSL (380 mg/kg and 4,800 mg/kg, respectively). The lateral extent of samples with concentrations exceeding the BTV includes most of SWMU 1. At one location (2.8 mg/kg at SWMU1-2 at 9 to 10 feet bgs), the deepest samples have concentrations slightly exceeding the BTV. The concentration at SWMU1-2 also slightly exceeds the ECV.

2.2.9 Nickel

Nickel was detected in 185 of 185 soil samples collected from SWMU 1. Detected concentrations of nickel exceeded the interim screening level of 27.3 mg/kg (BTV/ECV) 20 times (with a maximum detected concentration of 51 mg/kg at SWMU1-WP-9 at 11 to

12 feet bgs), as shown in Tables C1-3 and C1-9 and Figure C1-7. None of the detected concentrations exceeded the residential or commercial/industrial CHHSLs (1,600 mg/kg and 16,000 mg/kg, respectively). The lateral extent of samples with concentrations exceeding screening levels appears to be limited to the southern portion of SWMU 1. At five locations, the deepest samples have concentrations exceeding the BTV. The vertical extent of nickel is not defined at SWMU1-WP-9 at 13 to 14 feet bgs.

2.2.10 Selenium

Selenium was detected in four of 141 soil samples collected from SWMU 1. Detected concentrations of selenium exceeded the interim screening level of 1.47 mg/kg (BTV/ECV) at two locations (1.6 mg/kg at SWMU1-16 at 5 to 6 feet bgs and 2.5 mg/kg at SWMU1-WP-9 at 2 to 3 feet bgs), as shown in Tables C1-3 and C1-9. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). These locations are located in the southern portion of SWMU 1. Samples with concentrations below screening levels surround each of these two locations laterally. At SWMU1-16, the deepest sample (5 to 6 feet bgs) slightly exceeds the screening level (1.6 mg/kg compared to the BTV of 1.47 mg/kg). At SWMU1-WP-9, concentrations in deeper samples are below screening levels.

2.2.11 Vanadium

Vanadium was detected in 149 of 149 soil samples collected from SWMU1. Detected concentrations of vanadium slightly exceeded the interim screening level of 52.2 mg/kg (BTV/ECV) nine times (with a maximum detected concentration of 57 mg/kg at SWMU1-15 at 40 to 50 feet bgs), as shown in Table C1-3 and C1-9 and Figure C1-8. None of the detected concentrations of vanadium exceeded residential and commercial RSLs (390 mg/kg and 5,200 mg/kg, respectively). The lateral extent of samples with concentrations exceeding screening levels appears to be limited to the southern half of SWMU 1. At three locations (SWMU1-T3a, SWMU1-WP-6a, and SWMU-WP-9), the deepest samples have concentrations slightly exceeding the BTV, with concentrations of 53 mg/kg, 55 mg/kg, and 56 mg/kg, respectively.

2.2.12 Zinc

Zinc was detected in 185 of 185 soil samples collected at SWMU 1. Detected concentrations of zinc exceeded the interim screening level of 58 mg/kg (BTV/ECV) 37 times (with a maximum detected concentration of 673 mg/kg [surface soil sample T-3-B]), as shown in Tables C1-3 and C1-9 and Figure C1-9. None of the detected concentrations exceeded residential and commercial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). The lateral extent of samples with concentrations exceeding screening levels is generally limited to the northern portion of SWMU 1 and a portion of the east bank of Bat Cave Wash. At 10 locations, the deepest samples have concentrations exceeding screening levels. In addition, four surface samples (T-3-B, WP-2, WP-4, and WP-Bank-2) and one shallow soil sample (WP-6 at 2 feet bgs) have concentrations exceeding the BTV; deeper samples were not collected at these locations.

2.2.13 Target Analyte List/Target Compound List Constituents

Ten percent of the Phase 1 soil samples collected in SWMU 1 (16 soil samples) were analyzed for the full inorganic and organic suites per the CERCLA TAL/TCL. Aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, and total PCBs were detected in the SWMU 1 soil samples analyzed for the complete TAL/TCL suite of compounds. These constituents are discussed below.

Aluminum was detected in 16 of 16 surface soil samples collected from SWMU 1. None of the detected concentrations exceeded the BTV (16,400 mg/kg). The maximum detected concentration was 12,000 mg/kg at SWMU1-11. Remaining detected concentrations of aluminum ranged from 5,900 to 11,000 mg/kg), as shown in Tables C1-4 and C1-9. None of the detected concentrations exceeded residential and commercial CHHSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in 19 of 19 surface soil samples collected from SWMU 1. Detected concentrations of calcium exceeded the interim screening level of 66,500 mg/kg (BTV) four times (with a maximum detected concentration of 280,000 mg/kg at WP-BANK 1), as shown in Tables C1-4 and C1-9. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium. The lateral extent of samples with concentrations exceeding the BTV appears to be limited primarily on the eastern slope of Bat Cave Wash in the white powder area, although one exceedance (255,000J mg/kg) of the BTV was identified at P-2Soil in the central portion of SWMU 1 along the western boundary.

Iron was detected in 27 of 27 soil samples collected from SWMU 1. The maximum detected concentration of iron was 25,000 mg/kg at both SWMU1-1 at 0 to 0.5 foot bgs and SWMU1-WP-7 also at 0 to 0.5 foot bgs. All detected concentrations are below the interim screening level of 55,000 mg/kg (residential RSL), as shown in Tables C1-4 and C1-9. Remaining detected concentrations of iron ranged from 4,760 to 24,000J mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for iron.

Magnesium was detected in 19 of 19 surface soil samples collected from SWMU 1. Detected concentrations of magnesium exceeded the interim screening level of 12,100 mg/kg (BTV) two times (at two sample locations; 14,700J mg/kg at P-2Soil at 3.5 feet bgs and 14,300 mg/kg at WP-BANK 2 at 0 to 0.5 foot bgs), as shown in Tables C1-4 and C1-9. Remaining detections ranged from 6,300 to 12,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium. The two samples with concentrations exceeding the BTV are located in the southern portion of SWMU 1.

Manganese was detected in 27 of 27 samples collected from SWMU 1. One detected concentration of magnesium slightly exceeded the interim screening level of 402 mg/kg (BTV/ECV) (detected concentration of 526 mg/kg at MW-9), as shown in Tables C1-4 and C1-9. The detected concentration did not exceed the residential and commercial/industrial CHHSLs (1,800 mg/kg and 23,000 mg/kg, respectively). This exceedance was detected in the deepest sample collected at this location (87 feet bgs), and concentrations in the overlying samples at this location were well below the BTV. Remaining detected concentrations ranged from 67.4 to 340 mg/kg. Therefore, because the elevated concentration of manganese detected at depth does not appear to be related to a surface release, no further characterization is needed for manganese in this area.

Potassium was detected in 19 of 19 surface soil samples collected from SWMU 1. One detected concentrations of potassium exceeded the interim screening level of 4,400 mg/kg (BTV) (detected concentration of 4,900 mg/kg at SWMU1-17), as shown in Tables C1-4 and

C1-9. The remaining detected concentrations ranged from 1,040 to 3,200 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for potassium.

Sodium was detected in 13 of 19 surface soil samples collected from SWMU 1. The maximum detected concentration of sodium was 1,800 mg/kg at WP-Bank-1) which is below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C1-4 and C1-9. Remaining detected concentrations of sodium ranged from 190 to 1,650 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

The PCB Aroclor-1254 was detected in nine of 21 soil samples collected from SWMU 1; both surface (0 to 0.5 feet bgs) and shallow soil (2 to 3 feet bgs) samples were collected. The maximum detected concentration of Aroclor-1254 of 200 micrograms per kilogram (µg/kg) was detected at SWMU1-WP-7 at 0 to 0.5 foot bgs. Remaining detected concentration of Aroclor-1254 range from 18 to 96 µg/kg. None of the detected concentrations of Arcolor-1254 exceeded the interim screening level of 220 µg/kg (residential RSL), as shown in Table C1-8. To assist with evaluation of PCBs for ecological risk, detected concentrations of the Aroclors (only Aroclor-1254 at SWMU 1) were summed, and the total PCB values were compared to the ECV. The maximum calculated value for total PCBs was 200 µg/kg, which is below the total PCB ECV of 204 µg/kg, as shown in Table C1-8. The remaining calculated total PCB concentrations ranged from 18 to 96 µg/kg.

As discussed in Section C.2 of the main text of Appendix C, PG&E recommends that PCBs be evaluated further in SWMU 1. PG&E also recommends aluminum, calcium, iron, magnesium, manganese, potassium, and sodium not be considered COPCs/COPECs for this SWMU, and no further sampling is proposed for these constituents. These constituents have been fully discussed in Section C.2 of Appendix C.

2.3 White Powder Samples

As previously mentioned, eight trenches were excavated on the eastern side of SWMU 1 to evaluate the extent of white powder on the hillside, as shown in the inset of Figures C1-1 and C1-3 to C1-9. A photo log of the trenches is included as Appendix B4 of Appendix B to the Data Gaps Evaluation Report. Trench SWMU1-WP-2h defines the northern extent of the white powder, and the southern extent is defined by trench SWMU1-WP-10 and the topography just south of trench SWMU1-WP-10.

White powder material was encountered at several places in SWMU 1 during trenching activities into the eastern sidewall of Bat Cave Wash. Four samples of white powder material (sample locations SWMU1-WP-5h at 2 to 3 feet bgs, SWMU1-WP-6h at the surface (0 to 0.5 foot bgs), SWMU1-WP7 at 2 to 3 feet bgs, and SWMU1-WP-10 at 2 to 3 feet bgs) were collected and sent to the laboratory for analysis. The white powder material in SWMU 1 was mapped, and results of the mapping are presented in Appendix B to the Data Gaps Evaluation Report. In general, the following compounds were detected in the white powder material samples: arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, nickel, vanadium, and zinc. Molybdenum was detected in one of the white powder material samples. Of those compounds detected, total chromium, hexavalent chromium, molybdenum, and zinc were detected above their respective interim screening levels. The maximum detected concentrations of total chromium in the white powder samples was 1,400 mg/kg (exceeding the BTV and equal to the industrial RSL) collected at

SWMU1-WP-10 at 2 to 3 feet bgs; hexavalent chromium was 18.2 mg/kg (exceeding the BTV and residential CHHSL) collected at SWMU1-WP-7 at 2 to 3 feet bgs; molybdenum was 3.4 mg/kg (exceeding the BTV and ECV) collected at SWMU1-WP-7 at 2 to 3 feet bgs; and zinc was 360 mg/kg (exceeding the BTV and ECV) collected at SWMU1-WP-10 at 2 to 3 feet bgs.

The extent of white powder material in SWMU 1 has been defined to the north, south, and west of the white powder area; however, the extent of the white powder has not been defined to the east of the white powder area, on the slope leading up to the compressor station fence line.

2.4 Central Tendency Comparison to Background Threshold Values

Sixteen metals (arsenic, barium, calcium, total chromium, hexavalent chromium, cobalt, copper, lead, magnesium, manganese, molybdenum, potassium, nickel, selenium, vanadium, and zinc) were detected above their respective Topock site-specific BTVs in soil collected from SWMU 1, as shown in Table C1-9. A central tendency comparison was performed for 14 of these 16 metals (arsenic, barium, calcium, total chromium, cobalt, copper, lead, magnesium, manganese, molybdenum, potassium, nickel, vanadium, and zinc) to compare the SWMU 1 soil data set for these metals with the corresponding Topock soil background data set to determine whether a difference exists between the two populations and if additional sampling is required for a given metal (see Figure 3-1 in the Data Gaps Evaluation Report and Table C1-10 of this sub-appendix). Metals in either the SWMU 1 data or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of selenium at SWMU 1 to conduct the test, and there were insufficient detections of hexavalent chromium in the background data set to allow for a central tendency comparison; however, additional investigation is proposed to evaluate the lateral and vertical extent of hexavalent chromium at SWMU 1.

No statistical difference between the two populations was noted for arsenic, barium, calcium, lead, magnesium, manganese, molybdenum, potassium, nickel, and vanadium, as shown in Table C1-10. However, results from the Gehan test show that site concentrations for total chromium, cobalt, copper, and zinc may exceed background. The lateral and vertical extent of cobalt have been adequately defined, as discussed above, and additional sampling is proposed for total chromium, copper, and zinc. Although the Gehan test indicated that the distribution of nickel and molybdenum detections in the site data set is statistically comparable to background, additional sampling is also recommended to further evaluate the extent of nickel and molybdenum within SWMU 1.

2.5 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates than decision error has been held to an acceptable level. Sufficient data of acceptable quality have been attained by the collection of historical Part A soil samples in areas most likely to have been impacted by the wastewater discharges to the Bat Cave Wash and the former percolation bed, white powder on the east bank of Bat Cave Wash, and potential stormwater runoff from the lower yard of the compressor station. Review of the nature and extent discussions above indicates that the lateral extent of samples with concentrations exceeding interim screening levels is variable, with the majority constituents exceeding screening levels located in the northern portion of SWMU 1 and along the eastern bank of Bat Cave Wash. Exceedances of total chromium and hexavalent chromium are present throughout this unit. Based on the review of the data for SWMU 1, the lateral extent of molybdenum extends to the SMWU 1 boundary. The vertical extent of chromium, hexavalent chromium, copper, molybdenum, nickel, and zinc has not been completely defined in the bottom of the wash.

Based on review of the data and the Part A DQOs, two data gaps were identified to resolve Decision 1 – Nature and Extent, and limited additional sampling is recommended in Phase 2 to fill the following data gap:

- Data Gap #1 – Vertical extent of contamination within the SWMU 1 boundary.
- Data Gap #2 – Lateral extent of white powder upslope from the white powder area to the compressor station boundary.

Proposed Phase 2 sample locations are presented in Section 6.0 of this sub-appendix.

3.0 Decision 2 – Data Sufficiency to Estimate Representative Exposure Point Concentrations

The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC) for the combined SWMU 1/AOC 1 area. For Decision 2, SWMU 1 data were combined with AOC 1 data to determine if SWMU 1/AOC 1 data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Evaluation Report. This is consistent with the approach to exposure assessment described in the Human Health and Ecological Risk Assessment Work Plan (ARCADIS, 2008). Category 1 soil sampling results and results from location AOC1-BCW-6, in an area of soil transitioning to sediment, were included in the combined SWMU 1/AOC 1 data set for the Decision 2 evaluation.

Table C2-10 in Appendix C2 summarizes the results of the evaluation to determine if data are sufficient to estimate representative EPCs. Table C2-10 documents the review of all combined AOC 1/SWMU 1 data. Data were reviewed for all chemicals that were detected in at least one sample and that exceeded at least one comparison value. The samples designated as “white powder” were included in the data reviewed as a conservative measure, assuming that exposure to white powder areas would not differ significantly from exposure to surrounding soil areas. In general, existing data are adequate to support soil EPC development for detected chemicals that exceeded one or more comparison values (twelve metals, three CLP inorganics, and PAHs) as described below. Phase 2 data will be added to the existing data set to calculate the final EPC (i.e., after Decision 1 is satisfied).

3.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, and zinc using the ProUCL software, as shown in Table C2-10. For selenium, additional data collection is not expected to significantly change the results of the risk assessment because the compound is very infrequently detected (i.e., additional non-detects would be expected).

3.2 Inorganics

Sufficient data (numbers of samples and detections) are available to calculate EPCs for calcium, magnesium, and potassium using ProUCL, although additional data are not available for deeper locations associated with the scouring scenarios. No additional data collection appears warranted because it is reasonable to assume that the nature and extent of these inorganics in the shallow exposure intervals (0 to 0.5 foot bgs or 0 to 3 feet bgs) are representative of the deeper depths. In addition, maximum concentrations of calcium, magnesium, and potassium detected in the standard exposure intervals (0 to 0.5, 0 to 3, 0 to 6, and 0 to 10 feet bgs) are comparable to background (all detections were below the BTV, as discussed in Tables C1-4 and C1-9).

3.3 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene toxicity equivalents and high molecular weight PAHs using ProUCL.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

A conservative, three-tiered approach was used in the evaluation to assess the potential impact to groundwater from source areas in the vadose zone. A full description of the three-tiered approach is provided in Section 5.0 of the Data Gaps Evaluation Report. Since the southern portion of AOC 1 encompasses SMWU 1, the data from these two areas were analyzed together for Decision 3. Figure C-1 in Appendix C shows the location of the combined SMWU 1/AOC 1 South subarea.

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, are needed to resolve Decision 3. Additional evaluation will be performed as appropriate, as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 – Nature and Extent evaluation will provide the final representative data set that will be used to assess the threat to groundwater. Table C1-11 presents the results of the tiered analysis for the SMWU 1/AOC 1 South subarea.

Twelve metals were detected at concentrations above the background threshold values. Of these 12 metals, only hexavalent chromium and molybdenum were detected at concentrations that exceeded the calculated soil screening levels, as shown in Table C1-12. Based on the initial screening model, the potential for hexavalent chromium and molybdenum to leach to groundwater was ruled out. Consequently, none of the metals detected in soil in subarea SWMU 1/AOC 1 South presents a threat to current or future groundwater, and no further sampling is required to address Decision 3 for SWMU 1/AOC 1 South.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study (CMS/FS). The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite).
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies).
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for SWMU 1 that are currently available to support CMS/FS. Data gaps identified for Decision 4 will be filled using samples being collected to fill data gaps identified for other decisions. Data will not be collected to solely fill Decision 4 data gaps.

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The lateral and vertical extent of the COPCs and COPECs is discussed in Sections 2.2 and 2.3 of this sub-appendix. Data results for selected constituents are shown in Figures C1-1 and C1-3 through C1-9, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0 of this sub-appendix.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLC). The maximum concentrations of these metals for each of the units were compared to the TTLCs, and total chromium exceeded the TTLCs twice, as shown in Table C1-13. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLCs). Concentrations of barium exceeded 10 times the STLC once, and total chromium exceeded 10 times the STLC 58 times, as shown in Table C1-13. In addition, total chromium also exceeded 20 times the toxicity characteristic leaching procedure (TCLP) in 37 samples, as indicated in Table C1-13. Because these metals have the potential to exceed STLC or TCLP thresholds, additional leachability testing for waste characterization purposes may be required if soil excavation and offsite disposal is chosen as a remedy. For the purposes of supporting the CMS/FS, the lack of STLC or TCLP analysis is not considered a data gap, for the existing total concentrations are sufficient for the purposes of evaluating various remedial alternatives. Additional data regarding potential COPC/ COPEC leachability include SPLP analysis for total and hexavalent chromium, as shown in Table C1-2. SPLP analysis was conducted only for soil samples (no white powder or debris samples were tested using SPLP). SPLP analysis of the white powder material is needed to support the CMS/FS.

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 soil investigation was limited to grain size analysis only. Specific soil physical properties data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 in the Data Gaps Evaluation Report. Additional soil physical parameter data are needed to support the CMS/FS.

5.4 Surface and Subsurface Features

While there is extensive information regarding surface and subsurface features at SWMU 1, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for SWMU 1. However, subsurface utilities, including gas transmission pipelines and any culverts or other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives and to prepare construction specifications.

6.0 Summary of Data Gaps, Proposed Phase 2 Soil Sample Locations to Fill Identified Gaps, and Access Restrictions

Based on the Part A DQO, data gaps were identified for two of the four decisions and are summarized below by decisions:

- **Decision 1 – Nature and Extent**. The following data gaps were identified to resolve this decision:
  - Data Gap #1 – Vertical extent of contamination within SWMU 1 boundary.
  - Data Gap #2 – Lateral extent of white powder upslope from white powder area to the compressor station boundary.
- **Decision 2 (Data Sufficient to Estimate Representative Exposure Point Concentrations)**. No data gap was identified for this decision.
- **Decision 3 (Potential Threat to Groundwater from Residual Soil Concentrations).**
  - Data Gap #3 – Vertical extent of contamination within SWMU 1 boundary.

- **Decision 4 (Data Sufficient to Estimate Soil Properties and Contaminant Distribution in Support of the CMS/FS).** The following data gap was identified to resolve this decision**:**
  - Data Gap #4 – Soil physical parameters to support the CMS/FS. Three samples each from boring locations SWMU1-18 and SWMU1-19 are proposed to be analyzed for soil physical parameters.

Table C1-14 summarizes the proposed Phase 2 sample locations, depths, rationale for each location, and analytes. Proposed Phase 2 sample locations are also shown in Figure C1-1 and Figures C1-3 through C1-10.

6.1 Access Restrictions

Most of the potential SWMU 1 Phase 2 sample locations are located at the bottom of Bat Cave Wash; no access restrictions are apparent with the exception of potential subsurface boulders. The proposed Phase 2 sample locations not located in the wash are located near the compressor station fence line at the top of a very steep slope. A backhoe will need to be used to collect these samples. Slope stability may limit the amount of soil that can be removed for sampling.

7.0 References

American Water Works Association. 1981. *Lime Softening Sludge Treatment and Disposal.* Journal of the American Water Works Association. November.

ARCADIS. 2008. *Human and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California.* August.

———. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

Tables

TABLE C1-1
Conceptual Site Model – SWMU 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Runoff from compressor station	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil Shallow Soil Potential Sediments Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion/enclosed space accumulation Potential discharge of groundwater to surface water [a] Potential extracted groundwater[b]
Discharge of wastewater from compressor station to Bat Cave Wash/ percolation bed	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil Shallow Soil Potential Sediments Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion/enclosed space accumulation Potential discharge of groundwater to surface water [a] Potential extracted groundwater[b]

[a] Discharge to surface water is an insignificant transport pathway as evaluated in the groundwater risk assessment (ARCADIS, 2009).

[b] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C1-2

Synthetic Precipitation Leaching Procedure (SPLP) Extraction Results
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			SPLP Results in mg/L	
Location	**Sample Date**	**Depth (ft bgs)**	**Hexavalent Chromium**	**Chromium (total)**
SWMU1				
SWMU1-1	10/16/08	5-6	0.02 J	0.142
SWMU1-3	10/06/08	5-6	0.0107 J	0.107
SWMU1-8	10/15/08	2-3	0.0031 J	0.156

Notes:

ft bgs	feet below ground surface
mg/L	milligrams per liter
J	concentration estimated by laboratory or data validation

TABLE C1-3

Sample Results: Metals

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
MW-9	06/30/97	1	N	---	---	---	---	---	15	ND (0.05)	---	7.2	---	---	---	7.6	---	---	---	---	19.7
	06/30/97	3.5	N	---	---	---	---	---	4.1	0.06	---	3.1	---	---	---	3.6	---	---	---	---	11.8
	06/30/97	3.5	FD	---	---	---	---	---	7.6	0.21	---	3.5	---	---	---	3.7	---	---	---	---	12.6
	06/30/97	6	N	---	---	---	---	---	11.8	ND (0.05)	---	6.4	---	---	---	7.7	---	---	---	---	21
	07/01/97	10	N	---	---	91	---	---	42.2	ND (0.05)	---	6.8	2.7	---	ND (0.2)	9.7	---	---	---	21.8	29
	06/30/97	20	N	---	---	---	---	---	9	ND (0.05)	---	7.1	---	---	---	9.1	---	---	---	---	21.7
	07/01/97	30	N	---	---	28.8	---	---	16.3	ND (0.05)	---	12.4	3.9	---	ND (0.2)	15.3	---	---	---	31	29.4
	06/30/97	40	N	---	---	---	---	---	9.7	ND (0.05)	---	7.5	---	---	---	9	---	---	---	---	22.5
	07/01/97	50	N	---	---	83.8	---	---	11.7	ND (0.05)	---	14.7	3.2	---	ND (0.2)	11.3	---	---	---	20.3	23.3
	06/30/97	60	N	---	---	---	---	---	28.8	ND (0.05)	---	17.4	---	---	---	20.2	---	---	---	---	34.4
	06/30/97	70	N	---	---	---	---	---	8.9	ND (0.05)	---	10	---	---	---	10.2	---	---	---	---	19
	07/01/97	87	N	---	---	94	---	---	9.8	ND (0.05)	---	10.2	8.4	---	ND (0.2)	11.6	---	---	---	33	126
	07/01/97	87	FD	---	---	---	---	---	11.9	0.06	---	11.4	---	---	---	11.7	---	---	---	---	121
SWMU1-1	10/16/08	0 - 0.5	N	ND (2.4) J*	3.5	120	ND (1.2) *	ND (1.2) *	44	0.524	11	12	4.2	ND (0.12) *	ND (1.2)	16	ND (1.2)	ND (1.2)	ND (2.4) *	38	41
	10/16/08	2 - 3	N	ND (2.1) *	3	110	ND (1) *	ND (1)	67	0.462	7.5	9.4	3	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	32	37
	10/16/08	5 - 6	N	ND (2.1) *	ND (1)	94	ND (1) *	ND (1)	3,200	14.1	7.3	9.5	4.5	ND (0.1) *	7.8	12	ND (1)	ND (1)	ND (2.1)	45	76
	10/16/08	9 - 10	N	ND (2.1) *	2.2	83	ND (1) *	ND (1)	55	0.907	6.9	8.6	1.7	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2.1)	27	89
SWMU1-2	10/15/08	0 - 0.5	N	ND (2) *	4.7	110	ND (1) *	ND (1)	26	ND (0.401)	7.3	22	6.5	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	35	37
	10/15/08	2 - 3	N	ND (2) *	2.6	110	ND (1) *	ND (1)	36	ND (0.404)	9.3	10	3.7	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2)	33	38
	10/15/08	5 - 6	N	ND (2) *	3.2	120	ND (1) *	ND (1)	44	ND (0.404)	8.9	12	6.1	ND (0.1) *	3	16	ND (1)	ND (1)	ND (2)	33	38
	10/15/08	9 - 10	N	ND (2.1) *	ND (1)	130	ND (1) *	ND (1)	2,000	22.8	10	15	4	ND (0.1) *	2.8	16	ND (1)	ND (1)	ND (2.1)	41	100
SWMU1-3	10/06/08	0 - 0.5	N	ND (2) *	2.7	94	ND (1) *	ND (1)	28	ND (0.405)	9.9	11	3.9	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2)	37	33
	10/06/08	2 - 3	N	ND (2.1) *	2.5	130	ND (1) *	ND (1)	41	ND (0.413)	9.2	9.4	2.3	ND (0.1) *	1.5	16	ND (1)	ND (1)	ND (2.1)	35	38
	10/06/08	2 - 3	FD	ND (2) *	2.8	120	ND (1) *	ND (1)	38	ND (0.41)	8.6	9	2.9	ND (0.1) *	1.4	14	ND (1)	ND (1)	ND (2)	34	37
	10/06/08	5 - 6	N	ND (2.1) *	ND (1)	140	ND (1) *	ND (1)	1,300	22.7	8.9	11	3.8	ND (0.1) *	4.2	12	ND (1)	ND (1)	ND (2.1)	37	78
	10/06/08	9 - 10	N	ND (2.1) *	3	60	ND (1) *	ND (1)	96	1.55 J	9.4	11	2.7	ND (0.11) *	ND (1)	18	ND (1)	ND (1)	ND (2.1)	32	140
	10/06/08	19 - 20	N	ND (2.1) *	5.6	250	ND (2.1) *	ND (1)	20	ND (0.416)	9.1	10	2.9	ND (0.1) *	ND (2.1) *	13	ND (1)	ND (2.1)	ND (4.1) *	34	39
	10/06/08	29 - 30	N	ND (2.1) *	10	59	ND (5.3) *	ND (1.1) *	21	ND (0.424)	8.8	15	2.4	ND (0.1) *	ND (5.3) *	16	ND (1.1)	ND (5.3) *	ND (11) *	32	38
	10/06/08	39 - 40	N	ND (2.1) *	5.3	45	ND (2.1) *	ND (1)	22	ND (0.424)	8.6	8.5	2.7	ND (0.1) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.2) *	31	35
	10/06/08	49 - 50	N	ND (2.1) *	5.6	63	ND (2.1) *	ND (1.1) *	25	ND (0.405)	9.8	12	3.2	ND (0.11) *	ND (2.1) *	17	ND (1.1)	ND (2.1)	ND (4.3) *	35	39
	10/06/08	59 - 60	N	ND (2.1) *	5.3	99	ND (2.1) *	ND (1)	38	ND (0.418)	9.6	14	3	ND (0.1) *	2.1	20	ND (1)	ND (2.1)	ND (4.1) *	37	36
	10/07/08	69 - 70	N	ND (2.1) *	5.2	64	ND (2.1) *	ND (1)	29	ND (0.42)	9.9	14	2.6	ND (0.1) *	ND (2.1) *	19	ND (1)	ND (2.1)	ND (4.2) *	38	38
	10/07/08	79 - 80	N	ND (2.2) *	6.6	350	ND (2.2) *	ND (1.1) *	20	ND (0.427)	8.3	13	3.1	ND (0.11) *	ND (2.2) *	14	ND (1.1)	ND (2.2)	ND (4.5) *	35	39
	10/07/08	79 - 80	FD	ND (2.3) *	5.1	340	ND (1.1) *	ND (1.1) *	21	ND (0.441)	7.3	15	2.6	ND (0.11) *	1.3	14	ND (1.1)	ND (1.1)	ND (2.3)	31	34
SWMU1-4	10/15/08	0 - 0.5	N	ND (2) J*	2.9	75	ND (1) *	ND (1)	17	ND (0.401)	5.6	6.8	2.6	ND (0.1) *	ND (1)	9.5	ND (1)	ND (1)	ND (2)	34	26
	10/15/08	2 - 3	N	ND (2.1) *	ND (1)	130	ND (1) *	ND (1)	870	4.95	7.3	11	3.6	ND (0.1) *	1.7	13	ND (1)	ND (1)	ND (2.1)	36	72
	10/15/08	5 - 6	N	ND (2.1) *	1.8	100	ND (1) *	ND (1)	100	1.39	7.6	10	1.8	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2.1)	36	170
	10/15/08	7 - 8	N	ND (2.1) *	2.1	89	ND (1) *	ND (1)	40	ND (0.415)	7.5	7.6	1.6	ND (0.1) *	ND (1)	9.8	ND (1)	ND (1)	ND (2.1)	31	120
	10/15/08	9 - 10	N	ND (2.1) *	2.1	95	ND (1) *	ND (1)	23	ND (0.414)	7.5	7.9	1.7	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2.1)	33	110
	10/15/08	13 - 14	N	ND (2.1) *	2.4	110	ND (1) *	ND (1)	18	ND (0.413)	7.4	7.1	1.7	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2.1)	31	67
SWMU1-5	10/15/08	9 - 10	N	ND (2.1) *	2.6	71	ND (1) *	ND (1)	47	0.874	7	8.3	2.1	ND (0.1) *	ND (1)	9.9	ND (1)	ND (1)	ND (2.1)	28	100
	10/15/08	13 - 14	N	ND (2.1) *	5.4	58	ND (2.1) *	ND (1)	21	ND (0.42)	8.3	7.9	2.8	ND (0.1) *	ND (2.1) *	13	ND (1)	ND (2.1)	ND (4.2) *	30	42
	10/15/08	13 - 14	FD	ND (2.1) *	5.8	48	ND (2.1) *	ND (1)	21	ND (0.423)	8	8	2.9	ND (0.1) *	ND (2.1) *	13	ND (1)	ND (2.1)	ND (4.2) *	31	44
	10/15/08	15 - 16	N	ND (2.1) *	5.4	63	ND (2.1) *	ND (1)	21	ND (0.414)	8.1	9.1	2.8	ND (0.1) *	ND (2.1) *	13	ND (1)	ND (2.1)	ND (4.1) *	31	34
	10/15/08	19 - 20	N	ND (2.1) *	4.3	180	ND (1.1) *	ND (1.1) *	19	ND (0.423)	8.6	11	3.1	ND (0.11) *	1.5	12	ND (1.1)	ND (1.1)	ND (2.1)	32	37

TABLE C1-3

Sample Results: Metals

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1] :				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2] :				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3] :				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4] :				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5] :				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
SWMU1-6	10/15/08	0 - 0.5	N	ND (2) *	2.4	110	ND (1) *	ND (1)	220	1.32	8.8	11	3.3	ND (0.1) *	1.2	12	ND (1)	ND (1)	ND (2)	41	42
	10/15/08	2 - 3	N	ND (2) *	2.1	95	ND (1) *	ND (1)	270	2.15	8.1	12	2.6	ND (0.1) *	1.9	13	ND (1)	ND (1)	ND (2)	39	46
	10/15/08	5 - 6	N	ND (2) *	2.6	81	ND (1) *	ND (1)	32	ND (0.405)	7.7	10	2.6	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	34	29
	10/15/08	9 - 10	N	ND (2) *	2.4	79	ND (1) *	ND (1)	33	0.531	8.3	8.6	1.7	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	33	88
SWMU1-7	10/15/08	0 - 0.5	N	ND (2) *	3.3	98	ND (1) *	ND (1)	27	ND (0.403)	8.7	13	6.6	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2)	37	38
	10/15/08	2 - 3	N	ND (2) *	ND (1)	97	ND (1) *	ND (1)	630	6.45	9	14	3.6	ND (0.1) *	1.7	15	ND (1)	ND (1)	ND (2)	36	130
	10/15/08	5 - 6	N	ND (2.1) *	1.2	100	ND (1) *	ND (1)	330	5.3	8.1	20	2.8	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2.1)	35	190
	10/15/08	9 - 10	N	ND (2) *	2.4	100	ND (1) *	ND (1)	51	0.517	8.2	9.2	1.9	ND (0.1) *	ND (1)	14 J	ND (1)	ND (1)	ND (2)	34	150
	10/15/08	9 - 10	FD	ND (2) *	2.4	99	ND (1) *	ND (1)	47	0.554	7.9	8.3	1.6	ND (0.1) *	ND (1)	11 J	ND (1)	ND (1)	ND (2)	32	150
SWMU1-8	10/15/08	0 - 0.5	N	ND (2) *	2.9	86	ND (1) *	ND (1)	120	0.618	8.2	9.1	4.7	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	38	36
	10/15/08	2 - 3	N	ND (2.1) *	1.5	100	ND (1) *	ND (1)	970	22.3	8.2	11	3.5	ND (0.1) *	2.2	14	ND (1)	ND (1)	ND (2.1)	36	160
	10/15/08	5 - 6	N	ND (2.1) *	ND (1)	120	ND (1) *	ND (1)	1,600	9.25	9.2	22	3.3	ND (0.1) *	3.2	16	ND (1)	ND (1)	ND (2.1)	46	120
	10/15/08	9 - 10	N	ND (2.2) *	3.9	39	ND (1.1) *	ND (1.1) *	15	ND (0.433)	7	7.1	2.8	ND (0.11) *	ND (1.1)	11	ND (1.1)	ND (1.1)	ND (2.2)	28	32
SWMU1-9	10/14/08	0 - 0.5	N	ND (2.1) *	2.9	110	ND (1) *	ND (1)	87	0.697	8.7	10	2.9	ND (0.11) *	1.4	16	ND (1)	ND (1)	ND (2.1)	36	37
	10/14/08	2 - 3	N	ND (2.1) *	5.6	140	ND (1) *	ND (1)	13	ND (0.42)	4.5	5.9	5	ND (0.11) *	ND (1)	8.6	ND (1)	ND (1)	ND (2.1)	21	26
	10/14/08	5 - 6	N	ND (2.1) *	5.8	45	ND (2.1) *	ND (1)	26	ND (0.417)	8.9	8.1	3.1	ND (0.1) *	ND (2.1) *	15	ND (1)	ND (2.1)	ND (4.1) *	34	39
	10/14/08	9 - 10	N	ND (2.1) *	4.3	150	ND (1.1) *	ND (1.1) *	22	ND (0.425)	9	11	3.2	ND (0.1) *	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	35	38
SWMU1-10	10/14/08	0 - 0.5	N	ND (2) *	2.8	91	ND (1) *	ND (1)	19	ND (0.401)	7.8	11	2.6	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	30	32
	10/14/08	2 - 3	N	ND (2) *	2.5	100	ND (1) *	ND (1)	26	ND (0.403)	8.8	13	2.2	ND (0.1) *	1.8	13	ND (1)	ND (1)	ND (2)	31	33
	10/14/08	5 - 6	N	ND (2.1) *	3.9	44	ND (1) *	ND (1)	21	ND (0.413)	10	8.4	2.9	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	36	42
	10/14/08	5 - 6	FD	ND (2.1) *	3.4	48	ND (1) *	ND (1)	22	ND (0.413)	9.4	10	2.9	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2.1)	36	41
	10/14/08	9 - 10	N	ND (2.1) *	4.9	51	ND (1.1) *	ND (1.1) *	25	ND (0.431)	9.6	15	3.6	ND (0.11) *	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.1)	37	44
SWMU1-11	10/15/08	0 - 0.5	N	ND (2.1) *	3.6	61	ND (1.1) *	ND (1.1) *	200	1.81	8.4	11	3.8	ND (0.11) *	1.2	15	ND (1.1)	ND (1.1)	ND (2.1)	34	65
	10/15/08	2 - 3	N	ND (2.1) *	2.2	92	ND (1.1) *	ND (1.1) *	840	8.82	8.1	11	4.3	ND (0.11) *	4	13	ND (1.1)	ND (1.1)	ND (2.1)	34	120
	10/15/08	5 - 6	N	ND (2.1) *	5.7	37	ND (2.1) *	ND (1.1) *	34	ND (0.431)	9.3	12	3.2	ND (0.11) *	ND (2.1) *	16	ND (1.1)	ND (2.1)	ND (4.3) *	35	96
	10/15/08	9 - 10	N	ND (2.1) *	4.7	36	ND (1.1) *	ND (1.1) *	22	ND (0.432)	9	10	3.4	ND (0.11) *	ND (1.1)	15	ND (1.1)	ND (1.1)	ND (2.1)	35	43
SWMU1-12	10/14/08	0 - 0.5	N	ND (2) *	2.8	100	ND (1) *	ND (1)	19	ND (0.403)	8	8.5	2.7	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	32	31
	10/14/08	2 - 3	N	ND (2) *	4.6	88	ND (2) *	ND (1)	24	ND (0.406)	9.5	11	2.3	ND (0.1) *	ND (2) *	16	ND (1)	ND (2)	ND (4) *	34	37
	10/14/08	5 - 6	N	ND (2) *	5.5	57	ND (2) *	ND (1)	20	ND (0.412)	9.6	13	2.7	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4.1) *	35	40
	10/14/08	9 - 10	N	ND (2.1) *	10	42	ND (5.2) *	ND (1)	21	ND (0.419)	9.7	11	3.1	ND (0.1) *	ND (5.2) *	16	ND (1)	ND (5.2) *	ND (10) *	34	41
SWMU1-13	10/14/08	0 - 0.5	N	ND (2) J*	3.3	120	ND (1) *	ND (1)	23	ND (0.407)	7.1	14	5.3	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	33	35
	10/14/08	2 - 3	N	ND (2) *	9.7	160	ND (5.1) *	ND (1)	28	ND (0.409)	9.3	11	3.5	ND (0.1) *	ND (5.1) *	15	ND (1)	ND (5.1)	ND (10) *	36	39
	10/14/08	2 - 3	FD	ND (2) *	9.3	170	ND (5.1) *	ND (1)	27	ND (0.411)	8.7	11	3.5	ND (0.1) *	ND (5.1) *	14	ND (1)	ND (5.1)	ND (10) *	34	39
	10/14/08	5 - 6	N	ND (2.1) *	6.4	85	ND (2.1) *	ND (1)	34	ND (0.416)	11	13	2.8	ND (0.1) *	ND (2.1) *	20	ND (1)	ND (2.1)	ND (4.1) *	40	44
	10/14/08	9 - 10	N	ND (2.1) *	5.7	49	ND (1) *	ND (1)	30	ND (0.426)	12	16	3.5	ND (0.1) *	ND (1)	20	ND (1)	ND (1)	ND (2.1)	43	45
SWMU1-14	10/14/08	0 - 0.5	N	ND (2) *	2.3	96	ND (1) *	ND (1)	20	ND (0.404)	8.8	8.2	2.6	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	33	33
	10/14/08	2 - 3	N	ND (2) *	2.8	120	ND (1) *	ND (1)	19	ND (0.408)	7.9	14	2.3	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	31	33
	10/14/08	5 - 6	N	ND (2) *	5.8	73	ND (2) *	ND (1)	28	ND (0.413)	11	17	3.4	ND (0.1) *	ND (2) *	20	ND (1)	ND (2)	ND (4.1) *	40	42
	10/14/08	9 - 10	N	ND (2.1) *	5.6	67	ND (1) *	ND (1)	52	ND (0.415)	13	35	3.9	ND (0.1) *	ND (1)	32	ND (1)	ND (1)	ND (2.1)	48	45

TABLE C1-3
Sample Results: Metals
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				0.285	11	410	0.672	1.1	39.8	0.83	12.7	16.8	8.39	0.0125	1.37	27.3	1.47	5.15	2.32	52.2	58
Residential Regional Screening Levels[2]:				31	0.062	15,000	160	70	280	39	23	3,100	150	23	390	1,500	390	390	5.1	390	23,000
Residential DTSC CHHSL[3]:				30	0.07	5,200	16	39	NE	17	660	3,000	80	18	380	1,600	380	380	5	530	23,000
Ecological Comparison Values[4]:				0.285	11.4	330	23.3	0.0151	36.3	139.6	13	20.6	0.0166	0.0125	2.25	0.607	0.177	5.15	2.32	13.9	0.164
Background[5]:				NE	11	410	0.672	1.1	39.8	0.83	12.7	16.8	8.39	NE	1.37	27.3	1.47	NE	NE	52.2	58
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
SWMU1-15	09/22/08	0 - 0.5	N	ND (2) J*	2.6	130	ND (1) *	ND (1)	25	1.14	8.7	12	4.1	ND (0.1) *	1.9	15	ND (1)	ND (1)	ND (2)	34	36
	09/22/08	2 - 3	N	ND (2.1) *	2.8	130	ND (1.1) *	ND (1.1) *	23	ND (0.422)	9.3	11	3	ND (0.11) *	1.2	17	ND (1.1)	ND (1.1)	ND (2.1)	32	34
	09/22/08	5 - 6	N	ND (2.1) *	4.5	100	ND (2.1) *	ND (1.1) *	41	ND (0.424)	12	18	4.5	ND (0.11) *	ND (2.1) *	28	ND (1.1)	ND (2.1)	ND (4.3) *	44	46
	09/22/08	9 - 10	N	ND (2.1) *	4.7	230	ND (2.1) *	ND (1)	58	ND (0.419)	15	24	4.4	ND (0.11) *	ND (2.1) *	43	ND (1)	ND (2.1)	ND (4.1) *	55	50
	09/22/08	9 - 10	FD	ND (2.1) *	5.1	190	ND (2.1) *	ND (1)	60	ND (0.42)	15	23	4.5	ND (0.1) *	ND (2.1) *	44	ND (2.1) *	ND (2.1)	ND (4.1) *	53	50
	09/22/08	19 - 20	N	ND (2.1) *	5.5	81	ND (2.1) *	ND (1.1) *	51	ND (0.425)	14	41	4.5	ND (0.11) *	ND (2.1) *	37	ND (1.1)	ND (2.1)	ND (4.2) *	53	50
	09/22/08	29 - 30	N	ND (2.1) *	7.4	110	ND (5.3) *	ND (1.1) *	54	ND (0.433)	14	23	5.4	ND (0.11) *	ND (5.3) *	39	ND (1.1)	ND (5.3) *	ND (11) *	51	54
	09/22/08	39 - 40	N	ND (2.1) *	4	56	ND (1) *	ND (1)	40	ND (0.422)	12	23	3	ND (0.1) *	ND (1)	27	ND (1)	ND (1)	ND (2.1)	48	47
	09/22/08	49 - 50	N	ND (2.2) *	6.7	160	ND (2.2) *	ND (1.1) *	55	ND (0.439)	13	25	5.4	ND (0.11) *	ND (2.2) *	39	ND (1.1)	ND (2.2)	ND (4.3) *	57	59
	09/22/08	59 - 60	N	ND (2.1) *	8.4	110	ND (5.3) *	ND (1.1) *	47	ND (0.449)	14	23	3	ND (0.1) *	ND (5.3) *	34	ND (1.1)	ND (5.3) *	ND (11) *	51	49
	09/22/08	59 - 60	FD	ND (2.1) *	5.6	110	ND (2.1) *	ND (1.1) *	44	ND (0.411)	15	24	4.3	ND (0.1) *	ND (2.1) *	31	ND (1.1)	ND (2.1)	ND (4.2) *	52	47
	09/22/08	69 - 70	N	ND (2.1) *	6.1	47	ND (1.1) *	ND (1.1) *	39	ND (0.43)	13	25	3.8	ND (0.11) *	ND (1.1)	27	ND (1.1)	ND (1.1)	ND (2.1)	42	53
	09/22/08	79 - 80	N	ND (2.1) *	4.4	94	ND (1.1) *	ND (1.1) *	28	ND (0.43)	11	20	3.2	ND (0.11) *	ND (1.1)	19	ND (1.1)	ND (1.1)	ND (2.1)	38	60
	09/23/08	89 - 90	N	ND (4) *	3.7	560	ND (2) *	ND (2) *	6.5	ND (0.4)	6.2	ND (4)	ND (2)	ND (0.1) *	ND (2) *	7	ND (2) *	ND (2)	ND (4) *	15	21
SWMU1-16	09/21/08	0 - 0.5	N	ND (2) *	2.6	83	ND (1) *	ND (1)	10	ND (0.405)	4.5	5.2	2.3	ND (0.099) *	ND (1)	6.8	ND (1)	ND (1)	ND (2)	20	21
	09/21/08	2 - 3	N	ND (2) *	1.7	99	ND (1) *	ND (1)	18	ND (0.408)	7.9	8.3	2	ND (0.1) *	1	11	1.1	ND (1)	ND (2)	32	34
	09/21/08	5 - 6	N	ND (2) *	1.6	110	ND (1) *	ND (1)	18	ND (0.406)	7.8	8.9	2	ND (0.1) *	ND (1)	11	1.6	ND (1)	ND (2)	32	35
SWMU1-17	09/21/08	0 - 0.5	N	ND (2) *	3.7	210	ND (2) *	ND (1)	27	ND (0.403)	11	16	3.5	ND (0.1) *	ND (2) *	19	ND (2) *	ND (2)	ND (4) *	47	46
	09/21/08	2 - 3	N	ND (2) *	4.3	180	ND (2) *	ND (1)	29	ND (0.405)	10	12	3.9	ND (0.1) *	ND (2) *	20	ND (1)	ND (2)	ND (4) *	40	40
	09/21/08	5 - 6	N	ND (2) *	2.8	130	ND (2) *	ND (1)	29	ND (0.407)	10	12	3.1	ND (0.1) *	2.4	18	ND (1)	ND (2)	ND (4) *	39	44
	09/21/08	9 - 10	N	ND (2) *	3.9	110	ND (2) *	ND (1)	43 J	ND (0.408)	13	26	4.4	ND (0.1) *	ND (2) *	32	ND (2) *	ND (2)	ND (4) *	46	41
	09/21/08	9 - 10	FD	ND (2) *	4.1	110	ND (2) *	ND (1)	53 J	ND (0.408)	14	24	4.7	ND (0.1) *	ND (2) *	37	ND (1)	ND (2)	ND (4) *	51	46
SWMU1-WP-1h	10/07/08	0 - 0.5	N	ND (2.1) *	4.5	53	ND (1) *	ND (1)	25	ND (0.418)	8.3	11	3.9	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	32	38
	10/07/08	2 - 3	N	ND (2.1) *	4.4	40	ND (1) *	ND (1)	17	ND (0.418)	7.2	8.9	2.8	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	30	34
	10/07/08	5 - 6	N	ND (2.1) *	3.7	23	ND (1.1) *	ND (1.1) *	15	ND (0.417)	7	7.1	2.5	ND (0.11) *	ND (1.1)	11	ND (1.1)	ND (1.1)	ND (2.1)	26	39
	10/07/08	9 - 10	N	ND (2.1) *	3.8	29	ND (1) *	ND (1)	28	ND (0.422)	8	8.7	2.9	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	29	58
SWMU1-WP-3a	10/14/08	0 - 0.5	N	ND (2.1) *	3.1	100	ND (1.1) *	ND (1.1) *	27	ND (0.419)	7.4	11	3.6	ND (0.11) *	ND (1.1)	13	ND (1.1)	ND (1.1)	ND (2.1)	33	40
	10/14/08	2 - 3	N	ND (2.1) *	2.3	100	ND (1) *	ND (1)	20	ND (0.419)	8	9.4	2.3	ND (0.11) *	1.1	11	ND (1)	ND (1)	ND (2.1)	38	34
	10/14/08	5 - 6	N	ND (2.1) *	6	68	ND (2.1) *	ND (1.1) *	27	ND (0.425)	14	15	6.2	ND (0.11) *	ND (2.1) *	17	ND (1.1)	ND (2.1)	ND (4.2) *	37	45
	10/14/08	7 - 8	N	ND (2.1) *	6	69	ND (2.1) *	ND (1)	23	ND (0.417)	9.3	11	3.4	ND (0.1) *	ND (2.1) *	18	ND (1)	ND (2.1)	ND (4.1) *	36	39
	10/14/08	9 - 10	N	ND (2.1) *	12	120	ND (5.1) *	ND (1)	66	ND (0.415)	14	21	2.8	ND (0.1) *	ND (5.1) *	45	ND (1)	ND (5.1)	ND (10) *	51	46
	10/14/08	9 - 10	FD	ND (2.1) *	12	120	ND (5.1) *	ND (1)	66	ND (0.414)	15	22	2.7	ND (0.1) *	ND (5.1) *	45	ND (1)	ND (5.1)	ND (10) *	52	47
	10/14/08	11 - 12	N	ND (2.1) *	5.1	56	ND (1) *	ND (1)	30	ND (0.421)	12	27	4	ND (0.1) *	ND (1)	23	ND (1)	ND (1)	ND (2.1)	40	40
	10/14/08	13 - 14	N	ND (2.1) *	5.5	40	ND (1) *	ND (1)	28	ND (0.426)	10	31	3.8	ND (0.1) *	ND (1)	21	ND (1)	ND (1)	ND (2.1)	39	40
SWMU1-WP-3h	10/07/08	0 - 0.5	N	ND (2.1) *	5.1	40	ND (2.1) *	ND (1.1) *	17	ND (0.433)	7.4	6.3	1.8	ND (0.11) *	ND (2.1) *	11	ND (1.1)	ND (2.1)	ND (4.3) *	25	33
	10/07/08	2 - 3	N	ND (2) *	2.4	89	ND (1) *	ND (1)	17	ND (0.404)	7.6	8.6	2.1	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	30	34
	10/07/08	5 - 6	N	ND (2) *	2.8	92	ND (1) *	ND (1)	21	ND (0.404)	8.7	7.8	2.4	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2)	31	36
SWMU1-WP-5a	10/05/08	0 - 0.5	N	ND (2) J*	2.4	91	ND (1) *	ND (1)	19	ND (0.405)	8	11	3.9	ND (0.1) *	1	11	ND (1)	ND (1)	ND (2)	36	35
	10/05/08	2 - 3	N	ND (2) *	2.3	100	ND (1) *	ND (1)	19	ND (0.408)	8.9	9.2	2.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	33	35
	10/05/08	5 - 6	N	ND (2.1) *	6.7	120	ND (2.1) *	ND (1)	53	ND (0.419)	13	17	3.9	ND (0.1) *	ND (2.1) *	38	ND (1)	ND (2.1)	ND (4.1) *	52	42
	10/05/08	5 - 6	FD	ND (2.1) *	12	120	ND (5.2) *	ND (1)	58	ND (0.42) J	15	19	3.5	ND (0.1) *	ND (5.2) *	42	ND (1)	ND (5.2) *	ND (10) *	56	46
	10/05/08	7 - 8	N	ND (2.1) *	6.6	100	ND (2.1) *	ND (1)	53	ND (0.416)	12	18	4.1	ND (0.1) *	ND (2.1) *	37	ND (1)	ND (2.1)	ND (4.1) *	44	41
	10/05/08	9 - 10	N	ND (2.1) *	6.4	76	ND (2.1) *	ND (1)	43	ND (0.421)	13	21	4.2	ND (0.1) *	ND (2.1) *	33	ND (1)	ND (2.1)	ND (4.2) *	47	47
	10/05/08	11 - 12	N	ND (2.1) *	6.8	50	ND (2.1) *	ND (1)	36	ND (0.416)	11	26	3.5	ND (0.1) *	ND (2.1) *	26	ND (1)	ND (2.1)	ND (4.1) *	43	42
	10/05/08	13 - 14	N	ND (2.1) *	4.9	92	ND (1) *	ND (1)	27	ND (0.422)	11	13	3.5	ND (0.1) *	ND (1)	20	ND (1)	ND (1)	ND (2.1)	40	52

TABLE C1-3

Sample Results: Metals

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
SWMU1-WP-5h	10/07/08	0 - 0.5	N	ND (2.2) J*	3.4	73	ND (1.1) *	ND (1.1) *	14	ND (0.43)	12	12	2.7	ND (0.11) *	ND (1.1)	9.5	ND (1.1)	ND (1.1)	ND (2.2)	23	31
	10/07/08[6]	2 - 3	N	ND (2.1) *	5.3	130	ND (2.1) *	ND (1.1) *	33	ND (0.435)	8.7	12	4.9	ND (0.11) *	ND (2.1) *	14	ND (1.1)	ND (2.1)	ND (4.3) *	31	46
	10/07/08	5	N	ND (2.1) *	3.2	110	ND (1) *	ND (1)	23	ND (0.415)	8.5	11	3.3	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2.1)	33	40
SWMU1-WP-6a	10/05/08	0 - 0.5	N	ND (2) *	2.9	100	ND (1) *	ND (1)	32	ND (0.405)	9.3	10	7.2	ND (0.1) *	2.5	15	ND (1)	ND (1)	ND (2)	30	35
	10/05/08	2 - 3	N	ND (2) *	2.3	81	ND (1) *	ND (1)	19	ND (0.404)	8.8 J	10	2.3	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	34	35
	10/05/08	2 - 3	FD	ND (2) *	2.4	82	ND (1) *	ND (1)	19	ND (0.403)	11 J	9.2	2.2	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	34	33
	10/05/08	5 - 6	N	ND (2.1) *	6.2	180	ND (2.1) *	ND (1)	41	ND (0.413)	12	19	3.2	ND (0.1) *	ND (2.1) *	27	ND (1)	ND (2.1)	ND (4.1) *	43	44
	10/05/08	7 - 8	N	ND (2.1) *	6	66	ND (2.1) *	ND (1)	35	ND (0.414)	10	18	3.5	ND (0.1) *	ND (2.1) *	24	ND (1)	ND (2.1)	ND (4.1) *	40	38
	10/05/08	9 - 10	N	ND (2) *	11	98	ND (5.1) *	ND (1)	26	ND (0.412)	11	14	2.4	ND (0.1) *	ND (5.1) *	19	ND (1)	ND (5.1)	ND (10) *	40	39
	10/05/08	11 - 12	N	ND (2) *	4.3	71	ND (1) *	ND (1)	51	ND (0.411)	10	17	3.1	ND (0.1) *	3.6	22	ND (1)	ND (1)	ND (2)	38	35
	10/05/08	13 - 14	N	ND (2) *	6.7	110	ND (2) *	ND (1)	60	ND (0.41)	14	15	3.6	ND (0.1) *	ND (2) *	43	ND (1)	ND (2)	ND (4.1) *	55	43
SWMU1-WP-6h	10/06/08[6]	0 - 0.5	N	ND (2) *	4.7	150	ND (2) *	ND (1)	130	4.98	8.8	15	5.5	ND (0.1) *	ND (2) *	17	ND (1)	ND (2)	ND (4.1) *	37	87
	10/06/08	2 - 3	N	ND (2.1) *	5.5	70	ND (1) *	ND (1)	23	0.538	19	61	6.6	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	36	34
	10/06/08	5 - 6	N	ND (2) *	2.7	100	ND (1) *	ND (1)	19	ND (0.406)	8	10	2.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	34	36
	10/06/08	5 - 6	FD	ND (2) *	2.7	100	ND (1) *	ND (1)	20	ND (0.405)	8.1	12	2.3	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	32	37
	10/06/08	9 - 10	N	ND (2.1) *	4.1	100	ND (1.1) *	ND (1.1) *	41	ND (0.409)	9.4	23	3.5	ND (0.11) *	ND (1.1)	27	ND (1.1)	ND (1.1)	ND (2.1)	36	39
SWMU1-WP-7	10/06/08	0 - 0.5	N	ND (2.1) *	ND (5.3)	160	ND (5.3) *	ND (1.1) *	2,600	0.566	7.2	11	13	ND (0.11) *	7.1	15	ND (1.1)	ND (5.3) *	ND (11) *	35	88
	10/06/08[6]	2 - 3	N	ND (2.2) *	6	190	ND (2.2) *	ND (1.1) *	1,200	18.2	7.4	16	5.7	ND (0.11) *	3.4	17	ND (1.1)	ND (2.2)	ND (4.4) *	35	56
	10/06/08	5 - 6	N	ND (2.1) *	3	110	ND (1) *	ND (1)	21	6.17	8	11	2.7	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2.1)	31	34
	10/06/08	9 - 10	N	ND (2.1) *	3	82	ND (1) *	ND (1)	23	ND (0.417)	7.2	15	2.7	ND (0.11) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	30	31
SWMU1-WP-8	10/06/08	0 - 0.5	N	ND (2) *	5.4	150	ND (2) *	ND (1)	35	ND (0.402)	7.5	13	6.9	ND (0.1) *	ND (2) *	16	ND (1)	ND (2)	ND (4.1) *	31	47
	10/06/08	2 - 3	N	ND (2.1) *	5.1	160	ND (2.1) *	ND (1.1) *	26	0.541	7.9	10	4.1	ND (0.1) *	ND (2.1) *	17	ND (1.1)	ND (2.1)	ND (4.2) *	32	32
	10/06/08	5 - 6	N	ND (2) *	2.7	130	ND (1) *	ND (1)	19	ND (0.407)	8.3	10	2.7	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	34	38
	10/06/08	9 - 10	N	ND (2) J*	2.9	120	ND (1) *	ND (1)	22	ND (0.411)	7.9	9.8	2.6	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	38	38
SWMU1-WP-9	09/21/08	0 - 0.5	N	ND (2) *	2.4	100	ND (1) *	ND (1)	26	ND (0.406)	7.6	8.2	2.9	ND (0.1) *	2.1	12	ND (1)	ND (1)	ND (2)	30	33
	09/21/08	2 - 3	N	ND (2) *	2.7	150 J	ND (1) *	ND (1)	34 J	ND (0.407)	9.5 J	15	2.3	ND (0.1) *	1.2	20 J	2.5	ND (1)	ND (2)	35	34
	09/21/08	2 - 3	FD	ND (2.1) *	2.1	1,900 J	ND (1) *	ND (1)	20 J	ND (0.409)	5.9 J	10	2.7	ND (0.1) *	ND (1)	12 J	ND (1)	ND (1)	ND (2.1)	32	34
	09/21/08	5 - 6	N	ND (2) *	4.2	75	ND (2) *	ND (1)	39	ND (0.416)	13	15	3.2	ND (0.1) *	ND (2) *	26	1.3	ND (2)	ND (4.1) *	49	43
	09/21/08	7 - 8	N	ND (2.1) *	4.8	58	ND (2.1) *	ND (1)	28	ND (0.416)	10	14	3.5	ND (0.1) *	ND (2.1) *	20	ND (1)	ND (2.1)	ND (4.1) *	39	45
	09/21/08	9 - 10	N	ND (2) *	4.7	77	ND (2) *	ND (1)	37	ND (0.411)	12	15	3.3	ND (0.1) *	ND (2) *	28	ND (1)	ND (2)	ND (4.1) *	43	43
	09/21/08	11 - 12	N	ND (2.1) *	7.1	88	ND (5.2) *	ND (1)	68	ND (0.422)	16	23	4	ND (0.11) *	ND (5.2) *	51	ND (1)	ND (5.2) *	ND (10) *	56	56
	09/21/08	13 - 14	N	ND (2.1) *	5.3	91	ND (2.1) *	ND (1)	60	ND (0.423)	15	22	4.9	ND (0.11) *	ND (2.1) *	46	ND (1)	ND (2.1)	ND (4.2) *	56	52
SWMU1-WP-10	10/05/08	0 - 0.5	N	ND (2.1) *	4.4	150	ND (2.1) *	ND (1)	540	6.64	7.1	11	8.3	ND (0.1) *	ND (2.1) *	15	ND (1)	ND (2.1)	ND (4.1) *	32	56
	10/05/08[6]	2 - 3	N	ND (2.1) *	5.3	180	ND (5.2) *	ND (1)	1,400	3.85	8.8	18	10	ND (0.1) *	ND (5.2) *	16	ND (1)	ND (5.2) *	ND (10) *	39	360
	10/05/08	5 - 6	N	ND (2.1) *	5.5	81	ND (2.1) *	ND (1.1) *	50	0.494 J	8	12	3.6	ND (0.11) *	ND (2.1) *	15	ND (1.1)	ND (2.1)	ND (4.3) *	33	53
	10/05/08	9 - 10	N	ND (2.1) *	4.8	110	ND (2.1) *	ND (1.1) *	250	2.31	9.4	11	5.4	ND (0.11) *	ND (2.1) *	18	ND (1.1)	ND (2.1)	ND (4.2) *	33	83
SWMU1-WP-T3a	10/05/08	0 - 0.5	N	ND (2) J*	2.6	110	ND (1) *	ND (1)	25	ND (0.41)	10	11	2.8	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	38	39
	10/05/08	2 - 3	N	ND (2) *	2	92	ND (1) *	ND (1)	18	ND (0.411)	9.2	12	2.9	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	32	35
	10/05/08	5 - 6	N	ND (2.1) *	4.1	82	ND (1.1) *	ND (1.1) *	26	ND (0.431)	11	16	3.4	ND (0.11) *	ND (1.1)	19	ND (1.1)	ND (1.1)	ND (2.1)	38	40
	10/05/08	5 - 6	FD	ND (2.1) *	4.2	80	ND (1.1) *	ND (1.1) *	26	ND (0.438)	10	15	3.7	ND (0.11) *	1.1	19	ND (1.1)	ND (1.1)	ND (2.1)	38	39
	10/05/08	7 - 8	N	ND (2.1) *	6.1	86	ND (2.1) *	ND (1.1) *	38	ND (0.429)	12	19	4.4	ND (0.11) *	ND (2.1) *	28	ND (1.1)	ND (2.1)	ND (4.3) *	43	44
	10/05/08	9 - 10	N	ND (2) *	5.1	140	ND (2) *	ND (1)	71	ND (0.406)	13	20	3.4	ND (0.1) *	6.4	29	ND (1)	ND (2)	ND (4.1) *	44	42
	10/05/08	11 - 12	N	ND (2.1) *	7.1	92	ND (2.1) *	ND (1)	50	ND (0.42)	15	17	4.5	ND (0.1) *	ND (2.1) *	38	ND (1)	ND (2.1)	ND (4.2) *	54	42
	10/05/08	13 - 14	N	ND (2.1) *	11	100	ND (5.3) *	ND (1.1) *	62	ND (0.424)	14	30	3.8	ND (0.11) *	ND (5.3) *	45	ND (1.1)	ND (5.3) *	ND (11) *	53	51

TABLE C1-3

Sample Results: Metals

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
SSB-2	06/30/97	1	N	---	---	---	---	---	48.7	ND (0.05)	---	7.4	---	---	---	7.9	---	---	---	---	27.3
	06/30/97	3	N	---	---	---	---	---	7.6	ND (0.05)	---	6.8	---	---	---	5.7	---	---	---	---	20.4
	06/30/97	6	N	---	---	---	---	---	10.1	ND (0.05)	---	9.4	---	---	---	7.9	---	---	---	---	27
	06/30/97	10	N	---	---	46.4	---	---	9.7	ND (0.05)	---	11	3.1	---	ND (0.2)	11.7	---	---	---	20.2	27.3
SSB-3	06/30/97	1	N	---	---	---	---	---	8.2	ND (0.05)	---	4.3	---	---	---	6	---	---	---	---	13.7
	06/30/97	3	N	---	---	---	---	---	13.2	ND (0.05)	---	9.5	---	---	---	10.4	---	---	---	---	21.4
	06/30/97	6	N	---	---	---	---	---	23.5	ND (0.05)	---	13.7	---	---	---	16.4	---	---	---	---	27.1
	06/30/97	10	N	---	---	70	---	---	7.1	ND (0.05)	---	13.4	2.3	---	ND (0.2)	7.7	---	---	---	15.5	19.2
SSB-4	06/30/97	1	N	---	---	---	---	---	10.1	ND (0.05)	---	3	---	---	---	3.9	---	---	---	---	11.9
	06/30/97	3	N	---	---	---	---	---	1,520	ND (0.05)	---	10.3	---	---	---	5.4	---	---	---	---	141
	06/30/97	6	N	---	---	---	---	---	297	ND (0.05)	---	12.4	---	---	---	6.9	---	---	---	---	130
	06/30/97	10	N	---	---	93.9	---	---	201	ND (0.05)	---	11.9	2.1	---	ND (0.2)	7.4	---	---	---	19.3	188
SSB-5	06/30/97	1	N	---	---	---	---	---	521	0.06	---	13.5	---	---	---	7.8	---	---	---	---	39.6
	06/30/97	3	N	---	---	---	---	---	1,440	ND (0.05)	---	16	---	---	---	4.2	---	---	---	---	128
	06/30/97	6	N	---	---	---	---	---	617	ND (0.05)	---	14.9	---	---	---	6.4	---	---	---	---	115
	06/30/97	10	N	---	---	89.6	---	---	31.6	ND (0.05)	---	7	1.75	---	ND (0.2)	7.7	---	---	---	18.7	107
WP-1	06/30/97	0	N	---	---	---	---	---	2,090	47.5	---	3.9	---	---	---	3.6	---	---	---	---	44.5
WP-2	09/18/97	0	N	---	---	---	---	---	25.9	ND (0.5)	---	22.8	---	---	---	9.9	---	---	---	---	80.1
WP-3	09/18/97	0.5	N	---	---	---	---	---	1,290	11.8	---	13.2	---	---	---	5.6	---	---	---	---	50.3
	09/18/97	2	N	---	---	---	---	---	273	0.41	---	18.6	---	---	---	18.3	---	---	---	---	50
WP-4	09/18/97	0	N	---	---	---	---	---	120	1.14	---	10.8	---	---	---	4	---	---	---	---	65.6
WP-5	09/18/97	0	N	---	---	---	---	---	511	3.51	---	16.8	---	---	---	13.2	---	---	---	---	50.4
	09/18/97	1	N	---	---	---	---	---	711	6.66	---	15.4	---	---	---	10.2	---	---	---	---	61.5
	09/18/97	2	N	---	---	---	---	---	421	8.97	---	15.8	---	---	---	12.9	---	---	---	---	51.9
	09/18/97	3	N	---	---	---	---	---	158	6.1	---	10.1	---	---	---	4.5	---	---	---	---	22.9
	09/18/97	4	N	---	---	---	---	---	113	10.2	---	24.4	---	---	---	20.6	---	---	---	---	41.9
WP-6	09/18/97	0	N	---	---	---	---	---	712	1.64	---	21.6	---	---	---	12.4	---	---	---	---	57.9
	09/18/97	1	N	---	---	---	---	---	1,030	9.46	---	18.2	---	---	---	5.8	---	---	---	---	46.5
	09/18/97	2	N	---	---	---	---	---	401	2.29	---	11.9	---	---	---	10.5	---	---	---	---	210
WP-BANK 1	11/23/98	0	N	---	---	---	---	---	261	5.5	---	10.3	---	---	---	3.8	---	---	---	---	23.4
WP-BANK 2	11/23/98	0	N	---	---	---	---	---	909	14	---	27.2	---	---	---	7.9	---	---	---	---	61.8
T-3-B	11/13/98	0	N	---	---	---	---	---	619	3.1	---	19.6	---	---	---	7.9	---	---	---	---	673
P-2Soil	11/13/98	3.5	N	---	---	---	---	---	33.2	ND (0.76)	---	6	---	---	---	5.6	---	---	---	---	6.4

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] white powder sample.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C1-4

Sample Results: Contract Laboratory Program Inorganics

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
MW-9	07/01/97	10	N	---	---	11,400	---	190	---	---	---
	07/01/97	30	N	---	---	13,100	---	192	---	---	---
	07/01/97	50	N	---	---	9,580	---	139	---	---	---
	07/01/97	87	N	---	---	16,500	---	526	---	---	---
SWMU1-1	10/16/08	0 - 0.5	N	9,200	17,000	25,000	7,100	270	2,700	310	ND (1.03) *
SWMU1-3	10/06/08	0 - 0.5	N	8,100	16,000	21,000	6,400	250	2,500	ND (260)	ND (1.01) *
SWMU1-4	10/15/08	0 - 0.5	N	5,900	13,000	21,000	4,900	200	1,700	190	ND (1) *
SWMU1-9	10/14/08	0 - 0.5	N	9,400	19,000	20,000	7,600	260	2,800	270	ND (1.1) *
SWMU1-11	10/15/08	0 - 0.5	N	12,000	23,000	18,000	8,100	240	2,300	600	ND (1.06) *
SWMU1-13	10/14/08	0 - 0.5	N	7,900	15,000	21,000	6,500	270	2,500	220	ND (1.02) *
SWMU1-15	09/22/08	0 - 0.5	N	8,800	22,000	20,000 J	6,900 J	280 J	2,800 J	340	ND (1.03) *
SWMU1-17	09/21/08	0 - 0.5	N	12,000	22,000	23,000	9,700	340	4,900	580	ND (1.01) *
SWMU1-WP-1h	10/07/08	0 - 0.5	N	11,000	16,000	17,000	7,300	210	2,400	500	ND (1.04) *
SWMU1-WP-3a	10/14/08	0 - 0.5	N	8,700	15,000	18,000	6,600	270	2,800	290	ND (1.05) *
SWMU1-WP-5a	10/05/08	0 - 0.5	N	7,900	14,000	23,000 J	6,800	280	2,800 J	ND (280)	ND (1.01) *
SWMU1-WP-5h	10/07/08	0 - 0.5	N	8,500	21,000	17,000	6,300	220	2,300 J	310	ND (1.08) *
SWMU1-WP-6a	10/05/08	0 - 0.5	N	9,600	16,000	19,000	8,600	270	3,000	ND (370)	ND (1.01) *
SWMU1-WP-6h	10/06/08[6]	0 - 0.5	N	11,000	37,000	21,000	10,000	280	3,200	ND (690)	ND (1.03) *
SWMU1-WP-7	10/06/08	0 - 0.5	N	9,700	70,000	25,000	12,000	250	2,600	ND (1,000)	ND (1.07) *
SWMU1-WP-8	10/06/08	0 - 0.5	N	8,400	24,000	17,000	6,800	230	2,400	ND (320)	ND (1.01) *
SWMU1-WP-T3a	10/05/08	0 - 0.5	N	8,400	17,000	24,000 J	8,000 J	280	2,900 J	ND (330)	ND (1.03) *
SSB-2	06/30/97	10	N	---	---	9,600	---	150	---	---	---
SSB-3	06/30/97	10	N	---	---	7,220	---	114	---	---	---
SSB-4	06/30/97	10	N	---	---	11,600	---	161	---	---	---

TABLE C1-4

Sample Results: Contract Laboratory Program Inorganics
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
SSB-5	06/30/97	10	N	---	---	9,870	---	139	---	---	---
WP-BANK 1	11/23/98	0	N	---	280,000	4,760	12,000	67.4	1,040	1,800	---
WP-BANK 2	11/23/98	0	N	---	173,000	11,300	14,300	139	1,680	1,650	---
P-2Soil	11/13/98	3.5	N	---	255,000 J	6,790 J	14,700 J	112 J	1,520 J	1,540 J	---

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] white powder sample.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C1-5

Sample Results: Polycyclic Aromatic Hydrocarbons

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				22,000	310,000	1,700,000	3,400,000	17,000,000	380	38	380	1,700,000	380	3,800	110	2,300,000	2,300,000	380	3,600	1,700,000	1,700,000	10,000	1,160	38
Residential Regional Screening Levels[2] :				22,000	310,000	1,700,000	3,400,000	17,000,000	380	15	380	1,700,000	380	3,800	110	2,300,000	2,300,000	380	3,600	1,700,000	1,700,000	NE	NE	15
Residential DTSC CHHSL[3] :				NE	NE	NE	NE	NE	NE	38	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	38
Ecological Comparison Values[4] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	10,000	1,160	NE
Background[5] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
SWMU1-1	10/16/08	0 - 0.5	N	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND (6)	ND	ND	ND (5.3)
	10/16/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	8.7	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	7.5	ND	16	4.5
	10/16/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.1)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/16/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-2	10/15/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/15/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/15/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/15/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-3	10/06/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/06/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/06/08	2 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/06/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/06/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/06/08	19 - 20	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/06/08	29 - 30	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/06/08	39 - 40	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/06/08	49 - 50	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.8)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/06/08	59 - 60	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/07/08	69 - 70	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/07/08	79 - 80	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND	ND	ND (4.9)
	10/07/08	79 - 80	FD	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (4.8)	ND (5.7)	ND (5.7)	ND	ND	ND (5)
SWMU1-4	10/15/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/15/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/15/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.6)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	7 - 8	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.8)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.6)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	13 - 14	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.7)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-5	10/15/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	13 - 14	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.7)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	13 - 14	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	15 - 16	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.7)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/15/08	19 - 20	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
SWMU1-6	10/15/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/15/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/15/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/15/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C1-5

Sample Results: Polycyclic Aromatic Hydrocarbons

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level^{1} :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels^{2} :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL^{3} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values^{4} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background^{5} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
SWMU1-7	10/15/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.3	6.4	8.5	11	6.8	7.5	ND (5)	12	ND (5)	8.9	ND (5)	6.7	9.2	6.7	76	10
	10/15/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/15/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/15/08	9 - 10	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.9)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
SWMU1-8	10/15/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/15/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.1)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/15/08	9 - 10	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
SWMU1-9	10/14/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	2 - 3	N	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (26)	ND (6.2)	ND (26)	ND (26)	ND	ND	ND (23)
	10/14/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.8)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
SWMU1-10	10/14/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/14/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/14/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	5 - 6	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/14/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
SWMU1-11	10/15/08	0 - 0.5	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	7.2	5.4	10	ND (5.3)	7.4	8.3	ND (5.3)	14	ND (5.3)	ND (5.3)	ND (5.3)	5.3	12	5.3	64	9.1
	10/15/08	2 - 3	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	19	14	22	6.5	17	25	ND (5.3)	49	ND (5.3)	6.7	9.7	47	36	57	200	22
	10/15/08	5 - 6	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.7)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/15/08	9 - 10	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
SWMU1-12	10/14/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/14/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/14/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/14/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-13	10/14/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.3	ND (5.1)	7	ND (5.1)	6.3	5.7	ND (5.1)	12	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	11	ND	47	5.6
	10/14/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/14/08	2 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/14/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
SWMU1-14	10/14/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/14/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/14/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/14/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)

TABLE C1-5

Sample Results: Polycyclic Aromatic Hydrocarbons

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
SWMU1-15	09/22/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	10	ND (5.1)	ND (5.1)	ND (5.1)	5.3	8.2	5.3	18	4.5
	09/22/08	2 - 3	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/22/08	5 - 6	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/22/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/22/08	9 - 10	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/22/08	19 - 20	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/22/08	29 - 30	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/22/08	39 - 40	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/22/08	49 - 50	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	09/22/08	59 - 60	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/22/08	59 - 60	FD	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/22/08	69 - 70	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/22/08	79 - 80	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/23/08	89 - 90	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
SWMU1-16	09/21/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
SWMU1-17	09/21/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/21/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	9 - 10	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
SWMU1-WP-1h	10/07/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/07/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/07/08	5 - 6	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/07/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-WP-3a	10/14/08	0 - 0.5	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	5.7	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	5.7	4.6
	10/14/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.6)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	5 - 6	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/14/08	7 - 8	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	9 - 10	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	11 - 12	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/14/08	13 - 14	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.2)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)

TABLE C1-5

Sample Results: Polycyclic Aromatic Hydrocarbons

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acenaphthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
SWMU1-WP-3h	10/07/08	0 - 0.5	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/07/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/07/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
SWMU1-WP-5a	10/05/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/05/08	5 - 6	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/05/08	7 - 8	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/05/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.8)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/05/08	11 - 12	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/05/08	13 - 14	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-WP-5h	10/07/08	0 - 0.5	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/07/08[6]	2 - 3	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/07/08	5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-WP-6a	10/05/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	2 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.9)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	7 - 8	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/05/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	11 - 12	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.7)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	13 - 14	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
SWMU1-WP-6h	10/06/08[6]	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/06/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.7)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/06/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/06/08	5 - 6	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/06/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
SWMU1-WP-7	10/06/08	0 - 0.5	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	17	12	17	10	17	22	ND (5.4)	440	ND (5.4)	9.2	ND (5.4)	12	360	12	900	19
	10/06/08[6]	2 - 3	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND	ND	ND (4.8)
	10/06/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/06/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-WP-8	10/06/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.4	8.9	9.2	9	10	10	ND (5.1)	16	ND (5.1)	7.7	ND (5.1)	ND (5.1)	16	ND	93	13
	10/06/08	2 - 3	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (3.8)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/06/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.2)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/06/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C1-5

Sample Results: Polycyclic Aromatic Hydrocarbons

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
SWMU1-WP-9	09/21/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	2 - 3	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/21/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.6)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	7 - 8	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/21/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	11 - 12	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/21/08	13 - 14	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
SWMU1-WP-10	10/05/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	15	15	19	11	20	19	ND (5.2)	24	ND (5.2)	10	ND (5.2)	5.9	22	5.9	160	22
	10/05/08[6]	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	5.9	8	6	8.5	8.5	ND (5.2)	12	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	11	ND	60	9
	10/05/08	5 - 6	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/05/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	5.4	6.1	ND (5.3)	9.4	ND (5.3)	ND (5.3)	16	ND (5.3)	8.5	16	29	4.9
SWMU1-WP-T3a	10/05/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	5 - 6	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/05/08	5 - 6	FD	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.9)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/05/08	7 - 8	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/05/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/05/08	9 - 10	FD	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (5)	---	---	ND	---	ND
	10/05/08	11 - 12	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/05/08	13 - 14	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)

TABLE C1-5

Sample Results: Polycyclic Aromatic Hydrocarbons

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] white powder sample.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			General Chemistry									
							mg/kg	mg/kg	meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level ^{1} :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels ^{2} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL ^{3} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels ^{4} :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values ^{5} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background ^{6} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
MW-9	06/30/97	1	N	---	---	---	---	---	---	---	---	8.96	---	---	---	---
	06/30/97	3.5	N	---	---	---	---	---	---	---	---	9.66	---	---	---	---
	06/30/97	3.5	FD	---	---	---	---	---	---	---	---	10.08	---	---	---	---
	06/30/97	6	N	---	---	---	---	---	---	---	---	9.58	---	---	---	---
	07/01/97	10	N	---	---	---	---	---	---	124	305	9.5	---	ND (0.4)	300	---
	06/30/97	20	N	---	---	---	---	---	16.8	---	---	9.64	---	---	---	---
	07/01/97	30	N	---	---	---	---	---	---	118	276	8.79	---	ND (0.4)	310	---
	06/30/97	40	N	---	---	---	---	---	11.5	---	---	8.57	---	---	---	---
	07/01/97	50	N	---	---	---	---	---	---	121	311	8.65	---	ND (0.4)	ND (100)	---
	06/30/97	60	N	---	---	---	---	---	12.4	---	---	8.29	---	---	---	---
	06/30/97	70	N	---	---	---	---	---	---	---	---	8.74	---	---	---	---
	07/01/97	87	N	---	---	---	---	---	4.9	122	297	8.66	---	ND (0.4)	200	---
	07/01/97	87	FD	---	---	---	---	---	---	---	---	8.42	---	---	---	---
SWMU1-1	10/16/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.94	---	---	---	---
	10/16/08	2 - 3	N	ND (1)	ND (10)	10	---	---	---	---	---	9.4	---	---	---	---
	10/16/08	5 - 6	N	ND (1)	ND (10)	25.9	---	---	---	---	---	8.38	---	---	---	---
	10/16/08	9 - 10	N	ND (0.98)	ND (10)	ND (10)	---	---	---	---	---	9.36	---	---	---	---
SWMU1-2	10/15/08	0 - 0.5	N	---	12.4	13.1	---	---	---	---	---	8.68	---	---	---	---
	10/15/08	2 - 3	N	ND (0.98)	ND (10)	12.6	---	---	---	---	---	9.01	---	---	---	---
	10/15/08	5 - 6	N	ND (0.92)	ND (10)	15	---	---	---	---	---	9.04	---	---	---	---
	10/15/08	9 - 10	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	8.41	---	---	---	---

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			General Chemistry									
							mg/kg	mg/kg	meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level 1 :				540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels 2 :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL 3 :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels 4 :				540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values 5 :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background 6 :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
SWMU1-3	10/06/08	0 - 0.5	N	---	ND (10)	30.4	---	---	---	---	---	8.37	---	---	---	---
	10/06/08	2 - 3	N	ND (0.96)	ND (10)	ND (10)	---	---	---	---	---	8.44	---	---	---	---
	10/06/08	2 - 3	FD	ND (1)	ND (10)	ND (10)	---	---	---	---	---	8.85	---	---	---	---
	10/06/08	5 - 6	N	ND (0.89)	ND (10)	49.7	---	---	---	---	---	8.36	---	---	---	---
	10/06/08	9 - 10	N	ND (1.1)	ND (10)	14.9	---	---	---	---	---	9.2	---	---	---	---
	10/06/08	19 - 20	N	ND (0.96)	ND (10)	ND (10)	---	---	---	---	---	9.45	---	---	---	---
	10/06/08	29 - 30	N	ND (0.98)	ND (10)	ND (10)	---	---	---	---	---	9.5	---	---	---	---
	10/06/08	39 - 40	N	ND (0.9)	ND (10)	ND (10)	---	---	---	---	---	9.36	---	---	---	---
	10/06/08	49 - 50	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	9.35	---	---	---	---
	10/06/08	59 - 60	N	ND (1)	ND (10)	12.9	---	---	---	---	---	9.3	---	---	---	---
	10/07/08	69 - 70	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.01	---	---	---	---
	10/07/08	79 - 80	N	ND (0.88)	ND (10)	ND (10)	---	---	---	---	---	8.04	---	---	---	---
	10/07/08	79 - 80	FD	ND (1.4)	ND (10)	ND (10)	---	---	---	---	---	8.58	---	---	---	---
SWMU1-4	10/15/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.99	---	---	---	---
	10/15/08	2 - 3	N	ND (1.1)	ND (10)	17.6	---	---	---	---	---	8.93	---	---	---	---
	10/15/08	5 - 6	N	ND (0.97)	ND (10)	11.5	---	---	---	---	---	9.08	---	---	---	---
	10/15/08	7 - 8	N	ND (0.99)	ND (10)	ND (10)	---	---	---	---	---	9.19	---	---	---	---
	10/15/08	9 - 10	N	ND (0.88)	ND (10)	ND (10)	---	---	---	---	---	9.25	---	---	---	---
	10/15/08	13 - 14	N	ND (0.97)	ND (10)	ND (10)	---	---	---	---	---	9.6	---	---	---	---
SWMU1-5	10/15/08	9 - 10	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	9.04	---	---	---	---
	10/15/08	13 - 14	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.75	---	---	---	---
	10/15/08	13 - 14	FD	ND (0.9)	ND (10)	ND (10)	---	---	---	---	---	9.51	---	---	---	---
	10/15/08	15 - 16	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.52	---	---	---	---
	10/15/08	19 - 20	N	ND (1.4)	ND (10)	ND (10)	---	---	---	---	---	9.59	---	---	---	---
SWMU1-6	10/15/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.93	---	---	---	---
	10/15/08	2 - 3	N	ND (0.87)	ND (10)	ND (10)	---	---	---	---	---	9.09	---	---	---	---
	10/15/08	5 - 6	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.26	---	---	---	---
	10/15/08	9 - 10	N	ND (0.87)	ND (10)	ND (10)	---	---	---	---	---	9.22	---	---	---	---

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			General Chemistry									
							mg/kg	mg/kg	meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level [1] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
SWMU1-7	10/15/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.6	---	---	---	---
	10/15/08	2 - 3	N	ND (0.89)	ND (10)	13	---	---	---	---	---	9	---	---	---	---
	10/15/08	5 - 6	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	8.78	---	---	---	---
	10/15/08	9 - 10	N	ND (0.92)	ND (10)	ND (10)	---	---	---	---	---	8.95	---	---	---	---
	10/15/08	9 - 10	FD	ND (0.96)	ND (10)	ND (10)	---	---	---	---	---	9.12	---	---	---	---
SWMU1-8	10/15/08	0 - 0.5	N	---	ND (10)	11.7	---	---	---	---	---	8.99	---	---	---	---
	10/15/08	2 - 3	N	ND (1.1)	ND (10)	14.5	---	---	---	---	---	8.87	---	---	---	---
	10/15/08	5 - 6	N	ND (1)	ND (10)	19.4	---	---	---	---	---	8.82	---	---	---	---
	10/15/08	9 - 10	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	10.2	---	---	---	---
SWMU1-9	10/14/08	0 - 0.5	N	---	ND (10)	41.2 J	---	---	---	---	---	8.75	---	---	---	---
	10/14/08	2 - 3	N	ND (1.2)	ND (10)	41.9 J	---	---	---	---	---	9.89	---	---	---	---
	10/14/08	5 - 6	N	ND (1)	ND (10)	20.4 J	---	---	---	---	---	9.72	---	---	---	---
	10/14/08	9 - 10	N	ND (0.92)	ND (10)	11.8 J	---	---	---	---	---	9.59	---	---	---	---
SWMU1-10	10/14/08	0 - 0.5	N	---	10.1	60.8	---	---	---	---	---	8.69	---	---	---	---
	10/14/08	2 - 3	N	ND (0.91) J	ND (10)	10.9	---	---	---	---	---	9.07	---	---	---	---
	10/14/08	5 - 6	N	ND (1.1)	ND (10)	11.9	---	---	---	---	---	10	---	---	---	---
	10/14/08	5 - 6	FD	ND (1.2)	ND (10)	16.1	---	---	---	---	---	9.85	---	---	---	---
	10/14/08	9 - 10	N	ND (1.2)	ND (10)	15.6	---	---	---	---	---	9.67	---	---	---	---
SWMU1-11	10/15/08	0 - 0.5	N	---	ND (10)	17.6	---	---	---	---	---	8.4	---	---	---	---
	10/15/08	2 - 3	N	ND (1.3)	ND (10)	15.7	---	---	---	---	---	8.69	---	---	---	---
	10/15/08	5 - 6	N	ND (0.99)	ND (10)	21.7	---	---	---	---	---	9.63	---	---	---	---
	10/15/08	9 - 10	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	9.66	---	---	---	---
SWMU1-12	10/14/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	9.04	---	---	---	---
	10/14/08	2 - 3	N	ND (1.1)	ND (10)	10.4	---	---	---	---	---	8.98	---	---	---	---
	10/14/08	5 - 6	N	ND (0.93)	ND (10)	ND (10)	---	---	---	---	---	9.53	---	---	---	---
	10/14/08	9 - 10	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.64	---	---	---	---

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry**									
							mg/kg	**mg/kg**	**meq/100g**	**mV**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Interim Screening Level 1 :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels 2 :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL 3 :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels 4 :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values 5 :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background 6 :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
SWMU1-13	10/14/08	0 - 0.5	N	---	12.6	67.3	---	---	---	---	---	8.72	---	---	---	---
	10/14/08	2 - 3	N	ND (1.5)	ND (10)	ND (10)	---	---	---	---	---	8.86	---	---	---	---
	10/14/08	2 - 3	FD	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	8.9	---	---	---	---
	10/14/08	5 - 6	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.82	---	---	---	---
	10/14/08	9 - 10	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.76	---	---	---	---
SWMU1-14	10/14/08	0 - 0.5	N	---	ND (10)	58.4	---	---	---	---	---	8.92	---	---	---	---
	10/14/08	2 - 3	N	ND (0.9)	ND (10)	11.6	---	---	---	---	---	9.07	---	---	---	---
	10/14/08	5 - 6	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	9.97	---	---	---	---
	10/14/08	9 - 10	N	ND (1.3)	ND (10)	10.7	---	---	---	---	---	9.52	---	---	---	---
SWMU1-15	09/22/08	0 - 0.5	N	---	ND (10)	23.7	---	---	---	---	---	8.99	---	---	---	---
	09/22/08	2 - 3	N	ND (0.9)	ND (10)	ND (10)	---	---	---	---	---	9.95	---	---	---	---
	09/22/08	5 - 6	N	ND (1.1)	ND (10)	22.5	---	---	---	---	---	9.84	---	---	---	---
	09/22/08	9 - 10	N	ND (1.2) J	ND (10)	10.3	---	---	---	---	---	9.98	---	---	---	---
	09/22/08	9 - 10	FD	ND (1.1)	ND (10)	19.8	---	---	---	---	---	9.95	---	---	---	---
	09/22/08	19 - 20	N	ND (0.89)	ND (10)	ND (10)	---	---	---	---	---	9.82	---	---	---	---
	09/22/08	29 - 30	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.51	---	---	---	---
	09/22/08	39 - 40	N	ND (0.95)	ND (10)	11.6	---	---	---	---	---	9.39	---	---	---	---
	09/22/08	49 - 50	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.19	---	---	---	---
	09/22/08	59 - 60	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.22	---	---	---	---
	09/22/08	59 - 60	FD	ND (1.4)	ND (10)	ND (10)	---	---	---	---	---	9.07	---	---	---	---
	09/22/08	69 - 70	N	ND (1.3)	ND (10)	11.2	---	---	---	---	---	8.82	---	---	---	---
	09/22/08	79 - 80	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	8.7	---	---	---	---
	09/23/08	89 - 90	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.57	---	---	---	---
SWMU1-16	09/21/08	0 - 0.5	N	---	ND (10)	19.2 J	---	---	---	---	---	8.87	---	---	---	---
	09/21/08	2 - 3	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.23	---	---	---	---
	09/21/08	5 - 6	N	ND (0.98)	14.5 J	33.8 J	---	---	---	---	---	9.14	---	---	---	---

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			General Chemistry									
							mg/kg	mg/kg	meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level [1] :				540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels [2] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL [3] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels [4] :				540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values [5] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background [6] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
SWMU1-17	09/21/08	0 - 0.5	N	---	ND (10)	150 J	---	---	---	---	---	8.88	---	---	---	---
	09/21/08	2 - 3	N	ND (1.2) J	ND (10)	ND (10)	---	---	---	---	---	9.15	---	---	---	---
	09/21/08	5 - 6	N	ND (1)	ND (10)	27.2 J	---	---	---	---	---	9.71	---	---	---	---
	09/21/08	9 - 10	N	---	ND (10)	ND (10)	---	---	---	---	---	9.78	---	---	---	---
	09/21/08	9 - 10	FD	ND (1.5)	ND (10)	ND (10)	---	---	---	---	---	9.64	---	---	---	---
SWMU1-WP-1h	10/07/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.96	---	---	---	---
	10/07/08	2 - 3	N	ND (0.79)	ND (10)	ND (10)	---	---	---	---	---	9.37	---	---	---	---
	10/07/08	5 - 6	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.28	---	---	---	---
	10/07/08	9 - 10	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.22	---	---	---	---
SWMU1-WP-3a	10/14/08	0 - 0.5	N	---	17.8	86 J	---	---	---	---	---	8.68	---	---	---	---
	10/14/08	2 - 3	N	ND (0.95)	ND (10)	14.9 J	---	---	---	---	---	9.8	---	---	---	---
	10/14/08	5 - 6	N	ND (0.96)	ND (10) J	18.5 J	---	---	---	---	---	10	---	---	---	---
	10/14/08	7 - 8	N	ND (1.2)	ND (10)	11.6 J	---	---	---	---	---	9.59	---	---	---	---
	10/14/08	9 - 10	N	ND (1.2)	ND (10)	13.3 J	---	---	---	---	---	9.65	---	---	---	---
	10/14/08	9 - 10	FD	ND (1.1)	ND (10)	12.5 J	---	---	---	---	---	9.55	---	---	---	---
	10/14/08	11 - 12	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.64	---	---	---	---
	10/14/08	13 - 14	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.6	---	---	---	---
SWMU1-WP-3h	10/07/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.17	---	---	---	---
	10/07/08	2 - 3	N	ND (1.5)	ND (10)	ND (10)	---	---	---	---	---	9.44	---	---	---	---
	10/07/08	5 - 6	N	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.53	---	---	---	---
SWMU1-WP-5a	10/05/08	0 - 0.5	N	---	16.2	168	---	---	---	---	---	9.2	---	---	---	---
	10/05/08	2 - 3	N	ND (1.1)	ND (10)	16.2	---	---	---	---	---	9.32	---	---	---	---
	10/05/08	5 - 6	N	ND (1.2)	ND (10)	38.7	---	---	---	---	---	9.92	---	---	---	---
	10/05/08	5 - 6	FD	ND (0.98)	ND (10)	47.4	---	---	---	---	---	10.2	---	---	---	---
	10/05/08	7 - 8	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.64	---	---	---	---
	10/05/08	9 - 10	N	ND (52)	ND (10)	ND (10)	---	---	---	---	---	9.47	---	---	---	---
	10/05/08	11 - 12	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.67	---	---	---	---
	10/05/08	13 - 14	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	9.71	---	---	---	---

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry**									
							mg/kg	**mg/kg**	**meq/100g**	**mV**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Interim Screening Level [1] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
SWMU1-WP-5h	10/07/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.46	---	---	---	---
	10/07/08 [7]	2 - 3	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.71	---	---	---	---
	10/07/08	5	N	ND (1.5)	ND (10)	ND (10)	---	---	---	---	---	9.55	---	---	---	---
SWMU1-WP-6a	10/05/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	9.1	---	---	---	---
	10/05/08	2 - 3	N	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	9.28	---	---	---	---
	10/05/08	2 - 3	FD	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.16	---	---	---	---
	10/05/08	5 - 6	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.52	---	---	---	---
	10/05/08	7 - 8	N	ND (0.91)	ND (10)	ND (10)	---	---	---	---	---	9.86	---	---	---	---
	10/05/08	9 - 10	N	ND (0.87)	ND (10)	ND (10)	---	---	---	---	---	9.57	---	---	---	---
	10/05/08	11 - 12	N	ND (0.94)	ND (10)	ND (10)	---	---	---	---	---	9.54	---	---	---	---
	10/05/08	13 - 14	N	ND (0.96)	ND (10)	ND (10)	---	---	---	---	---	9.54	---	---	---	---
SWMU1-WP-6h	10/06/08 [7]	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	9.03	---	---	---	---
	10/06/08	2 - 3	N	ND (0.8)	ND (10)	ND (10)	---	---	---	---	---	9.09	---	---	---	---
	10/06/08	5 - 6	N	ND (0.86)	ND (10)	ND (10)	---	---	---	---	---	9.55	---	---	---	---
	10/06/08	5 - 6	FD	ND (1)	ND (10)	ND (10)	---	---	---	---	---	9.66	---	---	---	---
	10/06/08	9 - 10	N	ND (0.91)	ND (10)	ND (10)	---	---	---	---	---	9.63	---	---	---	---
SWMU1-WP-7	10/06/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	9.36	---	---	---	---
	10/06/08 [7]	2 - 3	N	ND (1.8)	ND (10)	ND (10)	---	---	---	---	---	9.39	---	---	---	---
	10/06/08	5 - 6	N	ND (0.99)	ND (10)	ND (10)	---	---	---	---	---	9.42	---	---	---	---
	10/06/08	9 - 10	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.87	---	---	---	---
SWMU1-WP-8	10/06/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	8.98	---	---	---	---
	10/06/08	2 - 3	N	ND (0.82)	ND (10)	ND (10)	---	---	---	---	---	9.5	---	---	---	---
	10/06/08	5 - 6	N	ND (0.93)	ND (10)	ND (10)	---	---	---	---	---	9.1	---	---	---	---
	10/06/08	9 - 10	N	ND (1.5)	ND (10)	ND (10)	---	---	---	---	---	8.96	---	---	---	---

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry**									
							mg/kg	**mg/kg**	**meq/100g**	**mV**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Interim Screening Level [1] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
SWMU1-WP-9	09/21/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	9.02	---	---	---	---
	09/21/08	2 - 3	N	ND (0.98)	ND (10)	ND (10)	---	---	---	---	---	9.58	---	---	---	---
	09/21/08	2 - 3	FD	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	8.84	---	---	---	---
	09/21/08	5 - 6	N	ND (1.2)	ND (10)	17.4 J	---	---	---	---	---	9.63	---	---	---	---
	09/21/08	7 - 8	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	9.57	---	---	---	---
	09/21/08	9 - 10	N	ND (0.94)	ND (10)	ND (10)	---	---	---	---	---	9.72	---	---	---	---
	09/21/08	11 - 12	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	9.77	---	---	---	---
	09/21/08	13 - 14	N	ND (1.4)	ND (10)	ND (10)	---	---	---	---	---	9.67	---	---	---	---
SWMU1-WP-10	10/05/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	9.1	---	---	---	---
	10/05/08 [7]	2 - 3	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.21	---	---	---	---
	10/05/08	5 - 6	N	ND (1.2) J	ND (10)	ND (10)	---	---	---	---	---	10.2	---	---	---	---
	10/05/08	9 - 10	N	ND (0.93)	ND (10)	ND (10)	---	---	---	---	---	9.81	---	---	---	---
SWMU1-WP-T3a	10/05/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	---	---	---	9.16	---	---	---	---
	10/05/08	2 - 3	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.19	---	---	---	---
	10/05/08	5 - 6	N	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	10	---	---	---	---
	10/05/08	5 - 6	FD	ND (1.2)	ND (10)	ND (10)	---	---	---	---	---	10	---	---	---	---
	10/05/08	7 - 8	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	9.75	---	---	---	---
	10/05/08	9 - 10	N	ND (1.4)	ND (10)	ND (10)	---	---	---	---	---	9.79	---	---	---	---
	10/05/08	9 - 10	FD	ND (1.1)	---	---	---	---	---	---	---	---	---	---	---	---
	10/05/08	11 - 12	N	ND (0.95)	ND (10)	ND (10)	---	---	---	---	---	9.67	---	---	---	---
	10/05/08	13 - 14	N	ND (0.98)	ND (10)	ND (10)	---	---	---	---	---	9.82	---	---	---	---
SSB-2	06/30/97	1	N	---	---	---	---	---	---	---	---	8.66	---	---	---	---
	06/30/97	3	N	---	---	---	---	---	---	---	---	9.07	---	---	---	---
	06/30/97	6	N	---	---	---	---	---	---	---	---	9.37	---	---	---	---
	06/30/97	10	N	---	---	---	---	---	---	103	313	10.49	---	ND (0.4)	490	---
SSB-3	06/30/97	1	N	---	---	---	---	---	---	---	---	8.9	---	---	---	---
	06/30/97	3	N	---	---	---	---	---	---	---	---	8.35	---	---	---	---
	06/30/97	6	N	---	---	---	---	---	---	---	---	9.7	---	---	---	---
	06/30/97	10	N	---	---	---	---	---	---	116	306	9.04	---	ND (0.4)	250	---

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry**									
							mg/kg	**mg/kg**	**meq/100g**	**mV**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Interim Screening Level ^{1} :				540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels ^{2} :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL ^{3} :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels ^{4} :				540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values ^{5} :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background ^{6} :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Chloride**
SSB-4	06/30/97	1	N	---	---	---	---	---	---	---	---	8.86	---	---	---	---
	06/30/97	3	N	---	---	---	---	---	---	---	---	8.24	---	---	---	---
	06/30/97	6	N	---	---	---	---	---	---	---	---	8.77	---	---	---	---
	06/30/97	10	N	---	---	---	---	---	---	120	265	9.42	---	ND (0.4)	110	---
SSB-5	06/30/97	1	N	---	---	---	---	---	---	---	---	8.63	---	---	---	---
	06/30/97	3	N	---	---	---	---	---	---	---	---	8.6	---	---	---	---
	06/30/97	6	N	---	---	---	---	---	---	---	---	8.92	---	---	---	---
	06/30/97	10	N	---	---	---	---	---	---	115	261	9.52	---	ND (0.4)	210	---
WP-1	06/30/97	0	N	---	---	---	---	---	---	---	---	9.08	---	---	---	---
WP-2	09/18/97	0	N	---	---	---	---	---	---	---	---	9.03	---	---	---	---
WP-3	09/18/97	0.5	N	---	---	---	---	---	---	---	---	9.12	---	---	---	---
	09/18/97	2	N	---	---	---	---	---	---	---	---	8.6	---	---	---	---
WP-4	09/18/97	0	N	---	---	---	---	---	---	---	---	8.99	---	---	---	---
WP-5	09/18/97	0	N	---	---	---	---	---	---	---	---	9.01	---	---	---	---
	09/18/97	1	N	---	---	---	---	---	---	---	---	9.15	---	---	---	---
	09/18/97	2	N	---	---	---	---	---	---	---	---	8.56	---	---	---	---
	09/18/97	3	N	---	---	---	---	---	---	---	---	9.09	---	---	---	---
	09/18/97	4	N	---	---	---	---	---	---	---	---	9.1	---	---	---	---
WP-6	09/18/97	0	N	---	---	---	---	---	---	---	---	8.52	---	---	---	---
	09/18/97	1	N	---	---	---	---	---	---	---	---	8.95	---	---	---	---
	09/18/97	2	N	---	---	---	---	---	---	---	---	8.56	---	---	---	---
WP-BANK 1	11/23/98	0	N	---	---	---	22	456	---	---	---	8.25	161	---	---	46
WP-BANK 2	11/23/98	0	N	---	---	---	68	271	---	---	---	8.93	358	---	---	227
T-3-B	11/13/98	0	N	---	---	---	---	---	---	---	---	8.67	---	---	---	---
P-2Soil	11/13/98	3.5	N	---	---	---	200	639	---	---	---	9.01	8.8	---	---	34

TABLE C1-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

[1] Interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[7] White powder sample.

Results greater than the interim screening level are circled.

TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
meq/100g	milli equivalents per 100 grams
mV	milli volts
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C1-7

Sample Results: Pesticides

SWMU 1 - Former Percolation Bed (Former Holding Pond)

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Interim Screening Level[1] :				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels[2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL[3] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values[4] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
SWMU1-1	10/16/08	0 - 0.5	N	ND (2.4) *	ND (2.4) *	ND (2.4) *	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (2.4)	ND (1.2)	ND (2.4)	ND (2.4)	ND (2.4)	ND (2.4)	ND (2.4)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (6)	ND (60)
SWMU1-3	10/06/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
SWMU1-4	10/15/08	0 - 0.5	N	ND (2)	ND (2) J	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2) J	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2) J	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
SWMU1-9	10/14/08	0 - 0.5	N	ND (2.1) *	ND (2.1) *	ND (2.1) *	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2.1)	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.2)	ND (52)
SWMU1-11	10/15/08	0 - 0.5	N	ND (2.1) *	ND (2.1) *	ND (2.1) *	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.1)	ND (1.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (5.3)	ND (53)
SWMU1-13	10/14/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
SWMU1-15	09/22/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
SWMU1-17	09/21/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
SWMU1-WP-1h	10/07/08	0 - 0.5	N	ND (2.1) *	ND (2.1) *	ND (2.1) *	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2.1)	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.2)	ND (52)
SWMU1-WP-3a	10/14/08	0 - 0.5	N	ND (2.1) *	ND (2.1) *	ND (2.1) *	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.1)	ND (1.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (5.3)	ND (53)
SWMU1-WP-5a	10/05/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
SWMU1-WP-5h	10/07/08	0 - 0.5	N	ND (2.2) *	ND (2.2) *	ND (2.2) *	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.2)	ND (1.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (5.4)	ND (54)
SWMU1-WP-6a	10/05/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
SWMU1-WP-6h[6]	10/06/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
SWMU1-WP-7	10/06/08	0 - 0.5	N	ND (2.1) *	ND (2.1) *	ND (2.1) *	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.1)	ND (1.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (5.4)	ND (54)
SWMU1-WP-8	10/06/08	0 - 0.5	N	ND (2.1) *	ND (2.1) *	ND (2.1) *	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2.1)	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
SWMU1-WP-T3a	10/05/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] white powder sample.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C1-8

Sample Results: Polychlorinated Biphenyls
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level[1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Regional Screening Levels[2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Residential DTSC CHHSL[3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
SWMU1-1	10/16/08	0 - 0.5	N	ND (20)	ND (40)	ND (20)	ND (20)	ND (20)	35	ND (20)	ND (20)	ND (20)	35
SWMU1-3	10/06/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	18	ND (17)	ND (17)	ND (17)	18
	10/06/08	2 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
SWMU1-4	10/15/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
SWMU1-9	10/14/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
SWMU1-11	10/15/08	0 - 0.5	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	40	ND (17)	ND (17)	ND (17)	40
SWMU1-13	10/14/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	22	ND (17)	ND (17)	ND (17)	22
SWMU1-15	09/22/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	96	ND (17)	ND (17)	ND (17)	96
	09/22/08	2 - 3	N	ND (17) J	ND (35) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
SWMU1-17	09/21/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
SWMU1-WP-1h	10/07/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
SWMU1-WP-3a	10/14/08	0 - 0.5	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
SWMU1-WP-5a	10/05/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
SWMU1-WP-5h	10/07/08	0 - 0.5	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	25	ND (18)	ND (18)	ND (18)	25
	10/07/08[6]	2 - 3	N	ND (18) J	ND (35) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (9)
SWMU1-WP-6a	10/05/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	41	ND (17)	ND (17)	ND (17)	41
	10/05/08	2 - 3	N	ND (17) J	ND (33) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
SWMU1-WP-6h	10/06/08[6]	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	19	ND (17)	ND (17)	ND (17)	19
	10/06/08	2 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
SWMU1-WP-7	10/06/08	0 - 0.5	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	200	ND (18)	ND (18)	ND (18)	200
	10/06/08[6]	2 - 3	N	ND (18) J	ND (37) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (18) J	ND (9)
SWMU1-WP-8	10/06/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	41	ND (17)	ND (17)	ND (17)	41
	10/06/08	2 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
SWMU1-WP-T3a	10/05/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)

TABLE C1-8

Sample Results: Polychlorinated Biphenyls
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is the USEPA residential regional screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] white powder sample.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C1-9

Constitiuent Concentrations in Soil Compared to Screening Values
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		**Ecological Comparison Value (ECV)** [2]		**Residential Screening Level (Res SL)** [3]		**RWQCB Environmental Screening Levels (ESL)** [4]		**Commercial Screening Level (Com SL)** [5]		**Interim Screening Level (Int SL)** [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences** [7]	**(BTV)**	**# of Exceedences** [8]	**(ECV)**	**# of Exceedences** [8]	**(Res SL)**	**# of Exceedences** [8]	**(ESL)**	**# of Exceedences** [8]	**(Com SL)**	**# of Exceedences** [8]	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 141 (0%)	ND (4) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	134 / 141 (95%)	12	2	(11)	2	(11.4)	2	(0.07) *	NA	(NE)	2	(0.24) *	2	(11)
Barium	mg/kg	149 / 149 (100%)	1,900	2	(410)	2	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	2	(410)
Beryllium	mg/kg	0 / 141 (0%)	ND (5.3) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	0 / 141 (0%)	ND (2) ‡	0	(1.1)	0	(0.0151) *	0	(39)	NA	(NE)	0	(500)	0	(1.1)
Chromium	mg/kg	185 / 185 (100%)	3,200	73	(39.8)	73	(36.3) *	26	(280)	NA	(NE)	7	(1,400)	73	(39.8)
Chromium, Hexavalent	mg/kg	48 / 185 (26%)	47.5	34	(0.83)	0	(139.6)	4	(17)	NA	(NE)	1	(37)	34	(0.83)
Cobalt	mg/kg	141 / 141 (100%)	19	20	(12.7)	14	(13)	0	(23)	NA	(NE)	0	(300)	20	(12.7)
Copper	mg/kg	184 / 185 (99%)	61	41	(16.8)	25	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	41	(16.8)
Lead	mg/kg	148 / 149 (99%)	13	2	(8.39)	2	(0.0166) *	0	(80)	NA	(NE)	0	(320)	2	(8.39)
Mercury	mg/kg	0 / 141 (0%)	ND (0.12) ‡	NA	(NE)	0	(0.0125)	0	(18)	NA	(NE)	0	(180)	0	(0.0125)
Molybdenum	mg/kg	31 / 149 (21%)	7.8	22	(1.37)	11	(2.25)	0	(380)	NA	(NE)	0	(4,800)	22	(1.37)
Nickel	mg/kg	185 / 185 (100%)	51	20	(27.3)	20	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	20	(27.3)
Selenium	mg/kg	4 / 141 (2.8%)	2.5	2	(1.47)	2	(0.177) *	0	(380)	NA	(NE)	0	(4,800)	2	(1.47)
Silver	mg/kg	0 / 141 (0%)	ND (5.3) ‡	NA	(NE)	0	(5.15)	0	(380)	NA	(NE)	0	(4,800)	0	(5.15)
Thallium	mg/kg	0 / 141 (0%)	ND (11) ‡	NA	(NE)	0	(2.32)	0	(5)	NA	(NE)	0	(63)	0	(2.32)
Vanadium	mg/kg	149 / 149 (100%)	57	9	(52.2)	9	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	9	(52.2)
Zinc	mg/kg	185 / 185 (100%)	673	37	(58)	37	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	37	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	16 / 16 (100%)	12,000	0	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	0	(16,400)
Calcium	mg/kg	19 / 19 (100%)	280,000	4	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	4	(66,500)
Iron	mg/kg	27 / 27 (100%)	25,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	19 / 19 (100%)	14,700	2	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	2	(12,100)
Manganese	mg/kg	27 / 27 (100%)	526	1	(402)	1	(220)	0	(1,800)	NA	(NE)	0	(23,000)	1	(402)
Potassium	mg/kg	19 / 19 (100%)	4,900	1	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	1	(4,400)
Sodium	mg/kg	13 / 19 (68%)	1,800	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 16 (0%)	ND (1.1) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Polycyclic Aromatic Hydrocarbons															
Benzo (a) anthracene	µg/kg	7 / 141 (5.0%)	19	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (a) pyrene	µg/kg	6 / 141 (4.3%)	15	NA	(NE)	NA	(NE)	0	(38)	NA	(NE)	0	(130)	0	(38)
Benzo (b) fluoranthene	µg/kg	7 / 141 (5.0%)	22	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (ghi) perylene	µg/kg	5 / 141 (3.5%)	11	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	8 / 141 (5.7%)	20	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Chrysene	µg/kg	8 / 141 (5.7%)	25	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Fluoranthene	µg/kg	11 / 141 (7.8%)	440	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Indeno (1,2,3-cd) pyrene	µg/kg	5 / 141 (3.5%)	10	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Naphthalene	µg/kg	2 / 141 (1.4%)	16	NA	(NE)	NA	(NE)	0	(3,600)	NA	(NE)	0	(18,000)	0	(3,600)
Phenanthrene	µg/kg	6 / 141 (4.3%)	47	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Pyrene	µg/kg	10 / 141 (7.1%)	360	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	7 / 141 (5.0%)	57	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	11 / 141 (7.8%)	900	NA	(NE)	0	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,160)
B(a)P Equivalent	µg/kg	11 / 141 (7.8%)	22	NA	(NE)	NA	(NE)	0	(38)	NA	(NE)	0	(130)	0	(38)

TABLE C1-9

Constitiuent Concentrations in Soil Compared to Screening Values
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Units	Frequency of detection	Maximum Detected Value	Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
				# of Exceedences[7]	(BTV)	# of Exceedences[8]	(ECV)	# of Exceedences[8]	(Res SL)	# of Exceedences[8]	(ESL)	# of Exceedences[8]	(Com SL)	# of Exceedences[8]	(Int SL)
Polychlorinated biphenyls															
Aroclor 1254	µg/kg	9 / 21 (43%)	200	NA	(NE)	NA	(NE)	0	(220)	NA	(NE)	0	(740)	0	(220)
Total PCBs	µg/kg	9 / 21 (43%)	200	NA	(NE)	0	(204)	NA	(NE)	NA	(NE)	NA	(NE)	0	(204)
Total Petroleum Hydrocarbons															
TPH as diesel	mg/kg	6 / 141 (4.3%)	17.8	NA	(NE)	NA	(NE)	NA	(NE)	0	(540)	NA	(NE)	0	(540)
TPH as motor oil	mg/kg	49 / 141 (35%)	168	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C1-10

Central Tendency Comparisons (Site to Background)
SWMU 1 - Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	**Comparison Test Used**	**Probability that the Observed Differences Would Occur Purely by Chance**	**Statistical Decision with 0.05 Significance Level**	**Mean of Site Detects**	**Mean of Bkgd Detects**	**Median of Site Detects**	**Median of Bkgd Detects**	**Number of Site Detects**	**Number of Site Samples**	**Number of Bkgd Detects**	**Number of Bkgd Samples**	**Percent Detects Site**	**Percent Detects Bkgd**
Arsenic	Gehan	0.072	nsd	4.43	4.01	4.2	3.5	134	141	58	59	95	98
Barium	Gehan	1.000	nsd	112	165	94	135	149	149	60	60	100	100
Calcium	Gehan	0.470	nsd	55200	24300	19000	20000	19	19	55	55	100	100
Chromium	Gehan	0.000	Site > Bkgd	187	22.3	29	21.9	185	185	70	70	100	100
Cobalt	Gehan	0.000	Site > Bkgd	9.65	7.85	9	7.61	141	141	58	59	100	98
Copper	Gehan	0.001	Site > Bkgd	13.6	10.5	11.6	10.1	184	185	70	70	99	100
Lead	Gehan	0.995	nsd	3.51	4.38	3.2	3.5	148	149	59	60	99	98
Magnesium	Gehan	0.522	nsd	8450	7950	7300	8100	19	19	55	55	100	100
Manganese	Gehan	1.000	nsd	224	298	230	281	27	27	59	59	100	100
Molybdenum	Gehan	0.640	nsd	2.49	1.03	1.9	1	31	149	11	60	21	18
Nickel	Gehan	0.792	nsd	16.1	15.4	14	15	185	185	70	70	100	100
Potassium	Gehan	0.954	nsd	2510	2860	2500	2800	19	19	55	55	100	100
Vanadium	Gehan	0.121	nsd	36.1	34	35	34.1	149	149	60	60	100	100
Zinc	Gehan	0.001	Site > Bkgd	54.9	36.8	40	35.5	185	185	70	70	100	100

Bkgd = background

nsd = no statistical difference

> = greater than
< = less thank

TABLE C1-11
Results of Tiered Analysis at SMWU1/AOC 1-South
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Metal	**Step 1 Do COPCs/COPECs Exceed Background?**	**Step 2 Do COPCs/COPECs Exceed SSL?**	**Step 3 Does Screening Model Eliminate Potential for Leaching to Groundwater?**
Arsenic	√		
Barium	√		
Chromium	√		
Chromium, Hexavalent	√	√	Yes
Cobalt[a]	√		
Copper	√		
Lead	√		
Molybdenum	√	√	Yes
Nickel	√		
Selenium	√		
Vanadium	√		
Zinc	√		

[a] Cobalt has no maximum contaminant limit. The USEPA tap water regional screening level (11 micrograms per liter) was used in place of the maximum contaminant limit.

✓ = Constituents concentration exceeds background and/or SSL.
SSL = soil screening level.

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels
AOC1 South/SMWU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
			Soil Screening Levels : [1]	**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
			Background : [2]	**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
MW-9	06/30/97	1	N	---	---	15	ND (0.05)	---	7.2	---	---	7.6	---	---	19.7
	06/30/97	3.5	N	---	---	4.1	0.06	---	3.1	---	---	3.6	---	---	11.8
	06/30/97	3.5	FD	---	---	7.6	0.21	---	3.5	---	---	3.7	---	---	12.6
	06/30/97	6	N	---	---	11.8	ND (0.05)	---	6.4	---	---	7.7	---	---	21
	07/01/97	10	N	---	91	42.2	ND (0.05)	---	6.8	2.7	ND (0.2)	9.7	---	21.8	29
	06/30/97	20	N	---	---	9	ND (0.05)	---	7.1	---	---	9.1	---	---	21.7
	07/01/97	30	N	---	28.8	16.3	ND (0.05)	---	12.4	3.9	ND (0.2)	15.3	---	31	29.4
	06/30/97	40	N	---	---	9.7	ND (0.05)	---	7.5	---	---	9	---	---	22.5
	07/01/97	50	N	---	83.8	11.7	ND (0.05)	---	14.7	3.2	ND (0.2)	11.3	---	20.3	23.3
	06/30/97	60	N	---	---	28.8	ND (0.05)	---	17.4	---	---	20.2	---	---	34.4
	06/30/97	70	N	---	---	8.9	ND (0.05)	---	10	---	---	10.2	---	---	19
	07/01/97	87	N	---	94	9.8	ND (0.05)	---	10.2	8.4	ND (0.2)	11.6	---	33	126
	07/01/97	87	FD	---	---	11.9	0.06	---	11.4	---	---	11.7	---	---	121
MW-10	06/27/97	1	N	---	---	14.2	ND (0.05)	---	14.1	---	---	8.8	---	---	20.9
	06/27/97	3	N	---	---	13.4	ND (0.05)	---	8.3	---	---	9	---	---	26.6
	06/27/97	6	N	---	---	19	ND (0.05)	---	8.4	---	---	10.7	---	---	23.3
	06/27/97	10	N	---	95.3	26.7	ND (0.05)	---	9.6	2.8	0.62	14.1	---	26.9	30.4
	06/27/97	20	N	---	---	14.7	ND (0.05)	---	7.7	---	---	10.2	---	---	27.1
	06/27/97	25	N	---	---	16.1	ND (0.05)	---	10.6	---	---	13.4	---	---	34.1
	06/27/97	30	N	---	---	13.8	ND (0.05)	---	9.4	---	---	11.5	---	---	31.5
	06/27/97	35	N	---	87	---	---	---	---	3.6	ND (0.2)	---	---	29.9	---
	06/27/97	40	N	---	---	14.5	ND (0.05)	---	9.2	---	---	12.6	---	---	29.4
	06/28/97	50	N	---	---	14.3	ND (0.05)	---	8.5	---	---	12.2	---	---	31.2
	06/27/97	60	N	---	---	9.1	ND (0.05)	---	6	---	---	6.6	---	---	16.3
	06/27/97	70	N	---	110	11.7	ND (0.05)	---	8.8	2.2	ND (0.2)	9.4	---	20.1	24.2
	06/27/97	75	N	---	---	11.5	ND (0.05)	---	6.4	---	---	8.2	---	---	24.9
	06/27/97	75	FD	---	---	9.6	0.1	---	6.97	---	---	8.1	---	---	21.6
	06/27/97	82	N	---	115	9.9	ND (0.05)	---	6.3	2.3	ND (0.2)	8.7	---	21.5	26.6

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels
AOC1 South/SMWU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
			Soil Screening Levels : [1]	**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
			Background : [2]	**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
SWMU1-1	10/16/08	0 - 0.5	N	3.5	120	44	0.524	11	12	4.2	ND (1.2)	16	ND (1.2)	38	41
	10/16/08	2 - 3	N	3	110	67	0.462	7.5	9.4	3	ND (1)	15	ND (1)	32	37
	10/16/08	5 - 6	N	ND (1)	94	3,200	14.1	7.3	9.5	4.5	7.8	12	ND (1)	45	76
	10/16/08	9 - 10	N	2.2	83	55	0.907	6.9	8.6	1.7	ND (1)	11	ND (1)	27	89
SWMU1-2	10/15/08	0 - 0.5	N	4.7	110	26	ND (0.401)	7.3	22	6.5	ND (1)	14	ND (1)	35	37
	10/15/08	2 - 3	N	2.6	110	36	ND (0.404)	9.3	10	3.7	ND (1)	15	ND (1)	33	38
	10/15/08	5 - 6	N	3.2	120	44	ND (0.404)	8.9	12	6.1	3	16	ND (1)	33	38
	10/15/08	9 - 10	N	ND (1)	130	2,000	22.8	10	15	4	2.8	16	ND (1)	41	100
SWMU1-3	10/06/08	0 - 0.5	N	2.7	94	28	ND (0.405)	9.9	11	3.9	ND (1)	15	ND (1)	37	33
	10/06/08	2 - 3	N	2.5	130	41	ND (0.413)	9.2	9.4	2.3	1.5	16	ND (1)	35	38
	10/06/08	2 - 3	FD	2.8	120	38	ND (0.41)	8.6	9	2.9	1.4	14	ND (1)	34	37
	10/06/08	5 - 6	N	ND (1)	140	1,300	22.7	8.9	11	3.8	4.2	12	ND (1)	37	78
	10/06/08	9 - 10	N	3	60	96	1.55 J	9.4	11	2.7	ND (1)	18	ND (1)	32	140
	10/06/08	19 - 20	N	5.6	250	20	ND (0.416)	9.1	10	2.9	ND (2.1)	13	ND (1)	34	39
	10/06/08	29 - 30	N	10	59	21	ND (0.424)	8.8	15	2.4	ND (5.3)	16	ND (1.1)	32	38
	10/06/08	39 - 40	N	5.3	45	22	ND (0.424)	8.6	8.5	2.7	ND (2.1)	14	ND (1)	31	35
	10/06/08	49 - 50	N	5.6	63	25	ND (0.405)	9.8	12	3.2	ND (2.1)	17	ND (1.1)	35	39
	10/06/08	59 - 60	N	5.3	99	38	ND (0.418)	9.6	14	3	2.1	20	ND (1)	37	36
	10/07/08	69 - 70	N	5.2	64	29	ND (0.42)	9.9	14	2.6	ND (2.1)	19	ND (1)	38	38
	10/07/08	79 - 80	N	6.6	350	20	ND (0.427)	8.3	13	3.1	ND (2.2)	14	ND (1.1)	35	39
	10/07/08	79 - 80	FD	5.1	340	21	ND (0.441)	7.3	15	2.6	1.3	14	ND (1.1)	31	34
SWMU1-4	10/15/08	0 - 0.5	N	2.9	75	17	ND (0.401)	5.6	6.8	2.6	ND (1)	9.5	ND (1)	34	26
	10/15/08	2 - 3	N	ND (1)	130	870	4.95	7.3	11	3.6	1.7	13	ND (1)	36	72
	10/15/08	5 - 6	N	1.8	100	100	1.39	7.6	10	1.8	ND (1)	10	ND (1)	36	170
	10/15/08	7 - 8	N	2.1	89	40	ND (0.415)	7.5	7.6	1.6	ND (1)	9.8	ND (1)	31	120
	10/15/08	9 - 10	N	2.1	95	23	ND (0.414)	7.5	7.9	1.7	ND (1)	10	ND (1)	33	110
	10/15/08	13 - 14	N	2.4	110	18	ND (0.413)	7.4	7.1	1.7	ND (1)	11	ND (1)	31	67
SWMU1-5	10/15/08	9 - 10	N	2.6	71	47	0.874	7	8.3	2.1	ND (1)	9.9	ND (1)	28	100

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels

AOC1 South/SMWU1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
			Soil Screening Levels : 1	**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
			Background : 2	**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
SWMU1-5	10/15/08	13 - 14	N	5.4	58	21	ND (0.42)	8.3	7.9	2.8	ND (2.1)	13	ND (1)	30	42
	10/15/08	13 - 14	FD	5.8	48	21	ND (0.423)	8	8	2.9	ND (2.1)	13	ND (1)	31	44
	10/15/08	15 - 16	N	5.4	63	21	ND (0.414)	8.1	9.1	2.8	ND (2.1)	13	ND (1)	31	34
	10/15/08	19 - 20	N	4.3	180	19	ND (0.423)	8.6	11	3.1	1.5	12	ND (1.1)	32	37
SWMU1-6	10/15/08	0 - 0.5	N	2.4	110	220	1.32	8.8	11	3.3	1.2	12	ND (1)	41	42
	10/15/08	2 - 3	N	2.1	95	270	2.15	8.1	12	2.6	1.9	13	ND (1)	39	46
	10/15/08	5 - 6	N	2.6	81	32	ND (0.405)	7.7	10	2.6	ND (1)	13	ND (1)	34	29
	10/15/08	9 - 10	N	2.4	79	33	0.531	8.3	8.6	1.7	ND (1)	13	ND (1)	33	88
SWMU1-7	10/15/08	0 - 0.5	N	3.3	98	27	ND (0.403)	8.7	13	6.6	ND (1)	15	ND (1)	37	38
	10/15/08	2 - 3	N	ND (1)	97	630	6.45	9	14	3.6	1.7	15	ND (1)	36	130
	10/15/08	5 - 6	N	1.2	100	330	5.3	8.1	20	2.8	ND (1)	12	ND (1)	35	190
	10/15/08	9 - 10	N	2.4	100	51	0.517	8.2	9.2	1.9	ND (1)	14 J	ND (1)	34	150
	10/15/08	9 - 10	FD	2.4	99	47	0.554	7.9	8.3	1.6	ND (1)	11 J	ND (1)	32	150
SWMU1-8	10/15/08	0 - 0.5	N	2.9	86	120	0.618	8.2	9.1	4.7	ND (1)	14	ND (1)	38	36
	10/15/08	2 - 3	N	1.5	100	970	22.3	8.2	11	3.5	2.2	14	ND (1)	36	160
	10/15/08	5 - 6	N	ND (1)	120	1,600	9.25	9.2	22	3.3	3.2	16	ND (1)	46	120
	10/15/08	9 - 10	N	3.9	39	15	ND (0.433)	7	7.1	2.8	ND (1.1)	11	ND (1.1)	28	32
SWMU1-9	10/14/08	0 - 0.5	N	2.9	110	87	0.697	8.7	10	2.9	1.4	16	ND (1)	36	37
	10/14/08	2 - 3	N	5.6	140	13	ND (0.42)	4.5	5.9	5	ND (1)	8.6	ND (1)	21	26
	10/14/08	5 - 6	N	5.8	45	26	ND (0.417)	8.9	8.1	3.1	ND (2.1)	15	ND (1)	34	39
	10/14/08	9 - 10	N	4.3	150	22	ND (0.425)	9	11	3.2	ND (1.1)	16	ND (1.1)	35	38
SWMU1-10	10/14/08	0 - 0.5	N	2.8	91	19	ND (0.401)	7.8	11	2.6	ND (1)	12	ND (1)	30	32
	10/14/08	2 - 3	N	2.5	100	26	ND (0.403)	8.8	13	2.2	1.8	13	ND (1)	31	33
	10/14/08	5 - 6	N	3.9	44	21	ND (0.413)	10	8.4	2.9	ND (1)	15	ND (1)	36	42
	10/14/08	5 - 6	FD	3.4	48	22	ND (0.413)	9.4	10	2.9	ND (1)	14	ND (1)	36	41
	10/14/08	9 - 10	N	4.9	51	25	ND (0.431)	9.6	15	3.6	ND (1.1)	17	ND (1.1)	37	44
SWMU1-11	10/15/08	0 - 0.5	N	3.6	61	200	1.81	8.4	11	3.8	1.2	15	ND (1.1)	34	65
	10/15/08	2 - 3	N	2.2	92	840	8.82	8.1	11	4.3	4	13	ND (1.1)	34	120

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels

AOC1 South/SMWU1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
Soil Screening Levels : [1]				**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
Background : [2]				**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
SWMU1-11	10/15/08	5 - 6	N	5.7	37	34	ND (0.431)	9.3	12	3.2	ND (2.1)	16	ND (1.1)	35	96
	10/15/08	9 - 10	N	4.7	36	22	ND (0.432)	9	10	3.4	ND (1.1)	15	ND (1.1)	35	43
SWMU1-12	10/14/08	0 - 0.5	N	2.8	100	19	ND (0.403)	8	8.5	2.7	ND (1)	11	ND (1)	32	31
	10/14/08	2 - 3	N	4.6	88	24	ND (0.406)	9.5	11	2.3	ND (2)	16	ND (1)	34	37
	10/14/08	5 - 6	N	5.5	57	20	ND (0.412)	9.6	13	2.7	ND (2)	15	ND (1)	35	40
	10/14/08	9 - 10	N	10	42	21	ND (0.419)	9.7	11	3.1	ND (5.2)	16	ND (1)	34	41
SWMU1-13	10/14/08	0 - 0.5	N	3.3	120	23	ND (0.407)	7.1	14	5.3	ND (1)	12	ND (1)	33	35
	10/14/08	2 - 3	N	9.7	160	28	ND (0.409)	9.3	11	3.5	ND (5.1)	15	ND (1)	36	39
	10/14/08	2 - 3	FD	9.3	170	27	ND (0.411)	8.7	11	3.5	ND (5.1)	14	ND (1)	34	39
	10/14/08	5 - 6	N	6.4	85	34	ND (0.416)	11	13	2.8	ND (2.1)	20	ND (1)	40	44
	10/14/08	9 - 10	N	5.7	49	30	ND (0.426)	12	16	3.5	ND (1)	20	ND (1)	43	45
SWMU1-14	10/14/08	0 - 0.5	N	2.3	96	20	ND (0.404)	8.8	8.2	2.6	ND (1)	13	ND (1)	33	33
	10/14/08	2 - 3	N	2.8	120	19	ND (0.408)	7.9	14	2.3	ND (1)	12	ND (1)	31	33
	10/14/08	5 - 6	N	5.8	73	28	ND (0.413)	11	17	3.4	ND (2)	20	ND (1)	40	42
	10/14/08	9 - 10	N	5.6	67	52	ND (0.415)	13	35	3.9	ND (1)	32	ND (1)	48	45
SWMU1-15	09/22/08	0 - 0.5	N	2.6	130	25	1.14	8.7	12	4.1	1.9	15	ND (1)	34	36
	09/22/08	2 - 3	N	2.8	130	23	ND (0.422)	9.3	11	3	1.2	17	ND (1.1)	32	34
	09/22/08	5 - 6	N	4.5	100	41	ND (0.424)	12	18	4.5	ND (2.1)	28	ND (1.1)	44	46
	09/22/08	9 - 10	N	4.7	230	58	ND (0.419)	15	24	4.4	ND (2.1)	43	ND (1)	55	50
	09/22/08	9 - 10	FD	5.1	190	60	ND (0.42)	15	23	4.5	ND (2.1)	44	ND (2.1)	53	50
	09/22/08	19 - 20	N	5.5	81	51	ND (0.425)	14	41	4.5	ND (2.1)	37	ND (1.1)	53	50
	09/22/08	29 - 30	N	7.4	110	54	ND (0.433)	14	23	5.4	ND (5.3)	39	ND (1.1)	51	54
	09/22/08	39 - 40	N	4	56	40	ND (0.422)	12	23	3	ND (1)	27	ND (1)	48	47
	09/22/08	49 - 50	N	6.7	160	55	ND (0.439)	13	25	5.4	ND (2.2)	39	ND (1.1)	57	59
	09/22/08	59 - 60	N	8.4	110	47	ND (0.449)	14	23	3	ND (5.3)	34	ND (1.1)	51	49
	09/22/08	59 - 60	FD	5.6	110	44	ND (0.411)	15	24	4.3	ND (2.1)	31	ND (1.1)	52	47
	09/22/08	69 - 70	N	6.1	47	39	ND (0.43)	13	25	3.8	ND (1.1)	27	ND (1.1)	42	53
	09/22/08	79 - 80	N	4.4	94	28	ND (0.43)	11	20	3.2	ND (1.1)	19	ND (1.1)	38	60

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels

AOC1 South/SMWU1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
Soil Screening Levels : [1]				**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
Background : [2]				**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
SWMU1-15	09/23/08	89 - 90	N	3.7	560	6.5	ND (0.4)	6.2	ND (4)	ND (2)	ND (2)	7	ND (2)	15	21
SWMU1-16	09/21/08	0 - 0.5	N	2.6	83	10	ND (0.405)	4.5	5.2	2.3	ND (1)	6.8	ND (1)	20	21
	09/21/08	2 - 3	N	1.7	99	18	ND (0.408)	7.9	8.3	2	1	11	1.1	32	34
	09/21/08	5 - 6	N	1.6	110	18	ND (0.406)	7.8	8.9	2	ND (1)	11	1.6	32	35
SWMU1-17	09/21/08	0 - 0.5	N	3.7	210	27	ND (0.403)	11	16	3.5	ND (2)	19	ND (2)	47	46
	09/21/08	2 - 3	N	4.3	180	29	ND (0.405)	10	12	3.9	ND (2)	20	ND (1)	40	40
	09/21/08	5 - 6	N	2.8	130	29	ND (0.407)	10	12	3.1	2.4	18	ND (1)	39	44
	09/21/08	9 - 10	N	3.9	110	43 J	ND (0.408)	13	26	4.4	ND (2)	32	ND (2)	46	41
	09/21/08	9 - 10	FD	4.1	110	53 J	ND (0.408)	14	24	4.7	ND (2)	37	ND (1)	51	46
AOC1-T1a	10/16/08	0 - 0.5	N	6.5	100	19	ND (0.406)	7.3	11	4.9	ND (2)	14	ND (1)	30	38
	10/16/08	2 - 3	N	3.2	120	27	ND (0.404)	7.7	8.6	3.8	2	13	ND (1)	29	37
	10/16/08	5 - 6	N	3.5	110	26	ND (0.405)	7.2	9.5	3.4	2	12	ND (1)	29	34
	10/16/08	9 - 10	N	2.4	88	14	ND (0.404)	7.3	7.5	1.4	ND (1)	9.5	ND (1)	29	32
AOC1-T1b	10/16/08	0 - 0.5	N	2.9	88	43 J	ND (0.405)	8.4	9	3.1	ND (1)	14	ND (1)	36	31
	10/16/08	0 - 0.5	FD	2.8	86	33 J	ND (0.405)	8.2	10	3.2	ND (1)	16	ND (1)	35	32
	10/16/08	2 - 3	N	2.9	210	98	ND (1.94)	7.5	12	3.9	ND (1)	16	ND (1)	33	67
	10/16/08	5 - 6	N	3	99	28	0.402	7.2	9	3.2	1.7	12	ND (1)	31	31
	10/16/08	9 - 10	N	2.6	120	42	ND (0.402)	8	11	2.6	5	14	ND (1)	30	32
AOC1-T1c	10/16/08	0 - 0.5	N	3.2	120	44	0.601	7.4	13	7.5	1.9	11	ND (1)	33	53
	10/16/08	2 - 3	N	2.6	150	140	4.77 J	8	26	20 J	2.5	11 J	ND (1)	33	82 J
	10/16/08	2 - 3	FD	3	170	150	3.58 J	8.2	29	32 J	2.2	14 J	ND (1)	29	110 J
	10/16/08	5 - 6	N	3.1	97	46	0.446	7.2	15	5	3	12	ND (1)	27	44
	10/16/08	9 - 10	N	2.8	120	20	ND (0.418)	8.6	11	1.9	ND (1)	13	ND (1)	33	38
AOC1-T2d	10/07/08	0 - 0.5	N	3	100	46	ND (0.408)	8.2	10	2.9	2.9	14	ND (1)	36	36
	10/07/08	2 - 3	N	ND (1)	120	970	5.73	7.5	13	4.7	1.5	11	ND (1)	34	98
	10/07/08	5 - 6	N	ND (1)	84	370	4.34	6.9	11	3.9	1.1	11	ND (1)	26	130
	10/07/08	9 - 10	N	4.5	86	140	2.92	10	14	3.1	ND (2.1)	15	ND (1)	33	68
	10/07/08	19 - 20	N	5.8	56	26	ND (0.423)	10	9.2	3	ND (2.1)	16	ND (1.1)	38	45

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels
AOC1 South/SMWU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
			Soil Screening Levels : [1]	**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
			Background : [2]	**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
AOC1-T2d	10/07/08	29 - 30	N	6.2	38	21	ND (0.424)	8.5	8.9	2.7	ND (2.1)	14	ND (1)	31	37
	10/07/08	29 - 30	FD	9.7	40	24	ND (0.423)	8.7	ND (11)	2.2	ND (5.3)	16	ND (1.1)	34	36
	10/07/08	39 - 40	N	6.4	79	22	ND (0.431)	8.9	11	3.6	ND (2.1)	16	ND (1.1)	34	42
	10/07/08	49 - 50	N	4.1	62	28	ND (0.425)	9.3	10	2.1	ND (1.1)	17	ND (1.1)	36	38
	10/08/08	59 - 60	N	5.3	36	39	ND (0.406)	9	9.8	2.2	4.7	13	ND (1)	33	32
	10/08/08	69 - 70	N	4.4	41	18	ND (0.435)	9.1	9.8	2.8	2.2	13	ND (1.1)	31	31
SWMU1-WP-1h	10/07/08	0 - 0.5	N	4.5	53	25	ND (0.418)	8.3	11	3.9	ND (1)	13	ND (1)	32	38
	10/07/08	2 - 3	N	4.4	40	17	ND (0.418)	7.2	8.9	2.8	ND (1)	13	ND (1)	30	34
	10/07/08	5 - 6	N	3.7	23	15	ND (0.417)	7	7.1	2.5	ND (1.1)	11	ND (1.1)	26	39
	10/07/08	9 - 10	N	3.8	29	28	ND (0.422)	8	8.7	2.9	ND (1)	13	ND (1)	29	58
SWMU1-WP-3a	10/14/08	0 - 0.5	N	3.1	100	27	ND (0.419)	7.4	11	3.6	ND (1.1)	13	ND (1.1)	33	40
	10/14/08	2 - 3	N	2.3	100	20	ND (0.419)	8	9.4	2.3	1.1	11	ND (1)	38	34
	10/14/08	5 - 6	N	6	68	27	ND (0.425)	14	15	6.2	ND (2.1)	17	ND (1.1)	37	45
	10/14/08	7 - 8	N	6	69	23	ND (0.417)	9.3	11	3.4	ND (2.1)	18	ND (1)	36	39
	10/14/08	9 - 10	N	12	120	66	ND (0.415)	14	21	2.8	ND (5.1)	45	ND (1)	51	46
	10/14/08	9 - 10	FD	12	120	66	ND (0.414)	15	22	2.7	ND (5.1)	45	ND (1)	52	47
	10/14/08	11 - 12	N	5.1	56	30	ND (0.421)	12	27	4	ND (1)	23	ND (1)	40	40
	10/14/08	13 - 14	N	5.5	40	28	ND (0.426)	10	31	3.8	ND (1)	21	ND (1)	39	40
SWMU1-WP-3h	10/07/08	0 - 0.5	N	5.1	40	17	ND (0.433)	7.4	6.3	1.8	ND (2.1)	11	ND (1.1)	25	33
	10/07/08	2 - 3	N	2.4	89	17	ND (0.404)	7.6	8.6	2.1	ND (1)	12	ND (1)	30	34
	10/07/08	5 - 6	N	2.8	92	21	ND (0.404)	8.7	7.8	2.4	ND (1)	15	ND (1)	31	36
SWMU1-WP-5a	10/05/08	0 - 0.5	N	2.4	91	19	ND (0.405)	8	11	3.9	1	11	ND (1)	36	35
	10/05/08	2 - 3	N	2.3	100	19	ND (0.408)	8.9	9.2	2.4	ND (1)	12	ND (1)	33	35
	10/05/08	5 - 6	N	6.7	120	53	ND (0.419)	13	17	3.9	ND (2.1)	38	ND (1)	52	42
	10/05/08	5 - 6	FD	12	120	58	ND (0.42) J	15	19	3.5	ND (5.2)	42	ND (1)	56	46
	10/05/08	7 - 8	N	6.6	100	53	ND (0.416)	12	18	4.1	ND (2.1)	37	ND (1)	44	41
	10/05/08	9 - 10	N	6.4	76	43	ND (0.421)	13	21	4.2	ND (2.1)	33	ND (1)	47	47
	10/05/08	11 - 12	N	6.8	50	36	ND (0.416)	11	26	3.5	ND (2.1)	26	ND (1)	43	42

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels
AOC1 South/SMWU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
Soil Screening Levels : [1]				**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
Background : [2]				**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
SWMU1-WP-5a	10/05/08	13 - 14	N	4.9	92	27	ND (0.422)	11	13	3.5	ND (1)	20	ND (1)	40	52
SWMU1-WP-5h	10/07/08	0 - 0.5	N	3.4	73	14	ND (0.43)	12	12	2.7	ND (1.1)	9.5	ND (1.1)	23	31
	10/07/08[6]	2 - 3	N	5.3	130	33	ND (0.435)	8.7	12	4.9	ND (2.1)	14	ND (1.1)	31	46
	10/07/08	5	N	3.2	110	23	ND (0.415)	8.5	11	3.3	ND (1)	14	ND (1)	33	40
SWMU1-WP-6a	10/05/08	0 - 0.5	N	2.9	100	32	ND (0.405)	9.3	10	7.2	2.5	15	ND (1)	30	35
	10/05/08	2 - 3	N	2.3	81	19	ND (0.404)	8.8 J	10	2.3	ND (1)	12	ND (1)	34	35
	10/05/08	2 - 3	FD	2.4	82	19	ND (0.403)	11 J	9.2	2.2	ND (1)	12	ND (1)	34	33
	10/05/08	5 - 6	N	6.2	180	41	ND (0.413)	12	19	3.2	ND (2.1)	27	ND (1)	43	44
	10/05/08	7 - 8	N	6	66	35	ND (0.414)	10	18	3.5	ND (2.1)	24	ND (1)	40	38
	10/05/08	9 - 10	N	11	98	26	ND (0.412)	11	14	2.4	ND (5.1)	19	ND (1)	40	39
	10/05/08	11 - 12	N	4.3	71	51	ND (0.411)	10	17	3.1	3.6	22	ND (1)	38	35
	10/05/08	13 - 14	N	6.7	110	60	ND (0.41)	14	15	3.6	ND (2)	43	ND (1)	55	43
SWMU1-WP-6h	10/06/08[6]	0 - 0.5	N	4.7	150	130	4.98	8.8	15	5.5	ND (2)	17	ND (1)	37	87
	10/06/08	2 - 3	N	5.5	70	23	0.538	19	61	6.6	ND (1)	15	ND (1)	36	34
	10/06/08	5 - 6	N	2.7	100	19	ND (0.406)	8	10	2.4	ND (1)	12	ND (1)	34	36
	10/06/08	5 - 6	FD	2.7	100	20	ND (0.405)	8.1	12	2.3	ND (1)	12	ND (1)	32	37
	10/06/08	9 - 10	N	4.1	100	41	ND (0.409)	9.4	23	3.5	ND (1.1)	27	ND (1.1)	36	39
SWMU1-WP-7	10/06/08	0 - 0.5	N	ND (5.3)	160	2,600	0.566	7.2	11	13	7.1	15	ND (1.1)	35	88
	10/06/08[6]	2 - 3	N	6	190	1,200	18.2	7.4	16	5.7	3.4	17	ND (1.1)	35	56
	10/06/08	5 - 6	N	3	110	21	6.17	8	11	2.7	ND (1)	12	ND (1)	31	34
	10/06/08	9 - 10	N	3	82	23	ND (0.417)	7.2	15	2.7	ND (1)	15	ND (1)	30	31
SWMU1-WP-8	10/06/08	0 - 0.5	N	5.4	150	35	ND (0.402)	7.5	13	6.9	ND (2)	16	ND (1)	31	47
	10/06/08	2 - 3	N	5.1	160	26	0.541	7.9	10	4.1	ND (2.1)	17	ND (1.1)	32	32
	10/06/08	5 - 6	N	2.7	130	19	ND (0.407)	8.3	10	2.7	ND (1)	13	ND (1)	34	38
	10/06/08	9 - 10	N	2.9	120	22	ND (0.411)	7.9	9.8	2.6	ND (1)	12	ND (1)	38	38
SWMU1-WP-9	09/21/08	0 - 0.5	N	2.4	100	26	ND (0.406)	7.6	8.2	2.9	2.1	12	ND (1)	30	33
	09/21/08	2 - 3	N	2.7	150 J	34 J	ND (0.407)	9.5 J	15	2.3	1.2	20 J	2.5	35	34
	09/21/08	2 - 3	FD	2.1	1,900 J	20 J	ND (0.409)	5.9 J	10	2.7	ND (1)	12 J	ND (1)	32	34

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels
AOC1 South/SMWU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
Soil Screening Levels :[1]				**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
Background :[2]				**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
SWMU1-WP-9	09/21/08	5 - 6	N	4.2	75	39	ND (0.416)	13	15	3.2	ND (2)	26	1.3	49	43
	09/21/08	7 - 8	N	4.8	58	28	ND (0.416)	10	14	3.5	ND (2.1)	20	ND (1)	39	45
	09/21/08	9 - 10	N	4.7	77	37	ND (0.411)	12	15	3.3	ND (2)	28	ND (1)	43	43
	09/21/08	11 - 12	N	7.1	88	68	ND (0.422)	16	23	4	ND (5.2)	51	ND (1)	56	56
	09/21/08	13 - 14	N	5.3	91	60	ND (0.423)	15	22	4.9	ND (2.1)	46	ND (1)	56	52
SWMU1-WP-10	10/05/08	0 - 0.5	N	4.4	150	540	6.64	7.1	11	8.3	ND (2.1)	15	ND (1)	32	56
	10/05/08[6]	2 - 3	N	5.3	180	1,400	3.85	8.8	18	10	ND (5.2)	16	ND (1)	39	360
	10/05/08	5 - 6	N	5.5	81	50	0.494 J	8	12	3.6	ND (2.1)	15	ND (1.1)	33	53
	10/05/08	9 - 10	N	4.8	110	250	2.31	9.4	11	5.4	ND (2.1)	18	ND (1.1)	33	83
SWMU1-WP-T3a	10/05/08	0 - 0.5	N	2.6	110	25	ND (0.41)	10	11	2.8	ND (1)	12	ND (1)	38	39
	10/05/08	2 - 3	N	2	92	18	ND (0.411)	9.2	12	2.9	ND (1)	11	ND (1)	32	35
	10/05/08	5 - 6	N	4.1	82	26	ND (0.431)	11	16	3.4	ND (1.1)	19	ND (1.1)	38	40
	10/05/08	5 - 6	FD	4.2	80	26	ND (0.438)	10	15	3.7	1.1	19	ND (1.1)	38	39
	10/05/08	7 - 8	N	6.1	86	38	ND (0.429)	12	19	4.4	ND (2.1)	28	ND (1.1)	43	44
	10/05/08	9 - 10	N	5.1	140	71	ND (0.406)	13	20	3.4	6.4	29	ND (1)	44	42
	10/05/08	11 - 12	N	7.1	92	50	ND (0.42)	15	17	4.5	ND (2.1)	38	ND (1)	54	42
	10/05/08	13 - 14	N	11	100	62	ND (0.424)	14	30	3.8	ND (5.3)	45	ND (1.1)	53	51
SS-3	06/29/97	0.5	N	---	---	---	ND (0.05)	---	---	---	---	---	---	---	---
SSB-1	06/25/97	1	N	---	---	13.7	ND (0.05)	---	14.9	---	---	11.6	---	---	35.7
	06/25/97	3	N	---	---	13.6	ND (0.05)	---	11	---	---	12	---	---	29.6
	06/25/97	6	N	---	---	16.7	ND (0.05)	---	16.9	---	---	12.2	---	---	34.5
	06/25/97	10	N	---	97.3	16.5	ND (0.05)	---	8.2	1.3	ND (0.2)	12.9	---	24.6	31.9
SSB-2	06/30/97	1	N	---	---	48.7	ND (0.05)	---	7.4	---	---	7.9	---	---	27.3
	06/30/97	3	N	---	---	7.6	ND (0.05)	---	6.8	---	---	5.7	---	---	20.4
	06/30/97	6	N	---	---	10.1	ND (0.05)	---	9.4	---	---	7.9	---	---	27
	06/30/97	10	N	---	46.4	9.7	ND (0.05)	---	11	3.1	ND (0.2)	11.7	---	20.2	27.3
SSB-3	06/30/97	1	N	---	---	8.2	ND (0.05)	---	4.3	---	---	6	---	---	13.7
	06/30/97	3	N	---	---	13.2	ND (0.05)	---	9.5	---	---	10.4	---	---	21.4

TABLE C1-12

Sample Results Compared to the Calculated Soil Screening Levels
AOC1 South/SMWU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
Soil Screening Levels : [1]				**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
Background : [2]				**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
SSB-3	06/30/97	6	N	---	---	23.5	ND (0.05)	---	13.7	---	---	16.4	---	---	27.1
	06/30/97	10	N	---	70	7.1	ND (0.05)	---	13.4	2.3	ND (0.2)	7.7	---	15.5	19.2
SSB-4	06/30/97	1	N	---	---	10.1	ND (0.05)	---	3	---	---	3.9	---	---	11.9
	06/30/97	3	N	---	---	1,520	ND (0.05)	---	10.3	---	---	5.4	---	---	141
	06/30/97	6	N	---	---	297	ND (0.05)	---	12.4	---	---	6.9	---	---	130
	06/30/97	10	N	---	93.9	201	ND (0.05)	---	11.9	2.1	ND (0.2)	7.4	---	19.3	188
SSB-5	06/30/97	1	N	---	---	521	0.06	---	13.5	---	---	7.8	---	---	39.6
	06/30/97	3	N	---	---	1,440	ND (0.05)	---	16	---	---	4.2	---	---	128
	06/30/97	6	N	---	---	617	ND (0.05)	---	14.9	---	---	6.4	---	---	115
	06/30/97	10	N	---	89.6	31.6	ND (0.05)	---	7	1.75	ND (0.2)	7.7	---	18.7	107
WP-1	06/30/97	0	N	---	---	2,090	47.5	---	3.9	---	---	3.6	---	---	44.5
WP-2	09/18/97	0	N	---	---	25.9	ND (0.5)	---	22.8	---	---	9.9	---	---	80.1
WP-3	09/18/97	0.5	N	---	---	1,290	11.8	---	13.2	---	---	5.6	---	---	50.3
	09/18/97	2	N	---	---	273	0.41	---	18.6	---	---	18.3	---	---	50
WP-4	09/18/97	0	N	---	---	120	1.14	---	10.8	---	---	4	---	---	65.6
WP-5	09/18/97	0	N	---	---	511	3.51	---	16.8	---	---	13.2	---	---	50.4
	09/18/97	1	N	---	---	711	6.66	---	15.4	---	---	10.2	---	---	61.5
	09/18/97	2	N	---	---	421	8.97	---	15.8	---	---	12.9	---	---	51.9
	09/18/97	3	N	---	---	158	6.1	---	10.1	---	---	4.5	---	---	22.9
	09/18/97	4	N	---	---	113	10.2	---	24.4	---	---	20.6	---	---	41.9
WP-6	09/18/97	0	N	---	---	712	1.64	---	21.6	---	---	12.4	---	---	57.9
	09/18/97	1	N	---	---	1,030	9.46	---	18.2	---	---	5.8	---	---	46.5
	09/18/97	2	N	---	---	401	2.29	---	11.9	---	---	10.5	---	---	210
WP-BANK 1	11/23/98	0	N	---	---	261	5.5	---	10.3	---	---	3.8	---	---	23.4
WP-BANK 2	11/23/98	0	N	---	---	909	14	---	27.2	---	---	7.9	---	---	61.8
XMW-9	06/25/97	3	N	---	---	18.4	ND (0.05)	---	12	---	---	9	---	---	25.8
	06/25/97	10	N	---	257	45.7	ND (0.05)	---	19.7	5.7	0.075 J	35.2	---	44.5	44.2

TABLE C1-12
Sample Results Compared to the Calculated Soil Screening Levels
AOC1 South/SMWU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)											
			Soil Screening Levels : [1]	**39**	**2,600**	**3,400**	**0.22**	**40**	**13,000**	**2,100**	**0.73**	**2,300**	**25**	**66**	**77,000**
			Background : [2]	**11**	**410**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**1.37**	**27.3**	**1.47**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Selenium**	**Vanadium**	**Zinc**
XMW-9	06/25/97	10	FD	---	---	31.1	ND (0.05)	---	16.7	---	---	27	---	---	38.7
	06/25/97	30	N	---	88.1	35.6	ND (0.05)	---	17.2	7.2	0.11 J	32.1	---	42.9	50.3
	06/25/97	50	N	---	57.4	36.3	ND (0.05)	---	15.6	4.5	ND (0.2)	28.5	---	37.7	54.2
	06/25/97	70	N	---	1,580	6.7	ND (0.05)	---	170	6.1	1.8	7.4	---	19.7	54.6
P-2Soil	11/13/98	3.5	N	---	---	33.2	ND (0.76)	---	6	---	---	5.6	---	---	6.4

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Cobalt has no MCL. EPA tapwater regional screening level (11 ug/L) was used in place of MCL.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C1-13

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)
SWMU 1 - Former Percolation Bed (Former Holding Pond)
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			TTLC in mg/kg[1]		**STLC in mg/L**[1]			**TCLP in mg/L**[1]		
Parameter	**Frequency of detection**	**Maximum Detected Value (mg/kg)**	**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	0 / 141 (0%)	ND (4)	0	500	0	150	15	0	NE	NE
Arsenic	134 / 141 (95%)	12	0	500	0	50	5	0	100	5
Barium	149 / 149 (100%)	1,900	0	10000	1	1000	100	0	2000	100
Beryllium	0 / 141 (0%)	ND (5.3)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 141 (0%)	ND (2)	0	100	0	10	1	0	20	1
Chromium	185 / 185 (100%)	3,200	2	2500	58	50	5	37	100	5
Chromium, Hexavalent	48 / 185 (26%)	47.5	0	500	0	50	5	0	NE	NE
Cobalt	141 / 141 (100%)	19	0	8000	0	800	80	0	NE	NE
Copper	184 / 185 (99%)	61	0	2500	0	250	25	0	NE	NE
Lead	148 / 149 (99%)	13	0	1000	0	50	5	0	100	5
Mercury	0 / 141 (0%)	ND (0.12)	0	20	0	2	0.2	0	4	0.2
Molybdenum	31 / 149 (21%)	7.8	0	3500	0	3500	350	0	NE	NE
Nickel	185 / 185 (100%)	51	0	2000	0	200	20	0	NE	NE
Selenium	4 / 141 (2.8%)	2.5	0	100	0	10	1	0	20	1
Silver	0 / 141 (0%)	ND (5.3)	0	500	0	50	5	0	100	5
Thallium	0 / 141 (0%)	ND (11)	0	700	0	70	7	0	NE	NE
Vanadium	149 / 149 (100%)	57	0	2400	0	240	24	0	NE	NE
Zinc	185 / 185 (100%)	673	0	5000	0	2500	250	0	NE	NE

Notes:

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC x 10.

TABLE C1-14
Proposed Phase 2 Sampling Locations at SWMU 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[c]
SWMU1-18	0, 2, 5, 9, 14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gaps #1, #3, and #4 - Define lateral and vertical extent in southern part of AOC 1 and support CMS/FS	Hexavalent chromium, Title 22 metals, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Rotosonic
SWMU1-19	0, 2, 5, 9, 14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gap #1, #3, and #4 - Define lateral and vertical extent in bottom of Bat Cave Wash	Hexavalent chromium, Title 22 metals, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Rotosonic
SWMU1-20	14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gaps #1 and #3 - Define vertical extent at previous sample location SWU1-2	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
SWMU1-21	14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gaps #1 and #3 - Define vertical extent at previous sample location SWU1-1	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
SWMU1-22	None – pothole sample location	To resolve Data Gap #2 – Define lateral extent of white powder area and collect a sample of the white powder material and soil	Hexavalent chromium, Title 22 metals, PCBs[a], SPLP[b] and general chemistry analyses[b]	Backhoe
SWMU1-23	None – pothole sample location	To resolve Data Gap #2 – Define lateral extent of white powder area and collect a sample of the white powder material and soil	Hexavalent chromium, Title 22 metals, PCBs[a], SPLP[b] and general chemistry analyses[b]	Backhoe
SWMU1-24	None – pothole sample location	To resolve Data Gap #2 – Define lateral extent of white powder area and collect a sample of the white powder material and soil	Hexavalent chromium, Title 22 metals, PCBs[a], SPLP[b] and general chemistry analyses[b]	Backhoe

Notes:

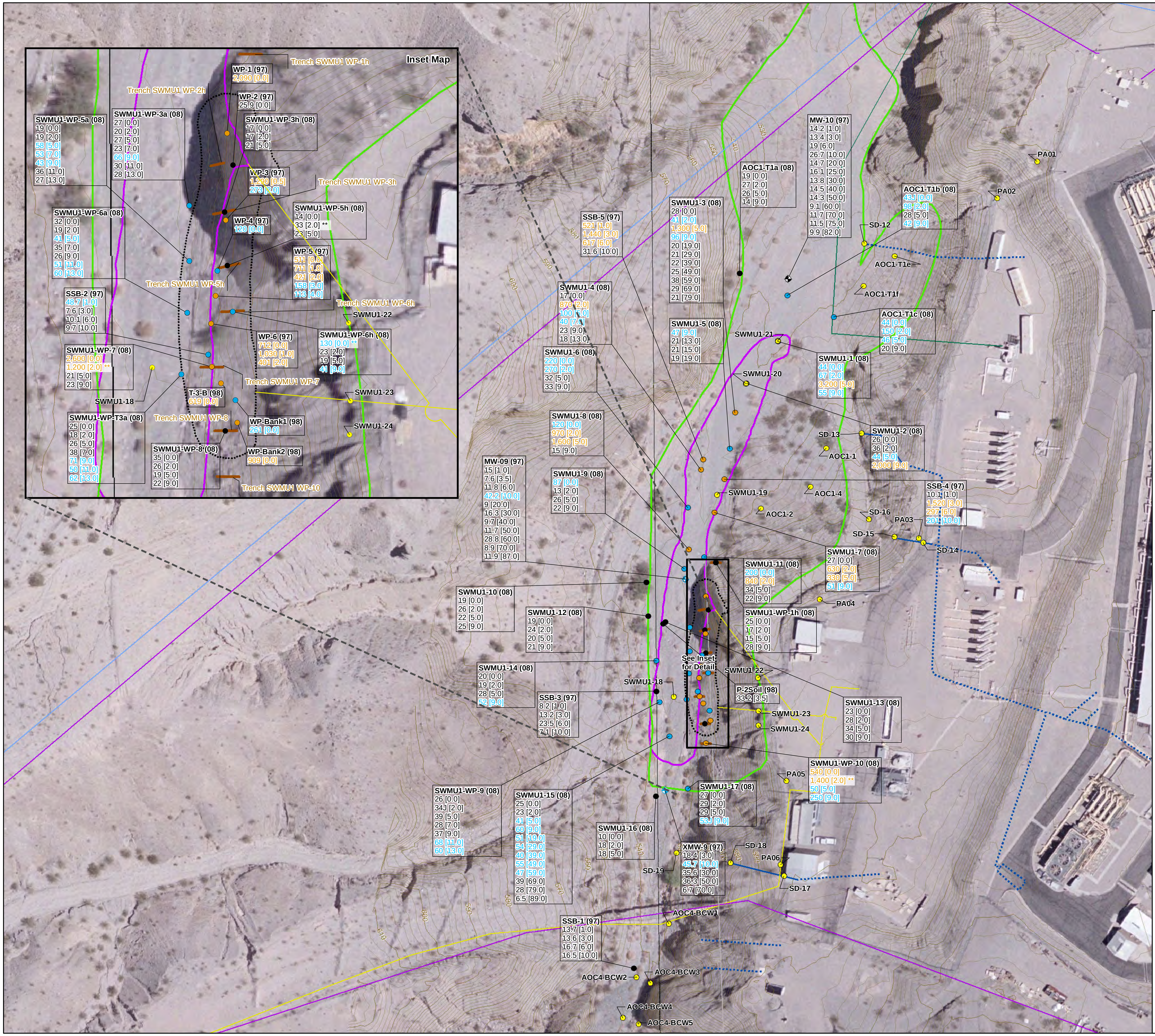
CMS/FS = corrective measures study/feasibility study.
ft bgs = feet below ground surface.

[a] PCB analysis only on soil samples collected at 0 and 2 feet bgs.

[b] White powder samples only.

[c] Proposed anticipated collection methods listed on this table are based on experience and knowledge of the site; actual collection method will be chosen in the field based on field conditions and site access restrictions.

Figures



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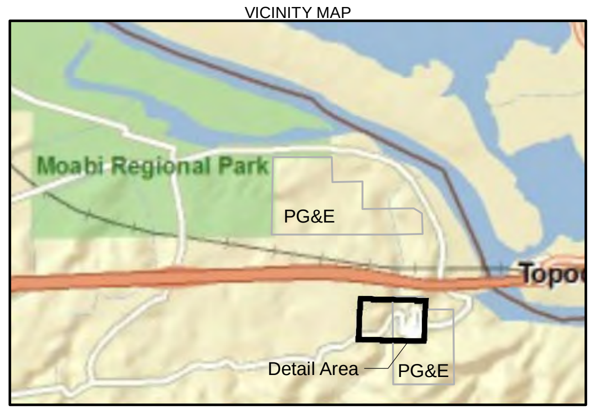

LEGEND

- ○ Proposed Phase 2 Sample location
- ⌖ Monitoring Well
- ● Soil Boring
- — Property Boundary
- — Approximate trench location and extent
- AOC 1 Boundary
- White Powder Area
- SWMU1 Boundary
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- — Historical Discharge Piping
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Year
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. ** = White Powder Sample (highlighted)
5. Results greater than Background (39.8 mg/kg) are shown in BLUE.
6. Results greater than or equal to the U.S Emvironmental Protection Agency Residential Regional Screening Level (280 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. Ecological Comparison Value (36.3 mg/kg) is below background value; therefore, the screening level is set at the background value.
9. Topographic contours shown are in 2 foot intervals.

FIGURE C1-1
Total Chromium Soil Sample Results SWMU 1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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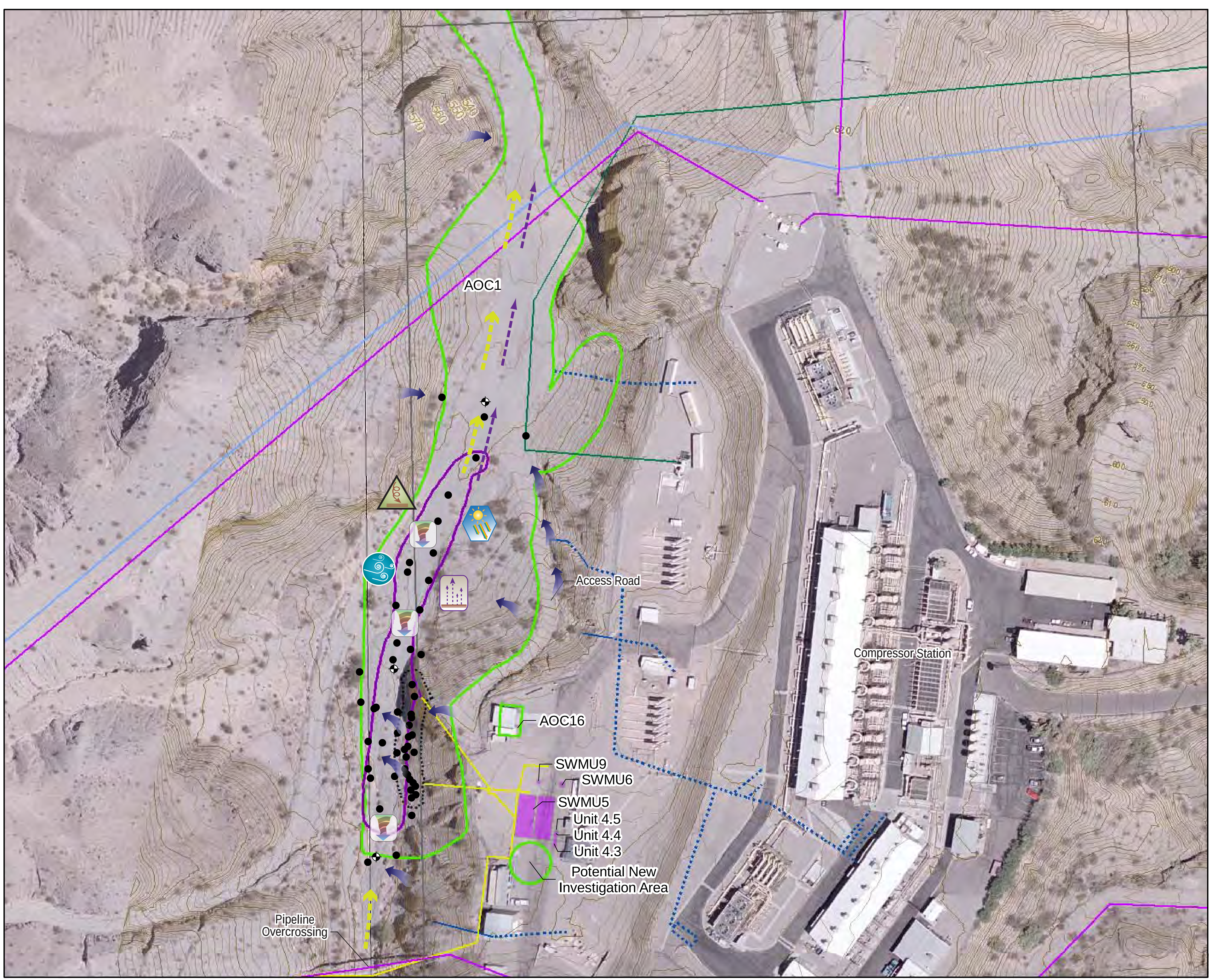

FIGURE C1-2
Conceptual Site Model for SWMU-1
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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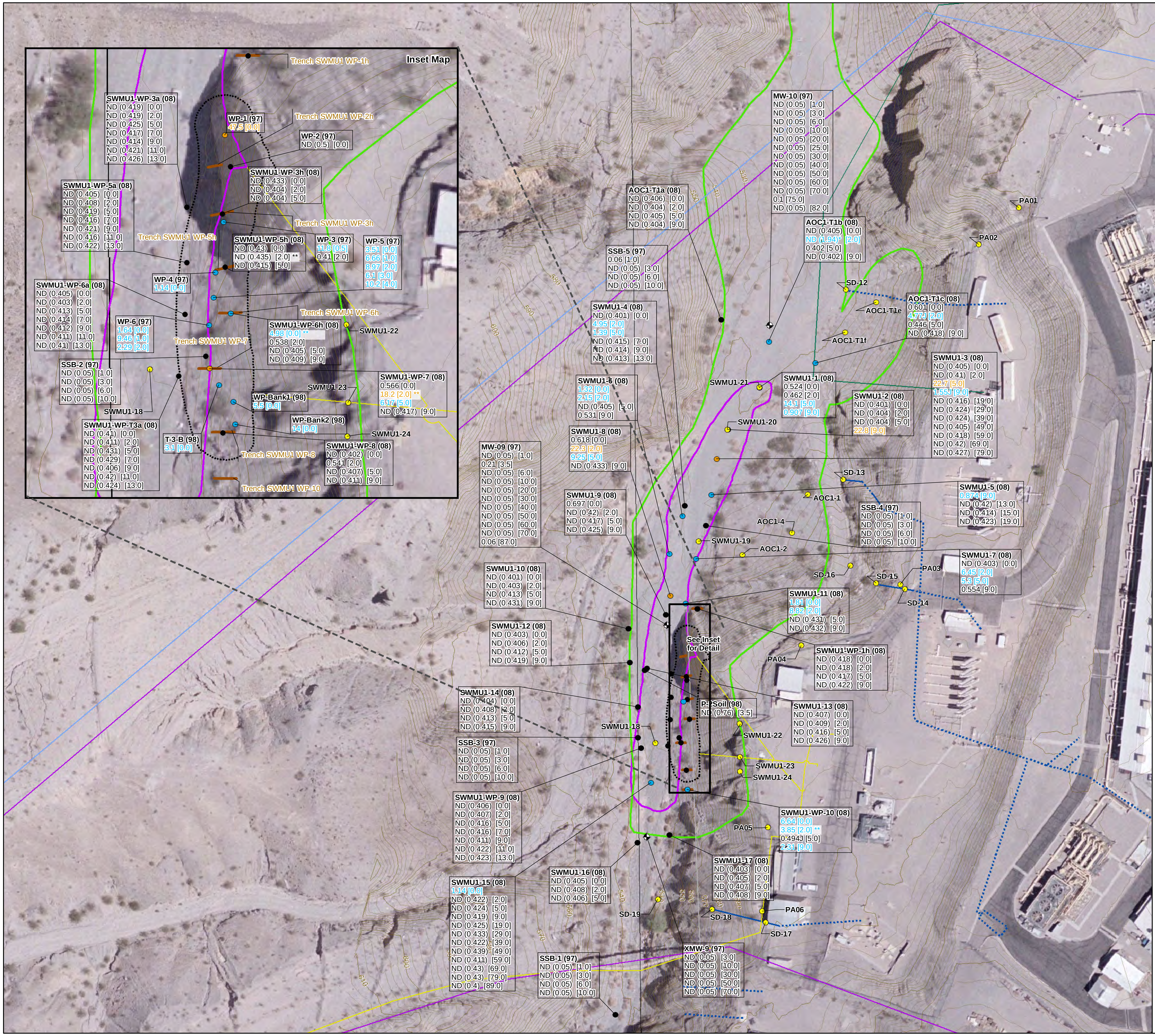

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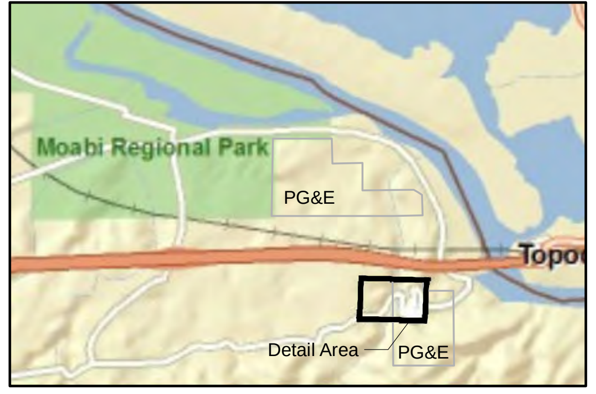

LEGEND

- 🟡 Potential Phase 2 Sample Location
- ⊕ Monitoring Well
- ● Soil Boring
- ━ Approximate trench location and extent
- ─ Property Boundary
- AOC 1 Boundary
- White Powder Area
- SWMU 1 Boundary
- ─ Transwestern Pipeline
- ─ Mojave Pipeline
- ─ PG&E Pipeline
- ─ SoCal Gas Pipeline
- ─ Historical Discharge Piping
- ┅ Approximate Location of Stormwater Piping Below Ground
- ─ Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location — Installation Year
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. ** = White Powder Sample (highlighted)
5. Results greater than Background (0.83 mg/kg) are shown in BLUE.
6. Results greater than or equal to the Ecological Comparison Value (139.6 mg/kg) are shown in PURPLE.
7. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (17 mg/kg) are shown in ORANGE.
8. J = Estimated Result.
9. Topographic contours shown are in 2 foot intervals.

N

0 50 100
Feet

FIGURE C1-3
Hexavalent Chromium Soil Sample Results SWMU 1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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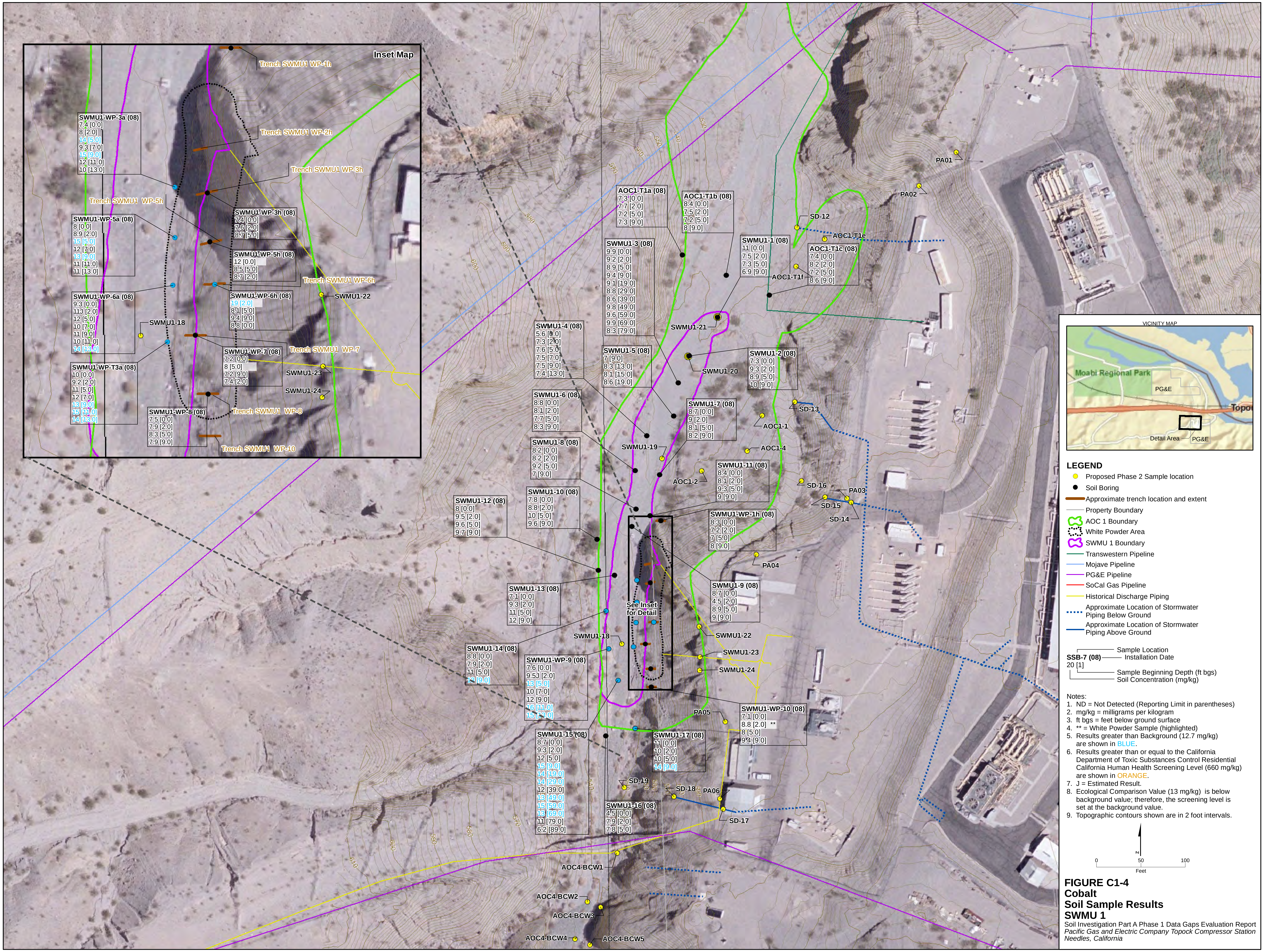


LEGEND

- Proposed Phase 2 Sample location
- Soil Boring
- Approximate trench location and extent
- Property Boundary
- AOC 1 Boundary
- White Powder Area
- SWMU 1 Boundary
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Historical Discharge Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

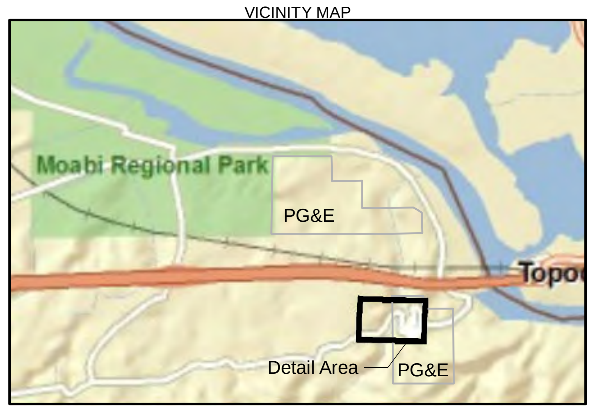
SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. ** = White Powder Sample (highlighted)
5. Results greater than Background (12.7 mg/kg) are shown in BLUE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (660 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. Ecological Comparison Value (13 mg/kg) is below background value; therefore, the screening level is set at the background value.
9. Topographic contours shown are in 2 foot intervals.

FIGURE C1-4
Cobalt
Soil Sample Results
SWMU 1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- Approximate trench location and extent
- Property Boundary
- AOC 1 Boundary
- White Powder Area
- SWMU 1 Boundary
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Historical Discharge Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location; Installation Year
20 [1] — Sample Beginning Depth (ft bgs); Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (16.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3,000 mg/kg) are shown in ORANGE.
7. ** = White Powder Sample (highlighted)
8. J = Estimated Result.
9. Topographic contours shown are in 2 foot intervals.

N
0 50 100
Feet

FIGURE C1-5
Copper
Soil Sample Results
SWMU 1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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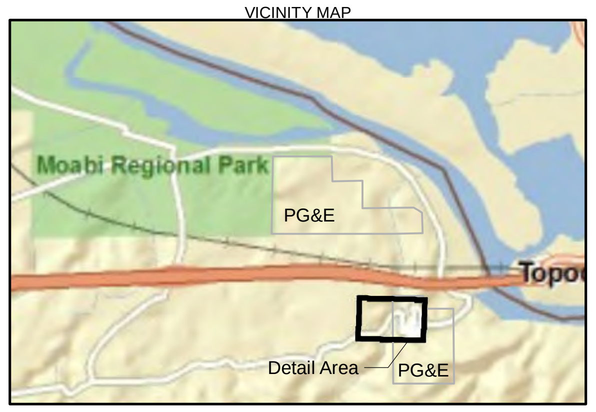
VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- ▬ Approximate trench location and extent
- — Property Boundary
- AOC 1 Boundary
- White Powder Area
- SWMU 1 Boundary
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- — Historical Discharge Piping
- ····· Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location — Installation Year
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (1.37 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (2.25 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (380 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. ** =White Powder Sample (highlighted)
9. * = Laboratory reporting limit exceeds screening levels.
10. Topographic contours shown are in 2 foot intervals.

N

0 50 100
Feet

FIGURE C1-6
Molybdenum
Soil Sample Results
SWMU 1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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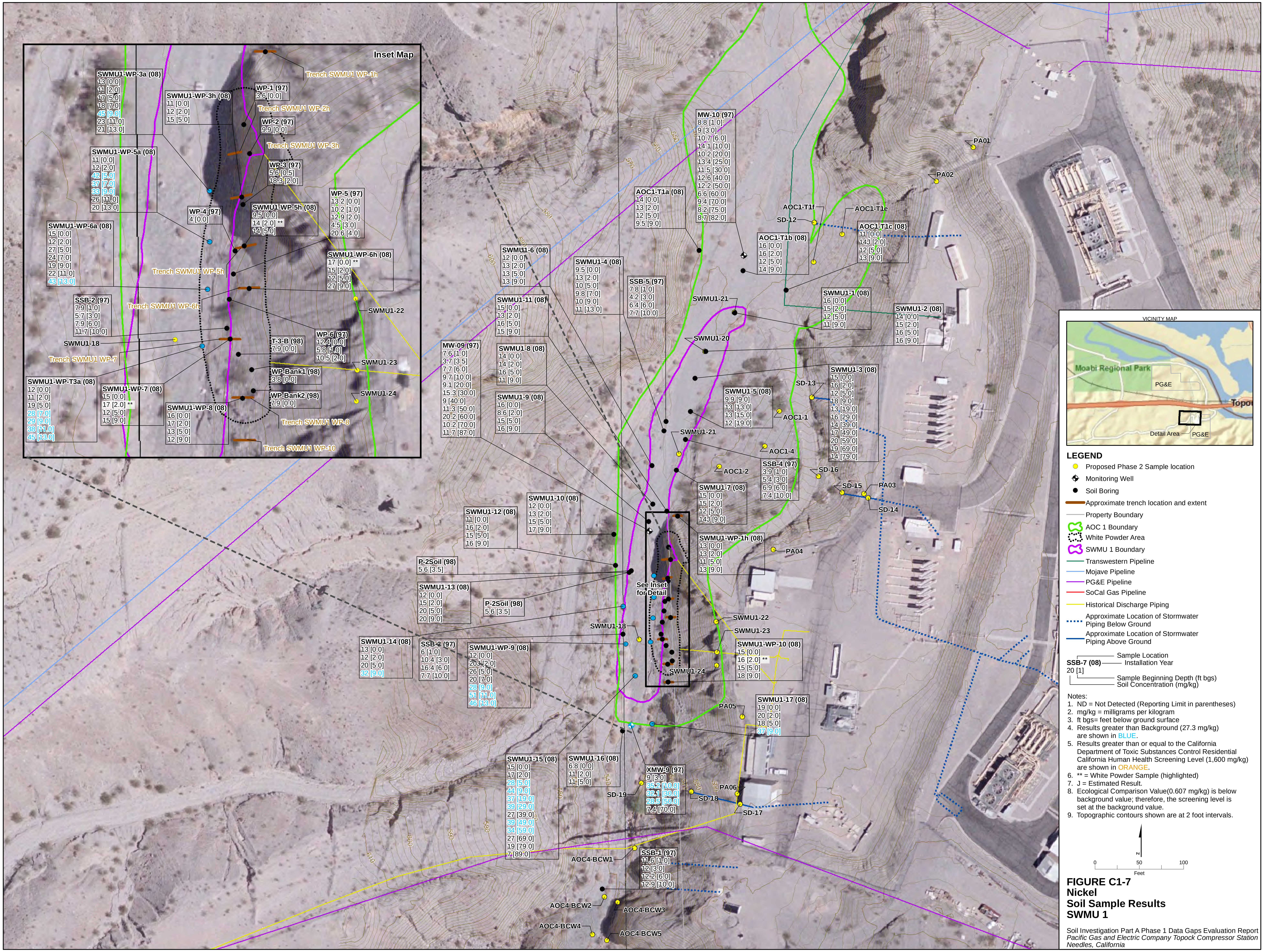


LEGEND

- ● Proposed Phase 2 Sample location
- Monitoring Well
- ● Soil Boring
- Approximate trench location and extent
- Property Boundary
- AOC 1 Boundary
- White Powder Area
- SWMU 1 Boundary
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Historical Discharge Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

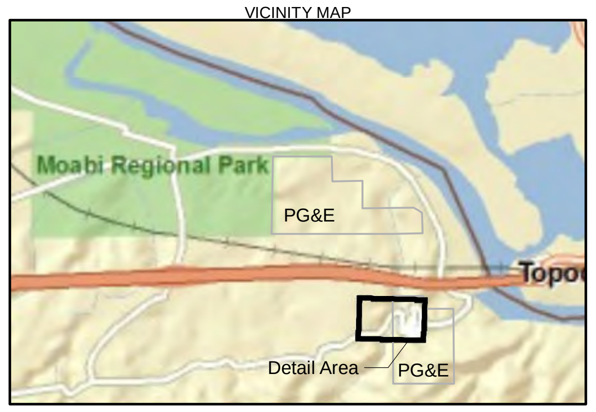
SSB-7 (08) — Sample Location, Installation Year
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs= feet below ground surface
4. Results greater than Background (27.3 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (1,600 mg/kg) are shown in ORANGE.
6. ** = White Powder Sample (highlighted)
7. J = Estimated Result.
8. Ecological Comparison Value(0.607 mg/kg) is below background value; therefore, the screening level is set at the background value.
9. Topographic contours shown are at 2 foot intervals.

FIGURE C1-7
Nickel
Soil Sample Results
SWMU 1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ● Soil Boring
- ⌖ Monitoring Well
- ━ Approximate trench location and extent
- ─ Property Boundary
- AOC 1 Boundary
- White Powder Area
- SWMU 1 Boundary
- ─ Transwestern Pipeline
- ─ Mojave Pipeline
- ─ PG&E Pipeline
- ─ SoCal Gas Pipeline
- ─ Historical Discharge Piping
- ┅ Approximate Location of Stormwater Piping Below Ground
- ─ Approximate Location of Stormwater Piping Above Ground

SSB-7 (08)
20 [1]

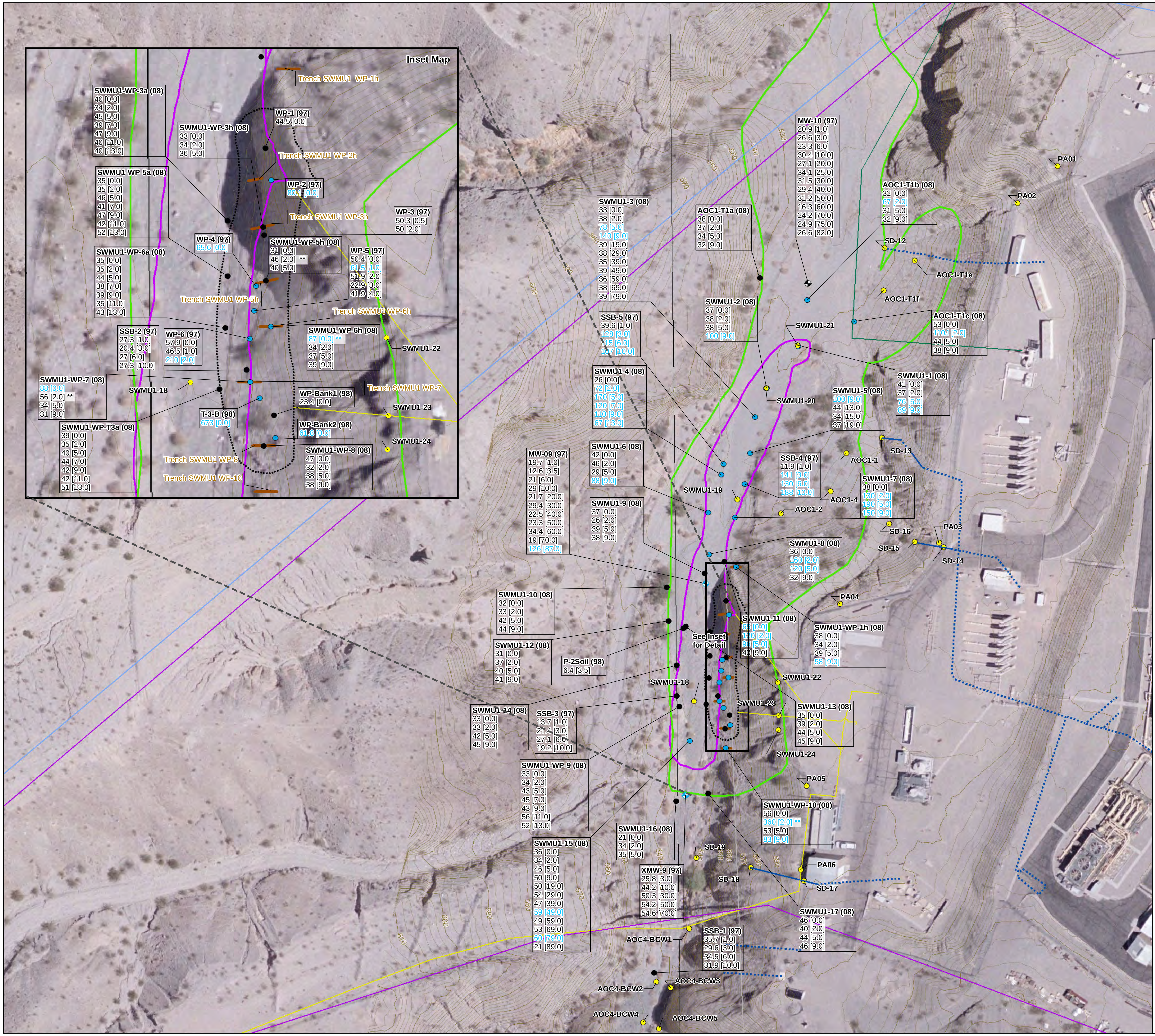
Sample Location
Installation Year
Sample Beginning Depth (ft bgs)
Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (52.2 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (530 mg/kg) are shown in ORANGE.
6. ** = White Powder Sample (highlighted)
7. J = Estimated Result.
8. Ecological Comparison Value (13.9 mg/kg) is below background value; therefore, the screening level is defaulted to the background value.
9. Topographic contours shown are in 2 foot intervals.

N

0 50 100
Feet

FIGURE C1-8
Vanadium
Soil Sample Results
SWMU 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



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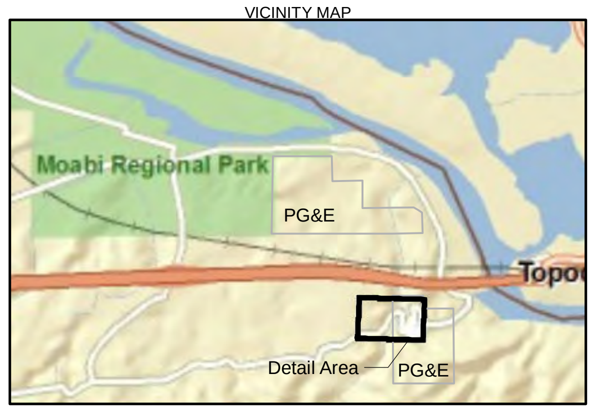

LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- Approximate trench location and extent
- Property Boundary
- AOC 1 Boundary
- White Powder Area
- SWMU1 Boundary
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Historical Discharge Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Year
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (58 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (23,000 mg/kg) are shown in ORANGE.
6. ** = White Powder Sample (highlighted)
7. J = Estimated Result.
8. Ecological Comparison Value (0.164 mg/kg) is below background value; therefore, the screening level is set at the background value.
9. Topographic contours shown are in 2 foot intervals.

N
0 50 100
Feet

FIGURE C1-9
Zinc
Soil Investigation SWMU 1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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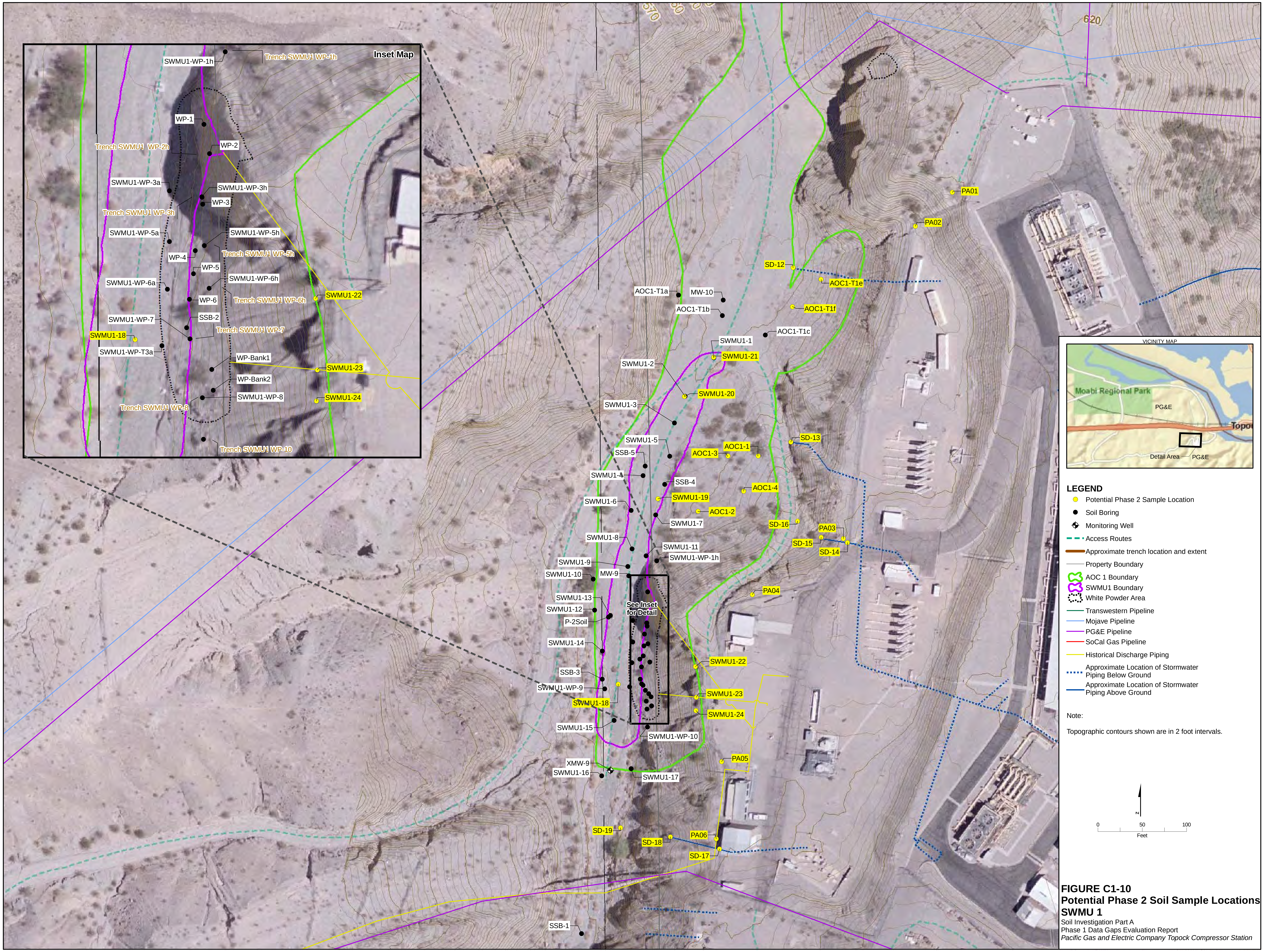

FIGURE C1-10
Potential Phase 2 Soil Sample Locations SWMU 1

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station

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Appendix C2

Area of Concern 1 Data Gaps Evaluation Results

Contents

Section **Page**

Acronyms and Abbreviations C2-vii

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
CMS/FS	corrective measures study/feasibility study
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DQO	data quality objective
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
STLC	soluble threshold limit concentration
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
VOC	volatile organic compound

APPENDIX C2

Area of Concern 1 Data Gaps Evaluation Results

1.0 Introduction and Background

This sub-appendix presents the results of the Data Gaps Evaluation and the Part A Phase 2 Sampling Program for Area of Concern (AOC) 1 – Area Around Former Percolation Bed at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 in the Data Gaps Evaluation Report.

1.1 Background

AOC 1 consists of the area that surrounds Solid Waste Management Unit (SWMU) 1, the former percolation bed. AOC 1 is located outside the facility fence line west of the compressor station within Bat Cave Wash, as shown in Figures C2-1 and C2-2. (All figures and tables appear at the end of this sub-appendix.) AOC 1 comprises a portion of Bat Cave Wash adjacent to the station and surrounding SWMU 1, as well as the portion of Bat Cave Wash extending to the north toward the Colorado River from SWMU 1. The investigation area is located partially on PG&E property, partially on the Havasu National Wildlife Refuge, partially on Bureau of Reclamation property (managed by Bureau of Land Management), partially on Burlington Northern Santa Fe Railroad land, and partially on Fort Mojave Indian Tribe property with PG&E as the easement holder.

From 1951 to approximately 1971, the facility discharged wastewater containing chromium (cooling tower blowdown) into Bat Cave Wash. Based on historical aerial photographs, it appears that during the 1950s, the facility discharged wastewater into the wash without any impoundment. Wastewater was released to the wash through two pipes that ran from the sludge-drying beds (SWMU 5) area in the lower yard down the slope into Bat Cave Wash. From about 1964 to 1971, wastewater was discharged to the former percolation bed (SWMU 1) which allowed water to percolate into the ground and/or evaporate. The chromium-containing wastewater was combined with a small quantity (approximately 5 percent) of treated water from the waste treatment system discharged from the station. PG&E completed closure of the former water treatment system that consisted of the sludge-drying beds (SWMU 5), chromate reduction tank (SWMU 6), process pump tank (SWMU 8), transfer pump (SWMU 9), transfer piping (AOC 18), the oil/water holding tank (Unit 4.3), the oil/water separator (Unit 4.4), and the portable waste oil storage tank (Unit 4.5). In the 1955 aerial photograph, an apparent round impoundment area with white powder material is located to the south of the sludge-drying beds (SWMU 5). This area has been identified as a new AOC (AOC 21) in the Part B investigation program (see Figure C2-2). Aerial photo review indicates that, prior to the establishment of the bermed percolation bed, discharges to Bat Cave Wash may have extended as far downstream as the railroad tracks.

Periodic storm (high runoff) events occur in Bat Cave Wash, making it difficult to assess the precise nature of erosion and deposition patterns. A 2006 storm event resulted in substantial erosion in portions of the wash in the vicinity of the compressor station, and a January 2010 storm event resulted in the movement of large gravel and cobbles from the southern area of Bat Cave Wash to the area near where AOC 4 enters Bat Cave Wash and as far north as the L-300A pipeline overcrossing (in the vicinity of SSB-1). North of the pipeline overcrossing, there appeared to be limited scouring and deposition in the wash and limited erosion of the wash walls within SWMU 1/AOC 1. Although there was damage to well MW-38, (installed in Bat Cave Wash), most of the sample location survey markers (1/8-inch lathe stakes) were still in place following the 2010 runoff event. MW-38 is also located immediately downstream of a sizable feeder wash on the west side of Bat Cave Wash. Based on this visual reconnaissance of Bat Cave Wash, most of the soil samples collected during Soil Part A Phase 1 are still considered to be representative. Surficial samples collected from locations within areas of highest energy during the 2010 event may not be representative of current conditions.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 1 based on the above site history and background and is shown in Figures C2-3 and C2-4. Table C2-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 1. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the Soil Part A Data Quality Objective (DQO) Tech Memo, which is included as Appendix A to the Data Gaps Evaluation Report.

For AOC 1, the primary source of contamination is historical direct discharge of untreated wastewater into Bat Cave Wash and potential overflow or discharges from the SWMU 1 percolation bed. Therefore, surface soil in AOC 1 is the primary source medium. From surface soil, contaminants could have migrated to shallow and deeper soils. Shallow soils may act as a secondary source medium to subsurface soil, and subsurface soil may act as a secondary source medium to groundwater. Some of the contaminated wastewater may have infiltrated to affect subsurface soil and groundwater, as hexavalent chromium contamination is present in groundwater underneath AOC 1. If released, volatile organic compounds (VOCs) in surface soils would be expected to have been degraded by heat and light and are likely no longer present.

Other potential sources of contamination to AOC 1 are:

- Discharge from the Debris Ravine (AOC 4). Contaminants in fill/debris and surface soil in AOC 4 could have been entrained in surface water runoff and deposited in the southern portion of AOC 1 south of SWMU 1.
- Incidental spills and stormwater runoff from the western side of the compressor station (storm drains and/or sheet flow).
- Stormwater runoff from Interstate 40 and the railroad (from culverts discharging to Bat Cave Wash) could have resulted in the release of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), lead, and wear metals (including barium, chromium, copper, nickel, and zinc) into AOC 1.

- Stormwater runoff from AOC 14, North of Interstate 40.
- Historical dumping and military activities in the vicinity of Bat Cave Wash.
- Runoff from the former "Workman's Roadhouse" and service station near the mouth of Bat Cave Wash.

Historically, chemicals of potential concern (COPCs) in surface soil in AOC 1 may have been eroded and entrained in stormwater/surface water runoff during flooding events and may have been subsequently re-deposited downstream (further north) in Bat Cave Wash. Repeated erosion and deposition of soil at AOC 1 may have resulted in mixing of surface and near-surface soils in this unit.

The thick vegetation, widening of the channel near the end of Bat Cave Wash, and blockage of flow by National Trails Highway, greatly reduces the energy of flow during runoff events, resulting in deposition of entrained soil within the vegetated area near the mouth of Bat Cave Wash. This heavily vegetated portion of Bat Cave Wash is a long-term depositional area that has existed since before the compressor station was built.

For AOC 1, windblown contamination from within the wash (in the southern portion of AOC 1 around SWMU 1), is influenced by the topography of the wash. Windblown contamination, if any, is expected to be limited to surface soils.

Part A Phase 1 and historical soil samples were collected in AOC 1 primarily from the bed of the wash, with six sample transects in the areas south of the Burlington Northern Santa Fe railroad tracks and in a linear pattern in center of the wash north of the railroad tracks to the south end of the vegetated area at the mouth of the wash.

Sixteen samples were collected from four locations on the upstream side of the vegetated area near the mouth of Bat Cave Wash, and two samples were collected from one location on the downstream side, as shown in Figure C2-2.

Additionally, six samples from four locations were collected south of SWMU 1, where AOC 4 Debris Ravine enters Bat Cave Wash, to assess potential impacts from AOC 4.

Based on the site history, background, and conceptual site models, Part A Phase 1 and historical soil samples were collected in areas within the wash expected to have been impacted by the discharge of chromium-containing wastewater from the facility runoff and transport of material from SWMU 1, as well as runoff from AOC 4, portions of the compressor station, and potentially AOC 14 and MW-24 bench.

Both soil and sediment data have been collected in AOC 1. These two data sets are discussed separately below.

1.3 AOC 1 Soil Sampling

1.3.1 AOC 1 Soil Data

There are 64 historical soil samples collected from 17 locations (MW-10, MW-11, MW-13, SS-1 through SS-8, SSB-1, SSB-6 through SSB-9, and XMW-9) in AOC 1, as shown in Figures C2-1 and C2-2. Samples were generally collected from 0 to 10 feet below ground surface (bgs); however, at XMW-9, MW-10, and MW-11, samples were collected from depths up to 82 feet bgs. Historical soil samples were analyzed for five constituents: total chromium, hexavalent chromium, copper, nickel, and zinc. The two samples from SS-1 were collected near the mouth of Bat Cave Wash in an area of soil transitioning to sediment. For the purposes of data evaluation, these two samples were included in both the soil and sediment data sets.

During the 2008 Soil Part A Phase 1 investigation, 105 soil samples (generally collected at sample depths of 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs) were collected from 26 sample locations (AOC1-BCW1 through 6 and AOC1-T1a-c, AOC1-T2a-e, AOC1-T3a-c, AOC1-T4a-c, AOC1-T5a-c and AOC1-T6a-c), as shown in Figures C2-1 and C2-2.

The two samples collected from location AOC1-BCW6 were collected where soil is transitioning into sediment near the mouth of Bat Cave Wash. As with the samples from SS-1, these two samples were included in both the soil and sediment data sets.

Soil Part A Phase 1 soil samples collected in AOC 1 were analyzed for Title 22 metals, hexavalent chromium, VOCs, semivolatile organic compounds, PAHs, TPH, pH, pesticides, and polychlorinated biphenyls (PCBs). Surface soil samples were not analyzed for VOCs. Ten percent of the Phase 1 soil samples collected in AOC 1 (11 soil samples) were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). In addition, synthetic precipitation leaching procedure (SPLP) extraction was performed on soil samples collected at 2 to 3 feet bgs and 5 to 6 feet bgs at sample location AOC1-T2d, as shown in Table C2-2. The leachate from the SPLP extractions was analyzed for total and hexavalent chromium. Phase 1 data are included in Appendix D to the Data Gaps Evaluation Report.

All historical Category 1 and validated Phase 1 soil data were used as inputs to the four DQO decisions, this data is shown on Tables C2-3 through C2-10.

1.3.2 AOC 1 Sediment Data

In addition to the soil and soil-transitioning-to-sediment data discussed above, 18 historical sediment samples (collected at 1 and 2 feet bgs) were collected from 18 sample locations in the mouth of Bat Cave Wash and along the banks of the Colorado River upstream and downstream of the mouth of Bat Cave Wash (DrSed-1 through DrSed-3, SED-1 through SED-12, and SED-27 through SED-29). The sediment samples were analyzed for total chromium, hexavalent chromium, copper, nickel, and zinc. A few of the samples were also analyzed for the full suite of Title 22 metals. Arsenic, cadmium, barium, beryllium, total chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silver, selenium, and thallium, vanadium, and zinc were detected in the sediment samples, as shown in Table C2-3.

1.3.3 Soil Data Collected in Bat Cave Wash near AOC 4

Soil sampling was recently conducted at the mouth of AOC 4 Debris Ravine where it enters Bat Cave Wash near the south end of AOC 1 as part of the AOC 4 time-critical removal action. The AOC 4 time-critical removal action is discussed in detail in Appendix C10. Twelve soil samples (AOC4-GB01 through AOC4-GB12) from seven sample locations were collected in this area at various depths, ranging from the surface to 5 feet bgs, and were analyzed for metals, PCBs, dioxins/furans, and PAHs. Prior to the AOC 4 time-critical removal action, three soil samples were collected in this area at sample location AOC4-1 at 0 to 0.5, 0.5 to 1, and 2 to 3 feet bgs, as shown in Figure C2-1. The AOC4-1 samples were analyzed for Title 22 metals, hexavalent chromium, PCBs, and PAHs. Barium, total chromium, hexavalent chromium, copper, lead, and zinc were detected in these soil samples above their respective soil background threshold values (BTVs). The maximum detected concentration of total PCBs was 2,400 micrograms per kilogram (µg/kg) in sample AOC4-GB05 collected at 4 to 5 feet bgs. The maximum detected concentration of dioxin/furan 2,3,7,8-TCDD toxic equivalency quotients (TEQs) was 950 nanograms per kilogram (ng/kg) in surface soil sample AOC4-GB03. All detected concentrations of benzo(a)pyrene equivalents were below screening levels.

During the installation of the gabions near the mouth of Debris Ravine, soil excavation was conducted, and soil was removed where samples AOC4-GB01 through AOC4-GB09 were collected. The soil samples collected at AOC4-GB10, AOC4-GB11, AOC4-GB12, and AOC4-1 are the only sample locations remaining, as shown in Figure C2-1. Results for these remaining samples are shown in Table C2-9. All historical Category 1, representative AOC 4 data (i.e., from samples collected following the installation of the gabions) and validated Phase 1 soil data were used as inputs to the four DQO decisions.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and chemicals of potential ecological concern (COPECs) at AOC 1. Data for AOC 1 were divided into two media: soil and sediment. Laboratory analytical results for historical and Phase 1 soil samples at AOC 1 are presented in Tables C2-2 and C2-4 through C2-10. (As noted above, laboratory analytical results for historical sediment samples at AOC 1 are presented in Table C2-3.) Tables C2-4 through C2-10 also includes data for white powder samples. Table C2-11 presents a statistical summary of soil analytical results for COPCs and COPECs that were either (1) detected above the laboratory reporting limits or (2) not detected but where the reporting limits for one more samples was greater than the interim screening value. The soil statistical summary presented in Table C2-10 does not include white powder or sediment samples.

2.1 Summary of AOC 1 Sediment Data

The 2005 *RCRA Investigation/Remedial Investigation Report PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2005) recommended no further action for sediment in this AOC. Therefore, no additional sediment sampling was proposed as part of the Soil Part A Work Plan. However, since the completion of the Soil Part A Work Plan, consensus-based threshold effect concentrations (TECs) and consensus-based probable effects concentrations were identified in the *Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California* as potential screening values for sediment samples, as shown in Table C2-1 (ARCADIS, 2008). To confirm the previous assessment of historical sediment concentrations, the combined AOC 1 sediment data (historical sediment data and data from SS-1 and AOC1-BCW6) were compared to the newly-defined interim screening values for sediment.

TECs are the more conservative of the two screening criteria; therefore, the interim screening levels for metals in sediment were defined as the TEC, where available, and soil BTV where no TEC was available. TECs are available for arsenic, cadmium, total chromium, copper, lead, mercury, nickel, selenium, silver, and zinc. Soil BTVs are available for all but three of the remaining compounds (antimony, silver, and thallium).

All sediment data were below the applicable interim screening values, with exception of arsenic, chromium, and hexavalent chromium in the shallow sample (0 to 0.5 foot bgs) at AOC1-BCW6, as shown in Table C2-3 and Figures C2-5 through C2-7. In this sample, located in the soil-transitioning-to-sediment zone, arsenic and chromium exceeded the TECs and hexavalent chromium exceeded the soil BTV. Hexavalent chromium was not detected above laboratory reporting limits in any of the historical sediment samples; however, the reporting limits ranged from 0.05 to 6 milligrams per kilogram (mg/kg), some of which are above the soil BTV of 0.83 mg/kg.

A TEC or soil BTV was not available for antimony, silver, or thallium. Antimony was not detected above laboratory reporting limits. All detections of silver are estimated concentrations below or approximately equal to the reporting limits for the non-detect samples. Thallium was detected in only one sample at an estimated concentration below the reporting limit for all the other samples.

2.2 Summary of AOC 1 Soil Data

Pesticides, TPH-gasoline, antimony, beryllium, cadmium, mercury, selenium, silver, thallium, cyanide, and most species of PCBs were not detected in soil samples collected in AOC 1. Table C2-11 lists the 41 constituents detected at AOC 1, including four calculated quantities: benzo(a)pyrene equivalents, total low molecular weight PAHs, total high molecular weight PAHs, and total PCBs. Nine of these constituents (aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, and total PCBs) were detected in the TAL/TCL samples.

Twenty-six of these constituents (cobalt, vanadium, aluminum, calcium, iron, magnesium, potassium, sodium, bis(2-ethylhexyl)phthalate, methyl acetate, 2-methyl naphthalene, anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, total low molecular weight PAHs, TPH-diesel, TPH-motor-oil, Aroclor 1254, and total PCBs) were detected at concentrations below their respective interim screening levels. Fifteen constituents, including two calculated quantities, were detected one or more times at concentrations exceeding the interim screening levels. These constituents were arsenic, barium, total chromium, hexavalent chromium, copper, lead, manganese, molybdenum, nickel, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(a)pyrene equivalents, and total high molecular weight PAHs. Seven constituents (total chromium, hexavalent chromium, copper, lead, molybdenum, zinc, and benzo(a)pyrene equivalent) were detected at concentrations exceeding the interim screening level four or more times; the distribution of these constituents are shown in Figures C2-1, C2-2, and C2-8 through C2-19. For ease of review, the figures show the sample locations and results separately for the area south of the railroad tracks and the area north of the railroad tracks.

2.3 Nature and Extent Evaluation

The following subsection discusses the nature and extent of COPCs and COPECs detected in soil at concentrations exceeding the interim screening level. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent have been adequately delineated. Section 2.4 of this sub-appendix summarizes the constituents that may require further evaluation, and Section 6.0 of this sub-appendix provides the recommended follow-up sampling for the Part A Phase 2 Soil Investigation.

2.3.1 Arsenic

Arsenic was detected in 106 of 111 soil samples collected at AOC 1. Only one detected concentration of arsenic (AOC1-BCW6 at 0 to 0.5 foot bgs) exceeded the interim screening level (11 mg/kg) (BTV); this same sample also exceeded the ecological comparison value (ECV) (11.4 mg/kg), as shown in Tables C2-4 and C2-11. This location is located at the mouth of Bat Cave Wash. No other samples in the vicinity of this location were analyzed for arsenic. At this location, the concentration in the deepest sample is below the screening level.

2.3.2 Barium

Barium was detected in 130 of 130 soil samples collected from AOC 1. Two detected concentration of barium in AOC 1 exceeded the interim screening level (410 mg/kg) (BTV/ECV), as shown in Table C2-4 and C2-11. The highest barium concentration was 1,580 mg/kg in sample XMW-9 at 70 feet bgs. The detected concentration is well below the residential and commercial/industrial California human health screening level (CHHSLs) (5,200 mg/kg and 63,000 mg/kg, respectively).

The detected concentration of barium exceeding the interim screening level is from the same sample in XMW-9 that also contained an elevated concentration of copper. As with the copper detection, there is a declining trend from 10 feet to 50 feet bgs, and barium concentrations in all samples above 70 feet bgs are below the interim screening level. The elevated concentration of barium detected at depth does not appear to be related to a surface release. Barium was also detected at 440 mg/kg in sample AOC4-1 at 0 to 0.5 foot bgs. This concentration is close to BTV.

2.3.3 Total Chromium

Total chromium was detected in 167 of 167 soil samples collected at AOC 1. Detected concentrations of total chromium exceeded the interim screening level (39.8 mg/kg) (BTV) 23 times (maximum detected concentration of 970 mg/kg at AOC1-T2d at 2 to 3 feet bgs), as shown in Tables C2-4 and C2-11 and Figures C2-1 and C2-2. Three of the detected concentrations of total chromium exceeded the United States Environmental Protection Agency residential regional screening level for residential use (280 mg/kg); none of the detected concentrations exceeded the residential regional screening level for commercial/industrial use (1,400 mg/kg). With the exception of the detection of total chromium at AOC 1-BCW6 and SSB-8, samples with concentrations exceeding the screening levels were located south of Interstate 40, primarily in the area immediately north of SWMU 1. The highest detected concentration south of SWMU 1 was 47 mg/kg (at AOC4-1 at 0 to 0.5 foot bgs), which is above the BTV (39.8 mg/kg). At all locations, the deepest samples have concentrations below the screening levels, with the exception of the deepest sample collected at AOC1-T1b; however, this sample contained only 42 mg/kg total chromium, which is very close to the BTV.

2.3.4 Hexavalent Chromium

Hexavalent chromium was detected in 28 of 173 soil samples collected at AOC 1. Detected concentrations of hexavalent chromium exceeded the interim screening level (0.83 mg/kg) (BTV) 12 times (with a maximum detected concentration of 5.73 mg/kg at AOC1-T2d at 2 to 3 feet bgs), as shown in Tables C2-4 and C2-11 and Figures C2-8 and C2-9. None of the detected concentrations of hexavalent chromium exceeded the residential or commercial/ industrial CHHSLs (17 mg/kg and 37 mg/kg, respectively) or the ECV (139.6 mg/kg). With the exception of AOC1-BCW4 at 0 to 0.5 foot bgs and AOC1-BCW6 at 0 to 0.5 foot bgs, AOC 1 samples with concentrations exceeding the screening levels were located south of Interstate 40; the highest concentrations are immediately north of SWMU 1, and concentrations decrease with distance from SWMU 1. All samples collected south of SWMU 1 had hexavalent chromium concentrations below the BTV. At all locations in AOC 1, hexavalent chromium concentrations in the deepest samples are below the screening levels.

2.3.5 Copper

Copper was detected in 166 of 167 soil samples collected at AOC 1. Detected concentrations of copper exceeded the interim screening level (16.8 mg/kg) (background value) 11 times (with a maximum detected concentration of 170 mg/kg at XMW-9 at 70 feet bgs), as shown in Tables C2-4 and C2-11 and Figures C2-10 and C2-11. Seven detected concentrations exceeded the ECV (20.6 mg/kg), and no detected concentrations of copper exceeded the residential or commercial/industrial CHHSLs (3,000 mg/kg and 38,000 mg/kg, respectively). With the exception of AOC1-BCW6 at 0 to 0.5 foot bgs, all AOC 1 samples with concentrations exceeding the screening levels were located south of Interstate 40. The locations of exceedances of the BTV and ECV were variable, with a slightly higher frequency of exceedance to the north of SWMU 1. With the exception of the deep sample from XMW-9, all detections were below 30 mg/kg. At all locations, concentrations in deepest samples are below the screening levels, with the exception of the deepest sample collected at XMW-9 (at 70 feet bgs). Copper concentrations in XMW-9 above this sample ranged from 12 to 19.7 mg/kg. There is an apparent declining trend from 10 feet bgs to 50 feet bgs, with a copper concentration in the 50 feet bgs sample of 15.6 mg/kg, which is below the background value. Therefore, because the elevated concentration of copper detected at depth does not appear to be related to a surface release, no further characterization is needed for copper in this area.

2.3.6 Lead

Lead was detected in 130 of 130 soil samples collected at AOC 1. Detected concentrations of lead exceeded the interim screening level (8.39 mg/kg) (BTV/ECV) 19 times (with a maximum detected concentration of 32J mg/kg at AOC1 T1c at 2 to 3 feet bgs), as shown in Tables C2-4 and C2-11 and Figures C2-12 and C2-13. None of the detected concentrations exceeded the residential or commercial/industrial CHHSLs (80 mg/kg and 320 mg/kg, respectively). The lateral extent of samples with lead concentrations exceeding the BTV consists of the portions of AOC 1 north and south of the tamarisk thicket, the area between the railroad tracks and sample Transect 3, and the samples collected at the mouth of the debris ravine (AOC 4 samples). With the exception of the samples from AOC1-T1c and AOC1-BCW6, exceedance concentrations were limited to no more than two times the BTV. At all locations except AOC1-T6b (concentration of 12 mg/kg at 9.5 feet bgs), concentrations in the deepest samples are below the BTV. Samples near AOC1-T6b collected at the same depth had concentrations equal to or below the BTV.

2.3.7 Molybdenum

Molybdenum was detected in 38 of 130 soil samples collected at AOC 1. Detected concentrations of molybdenum exceeded the interim screening level (1.37 mg/kg) (background value) 22 times (maximum detected concentration of 5.5 mg/kg at AOC1-T2b at 5 to 6 feet bgs), as shown in Tables C2-4 and C2-11 and Figures C2-14 and C2-15. Nine detected concentrations exceeded the ECV (2.25 mg/kg), and none of the detected concentrations of molybdenum exceeded residential and commercial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). The lateral extent of samples with concentrations exceeding the screening levels is limited to the central portions of AOC 1, just north of SWMU 1, with the exception of the exceedance at AOC1-T5a. Samples with concentrations below the screening levels surround the AOC1-T5a location. One sample each collected at locations AOC1-BCW2 (1.5 mg/kg at 5 to 6 feet bgs) and XMW-9 (1.8 mg/kg at 70 feet bgs) slightly exceeded the BTV. At all but three locations, concentrations in deepest samples are below the screening levels. The deepest samples at AOC1-T2d (at 69 to 70 feet bgs) and XMW-9 at (70 feet bgs) exceed the BTV but not the ECV. The deepest sample from AOC1-T1b (at 9 to 10 feet bgs) contains 5 mg/kg molybdenum.

2.3.8 Nickel

Nickel was detected in 167 of 167 soil samples collected from AOC 1. Detected concentrations of nickel exceeded the interim screening level (27.3 mg/kg) (BTV/ECV) three times (with a maximum detected concentration of 35.2 mg/kg at XMW-9 (10 feet bgs), as shown in Tables C2-4 and C2-11. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (1,600 mg/kg and 16,000 mg/kg, respectively). All concentrations exceeding the BTV were in soil samples collected at XMW-9; concentrations ranged from 28. 5 to 35.2 mg/kg. Samples with concentrations below the screening levels are located to the west but not to the north, east, or south of XMW-9. At this location, the concentration in the deepest samples is well below the BTV.

2.3.9 Zinc

Zinc was detected in 167 of 167 soil samples collected at AOC 1. Detected concentrations of zinc exceeded the interim screening level (58 mg/kg) (BTV) 13 times (with a maximum detected concentration of 132 mg/kg at SSB-6 at 6 feet bgs), as shown in Tables C2-4 and C2-10 and Figures C2-16 and C2-17. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). With the exception of the surface soil samples from AOC1-BCW4 and AOC1-BCW4, AOC 1 samples with concentrations exceeding the zinc BTV were located south of Interstate 40 and north of SWMU 1.

With the exception of the deepest sample collected at AOC1-T1b (69 to 70 feet bgs), the deepest zinc concentration at all locations is below the BTV.

2.3.10 Benzo(a)pyrene, Benzo(a)pyrene Equivalents, and PAHs

Benzo(a)pyrene was detected in 25 of 111 soil samples collected from AOC 1. Detected concentrations of benzo(a)pyrene exceeded the interim screening level of 38 µg/kg (residential CHHSL) three times (with a maximum detected concentration of 170 µg/kg at AOC1-T4c at 5 to 6 feet bgs). Several other PAHs were detected in soil samples collected from AOC 1; only benzo(a)anthracene and benzo(b)fluoranthene were detected at concentrations above their respective interim screening levels. These constituents were detected above their interim screening levels (residential CHHSLs) once each. At each location, individual constituent concentrations in the deepest samples are below the applicable interim screening levels. To assist with evaluation of PAHs for human health, benzo(a)pyrene equivalents were calculated for each of the soil samples collected at AOC 1, as shown in Table C2-6. Benzo(a)pyrene equivalent values exceeded the interim screening level (38 µg/kg) (residential CHHSL) five times (maximum detected concentration of 290 µg/kg at AOC1-T4c at 5 to 6 feet bgs), as shown in Tables C2-6 and C2-11 and Figures C2-18 and C2-19. Screening level exceedances were limited to five sample locations (AOC1-T1c at 0 to 0.5 foot bgs; AOC1-T4c at 2 to 3, 5 to 6, and 9 to 10 feet bgs; and AOC1-T5c at 5 to 6 feet bgs). At each location, the deepest samples have concentrations below the screening levels, with the exception of sample location AOC1-T4c. The deepest sample at AOC1-T4c (at 9 to 10 foot bgs) had a lower benzo(a)pyrene equivalent concentration than the two samples above this depth.

To assist with evaluation of PAHs for ecological risk, detected concentrations of low molecular weight PAHs and high molecular weight PAHs were summed and compared to the total low molecular weight PAHs and total high molecular weight PAHs ECVs of 10,000 µg/kg and 1,160 µg/kg, respectively. One total high molecular weight PAH sum of detected concentrations exceeded the ECV of 1,160 µg/kg, and none of the totals of detected low molecular weight PAH concentrations exceeded the ECVs. The ECV for total high molecular weight PAHs was exceeded in sample AOC1-T4c at 5 to 6 feet bgs (2,900 µg/kg); the sum of total high molecular weight PAHs was well below the ECV in the deeper sample at this location (9 to 10 feet bgs).

2.3.11 Target Analyte List/Target Compound List Constituents

As described above, aluminum, calcium, iron, magnesium, manganese, potassium, sodium, bis(2-ethylhexyl) phthalate, methyl acetate, Aroclor-1254, and total PCBs were detected in the AOC 1 soil samples analyzed for the complete TAL/TCL suite of compounds. (Note that some of these constituents, including semivolatile organic compounds and PCBs, were also analyzed at varying frequencies in other samples.) Manganese and total PCBs were the only constituents in this group that were detected at a concentration exceeding the interim screening.

Aluminum was detected in 12 of 12 surface soil samples collected from AOC 1. The detected concentrations did not exceed the BTV (16,400 mg/kg). The maximum detected concentration was 14,000 mg/kg at AOC1-BCW6. Remaining detected concentrations of aluminum ranged from 5,300 to 11,000 mg/kg, as shown in Tables C2-5 and C2-11. None of the detected concentrations exceeded residential and commercial RSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in 12 of 12 surface soil samples collected from AOC 1. The detected concentrations did not exceed the interim screening level of 66,500 mg/kg (BTV). The maximum detected concentration was 35,000 mg/kg at AOC1-BCW6. Remaining detected concentrations of calcium ranged from 14,000 to 30,000 mg/kg, as shown in Tables C2-5 and C2-11. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in 31 of 31 soil samples collected from AOC 1. The detected concentrations did not exceed the interim screening value (55,000 mg/kg [residential regional screening level (RSL)]). The maximum detected concentration was 22,600 mg/kg at XMW-9 at 10 feet bgs. Remaining detected concentrations of iron ranged from 3,510 to 22,200 mg/kg, as shown in Tables C2-5 and C2-11. Residential and commercial/industrial CHHSLs and an ECV have not been established for iron.

Magnesium was detected in 12 of 12 surface soil samples collected from AOC 1. Detected concentrations of magnesium were below the interim screening level of 12,100 mg/kg (BTV). The maximum detected concentration was 11,000 mg/kg, at AOC1-BCW6, as shown in Tables C2-5 and C2-11. Remaining detections ranged from 5,300 to 8,100 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in 31 of 31 samples collected from AOC 1. One detected concentration of magnesium (420 mg/kg in AOC1-BCW6 at 0 to 0.5 foot bgs) slightly exceeded the interim screening level of 402 mg/kg (BTV/ECV), as shown in Tables C2-5 and C2-11. The detected concentration did not exceed the residential and commercial/industrial RSLs (1,800 mg/kg and 23,000 mg/kg, respectively). Only the surface sample at AOC1-BCW6 was analyzed for manganese. Manganese concentrations in the remaining 29 samples were all below the BTV and ranged from 92.1 to 353 mg/kg.

Potassium was detected in 12 of 12 surface soil samples collected from AOC 1. The detected concentrations did not exceed the BTV (4,400 mg/kg). The maximum detected concentration was 4,000 mg/kg at AOC1-BCW6. Remaining detected concentrations of potassium ranged from 1,600 to 3,900 mg/kg, as shown in Tables C2-5 and C2-11. Residential and commercial/industrial CHHSLs and an ECV have not been established for potassium.

Sodium was detected in eight of 12 surface soil samples collected from AOC 1. The maximum detected concentration of sodium was 660 mg/kg at AOC1-BCW6, which is below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C2-5 and C2-11. Remaining detected concentrations of sodium ranged from non-detect to 340 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

Bis(2-ethylhexyl)phthalate was detected in two of 108 soil samples collected at AOC 1, both surface and subsurface soil samples were collected, as shown in Tables C2-7 and C2-11. The maximum detected concentration was 810 µg/kg at AOC4-1 (at 2 to 3 feet bgs), which is below the interim screening level of 2,870 µg/kg (ECV), and well below the residential and commercial/industrial RSLs (35,000 µg/kg and 120,000 µg/kg, respectively).

Methyl acetate was detected in two of 12 soil samples collected at AOC 1; all samples were collected at 2 to 3 feet bgs, as shown in Tables C2-7 and C2-11. The maximum detected concentration was 12 µg/kg at AOC4-1 (at 2 to 3 feet bgs), which is below the interim screening level of 22,000,000 µg/kg (residential RSL). An ECV and residential and commercial CHHSLs have not been defined for methyl acetate.

The PCB Aroclor-1254 was detected in seven of 17 soil samples collected from AOC 1; both surface and shallow soil (2 to 3 feet bgs) samples were collected. The maximum detected concentration of Aroclor-1254 of 900 µg/kg was detected at AOC4-GB11 at 0 feet bgs. Remaining detected concentration of Aroclor-1254 range from 24 to 420 µg/kg. None of the detected concentrations of Aroclor-1254 within AOC 1 exceeded the interim screening level of 220 µg/kg (residential RSL). Detected concentrations in AOC 1 samples ranged from 24 to 91 µg/kg, as shown in Table C2-9. All three AOC 4 gabion samples had Aroclor-1254 concentrations above the interim screening level.

To assist with evaluation of PCBs for ecological risk, detected concentrations of the Aroclors (only Aroclor-1254 at AOC 1) were summed, and the total PCB values were compared to the ECV. Total PCB concentrations in the three AOC 4 gabion samples exceeded the total PCB ECV of 204 µg/kg, as shown in Table C2-9. The maximum calculated value for total PCBs was 900 µg/kg. The remaining calculated total PCB concentrations ranged from 24 to 420 µg/kg. All total PCB concentrations within AOC 1 itself were well below the ECV.

As discussed in Section C.2 of Appendix C, PG&E recommends that PCBs be evaluated further in AOC 1. PG&E also recommends aluminum, calcium, iron, magnesium, manganese, potassium, sodium, methyl acetate, and bis(2-ethylhexyl)phthalate not be considered COPCs/COPECs for this SWMU, and no further sampling is proposed for these constituents. These constituents have been fully discussed in Section C.2 of Appendix C.

The three gabion sample locations associated with AOC 4 were also analyzed for dioxins and furans. As shown in Table C2-10, none of the individual dioxin and furan concentrations exceeded the applicable interim screening levels (residential CHHSL). To assist with evaluation of dioxins and furans for human health, 2,3,7,8-TCDD TEQs were calculated for each of the soil samples, as shown in Table C2-10. The TEQs for two of the three samples exceeded the interim screening level of 50 ng/kg. The two detected concentrations exceeding the screening levels were 94.5 ng/kg collected at 5 feet bgs from location AOC4-GB11 and 74.5 ng/kg collected from 5 feet bgs at location AOC4-GB10. The remaining detected concentration was 8.9 ng/kg, which is below the screening level.

2.4 Central Tendency Comparison to Background Threshold Values

Ten metals (arsenic, barium, total chromium, hexavalent chromium, copper, lead, manganese, molybdenum, nickel, and zinc) were detected above their respective BTVs in soil samples. A central tendency comparison was performed for nine of these ten metals (arsenic, barium, total chromium, copper, lead, manganese, molybdenum, nickel, and zinc) to compare the AOC 1 soil data set with the corresponding soil background data set. A central tendency comparison for hexavalent chromium was not conducted because there were insufficient detections of hexavalent chromium in the background data set.

The purpose of this comparison is to determine whether a difference exists between the two populations and if additional sampling is required for a given metal (see Table C2-12 and

Figure 3-1 in the Data Gaps Evaluation Report). No statistical difference between the two populations was noted for any of the nine metals evaluated (arsenic, barium, total chromium, copper, lead, manganese, molybdenum, nickel and zinc, as shown in Table C2-12).

2.5 Potential New White Powder Area

A new area of potential white powder material was identified subsequent to the January 2010 rain event. This area is shown in Figure B-5 in Appendix B to the Data Gaps Evaluation Report. While this potential new white powder area has been assigned to AOC 1, it is actually located high on a steep bluff and may represent a natural soil material (no known disposal or use of white powder material occurred in this area).

2.6 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates than decision error has been held to an acceptable level. Sufficient data of acceptable quality have been attained by the collection of historical/Part A soil samples in areas most likely to have been impacted by the waste water discharges to Bat Cave Wash, potential overflows or discharges from the former percolation bed in SWMU 1, stormwater runoff and incidental spills from the western side of the compressor station, stormwater runoff from Interstate 40 (from culverts discharging to Bat Cave Wash), military activities on the mesas in the vicinity of Bat Cave Wash (i.e., surface runoff from surrounding areas), and runoff from AOC 14. Further sampling is required to more closely define the extent of some areas with metals concentrations above the interim screening levels.

Potential impacts from discharges from the Debris Ravine (AOC 4), runoff from the former "Workman's Roadhouse" and service station (near the mouth of Bat Cave Wash), and the potential new white powder area on the bluff above AOC 1 have either not been characterized or have been only partially characterized. Further investigation is also required in the vicinity of AOC1-BCW6 located at the lower end of Bat Cave Wash in the tamarisk area where soil is transitioning to sediment. In addition, DOI has requested (December 15, 2010 email) that PG&E further evaluate and fully characterize the lower end of Bat Cave Wash, specifically in the tamarisk thicket area located near the mouth. This area is a historical and current depositional area of fine-grained materials being transported down the wash during rain events and may have received historical releases from the Topock Compressor Station. The evaluation of the tamarisk area near the mouth of Bat Cave Wash is discussed in Section 7.0 of this sub-appendix.

Based on the review of the data for AOC 1 and the Part A DQO, four data gaps were identified to resolve Decision 1 – Nature and Extent, and limited additional sampling is proposed in Phase 2 to fill the following data gaps:

- Data Gap #1 – Lateral and vertical extent of contamination in the bottom of Bat Cave Wash (within the portion of AOC 1 between the northern boundary of SWMU 1 and Interstate 40).
- Data Gap #2 – Extent of constituents associated with the discharge from the Debris Ravine, including PCBs and dioxins and furans.

- Data Gap #3 – Chemical concentrations of soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.
- Data Gap #4– Characteristics of the potential white powder material on the eastern slope of Bat Cave Wash.
- Data Gap #5 – Assess potential impoundment area near railroad bridge culvert and IM-3 road crossing.

The proposed Phase 2 soil sample locations to fill the identified data gaps are presented in Section 6.0.

3.0 Decision 2 – Data Sufficiency to Estimate Representative Exposure Point Concentrations

For Decision 2, AOC 1 data were combined with SWMU 1 data to determine whether SWMU 1/AOC 1 data are sufficient to conduct human health and ecological risk assessments. The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC) for the combined SWMU 1/AOC 1 area. Data reviewed were all available Category 1 data (including historical data) at SWMU 1/AOC 1. The samples designated as "white powder" were included in the data reviewed as a conservative measure assuming that exposure to white powder areas would not differ significantly from exposure to surrounding soil areas. Category 1 soil sampling results and results from locations SS-1 and AOC1-BCW-6, in an area of soil transitioning to sediment, were included in the data set for the Decision 2 evaluation.

Tables C2-3 and C2-14 summarize the results of the evaluation to determine whether data are sufficient to estimate representative EPCs. Table C2-13 documents the review of all combined AOC 1/SWMU 1 soil data. Table C2-14 presents the review of only those data from locations north of the Burlington Northern Santa Fe railroad corridor on Bureau of Reclamation land managed by the Bureau of Land Management. These data were reviewed separately to evaluate whether there are sufficient data to estimate representative EPCs for a hypothetical residential exposure scenario. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value.

Table C2-15 summarizes the results of the evaluation to determine if sediment data are sufficient to estimate representative ecological EPCs. Samples considered in this evaluation were those from the preliminary AOC 1 sediment exposure area at the mouth of Bat Cave Wash. The sediment exposure area defined for this evaluation extends from the east margin of the Tamarisk thicket near the mouth of Bat Cave Wash to the easternmost end of the wash. Samples from both the west and east side of National Trails Highway at the mouth of Bat Cave Wash were included.

In general, existing data are adequate to support soil and sediment EPC development for detected chemicals that exceeded one or more comparison values in one or both media (12 metals, three Contract Laboratory Program inorganics, and PAHs), as described below. In addition, data are adequate to support human health risk assessment EPC development for arsenic in the area north of the railroad corridor. Arsenic was the only compound that exceeded at least one human health risk-based comparison value in the area north of the railroad corridor, as shown in Table C2-14. Phase 2 data will be added to the existing data set to calculate the final EPC (i.e., after Decision 1 is satisfied).

3.1 Metals

Sufficient soil data (numbers of samples and detections) are available to calculate EPCs for arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, and zinc using the ProUCL software; these data are presented in Tables C2-13 and C2-14. For selenium, additional soil data collection is not expected to significantly change the results of the risk assessment because the compound is very infrequently detected (i.e., additional non-detects would be expected).

Sufficient sediment data are available to calculate EPCs for chromium using the ProUCL software, as shown in Table C2-15. For arsenic, additional data collection is not expected to significantly change the results of the risk assessment because the maximum detected concentration (13 mg/kg) is comparable to soil background (11 mg/kg), a conservative estimate of the sediment background value. Therefore, additional data collection would be anticipated to yield similar results. Similarly, for hexavalent chromium, additional data collection may not significantly change the results of the risk assessment because the compound is very infrequently detected in sediment. However, as noted in Section 2.0 of this sub-appendix, historical reporting limits for hexavalent chromium were elevated relative to the soil BTV, and no TEC is available for this compound. Therefore, the potential effect of additional sampling on the EPC is uncertain. To reduce this uncertainty and to provide further data to resolve Decision 1, an additional sediment sampling location is proposed and is discussed in Section 5.0.

3.2 Inorganics

Sufficient data (numbers of samples and detections) are available to calculate EPCs for calcium, magnesium, and potassium using ProUCL, although additional data are not available for deeper locations associated with the scouring scenarios. No additional data collection appears warranted because it is reasonable to assume that the nature and extent of these inorganics in the shallow exposure intervals (0 to 0.5 or 0 to 3 feet bgs) are representative of the deeper depths. In addition, maximum concentrations of calcium, magnesium, and potassium detected in the standard exposure intervals (0 to 0.5, 0 to 3, 0 to 6, and 0 to 10 feet bgs) are comparable to background (all detections were below the BTV, as shown in Tables C2-5 and C2-11).

3.3 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene toxicity equivalents and high molecular weights PAHs using ProUCL.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

A conservative, three-tiered approach was used in the evaluation to assess the potential impact to groundwater from source areas in the vadose zone. A full description of the three-tiered approach is provided in Section 5.0 of the Data Gaps Evaluation Report. For this analysis, AOC 1 was separated into a northern and a southern portion as shown in Figure C-1 in Appendix C. The potential threat to groundwater analysis in this sub-appendix focuses on the northern portion. A similar analysis for the southern portion is combined with the SWMU 1 analysis presented in Appendix C1.

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, are needed to resolve Decision 3. Additional evaluation will be performed as appropriate, as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 – Nature and Extent evaluation will provide the final representative data set that will be used to assess the threat to groundwater. No current or potential threat to groundwater was identified for the northern portion of AOC 1.

The results of the tiered analysis presented in Table C2-16 show that seven metals had soil concentrations exceeding their BTVs. Of those seven metals, only hexavalent chromium and molybdenum had concentrations above the calculated soil screening levels, as shown in Table C2-17. Based on the initial screening model, the potential for hexavalent chromium and molybdenum to leach to groundwater was ruled out. Consequently, none of the metals detected in soil in AOC 1 north presents a threat to current or future groundwater, and no further sampling is required to address Decision 3 for AOC 1.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study (CMS/FS). The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite).
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies).
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for AOC 1 that are currently available to support CMS/FS. Data gaps identified for Decision 4 will be filled using samples being collected to fill data gaps identified for other decisions. Data will not be collected to solely fill Decision 4 data gaps.

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The lateral and vertical extent of the COPCs and COPECs is discussed in Section 2.3 above. Data results for selected constituents are shown in Figures C2-1, C2-2, and C2-4 through C2-10, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0 of this sub-appendix.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLCs). The maximum concentrations of these metals for each of the units were compared to the TTLCs, as shown in Table C2-18. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLCs). Concentrations of barium exceeded 10 times the STLC once, and total chromium exceeded 10 times the STLC 13 times, respectively, as shown in Table C2-18. In addition, total chromium also exceeded 20 times the toxicity characteristic leaching procedure (TCLP) in six samples, as indicated in Table C2-18. Because these metals have the potential to exceed STLC or TCLP thresholds, additional leachability testing for waste characterization purposes may be required if soil excavation and offsite disposal is chosen as a remedy. For the purposes of supporting the CMS/FS, the lack of STLC or TCLP analysis is not considered a data gap, for the existing total concentrations are sufficient for the purposes of evaluating various remedial alternatives. Additional data regarding potential COPC/COPEC leachability include SPLP analysis for total and hexavalent chromium, as shown in Table C2-2. SPLP analysis was conducted only for soil samples (no white powder or debris samples were tested using SPLP).

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 soil investigation was limited to grain size analysis only. Specific soil physical properties data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 in the Data Gaps Report. Additional soil physical parameter data are needed to support the CMS/FS.

5.4 Surface and Subsurface Features

While there is extensive information regarding surface and subsurface features at AOC 1, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for AOC 1. However, subsurface utilities, including gas transmission pipelines and any culverts or other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives and to prepare construction specifications.

6.0 Summary of Data Gaps, Proposed Phase 2 Soil Sample Locations to Fill Identified Gaps, and Access Restrictions

Based on the Part A DQOs, five data gaps were identified for two of the four decisions and are summarized below by decisions:

- **Decision 1 – Nature and Extent**. The following data gaps were identified to resolve this decision:
  - Data Gap #1 – Lateral and vertical extent of contamination in the bottom of Bat Cave Wash (within the portion of AOC 1 between the northern boundary of SWMU 1 and Interstate 40).
  - Data Gap #2 – Extent of constituents associated with the discharge from the Debris Ravine (AOC 4), including PCBs and dioxins and furans.
  - Data Gap #3 – Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk thicket area near the mouth of Bat Cave Wash.
  - Data Gap #4 – Characteristics of the potential white powder material on the eastern slope of Bat Cave Wash.
  - Data Gap #5 – Assess potential impoundment area near railroad bridge culvert and IM-3 road crossing.
- **Decision 2 (Data Sufficient to Estimate Representative Exposure Point Concentrations)**. No data gap was identified for this decision.
- **Decision 3 (Potential Threat to Groundwater from Residual Soil Concentrations)**. No data gap was identified to resolve this decision.
- **Decision 4 (Data Sufficient to Estimate Soil Properties and Contaminant Distribution in Support of the CMS/FS).** The following data gap was identified to resolve this decision**:**
  - Data gap #6 – Soil physical parameters to support the CMS/FS. Three samples each from boring locations AOC1-BCW7, AOC1-BCW13, AOC1-BCW25, AOC1-T5d, and AOC1-T6d are proposed to be analyzed for soil physical parameters.

Table C2-19 summarizes the proposed Phase 2 sample locations, depths, description/ rationale for each proposed location, and analytes. Proposed Phase 2 sample locations are also shown in Figures C2-20 and C2-21.

6.1 Access Restrictions

The following access restrictions apply and may impact soil sampling in AOC 1:

- Proposed Phase 2 sample locations AOC1-1 through AOC1-4 are located on a plateau approximately 10 feet in elevation from the bottom of Bat Cave Wash. Possible road improvement and/or minor grading may be necessary to access these samples.

- Proposed Phase 2 sample location AOC1-6d is located in Bat Cave Wash between two culverts (Interstate 40 and Burlington North and Santa Fe (BNSF) railroad tracks). To access this location a drill rig will need to pass through the railroad culvert; a BNSF railroad permit is required for this activity.
- A significant storm event occurred in early January 2010, which deposited a large amount of material (i.e., large and small cobbles) in the southern reaches of Bat Cave Wash near the confluence of AOC 4 – Debris Ravine. This material will need to be cleared prior to collection of the proposed Phase 2 sample locations near the mouth of AOC 4 – Debris Ravine (AOC4-BCW1 through AOC4-BCW6).

7.0 Tamarisk Area Evaluation

The thick vegetation, widening of the channel near the end of Bat Cave Wash, and blockage of flow by National Trails Highway greatly reduces the energy of flow during runoff events, resulting in deposition of entrained soil within the vegetated area at the lower end of Bat Cave Wash. This area is heavily vegetated, predominately with salt cedar (also known as tamarisk), which is an invasive, exotic plant species (CH2M HILL, 2007). This heavily vegetated portion of Bat Cave Wash is a long-term depositional area that existed before the compressor station was built. Depositional history and patterns within this area are not known with certainty. As requested by DOI in the December 15, 2010 email, PG&E is proposing grid-based sampling near the mouth of Bat Cave Wash in the tamarisk area to assess the potential for historical deposition of potentially contaminated fine-grained materials that may have been transported down Bat Cave Wash during rain events.

Twenty-three borings are proposed to be advanced in an approximate 100-foot grid pattern across the tamarisk area near the mouth of Bat Cave Wash, as shown in Figure C2-21. Due to the thick vegetation in this area, a path will need to be cut through the vegetation to allow passage of necessary drilling equipment. The path will be up to 25 feet wide to accommodate a track-mounted spider rig (or equivalent) and necessary support vehicles (pickup truck or all-terrain vehicles). The approximate location of the paths are show on Figure C2-21; however, the exact path may change based on field conditions (i.e., boulders, large pieces of debris, sink holes, and low areas filled with water) and to save larger trees and species of interest (i.e., palo verde and mesquite). Therefore, the area of potential impact includes the entire vegetated area at the lower end of Bat Cave Wash, as shown on Figure C2-21. Every effort will be made to remove as little vegetation as possible. The amount of vegetation removal will be approximately 2 acres.

8.0 References

ARCADIS. 2008. *Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California.* August 25.

————. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2005. *RCRA Investigation/Remedial Investigation Report PG&E Topock Compressor Station, Needles, California.* February.

———. 2009. *Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California.* May.

Tables

TABLE C2-1
Conceptual Site Model – AOC 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Runoff from compressor station, AOC 4, SWMU 1, and potentially AOC 14	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion
			Potential Sediment	Potential discharge of groundwater to surface water [a]
			Potential Groundwater	Potential extracted groundwater[b]
Discharge of wastewater from compressor station to Bat Cave Wash	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion
			Potential Sediment	Potential discharge of groundwater to surface water [a]
			Potential Groundwater	Potential extracted groundwater[b]

[a] Discharge to surface water is an insignificant transport pathway as evaluated in the groundwater risk assessment (ARCADIS, 2009).

[b] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C2-2

Synthetic Precipitation Leaching Procedure (SPLP) Extraction Results
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			SPLP Results in mg/L	
Location	**Sample Date**	**Depth (ft bgs)**	**Hexavalent Chromium**	**Chromium (total)**
AOC1				
AOC1-T2d	10/07/08	5-6	0.0106 J	0.168
AOC1-T2d	10/07/08	2-3	0.0188 J	0.238

Notes:

ft bgs	feet below ground surface
mg/L	milligrams per liter
J	concentration estimated by laboratory or data validation

TABLE C2-3

Sediment Sample Results: Metals

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1] :				**NE**	**NE**	**9.79**	**NE**	**410**	**NE**	**0.672**	**NE**	**0.99**	**NE**	**43.4**	**NE**	**0.83**	**NE**	**12.7**	**NE**	**31.6**	**NE**
Soil Background[2] :				**NE**	**NE**	**11**	**NE**	**410**	**NE**	**0.672**	**NE**	**1.1**	**NE**	**39.8**	**NE**	**0.83**	**NE**	**12.7**	**NE**	**16.8**	**NE**
Consensus-based Threshold effect concentration[3] :				**NE**	**NE**	**9.79**	**NE**	**NE**	**NE**	**NE**	**NE**	**0.99**	**NE**	**43.4**	**NE**	**NE**	**NE**	**NE**	**NE**	**31.6**	**NE**
Consensus-based Probable effect concentration[3] :				**NE**	**NE**	**33**	**NE**	**NE**	**NE**	**NE**	**NE**	**4.98**	**NE**	**111**	**NE**	**NE**	**NE**	**NE**	**NE**	**149**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Antimony**	**Arsenic**	**Arsenic**	**Barium**	**Barium**	**Beryllium**	**Beryllium**	**Cadmium**	**Cadmium**	**Chromium**	**Chromium**	**Chromium, Hexavalent**	**Chromium, Hexavalent**	**Cobalt**	**Cobalt**	**Copper**	**Copper**
AOC1-BCW6	08/22/08[4]	0 - 0.5	N	ND (5.7) *	ND (5.7) *	13	13	320	320	ND (2.8) *	ND (2.8) *	ND (2.8) *	ND (2.8) *	71	71	2.63	2.63	7.7	7.7	22	22
	08/22/08[4]	2 - 3	N	ND (5.8) *	ND (5.8) *	9.3	9.3	230	230	ND (2.9) *	ND (2.9) *	ND (2.9) *	ND (2.9) *	21	21	ND (0.608)	ND (0.608)	6.3	6.3	14	14
DrSed-1	02/18/03	1	N	ND (1.56) *	ND (1.56) *	1.57	1.57	92.6	92.6	0.105 J	0.105 J	ND (0.39)	ND (0.39)	2.27	2.27	ND (4.2) *	ND (4.2) *	1.14	1.14	1.26	1.26
DrSed-2	02/18/03	1	N	ND (1.58) *	ND (1.58) *	1.27	1.27	65.9	65.9	0.0963 J	0.0963 J	ND (0.394)	ND (0.394)	1.78	1.78	ND (4.2) *	ND (4.2) *	1.07	1.07	1.07	1.07
DrSed-3	02/19/03	1	N	ND (1.81) *	ND (1.81) *	1.67	1.67	45.8	45.8	0.101 J	0.101 J	ND (0.453)	ND (0.453)	1.75	1.75	ND (4.2) *	ND (4.2) *	1.02	1.02	1.38	1.38
SED-01	02/18/03	2	N	---	---	---	---	---	---	---	---	---	---	3.33	3.33	ND (5.5) *	ND (5.5) *	---	---	2.5	2.5
SED-10	02/17/03	2	N	ND (2.79) *	ND (2.79) *	2.72	2.72	100	100	0.219 J	0.219 J	0.0789 J	0.0789 J	6.79	6.79	ND (5.7) *	ND (5.7) *	2.07	2.07	5.17	5.17
SED-11	02/17/03	2	N	---	---	---	---	---	---	---	---	---	---	15.7	15.7	ND (5.6) *	ND (5.6) *	---	---	7.88	7.88
SED-12	02/17/03	2	N	ND (2.15) *	ND (2.15) *	3.58	3.58	170	170	0.506 J	0.506 J	0.158 J	0.158 J	21.4	21.4	ND (4.9) *	ND (4.9) *	8.1	8.1	15.2	15.2
SED-02	02/18/03	2	N	---	---	---	---	---	---	---	---	---	---	4.61	4.61	ND (5) *	ND (5) *	---	---	3.39	3.39
SED-27	02/19/03	2	N	ND (2.86) *	ND (2.86) *	3.68	3.68	151	151	0.338 J	0.338 J	0.198 J	0.198 J	6.87	6.87	ND (6) *	ND (6) *	2.7	2.7	6.84	6.84
SED-28	02/19/03	2	N	ND (2.19) *	ND (2.19) *	1.58	1.58	69.3	69.3	0.156 J	0.156 J	0.0772 J	0.0772 J	4.62	4.62	ND (5.4) *	ND (5.4) *	1.47	1.47	2.8	2.8
SED-29	02/19/03	2	N	ND (2.11) *	ND (2.11) *	1.54	1.54	170	170	0.17 J	0.17 J	0.0666 J	0.0666 J	4.48	4.48	ND (5.3) *	ND (5.3) *	1.65	1.65	2.93	2.93
SED-03	02/18/03	2	N	---	---	---	---	---	---	---	---	---	---	3.64	3.64	ND (5) *	ND (5) *	---	---	3.12	3.12
SED-04	02/18/03	2	N	---	---	---	---	---	---	---	---	---	---	5.48	5.48	ND (5.8) *	ND (5.8) *	---	---	4.46	4.46
SED-05	02/17/03	2	N	---	---	---	---	---	---	---	---	---	---	2.41	2.41	ND (5) *	ND (5) *	---	---	1.95	1.95
SED-06	02/17/03	2	N	---	---	---	---	---	---	---	---	---	---	5.1	5.1	ND (4.9) *	ND (4.9) *	---	---	2.13	2.13
SED-07	02/17/03	2	N	---	---	---	---	---	---	---	---	---	---	22.1	22.1	ND (6) *	ND (6) *	---	---	11.7	11.7
SED-08	02/17/03	2	N	ND (2.38) *	ND (2.38) *	1.54	1.54	64.3	64.3	0.215 J	0.215 J	ND (0.595)	ND (0.595)	8.27	8.27	ND (4.8) *	ND (4.8) *	2.53	2.53	5.71	5.71
SED-09	02/17/03	2	N	ND (4.2) *	ND (4.2) *	ND (1.05)	ND (1.05)	135	135	0.614	0.614	0.0822 J	0.0822 J	19.1	19.1	ND (4.9) *	ND (4.9) *	7.44	7.44	25.6	25.6
SS-1	06/29/97[4]	0.5	N	---	---	---	---	---	---	---	---	---	---	38.2	38.2	ND (0.05)	ND (0.05)	---	---	16.5	16.5
	06/29/97[4]	1.5	N	---	---	---	---	---	---	---	---	---	---	25.3	25.3	ND (0.05)	ND (0.05)	---	---	13.6	13.6

[1] Interim screening level is equal to the to the lower value between the TEC and PEC. If neither is available, then the soil background value, if available, is used.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

[3] MacDonald et al. (2000)

[4] This location is in an area where soil is transitioning into sediment.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-4

Soil Sample Results: Metals

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC4-1	10/14/08	0 - 0.5	N	ND (2) J*	3.7	440 J	ND (1) *	ND (1)	47	0.49	6.7	16	8.5	ND (0.1) *	ND (1)	19	ND (1)	ND (1)	ND (2)	23	48
	10/14/08	0.5 - 1	N	ND (2) *	4	120	ND (1) *	ND (1)	32	ND (0.404)	9.6	13	10	ND (0.1) *	ND (1)	17	ND (1)	ND (1)	ND (2)	32	47
	10/14/08	2 - 3	N	ND (2) *	3.6	120	ND (1) *	ND (1)	20	ND (0.405)	7.4	12	17	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	30	39
AOC4-GB10	02/10/10	0	N	ND (2.2) *	ND (1.1)	160 J	ND (1.1) *	ND (1.1) *	35 J	ND (0.44)	8.5	16	14	ND (0.11) *	ND (1.1)	20	ND (1.1)	ND (1.1)	ND (2.2)	40 J	71 J
AOC4-GB11	02/10/10	0	N	ND (2.2) *	ND (1.1)	170	ND (1.1) *	ND (1.1) *	31	ND (0.43)	9.1	13	7.2 J	ND (0.11) *	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.2)	38	46
	02/10/10	0	FD	ND (2.2) *	ND (1.1)	160	ND (1.1) *	ND (1.1) *	29	0.57	8.1	14	16 J	ND (0.11) *	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.2)	38	47
AOC4-GB12	02/10/10	0	N	ND (2.2) *	ND (1.1)	160	ND (1.1) *	ND (1.1) *	35	ND (0.44)	9.1	15	5.5	ND (0.11) *	ND (1.1)	24	ND (1.1)	ND (1.1)	ND (2.2)	42	43
AOC1-BCW1	09/20/08	0 - 0.5	N	ND (2) *	4.3	160	ND (1) *	ND (1)	23	ND (0.401)	6.4	11	7.5	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	26	44
	09/20/08	2 - 3	N	ND (2) *	8.4	160	ND (1) *	ND (1)	25	ND (0.404)	9.4	15	2	ND (0.1) *	ND (1)	19	ND (1)	ND (1)	ND (2)	40	28
AOC1-BCW2	10/04/08	0 - 0.5	N	ND (2) *	3.4	96	ND (1) *	ND (1)	21	ND (0.403)	6	7.6	3.7	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	23	40
	10/04/08	2 - 3	N	ND (2) *	3.1	110	ND (1) *	ND (1)	34	ND (0.407)	7.1	9.2	18	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	30	39
	10/04/08	5 - 6	N	ND (2) *	3.1	100	ND (1) *	ND (1)	35	ND (0.404)	7.1	8.8	4.4	ND (0.1) *	1.5	12	ND (1)	ND (1)	ND (2)	28	41
	10/04/08	9 - 10	N	ND (2.1) *	3.8	120	ND (1.1) *	ND (1.1) *	20	ND (0.426)	8.7	8.1	3.8	ND (0.1) *	ND (1.1)	14	ND (1.1)	ND (1.1)	ND (2.1)	38	39
AOC1-BCW3	10/04/08	0 - 0.5	N	ND (2) *	4.4	140	ND (1) *	ND (1)	25	0.416	6.4	11	7.3	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	27	51
	10/04/08	2 - 3	N	ND (2) *	3.2	99	ND (1) *	ND (1)	25	ND (0.404)	7.5	9.8	4	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	30	38
	10/04/08	5 - 6	N	ND (2.1) *	4.2	170	ND (2.1) *	ND (1)	23	ND (0.415)	11	9.6	2.2	ND (0.1) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.1) *	36	43
	10/04/08	9 - 10	N	ND (2.1) *	4	120	ND (1.1) *	ND (1.1) *	21	ND (0.421)	9	8.5	2.2	ND (0.11) *	ND (1.1)	13	ND (1.1)	ND (1.1)	ND (2.1)	36	38
	10/04/08	9 - 10	FD	ND (2.1) *	4.2	130	ND (1.1) *	ND (1.1) *	22	ND (0.424)	9.3	8.8	2.3	ND (0.11) *	ND (1.1)	14	ND (1.1)	ND (1.1)	ND (2.1)	37	41
AOC1-BCW4	10/04/08	0 - 0.5	N	ND (2) *	4.4	180	ND (1) *	ND (1)	36	1.3	8.3	13	9.4	ND (0.1) *	ND (1)	16	ND (1)	ND (1)	ND (2)	33	61
	10/04/08	2 - 3	N	ND (2) *	2.9	76	ND (1) *	ND (1)	24	ND (0.407)	5.8	8.3	3.6	ND (0.1) *	ND (1)	9.5	ND (1)	ND (1)	ND (2)	23	33
	10/04/08	5 - 6	N	ND (2.1) *	4	60	ND (1) *	ND (1)	23	ND (0.416)	9.4	8.4	2.7	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2.1)	37	45
	10/04/08	9 - 10	N	ND (2.1) *	5.1	81	ND (2.1) *	ND (1.1) *	22	ND (0.426)	9.7	7.6	2.3	ND (0.11) *	ND (2.1) *	15	ND (1.1)	ND (2.1)	ND (4.3) *	35	42
AOC1-BCW5	10/04/08	0 - 0.5	N	ND (2) *	3.7	160	ND (1) *	ND (1)	35	0.445	8.7	12	6	ND (0.099) *	ND (1)	15	ND (1)	ND (1)	ND (2)	34	46
	10/04/08	2 - 3	N	ND (2) *	3.5	130	ND (1) *	ND (1)	31	ND (0.407)	7.4	9.6	7	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	30	42
	10/04/08	5 - 6	N	ND (2.1) *	3.9	120	ND (1) *	ND (1)	26	ND (0.42)	9.9	8.4	2.7	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	41	44
	10/04/08	9 - 10	N	ND (2.1) *	4.7	110	ND (2.1) *	ND (1)	22	ND (0.425)	9.2	ND (7.4)	3.2	ND (0.11) *	ND (2.1) *	15	ND (1)	ND (2.1)	ND (4.2) *	35	40
	10/04/08	9 - 10	FD	ND (2.1) *	4.7	110	ND (2.1) *	ND (1.1) *	24	ND (0.427)	9	ND (7.3)	3	ND (0.11) *	ND (2.1) *	15	ND (1.1)	ND (2.1)	ND (4.2) *	34	40
AOC1-BCW6	08/22/08[6]	0 - 0.5	N	ND (5.7) *	13	320	ND (2.8) *	ND (2.8) *	71	2.63	7.7	22	23	ND (0.14) *	ND (2.8) *	18	ND (2.8) *	ND (2.8)	ND (5.7) *	37	81
	08/22/08[6]	2 - 3	N	ND (5.8) *	9.3	230	ND (2.9) *	ND (2.9) *	21	ND (0.608)	6.3	14	8.7	ND (0.14) *	ND (2.9) *	13	ND (2.9) *	ND (2.9)	ND (5.8) *	31	50
MW-10	06/27/97	1	N	---	---	---	---	---	14.2	ND (0.05)	---	14.1	---	---	---	8.8	---	---	---	---	20.9
	06/27/97	3	N	---	---	---	---	---	13.4	ND (0.05)	---	8.3	---	---	---	9	---	---	---	---	26.6
	06/27/97	6	N	---	---	---	---	---	19	ND (0.05)	---	8.4	---	---	---	10.7	---	---	---	---	23.3
	06/27/97	10	N	---	---	95.3	---	---	26.7	ND (0.05)	---	9.6	2.8	---	0.62	14.1	---	---	---	26.9	30.4
	06/27/97	20	N	---	---	---	---	---	14.7	ND (0.05)	---	7.7	---	---	---	10.2	---	---	---	---	27.1
	06/27/97	25	N	---	---	---	---	---	16.1	ND (0.05)	---	10.6	---	---	---	13.4	---	---	---	---	34.1
	06/27/97	30	N	---	---	---	---	---	13.8	ND (0.05)	---	9.4	---	---	---	11.5	---	---	---	---	31.5
	06/27/97	35	N	---	---	87	---	---	---	---	---	---	3.6	---	ND (0.2)	---	---	---	---	29.9	---
	06/27/97	40	N	---	---	---	---	---	14.5	ND (0.05)	---	9.2	---	---	---	12.6	---	---	---	---	29.4
	06/28/97	50	N	---	---	---	---	---	14.3	ND (0.05)	---	8.5	---	---	---	12.2	---	---	---	---	31.2
	06/27/97	60	N	---	---	---	---	---	9.1	ND (0.05)	---	6	---	---	---	6.6	---	---	---	---	16.3
	06/27/97	70	N	---	---	110	---	---	11.7	ND (0.05)	---	8.8	2.2	---	ND (0.2)	9.4	---	---	---	20.1	24.2
	06/27/97	75	N	---	---	---	---	---	11.5	ND (0.05)	---	6.4	---	---	---	8.2	---	---	---	---	24.9
	06/27/97	75	FD	---	---	---	---	---	9.6	0.1	---	6.97	---	---	---	8.1	---	---	---	---	21.6
	06/27/97	82	N	---	---	115	---	---	9.9	ND (0.05)	---	6.3	2.3	---	ND (0.2)	8.7	---	---	---	21.5	26.6

TABLE C2-4
Soil Sample Results: Metals
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
MW-11	06/29/97	1	N	---	---	---	---	---	12.2	ND (0.05)	---	7.5	---	---	---	8.4	---	---	---	---	24.8
	06/29/97	3	N	---	---	---	---	---	31.1	ND (0.05)	---	6.6	---	---	---	7.3	---	---	---	---	29.5
	06/29/97	6	N	---	---	---	---	---	26.9	ND (0.05)	---	5.3	---	---	---	5.6	---	---	---	---	23.2
	06/29/97	10	N	---	---	101	---	---	13.5	ND (0.05)	---	8.3	6.3	---	0.32	7.7	---	---	---	18.9	38.5
	06/29/97	20	N	---	---	---	---	---	5.9	ND (0.05)	---	6	---	---	---	4.9	---	---	---	---	19.9
	06/29/97	30	N	---	---	91.4	---	---	12.6	ND (0.05)	---	6.9	1.8	---	0.8	8.2	---	---	---	22	28.4
	06/29/97	40	N	---	---	---	---	---	9.8	ND (0.05)	---	9.8	---	---	---	8.6	---	---	---	---	28.4
	06/29/97	50	N	---	---	---	---	---	13.6	ND (0.05)	---	6.9	---	---	---	10.1	---	---	---	---	29.8
	06/29/97	60	N	---	---	27.4	---	---	9.6	ND (0.05)	---	5.8	3	---	0.088 J	8.3	---	---	---	18.1	26.2
	06/29/97	60	FD	---	---	---	---	---	10	ND (0.05)	---	5.74	---	---	---	8.6	---	---	---	---	19.8
	06/29/97	69	N	---	---	370	---	---	16.9	ND (0.05)	---	13.8	5	---	ND (0.2)	11.3	---	---	---	23.2	35.7
MW-13	07/09/97	10	N	---	---	---	---	---	10.8	ND (0.05)	---	9.3	---	---	---	8.1	---	---	---	---	27.2
	07/09/97	20	N	---	---	94.2	---	---	10.5	ND (0.05)	---	7.1	2.4	---	0.14 J	8.9	---	---	---	21.1	28.3
	07/09/97	25	N	---	---	124	---	---	---	---	---	---	2.8	---	ND (0.2)	---	---	---	---	26.4	---
	07/09/97	30	N	---	---	---	---	---	12.2	ND (0.05)	---	8.6	---	---	---	8.2	---	---	---	---	33.3
	07/09/97	40	N	---	---	---	---	---	10.7	ND (0.05)	---	8.1	---	---	---	9.4	---	---	---	---	30.4
	07/09/97	40	FD	---	---	---	---	---	6.4	ND (0.05)	---	5.6	---	---	---	5.6	---	---	---	---	17.7
AOC1-T1a	10/16/08	0 - 0.5	N	ND (2) *	6.5	100	ND (2) *	ND (1)	19	ND (0.406)	7.3	11	4.9	ND (0.1) *	ND (2) *	14	ND (1)	ND (2)	ND (4) *	30	38
	10/16/08	2 - 3	N	ND (2) *	3.2	120	ND (1) *	ND (1)	27	ND (0.404)	7.7	8.6	3.8	ND (0.1) *	2	13	ND (1)	ND (1)	ND (2)	29	37
	10/16/08	5 - 6	N	ND (2) *	3.5	110	ND (1) *	ND (1)	26	ND (0.405)	7.2	9.5	3.4	ND (0.1) *	2	12	ND (1)	ND (1)	ND (2)	29	34
	10/16/08	9 - 10	N	ND (2) *	2.4	88	ND (1) *	ND (1)	14	ND (0.404)	7.3	7.5	1.4	ND (0.1) *	ND (1)	9.5	ND (1)	ND (1)	ND (2)	29	32
AOC1-T1b	10/16/08	0 - 0.5	N	ND (2) *	2.9	88	ND (1) *	ND (1)	43 J	ND (0.405)	8.4	9	3.1	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	36	31
	10/16/08	0 - 0.5	FD	ND (2) *	2.8	86	ND (1) *	ND (1)	33 J	ND (0.405)	8.2	10	3.2	ND (0.1) *	ND (1)	16	ND (1)	ND (1)	ND (2)	35	32
	10/16/08	2 - 3	N	ND (2.1) *	2.9	210	ND (1) *	ND (1)	98	ND (1.94) *	7.5	12	3.9	ND (0.1) *	ND (1)	16	ND (1)	ND (1)	ND (2.1)	33	67
	10/16/08	5 - 6	N	ND (2) *	3	99	ND (1) *	ND (1)	28	0.402	7.2	9	3.2	ND (0.1) *	1.7	12	ND (1)	ND (1)	ND (2)	31	31
	10/16/08	9 - 10	N	ND (2) *	2.6	120	ND (1) *	ND (1)	42	ND (0.402)	8	11	2.6	ND (0.1) *	5	14	ND (1)	ND (1)	ND (2)	30	32
AOC1-T1c	10/16/08	0 - 0.5	N	ND (2) *	3.2	120	ND (1) *	ND (1)	44	0.601	7.4	13	7.5	ND (0.1) *	1.9	11	ND (1)	ND (1)	ND (2)	33	53
	10/16/08	2 - 3	N	ND (2.1) *	2.6	150	ND (1) *	ND (1)	140	4.77 J	8	26	20 J	ND (0.1) *	2.5	11 J	ND (1)	ND (1)	ND (2.1)	33	82 J
	10/16/08	2 - 3	FD	ND (2.1) *	3	170	ND (1) *	ND (1)	150	3.58 J	8.2	29	32 J	ND (0.1) *	2.2	14 J	ND (1)	ND (1)	ND (2.1)	29	110 J
	10/16/08	5 - 6	N	ND (2) *	3.1	97	ND (1) *	ND (1)	46	0.446	7.2	15	5	ND (0.1) *	3	12	ND (1)	ND (1)	ND (2)	27	44
	10/16/08	9 - 10	N	ND (2.1) *	2.8	120	ND (1) *	ND (1)	20	ND (0.418)	8.6	11	1.9	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	33	38
AOC1-T2a	10/05/08	0 - 0.5	N	ND (2) *	4	110	ND (1) *	ND (1)	26	ND (0.403)	7.1	10	4.8	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	30	38
	10/16/08	2 - 3	N	ND (2) *	6	120	ND (2) *	ND (1)	28	ND (0.407)	8.7	10	4	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4) *	32	42
	10/16/08	5 - 6	N	ND (2) *	2.7	110	ND (1) *	ND (1)	19	ND (0.405)	8.1	8.3	2.4	ND (0.1) *	1.1	11	ND (1)	ND (1)	ND (2)	28	35
	10/16/08	9 - 10	N	ND (2.1) *	2.9	110	ND (1) *	ND (1)	15	ND (0.416)	7.4	7.1	2.1	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2.1)	27	36
AOC1-T2b	10/16/08	0 - 0.5	N	ND (2) J*	3.6	120	ND (1) *	ND (1)	26	ND (0.408)	7.3	9.3	3.2	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	28	39
	10/16/08	2 - 3	N	ND (2.1) *	3	93	ND (1) *	ND (1)	26	ND (0.414)	6.9	10	3	ND (0.1) *	2.4	11	ND (1)	ND (1)	ND (2.1)	23	33
	10/16/08	5 - 6	N	ND (2) *	3	89	ND (1) *	ND (1)	53	ND (0.407)	6.7	8.7	2.4	ND (0.1) *	5.5	12	ND (1)	ND (1)	ND (2)	25	32
	10/16/08	9 - 10	N	ND (2.1) *	2.4	99	ND (1) *	ND (1)	18	ND (0.415)	8.4	8.5	1.8	ND (0.1) *	1.3	12	ND (1)	ND (1)	ND (2.1)	27	33
	10/16/08	9 - 10	FD	ND (2.1) *	2.3	110	ND (1) *	ND (1)	18	ND (0.413)	8.2	9.6	1.6	ND (0.1) *	1.2	13	ND (1)	ND (1)	ND (2.1)	29	35
AOC1-T2c	10/08/08	0 - 0.5	N	ND (2) J*	3.7	88	ND (1) *	ND (1)	60	1.26	6.3	10	5.1	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	26	44
	10/08/08	2 - 3	N	ND (2) *	3.1	130	ND (1) *	ND (1)	42	ND (0.416)	8.4	11	3.3	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2)	34	33
	10/08/08	5 - 6	N	ND (2) *	2.3	81	ND (1) *	ND (1)	22	ND (0.412)	7.2	9.1	1.8	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	31	28
	10/08/08	9 - 10	N	ND (2.1) *	3.7	40	ND (1) *	ND (1)	24	ND (0.419)	9.3	9.7	2.6	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	35	40

TABLE C2-4

Soil Sample Results: Metals

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC1-T2d	10/07/08	0 - 0.5	N	ND (2) *	3	100	ND (1) *	ND (1)	46	ND (0.408)	8.2	10	2.9	ND (0.1) *	2.9	14	ND (1)	ND (1)	ND (2)	36	36
	10/07/08	2 - 3	N	ND (2.1) *	ND (1)	120	ND (1) *	ND (1)	970	5.73	7.5	13	4.7	ND (0.1) *	1.5	11	ND (1)	ND (1)	ND (2.1)	34	98
	10/07/08	5 - 6	N	ND (2.1) *	ND (1)	84	ND (1) *	ND (1)	370	4.34	6.9	11	3.9	ND (0.1) *	1.1	11	ND (1)	ND (1)	ND (2.1)	26	130
	10/07/08	9 - 10	N	ND (2.1) *	4.5	86	ND (2.1) *	ND (1)	140	2.92	10	14	3.1	ND (0.1) *	ND (2.1) *	15	ND (1)	ND (2.1)	ND (4.2) *	33	68
	10/07/08	19 - 20	N	ND (2.1) *	5.8	56	ND (2.1) *	ND (1.1) *	26	ND (0.423)	10	9.2	3	ND (0.11) *	ND (2.1) *	16	ND (1.1)	ND (2.1)	ND (4.2) *	38	45
	10/07/08	29 - 30	N	ND (2.1) *	6.2	38	ND (2.1) *	ND (1)	21	ND (0.424)	8.5	8.9	2.7	ND (0.1) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.2) *	31	37
	10/07/08	29 - 30	FD	ND (2.1) *	9.7	40	ND (5.3) *	ND (1.1) *	24	ND (0.423)	8.7	ND (11)	2.2	ND (0.11) *	ND (5.3) *	16	ND (1.1)	ND (5.3) *	ND (11) *	34	36
	10/07/08	39 - 40	N	ND (2.1) *	6.4	79	ND (2.1) *	ND (1.1) *	22	ND (0.431)	8.9	11	3.6	ND (0.11) *	ND (2.1) *	16	ND (1.1)	ND (2.1)	ND (4.3) *	34	42
	10/07/08	49 - 50	N	ND (2.1) *	4.1	62	ND (1.1) *	ND (1.1) *	28	ND (0.425)	9.3	10	2.1	ND (0.11) *	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.1)	36	38
	10/08/08	59 - 60	N	ND (2) *	5.3	36	ND (2) *	ND (1)	39	ND (0.406)	9	9.8	2.2	ND (0.1) *	4.7	13	ND (1)	ND (2)	ND (4) *	33	32
	10/08/08	69 - 70	N	ND (2.2) *	4.4	41	ND (1.1) *	ND (1.1) *	18	ND (0.435)	9.1	9.8	2.8	ND (0.11) *	2.2	13	ND (1.1)	ND (1.1)	ND (2.2)	31	31
AOC1-T2e	10/16/08	0 - 0.5	N	ND (2) *	2.9	98	ND (1) *	ND (1)	34	ND (0.405)	7.5	9.3	3.4	ND (0.1) *	2.2	13	ND (1)	ND (1)	ND (2)	29	36
	10/16/08	2 - 3	N	ND (2) *	2.9	87	ND (1) *	ND (1)	30	ND (0.408)	6.9	8.4	3.2	ND (0.1) *	1.4	12	ND (1)	ND (1)	ND (2)	27	30
	10/16/08	2 - 3	FD	ND (2) *	3.1	90	ND (1) *	ND (1)	32	ND (0.408)	7.1	8	3.2	ND (0.1) *	1.3	12	ND (1)	ND (1)	ND (2)	27	33
	10/16/08	5 - 6	N	ND (2) *	2.6	98	ND (1) *	ND (1)	44	ND (0.402)	7	8.4	2.3	ND (0.1) *	5.4	12	ND (1)	ND (1)	ND (2)	26	32
	10/16/08	9 - 10	N	ND (2.1) *	2.5	100	ND (1) *	ND (1)	20	ND (0.415)	6.4	4.9	1.1	ND (0.1) *	1.1	9	ND (1)	ND (1)	ND (2.1)	24	27
AOC1-T3a	10/05/08	0 - 0.5	N	ND (2) *	4.1	150	ND (1) *	ND (1)	24	ND (0.403)	7.8	11	8.4	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	33	47
	10/17/08	2 - 3	N	ND (2) *	4.4	110	ND (1) *	ND (1)	19	ND (0.407)	7.1	9	4.2	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	29	37
	10/17/08	5 - 6	N	ND (2) *	4.2	110	ND (1) *	ND (1)	23	ND (0.405)	7	12	14	ND (0.1) *	1.7	12	ND (1)	ND (1)	ND (2)	28	39
	10/17/08	9 - 10	N	ND (2) *	2.9	99	ND (1) *	ND (1)	15	ND (0.406)	7.2	10	1.9	ND (0.1) *	ND (1)	9.8	ND (1)	ND (1)	ND (2)	26	33
AOC1-T3b	10/05/08	0 - 0.5	N	ND (2) *	2.6	78	ND (1) *	ND (1)	23	ND (0.402)	7	8	3.1	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	35	29
	10/17/08	2 - 3	N	ND (2.1) *	3.1	120	ND (1) *	ND (1)	170	2.77	6.5	13	9.1	ND (0.11) *	ND (1)	12	ND (1)	ND (1)	ND (2.1)	26	120
	10/17/08	5 - 6	N	ND (2) *	2.3	92	ND (1) *	ND (1)	46	ND (0.405)	7	8.6	2.3	ND (0.1) *	4.6	12	ND (1)	ND (1)	ND (2)	25	34
	10/17/08	9 - 10	N	ND (2) *	2.7	110	ND (1) *	ND (1)	17	ND (0.41)	7.3	7.7	1.7	ND (0.1) *	1.1	9.4	ND (1)	ND (1)	ND (2)	28	31
	10/17/08	9 - 10	FD	ND (2.1) *	2.5	110	ND (1) *	ND (1)	16	ND (0.412)	7.2	6.5	1.9	ND (0.1) *	1.1	9.5	ND (1)	ND (1)	ND (2.1)	29	32
AOC1-T3c	10/05/08	0 - 0.5	N	ND (2) *	4.6	130	ND (1) *	ND (1)	27	0.42	6.5	11	7	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	29	46
	10/05/08	2 - 3	N	ND (2) *	3.5	98	ND (1) *	ND (1)	30	ND (0.41)	8.9	9.7	3.4	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	33	39
	10/05/08	5 - 6	N	ND (2) *	3.7	130	ND (1) *	ND (1)	89	1.65	8.8	12	5.8	ND (0.1) *	1.4	14	ND (1)	ND (1)	ND (2)	34	65
	10/05/08	9 - 10	N	ND (2) *	2.7	94	ND (1) *	ND (1)	19	ND (0.403)	8.2	10	2.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	32	36
AOC1-T4a	10/03/08	0 - 0.5	N	ND (2) *	4.2	120	ND (1) *	ND (1)	28	ND (0.402)	7.3	11	5.5	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	26	51
	10/03/08	2 - 3	N	ND (2) *	3.9	99	ND (1) *	ND (1)	26	ND (0.407)	7.7	10	4	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	31	40
	10/03/08	5 - 6	N	ND (2) *	4	89	ND (1) *	ND (1)	25	ND (0.409)	8.3	11	3.3	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	34	40
	10/03/08	9 - 10	N	ND (2) *	3.7	160	ND (1) *	ND (1)	26	0.525	6.9	9.6	4.3	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	28	36
AOC1-T4b	10/02/08	0 - 0.5	N	ND (2) *	2.9	83	ND (1) *	ND (1)	21	1.26	6.3	7.5	2.6	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	22	29
	10/02/08	2 - 3	N	ND (2) *	3.7	120	ND (1) *	ND (1)	29	ND (0.412)	7.6	12	8.8 J	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	33	46
	10/02/08	2 - 3	FD	ND (2) *	3.5	110	ND (1) *	ND (1)	28	ND (0.408)	7.2	11	7 J	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	31	50
	10/02/08	5 - 6	N	ND (2.1) *	3.6	110	ND (1) *	ND (1)	24	ND (0.419)	9.9	9.6	3.2	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	33	39
	10/02/08	9 - 10	N	ND (2.1) *	3.2	100	ND (1) *	ND (1)	19	ND (0.415)	7.7	8.8	2.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2.1)	31	37
AOC1-T4c	10/04/08	0 - 0.5	N	ND (2) J*	4.2	100	ND (1) *	ND (1)	19	ND (0.403)	5.5	22	5.9	ND (0.1) *	ND (1)	9.4	ND (1)	ND (1)	ND (2)	25	33
	10/04/08	2 - 3	N	ND (2) *	3.8	130	ND (1) *	ND (1)	27	0.816	8.9	19	14	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	38	67
	10/04/08	5 - 6	N	ND (2) *	3.3	150	ND (1) *	ND (1)	28	0.868	9.2	21	19	ND (0.1) *	1.3	13	ND (1)	ND (1)	ND (2)	36	71
	10/04/08	9 - 10	N	ND (2.1) *	3.1	120	ND (1) *	ND (1)	27	ND (0.413)	8.3	13	5.8	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	35	47

TABLE C2-4

Soil Sample Results: Metals

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC1-T5a	10/04/08	0 - 0.5	N	ND (2) *	3.1	150	ND (1) *	ND (1)	21	ND (0.402)	7.8	13	4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	33	41
	10/04/08	2 - 3	N	ND (2) *	2.8	95	ND (1) *	ND (1)	39	ND (0.403)	9	10	3.2	ND (0.099) *	ND (1)	13	ND (1)	ND (1)	ND (2)	32	38
	10/04/08	5 - 6	N	ND (2) *	3.8	99	ND (1) *	ND (1)	35	ND (0.405)	9	24	3.4	ND (0.1) *	2.2	17	ND (1)	ND (1)	ND (2)	32	38
	10/04/08	9 - 10	N	ND (2) *	2.6	110	ND (1) *	ND (1)	24	ND (0.411)	7.4	11	3.6	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	30	38
	10/04/08	9 - 10	FD	ND (2) *	2.4	110	ND (1) *	ND (1)	27	ND (0.409)	7.8	11	3.1	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	30	38
AOC1-T5b	10/04/08	0 - 0.5	N	ND (2) J*	2.4	73	ND (1) *	ND (1)	26	ND (0.402)	6.8	11	4.9	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	28	33
	10/04/08	2 - 3	N	ND (2) *	3.3	110	ND (1) *	ND (1)	41	0.452	7.2	9.5	4.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	32	38
	10/04/08	5 - 6	N	ND (2) *	3.4	120	ND (1) *	ND (1)	61	0.596	7.9	9.8	4.8	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	31	41
	10/04/08	9 - 10	N	ND (2) *	3.5	120	ND (1) *	ND (1)	23	ND (0.409)	9.6	13	3.4	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	39	41
AOC1-T5c	10/04/08	0 - 0.5	N	ND (2) *	3.7	140	ND (1) *	ND (1)	15	ND (0.403)	6.7	8.8	5.8	ND (0.1) *	ND (1)	8.7	ND (1)	ND (1)	ND (2)	27	37
	10/04/08	2 - 3	N	ND (2) *	3.3	150	ND (1) *	ND (1)	31	0.875	8.6	12	7.5	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	35	53
	10/04/08	5 - 6	N	ND (2) *	3.1	130	ND (1) *	ND (1)	36	0.641	7.2	12	11	ND (0.099) *	ND (1)	11	ND (1)	ND (1)	ND (2)	31	49
	10/04/08	9 - 10	N	ND (2) *	3.5	130	ND (1) *	ND (1)	21	0.478	7.7	9.8	3.9	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	32	39
AOC1-T6a	09/30/08	0 - 0.5	N	ND (2) *	3.2	96	ND (1) *	ND (1)	20	ND (0.402)	6.3	11	5.6	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	28	47
	09/30/08	2.5 - 3	N	ND (2) *	3.2	110	ND (1) *	ND (1)	20	ND (0.408)	6.9	8.9	5.6	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	29	36
	09/30/08	2.5 - 3	FD	ND (2) *	3.1	100	ND (1) *	ND (1)	21	ND (0.407)	6.6	8.8	5.4	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	31	40
	09/30/08	5.5 - 6	N	ND (2) *	2.3	94	ND (1) *	ND (1)	16	ND (0.408)	7.2	7.9	3.9	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	33	34
	09/30/08	9.5 - 10	N	ND (2) *	3.2	110	ND (1) *	ND (1)	20	ND (0.41)	7	8.7	12	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	32	40
AOC1-T6b	09/30/08	0 - 0.5	N	ND (2) *	3	110	ND (1) *	ND (1)	26	ND (0.401)	6.3	9	5.5	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	31	41
	09/30/08	2.5 - 3	N	ND (2) *	3.4	130	ND (1) *	ND (1)	18	ND (0.404)	5.7	7.1	4.4	ND (0.1) *	ND (1)	8.5	ND (1)	ND (1)	ND (2)	25	29
	09/30/08	5.5 - 6	N	ND (2) *	2.9	100	ND (1) *	ND (1)	22	ND (0.404)	7.3	10	3.2	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	30	36
	09/30/08	9.5 - 10	N	ND (2) *	2.8	94	ND (1) *	ND (1)	25	ND (0.405)	7	9.3	3.1 J	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	30	37
	09/30/08	9.5 - 10	FD	ND (2) *	3	110	ND (1) *	ND (1)	27	ND (0.404)	7.9	10	8.5 J	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	33	39
AOC1-T6c	09/30/08	0 - 0.5	N	ND (2) *	2.9	81	ND (1) *	ND (1)	18	ND (0.401)	6.4	8.7	3.2	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	25	39
	09/30/08	2.5 - 3	N	ND (2) *	5.1	94	ND (1) *	ND (1)	26	ND (0.407)	6.6	9.7	5.1	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	29	37
	09/30/08	5.5 - 6	N	ND (2) *	2.4	110	ND (1) *	ND (1)	21	ND (0.406)	9	9.4	2.9	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	32	37
SS-1	06/29/97[6]	0.5	N	---	---	---	---	---	38.2	ND (0.05)	---	16.5	---	---	---	17.9	---	---	---	---	55
	06/29/97[6]	1.5	N	---	---	---	---	---	25.3	ND (0.05)	---	13.6	---	---	---	12.5	---	---	---	---	43.4
SS-2	06/29/97	0.5	N	---	---	---	---	---	18.9	ND (0.05)	---	14.1	---	---	---	13.2	---	---	---	---	48.3
	06/29/97	1.5	N	---	---	---	---	---	10.2	ND (0.05)	---	12.9	---	---	---	9.4	---	---	---	---	42.2
SS-3	06/29/97	0.5	N	---	---	---	---	---	---	ND (0.05)	---	---	---	---	---	---	---	---	---	---	---
SS-4	06/29/97	0.5	N	---	---	---	---	---	---	ND (0.05)	---	---	---	---	---	---	---	---	---	---	---
SS-5	06/29/97	0.5	N	---	---	---	---	---	---	ND (0.05)	---	---	---	---	---	---	---	---	---	---	---
SS-6	06/29/97	0.5	N	---	---	---	---	---	---	ND (0.05)	---	---	---	---	---	---	---	---	---	---	---
SS-7	06/29/97	0.5	N	---	---	---	---	---	---	ND (0.05)	---	---	---	---	---	---	---	---	---	---	---
SS-8	06/29/97	0.5	N	---	---	---	---	---	---	ND (0.05)	---	---	---	---	---	---	---	---	---	---	---
SSB-1	06/25/97	1	N	---	---	---	---	---	13.7	ND (0.05)	---	14.9	---	---	---	11.6	---	---	---	---	35.7
	06/25/97	3	N	---	---	---	---	---	13.6	ND (0.05)	---	11	---	---	---	12	---	---	---	---	29.6
	06/25/97	6	N	---	---	---	---	---	16.7	ND (0.05)	---	16.9	---	---	---	12.2	---	---	---	---	34.5
	06/25/97	10	N	---	---	97.3	---	---	16.5	ND (0.05)	---	8.2	1.3	---	ND (0.2)	12.9	---	---	---	24.6	31.9
SSB-6	06/30/97	1	N	---	---	---	---	---	13.7	ND (0.05)	---	8.6	---	---	---	8.9	---	---	---	---	29.1
	06/30/97	3	N	---	---	---	---	---	27.5	ND (0.05)	---	6.6	---	---	---	8.2	---	---	---	---	24.8
	06/30/97	6	N	---	---	---	---	---	467	0.06	---	33.8	---	---	---	5.5	---	---	---	---	132
	06/30/97	10	N	---	---	100	---	---	14.8	ND (0.05)	---	9.6	3.1	---	0.79	10.3	---	---	---	22.7	33.4

TABLE C2-4

Soil Sample Results: Metals

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
SSB-7	06/30/97	1	N	---	---	---	---	---	19.8	ND (0.05)	---	7.7	---	---	---	8.4	---	---	---	---	28.1
	06/30/97	3	N	---	---	---	---	---	24.9	ND (0.05)	---	6.5	---	---	---	7	---	---	---	---	29.4
	06/30/97	6	N	---	---	---	---	---	8.6	ND (0.05)	---	14.7	---	---	---	6.3	---	---	---	---	23
	06/30/97	10	N	---	---	77.5	---	---	8.1	ND (0.05)	---	5.8	1.8	---	ND (0.2)	6.5	---	---	---	16.2	23.4
SSB-8	07/10/97	1	N	---	---	---	---	---	53.1	ND (0.05)	---	15.1	---	---	---	15.3	---	---	---	---	38.3
	07/10/97	3	N	---	---	---	---	---	13.6	ND (0.05)	---	14.1	---	---	---	10.6	---	---	---	---	35.3
	07/10/97	6	N	---	---	---	---	---	15.3	ND (0.05)	---	7.3	---	---	---	10	---	---	---	---	33.5
	07/10/97	10	N	---	---	43.9	---	---	17.1	ND (0.05)	---	10.7	2.8	---	0.071 J	13.9	---	---	---	26.8	35.8
	07/10/97	10	FD	---	---	---	---	---	13.7	ND (0.05)	---	8	---	---	---	11.1	---	---	---	---	30
SSB-9	07/10/97	1	N	---	---	---	---	---	17.3	ND (0.05)	---	8.6	---	---	---	10.1	---	---	---	---	35.5
	07/10/97	3	N	---	---	---	---	---	11	ND (0.05)	---	6.1	---	---	---	7	---	---	---	---	31.8
	07/10/97	6	N	---	---	---	---	---	9.6	ND (0.05)	---	6.4	---	---	---	7.8	---	---	---	---	25.3
	07/10/97	10	N	---	---	102	---	---	15.7	ND (0.05)	---	7.7	3	---	0.096 J	11.4	---	---	---	25.7	33.1
XMW-9	06/25/97	3	N	---	---	---	---	---	18.4	ND (0.05)	---	12	---	---	---	9	---	---	---	---	25.8
	06/25/97	10	N	---	---	257	---	---	45.7	ND (0.05)	---	19.7	5.7	---	0.075 J	35.2	---	---	---	44.5	44.2
	06/25/97	10	FD	---	---	---	---	---	31.1	ND (0.05)	---	16.7	---	---	---	27	---	---	---	---	38.7
	06/25/97	30	N	---	---	88.1	---	---	35.6	ND (0.05)	---	17.2	7.2	---	0.11 J	32.1	---	---	---	42.9	50.3
	06/25/97	50	N	---	---	57.4	---	---	36.3	ND (0.05)	---	15.6	4.5	---	ND (0.2)	28.5	---	---	---	37.7	54.2
	06/25/97	70	N	---	---	1,580	---	---	6.7	ND (0.05)	---	170	6.1	---	1.8	7.4	---	---	---	19.7	54.6

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] This location is in an area where soil is transitioning into sediment.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-5

Sample Results: Contract Laboratory Program Inorganics

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
AOC4-1	10/14/08	0 - 0.5	N	8,400	21,000	20,000	7,900	310	2,500 J	270	ND (1.01) *
AOC1-BCW1	09/20/08	0 - 0.5	N	8,100	21,000	14,000	6,400	260	2,800	300	ND (1) *
AOC1-BCW5	10/04/08	0 - 0.5	N	9,500	20,000	18,000	7,700	300	3,900	ND (360)	ND (1.01) *
AOC1-BCW6	08/22/08 [6]	0 - 0.5	N	14,000	35,000	20,000	11,000	420	4,000	660	ND (6.69) *
MW-10	06/27/97	10	N	---	---	15,300	---	231	---	---	---
	06/27/97	35	N	---	---	15,300	---	226	---	---	---
	06/27/97	70	N	---	---	10,400	---	284	---	---	---
	06/27/97	82	N	---	---	11,000	---	312	---	---	---
MW-11	06/29/97	10	N	---	---	11,300	---	201	---	---	---
	06/29/97	30	N	---	---	12,900	---	201	---	---	---
	06/29/97	60	N	---	---	10,100	---	138	---	---	---
	06/29/97	69	N	---	---	14,900	---	276	---	---	---
MW-13	07/09/97	20	N	---	---	12,200	---	218	---	---	---
	07/09/97	25	N	---	---	15,400	---	270	---	---	---
SED-10	02/17/03 [7]	2	N	---	---	5,610	---	122	---	---	---
SED-12	02/17/03 [7]	2	N	---	---	18,400	---	353	---	---	---
SED-27	02/19/03 [7]	2	N	---	---	7,270	---	202 B	---	---	---
SED-28	02/19/03 [7]	2	N	---	---	3,510	---	92.1 B	---	---	---
SED-29	02/19/03 [7]	2	N	---	---	4,630	---	113 B	---	---	---
SED-08	02/17/03 [7]	2	N	---	---	6,660	---	127	---	---	---
SED-09	02/17/03 [7]	2	N	---	---	19,600	---	224	---	---	---
AOC1-T1a	10/16/08	0 - 0.5	N	9,800	30,000	17,000	8,100	270	2,600	260	ND (1.02) *
AOC1-T1b	10/16/08	0 - 0.5	N	7,700	16,000	19,000	6,000	230	2,300	250	ND (1.01) *
	10/16/08	0 - 0.5	FD	8,100	15,000	19,000	6,500	240	2,500	250	ND (1.01) *

TABLE C2-5

Sample Results: Contract Laboratory Program Inorganics

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
AOC1-T1c	10/16/08	0 - 0.5	N	9,100	22,000	16,000	6,600	250	3,800	340	ND (1.02) *
AOC1-T2b	10/16/08	0 - 0.5	N	8,900	24,000	19,000	7,800	280	3,000 J	310	ND (1.02) *
AOC1-T3a	10/05/08	0 - 0.5	N	11,000	24,000	18,000	7,700	290	2,900	ND (250)	ND (1.01) *
AOC1-T4c	10/04/08	0 - 0.5	N	5,700	18,000	16,000	5,300	200	1,700	ND (240)	ND (1.01) *
AOC1-T5b	10/04/08	0 - 0.5	N	6,500	15,000	16,000	5,600	210	1,800	ND (210)	ND (1) *
AOC1-T6c	09/30/08	0 - 0.5	N	6,300	14,000	15,000	5,300	200	1,600	210	ND (1) *
SSB-1	06/25/97	10	N	---	---	15,300	---	248	---	---	---
SSB-6	06/30/97	10	N	---	---	14,700	---	273	---	---	---
SSB-7	06/30/97	10	N	---	---	10,100	---	186	---	---	---
SSB-8	07/10/97	10	N	---	---	15,600	---	270	---	---	---
SSB-9	07/10/97	10	N	---	---	14,200	---	205	---	---	---
XMW-9	06/25/97	10	N	---	---	22,600	---	345	---	---	---
	06/25/97	30	N	---	---	22,200	---	344	---	---	---
	06/25/97	50	N	---	---	19,700	---	280	---	---	---
	06/25/97	70	N	---	---	22,000	---	203	---	---	---

TABLE C2-5

Sample Results: Contract Laboratory Program Inorganics
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] This location is in an area where soil is transitioning into sediment.

[7] sediment sample

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-6

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC4-1	10/14/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	14	11	37	12	18	28	ND (5)	37	ND (5)	12	ND (5)	10	24	10	190	20
	10/14/08	0.5 - 1	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/14/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.2)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC4-GB10	02/10/10	0	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	28 J	15 J	33 J	9.6 J	ND (5.6)	25 J	ND (5.6)	45 J	ND (5.6)	10 J	ND (5.6)	13 J	36 J	13	201.6	22.35
AOC4-GB11	02/10/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	13	7.9	16	5.4	ND (5.4)	ND (5.4)	ND (5.4)	21	ND (5.4)	5.4	ND (5.4)	9	19	9	87.7	11.34
	02/10/10	0	FD	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	13	11	20	8	ND (5.5)	13	ND (5.5)	28	ND (5.5)	7.6	ND (5.5)	13	23	13	123.6	15.19
AOC4-GB12	02/10/10	0	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	12	12	19	9	ND (5.6)	ND (5.6)	ND (5.6)	7.8	ND (5.6)	8.6	ND (5.6)	ND (5.6)	7.8	ND	76.2	15.96
AOC1-BCW1	09/20/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8.5	11	9.4	10	10	12	ND (5)	17	ND (5)	7.8	ND (5)	6.2	15	6.2	100	16
	09/20/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
AOC1-BCW2	10/04/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/04/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.9 J	10 J	9.7 J	7.7 J	11 J	10 J	ND (5.1)	19 J	ND (5.1)	7.3 J	ND (5.1)	6.2 J	16 J	6.2	99	15
	10/04/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8	ND (5)	ND (5)	ND (5)	ND (5)	6.4	ND	14	4.4
	10/04/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.9)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
AOC1-BCW3	10/04/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	22	20	24	17	27	29	5.9	34	ND (5.1)	14	ND (5.1)	14	30	14	220	31
	10/04/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/04/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.1)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/04/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.7)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/04/08	9 - 10	FD	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.9)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
AOC1-BCW4	10/04/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	12	18	27	16	16	22	6.1	31	ND (5.1)	14	ND (5.1)	11	27	11	190	27
	10/04/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/04/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.8)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/04/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.4)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
AOC1-BCW5	10/04/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/04/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.7	7.9	ND (5.1)	5.5	ND (5.1)	8.1	ND (5.1)	9.3	ND (5.1)	5.1	ND (5.1)	ND (5.1)	9.3	ND	51	10
	10/04/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.1)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/04/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/04/08	9 - 10	FD	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
AOC1-BCW6	08/22/08[6]	0 - 0.5	N	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)	11	ND (7.1)	ND (7.1)	7.3	ND (7.1)	10	ND (7.1)	ND (7.1)	ND (7.1)	ND (7.1)	10	ND	38	7
	08/22/08[6]	2 - 3	N	ND (7.2)	ND (7.2)	ND (7.2)	ND (7.2)	ND (7.2)	ND (7.2)	ND (7.2)	10	ND (7.2)	ND (7.2)	7.7	ND (7.2)	19	ND (7.2)	ND (7.2)	ND (6.4)	10	15	10	52	7
AOC1-T1a	10/16/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C2-6

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC1-T1b	10/16/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	0 - 0.5	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.9)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/16/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	9 - 10	N	ND (5)	5.2	ND (5)	ND (5)	9.7	8.1	ND (5)	ND (5)	ND (5)	ND (5)	7.8	ND (5)	28	7.9	ND (5)	ND (4.8)	75	26	98	70	5
AOC1-T1c	10/16/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	24	26	26	23	31	32	9.1	48	ND (5.1)	21	ND (5.1)	20	42	20	280	40
	10/16/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	8.1	7.7	8	6.1	10	9.7	ND (5.2)	16	ND (5.2)	ND (5.2)	ND (5.2)	6.4	14	6.4	80	12
	10/16/08	2 - 3	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	9.4	8.3	12	6.3	8.1	12	ND (5.2)	21	ND (5.2)	5.6	ND (5)	7.1	17	7.1	100	13
	10/16/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6	7.3	7.8	7.5	10	9.6	ND (5.1)	11	ND (5.1)	6.4	ND (4.1)	ND (5.1)	10	ND	76	11
	10/16/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC1-T2a	10/05/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.8	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	5.8	4.4
	10/16/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/16/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC1-T2b	10/16/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/16/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/16/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/16/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.6)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/16/08	9 - 10	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC1-T2c	10/08/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	22	20	28	16	17	25	ND (5)	41	ND (5)	14	ND (5)	7.9	40	7.9	220	29
	10/08/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.5	8	9.5	7.5	6.3	8.1	ND (5.1)	15	ND (5.1)	6.3	ND (5)	5.4	13	5.4	80	12
	10/08/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/08/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC1-T2d	10/07/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/07/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	9	5.7	7.2	ND (5.2)	7.3	9.5	ND (5.2)	18	ND (5.2)	ND (5.2)	ND (4.2)	5.4	16	5.4	73	9.3
	10/07/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/07/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/07/08	19 - 20	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.9)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/07/08	29 - 30	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/07/08	29 - 30	FD	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/07/08	39 - 40	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/07/08	49 - 50	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.9)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	10/08/08	59 - 60	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/08/08	69 - 70	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.5)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)

TABLE C2-6
Sample Results: Polycyclic Aromatic Hydrocarbons
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC1-T2e	10/16/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/16/08	2 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/16/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/16/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC1-T3a	10/05/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.5	8.4	11	7.6	12	14	ND (5)	25	ND (5)	7	ND (5)	9.2	21	9.2	110	13
	10/17/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/17/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/17/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC1-T3b	10/05/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/17/08	2 - 3	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	15	16	14	13	21	20	ND (5.3)	25	ND (5.3)	12	ND (5.3)	6.8	23	6.8	160	23
	10/17/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.7)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/17/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/17/08	9 - 10	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC1-T3c	10/05/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.9	7.9	7.4	8.6	11	ND (5.1)	14	ND (5.1)	5.3	ND (5.1)	ND (5.1)	12	ND	72	9.3
	10/05/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/05/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.3	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.8	ND	12	4.5
	10/05/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC1-T4a	10/03/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.1	ND (5)	ND (5)	ND (5)	ND (5)	6.8	ND	14	4.4
	10/03/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC1-T4b	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.4	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	5.4	4.7
	10/02/08	2 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/02/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC1-T4c	10/04/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.4	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	5.4	4.4
	10/04/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	59	55	69	38	41	64	11	82	ND (5.1)	34	ND (5.1)	16	82	16	540	80
	10/04/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	32	380	170	410	81	190	400	37	560	ND (5.1)	78	ND (5.1)	150	560	180	2,900	290
	10/04/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.4	58	34	32	19	40	72	6.3	84	ND (5.1)	17	ND (5.1)	20	81	26	440	52
AOC1-T5a	10/04/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/04/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/04/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/04/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/04/08	9 - 10	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C2-6

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC1-T5b	10/04/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/04/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.1	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	5.1	4.7
	10/04/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/04/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC1-T5c	10/04/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.4	6.6	5.7	7.7	7.3	ND (5)	8.8	ND (5)	ND (5)	ND (5)	ND (5)	8	ND	50	8.3
	10/04/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.1	8.3	7.6	6.6	11	9.7	ND (5)	14	ND (5)	6.1	ND (5)	ND (5)	13	ND	82	12
	10/04/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	16	84	45	58	25	58	91	8.8	220	ND (5)	26	ND (5)	62	150	78	770	72
	10/04/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC1-T6a	09/30/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.4	6.3	10	8.8	6.1	9.2	ND (5)	10	ND (5)	5.6	ND (5)	ND (5)	10	ND	71	10
	09/30/08	2.5 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.2)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	2.5 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (3.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	5.5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	9.5 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (3.7)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC1-T6b	09/30/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.7	6	ND (5)	5.2	ND (5)	5.9	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	23	4.7
	09/30/08	2.5 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	5.5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (3.7)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	9.5 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	9.5 - 10	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4)	ND (5)	ND (5)	ND	ND	ND (4.4)
AOC1-T6c	09/30/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.5	ND (5)	6.1	ND (5)	5.6	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	17	4.4
	09/30/08	2.5 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	5.5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C2-6

Sample Results: Polycyclic Aromatic Hydrocarbons
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] This location is in an area where soil is transitioning into sediment.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	VOCs (µg/kg)	Total Petroleum Hydrocarbons (mg/kg)			General Chemistry								
									meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level[1] :				2,870	22,000,000	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels[2] :				35,000	22,000,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL[3] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels[4] :				NE	NE	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values[5] :				2,870	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background[6] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Fluoride**	**Sulfate**
AOC4-1	10/14/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	---	---	---	---	---	---
	10/14/08	0.5 - 1	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	---	---	---	---	---	---
	10/14/08	2 - 3	N	810	12	ND (0.98)	ND (10)	ND (10)	---	---	---	---	---	---	---	---	---
AOC1-BCW1	09/20/08	0 - 0.5	N	ND (330)	---	---	12.6	31.8	---	---	---	8.21	---	---	---	---	---
	09/20/08	2 - 3	N	ND (330)	ND (5.2)	ND (2.2)	ND (10)	ND (10)	---	---	---	9.02	---	---	---	---	---
AOC1-BCW2	10/04/08	0 - 0.5	N	ND (330)	---	---	ND (10)	31 J	---	---	---	8.85	---	---	---	---	---
	10/04/08	2 - 3	N	ND (340)	---	ND (0.92)	ND (10)	11.1 J	---	---	---	8.35	---	---	---	---	---
	10/04/08	5 - 6	N	ND (330)	---	ND (0.91)	ND (10)	17.6 J	---	---	---	8.72	---	---	---	---	---
	10/04/08	9 - 10	N	ND (350)	---	ND (1)	ND (10)	ND (10)	---	---	---	8.68	---	---	---	---	---
AOC1-BCW3	10/04/08	0 - 0.5	N	ND (340)	---	---	ND (10)	21.6 J	---	---	---	8.76	---	---	---	---	---
	10/04/08	2 - 3	N	ND (330)	---	ND (1.1)	ND (10)	10.7 J	---	---	---	8.68	---	---	---	---	---
	10/04/08	5 - 6	N	ND (340)	---	ND (1.2)	ND (10)	ND (10)	---	---	---	8.58	---	---	---	---	---
	10/04/08	9 - 10	N	ND (350)	---	ND (0.99)	ND (10)	ND (10)	---	---	---	9.5	---	---	---	---	---
	10/04/08	9 - 10	FD	ND (350)	---	ND (0.95)	ND (10)	ND (10)	---	---	---	9.54	---	---	---	---	---
AOC1-BCW4	10/04/08	0 - 0.5	N	ND (340)	---	---	15.8	17.8 J	---	---	---	8.06	---	---	---	---	---
	10/04/08	2 - 3	N	ND (330)	---	ND (0.92)	ND (10)	ND (10)	---	---	---	8.28	---	---	---	---	---
	10/04/08	5 - 6	N	ND (340)	---	ND (1)	ND (10)	ND (10)	---	---	---	8.69	---	---	---	---	---
	10/04/08	9 - 10	N	ND (350)	---	ND (1)	ND (10)	ND (10)	---	---	---	8.94	---	---	---	---	---
AOC1-BCW5	10/04/08	0 - 0.5	N	ND (330)	---	---	28.9	30.1 J	---	---	---	9.43	---	---	---	---	---
	10/04/08	2 - 3	N	ND (330)	ND (5.2)	ND (0.98)	10.5	22.6 J	---	---	---	8.58	---	---	---	---	---
	10/04/08	5 - 6	N	ND (340)	---	ND (0.92)	ND (10)	ND (10)	---	---	---	8.26	---	---	---	---	---
	10/04/08	9 - 10	N	ND (350)	---	ND (1.2)	ND (10)	ND (10)	---	---	---	9.55	---	---	---	---	---
	10/04/08	9 - 10	FD	ND (350)	---	ND (1.2)	ND (10)	ND (10)	---	---	---	9.48	---	---	---	---	---
AOC1-BCW6	08/22/08 [7]	0 - 0.5	N	ND (470)	---	---	ND (10)	17.5	---	---	---	7.74	---	---	---	---	---
	08/22/08 [7]	2 - 3	N	ND (480)	ND (6.4)	ND (1.3)	ND (10)	16.3	---	---	---	7.89	---	---	---	---	---
DrSed-1	02/18/03 [8]	1	N	---	---	---	---	---	---	---	---	9.3	---	---	---	---	---
DrSed-2	02/18/03 [8]	1	N	---	---	---	---	---	---	---	---	8.8	---	---	---	---	---
DrSed-3	02/19/03 [8]	1	N	---	---	---	---	---	---	---	---	9	---	---	---	---	---

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	VOCs (µg/kg)	Total Petroleum Hydrocarbons (mg/kg)			General Chemistry								
									meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level[1] :				2,870	22,000,000	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels[2] :				35,000	22,000,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL[3] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels[4] :				NE	NE	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values[5] :				2,870	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background[6] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Fluoride**	**Sulfate**
MW-10	06/27/97	1	N	---	---	---	---	---	---	---	---	9.03	---	---	---	---	---
	06/27/97	3	N	---	---	---	---	---	---	---	---	8.84	---	---	---	---	---
	06/27/97	6	N	---	---	---	---	---	---	---	---	8.73	---	---	---	---	---
	06/27/97	10	N	---	---	---	---	---	---	120	311	8.75	---	ND (0.4)	520	---	9.2 J
	06/27/97	20	N	---	---	---	---	---	---	---	---	8.87	---	---	---	---	---
	06/27/97	25	N	---	---	---	---	---	10	---	---	9.38	---	---	---	---	---
	06/27/97	30	N	---	---	---	---	---	---	---	---	9.85	---	---	---	---	---
	06/27/97	35	N	---	---	---	---	---	---	116	271	---	---	ND (0.4)	630	---	35
	06/27/97	40	N	---	---	---	---	---	---	---	---	9.2	---	---	---	---	---
	06/28/97	50	N	---	---	---	---	---	10	---	---	9.28	---	---	---	---	---
	06/27/97	60	N	---	---	---	---	---	---	---	---	9.26	---	---	---	---	---
	06/27/97	70	N	---	---	---	---	---	---	115	324	9.28	---	ND (0.4)	420	---	8.5 J
	06/27/97	75	N	---	---	---	---	---	12	---	---	8.09	---	---	---	---	---
	06/27/97	75	FD	---	---	---	---	---	---	---	---	9.29	---	---	---	---	---
	06/27/97	82	N	---	---	---	---	---	9	111	291	9.07	---	ND (0.4)	340	---	25
MW-11	06/29/97	1	N	---	---	---	---	---	---	---	---	8.62	---	---	---	---	---
	06/29/97	3	N	---	---	---	---	---	---	---	---	9.03	---	---	---	---	---
	06/29/97	6	N	---	---	---	---	---	---	---	---	8.83	---	---	---	---	---
	06/29/97	10	N	---	---	---	---	---	---	110	299	8.92	---	ND (0.4)	410	---	11
	06/29/97	20	N	---	---	---	---	---	0.7	---	---	9.09	---	---	---	---	---
	06/29/97	30	N	---	---	---	---	---	---	120	307	9.07	---	ND (0.4)	110	---	17
	06/29/97	40	N	---	---	---	---	---	10	---	---	9.03	---	---	---	---	---
	06/29/97	50	N	---	---	---	---	---	---	---	---	9.69	---	---	---	---	---
	06/29/97	60	N	---	---	---	---	---	11	112	291	9.25	---	ND (0.4)	330	---	18
	06/29/97	60	FD	---	---	---	---	---	---	---	---	9.46	---	---	---	---	---
	06/29/97	69	N	---	---	---	---	---	10	117	257	9.04	---	ND (0.4)	360	---	20
MW-13	07/09/97	10	N	---	---	---	---	---	---	---	---	8.66	---	---	---	---	---
	07/09/97	20	N	---	---	---	---	---	4.07	136.6	208	8.44	---	ND (0.4)	270	---	71
	07/09/97	25	N	---	---	---	---	---	4.16	138.5	224	---	---	ND (0.4)	ND (100)	---	93
	07/09/97	30	N	---	---	---	---	---	4.01	---	---	8.45	---	---	---	---	---
	07/09/97	40	N	---	---	---	---	---	---	---	---	8.7	---	---	---	---	---
	07/09/97	40	FD	---	---	---	---	---	---	---	---	8.72	---	---	---	---	---
SED-01	02/18/03[8]	2	N	---	---	---	---	---	---	---	---	8.8	---	---	---	---	---
SED-10	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	8.1	ND (2.79)	---	10,100 J	1.63	---
SED-11	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	7.9	---	---	---	---	---

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	VOCs (µg/kg)	Total Petroleum Hydrocarbons (mg/kg)			General Chemistry								
									meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level[1] :				2,870	22,000,000	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels[2] :				35,000	22,000,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL[3] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels[4] :				NE	NE	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values[5] :				2,870	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background[6] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Fluoride**	**Sulfate**
SED-12	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	8.1	ND (2.45)	---	13,400 J	1.44	---
SED-02	02/18/03[8]	2	N	---	---	---	---	---	---	---	---	8.8	---	---	---	---	---
SED-27	02/19/03[8]	2	N	---	---	---	---	---	---	---	---	8.6	ND (3.03)	---	17,700 J	2.68	---
SED-28	02/19/03[8]	2	N	---	---	---	---	---	---	---	---	8.4	ND (2.8)	---	4,770 J	0.918 J	---
SED-29	02/19/03[8]	2	N	---	---	---	---	---	---	---	---	8.7	ND (2.66)	---	ND (2,640) J	0.54 J	---
SED-03	02/18/03[8]	2	N	---	---	---	---	---	---	---	---	8.7	---	---	---	---	---
SED-04	02/18/03[8]	2	N	---	---	---	---	---	---	---	---	8.7	---	---	---	---	---
SED-05	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	8.5	---	---	---	---	---
SED-06	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	7.4	---	---	---	---	---
SED-07	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	7.5	---	---	---	---	---
SED-08	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	8	ND (2.48)	---	9,650 J	1.48	---
SED-09	02/17/03[8]	2	N	---	---	---	---	---	---	---	---	8.5	ND (2.44)	---	1,380 J	0.582 J	---
AOC1-T1a	10/16/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	8.66	---	---	---	---	---
	10/16/08	2 - 3	N	ND (330)	ND (7)	ND (1.3)	ND (10)	ND (10)	---	---	---	8.85	---	---	---	---	---
	10/16/08	5 - 6	N	ND (330)	---	ND (63)	ND (10)	15.5	---	---	---	8.83	---	---	---	---	---
	10/16/08	9 - 10	N	ND (330)	---	ND (1)	ND (10)	ND (10)	---	---	---	9.03	---	---	---	---	---
AOC1-T1b	10/16/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	9.18	---	---	---	---	---
	10/16/08	0 - 0.5	FD	ND (330)	---	---	ND (10)	ND (10)	---	---	---	9.08	---	---	---	---	---
	10/16/08	2 - 3	N	ND (340)	ND (4.9)	ND (1.2)	21.3	276	---	---	---	9.04	---	---	---	---	---
	10/16/08	5 - 6	N	ND (330)	---	ND (1.2)	ND (10)	21	---	---	---	8.87	---	---	---	---	---
	10/16/08	9 - 10	N	ND (330)	---	ND (0.89)	ND (10)	34.4	---	---	---	9.66	---	---	---	---	---
AOC1-T1c	10/16/08	0 - 0.5	N	ND (340)	---	---	ND (10)	26.2	---	---	---	9.24	---	---	---	---	---
	10/16/08	2 - 3	N	ND (340)	ND (5.2)	ND (1.1)	11.8	82.8	---	---	---	9.47	---	---	---	---	---
	10/16/08	2 - 3	FD	ND (350)	ND (5)	ND (1.1)	15	104	---	---	---	9.44	---	---	---	---	---
	10/16/08	5 - 6	N	ND (340)	---	ND (0.96)	ND (10)	36.5	---	---	---	8.94	---	---	---	---	---
	10/16/08	9 - 10	N	ND (340)	---	ND (0.89)	ND (10)	ND (10)	---	---	---	9.15	---	---	---	---	---
AOC1-T2a	10/05/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	8.26	---	---	---	---	---
	10/16/08	2 - 3	N	ND (330)	---	ND (1)	ND (10)	ND (10)	---	---	---	8.63	---	---	---	---	---
	10/16/08	5 - 6	N	ND (330)	---	ND (1.2)	ND (10)	ND (10)	---	---	---	8.7	---	---	---	---	---
	10/16/08	9 - 10	N	ND (340)	---	ND (1.1)	ND (10)	ND (10)	---	---	---	8.75	---	---	---	---	---

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	**VOCs (µg/kg)**	**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry**								
									meq/100g	**mV**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Interim Screening Level[1] :				**2,870**	**22,000,000**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels[2] :				**35,000**	**22,000,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels[4] :				**NE**	**NE**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[5] :				**2,870**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Fluoride**	**Sulfate**
AOC1-T2b	10/16/08	0 - 0.5	N	ND (340)	---	---	ND (10)	12.9	---	---	---	9.29	---	---	---	---	---
	10/16/08	2 - 3	N	ND (340)	ND (5.2)	ND (0.94)	ND (10)	14.4	---	---	---	9.18	---	---	---	---	---
	10/16/08	5 - 6	N	ND (330)	---	ND (0.92)	ND (10)	10.9	---	---	---	9.33	---	---	---	---	---
	10/16/08	9 - 10	N	ND (340)	---	ND (0.95)	ND (10)	ND (10)	---	---	---	9.4	---	---	---	---	---
	10/16/08	9 - 10	FD	ND (340)	---	ND (0.87)	ND (10)	ND (10)	---	---	---	9.29	---	---	---	---	---
AOC1-T2c	10/08/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	8.89	---	---	---	---	---
	10/08/08	2 - 3	N	ND (330)	---	ND (1)	ND (10)	ND (10)	---	---	---	9.15	---	---	---	---	---
	10/08/08	5 - 6	N	ND (330)	---	ND (0.91)	ND (10)	ND (10)	---	---	---	9.43	---	---	---	---	---
	10/08/08	9 - 10	N	ND (340)	---	ND (0.96)	ND (10)	ND (10)	---	---	---	9.36	---	---	---	---	---
AOC1-T2d	10/07/08	0 - 0.5	N	ND (340)	---	---	ND (10)	ND (10)	---	---	---	9.31	---	---	---	---	---
	10/07/08	2 - 3	N	ND (340)	---	ND (0.89)	ND (10)	17.5	---	---	---	8.86	---	---	---	---	---
	10/07/08	5 - 6	N	ND (340)	---	ND (0.98)	ND (10)	ND (10)	---	---	---	8.95	---	---	---	---	---
	10/07/08	9 - 10	N	ND (340)	---	ND (1.5)	21.4	25.2	---	---	---	9.23	---	---	---	---	---
	10/07/08	19 - 20	N	ND (350)	---	ND (1.3)	ND (10)	ND (10)	---	---	---	9.68	---	---	---	---	---
	10/07/08	29 - 30	N	ND (340)	---	ND (1)	ND (10)	ND (10)	---	---	---	9.73	---	---	---	---	---
	10/07/08	29 - 30	FD	ND (350)	---	ND (1.1)	ND (10)	ND (10)	---	---	---	9.78	---	---	---	---	---
	10/07/08	39 - 40	N	ND (350)	---	ND (1.2)	ND (10)	ND (10)	---	---	---	9.29	---	---	---	---	---
	10/07/08	49 - 50	N	ND (350)	---	ND (1)	ND (10)	ND (10)	---	---	---	9.35	---	---	---	---	---
	10/08/08	59 - 60	N	ND (330)	---	ND (1)	ND (10)	ND (10)	---	---	---	9.39	---	---	---	---	---
	10/08/08	69 - 70	N	ND (360)	---	ND (0.95)	ND (10)	ND (10)	---	---	---	9.5	---	---	---	---	---
AOC1-T2e	10/16/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	9.17	---	---	---	---	---
	10/16/08	2 - 3	N	ND (330)	---	ND (1.3)	ND (10)	11.9	---	---	---	9.28	---	---	---	---	---
	10/16/08	2 - 3	FD	ND (340)	---	ND (1)	ND (10)	10.9	---	---	---	9.26	---	---	---	---	---
	10/16/08	5 - 6	N	ND (330)	---	ND (0.89)	ND (10)	41.1	---	---	---	9.13	---	---	---	---	---
	10/16/08	9 - 10	N	ND (340)	---	ND (1.1)	ND (10)	14.5	---	---	---	9.14	---	---	---	---	---
AOC1-T3a	10/05/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	8.49	---	---	---	---	---
	10/17/08	2 - 3	N	ND (330)	6.6	ND (0.93)	ND (10)	11	---	---	---	9.32	---	---	---	---	---
	10/17/08	5 - 6	N	ND (330)	---	ND (0.95)	ND (10)	14.4	---	---	---	8.94	---	---	---	---	---
	10/17/08	9 - 10	N	ND (330)	---	ND (1)	ND (10)	ND (10)	---	---	---	8.35	---	---	---	---	---
AOC1-T3b	10/05/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	8.85	---	---	---	---	---
	10/17/08	2 - 3	N	ND (350)	---	ND (1.1)	ND (10)	24.9	---	---	---	9.11	---	---	---	---	---
	10/17/08	5 - 6	N	ND (330)	---	ND (1)	ND (10)	17.6	---	---	---	8.99	---	---	---	---	---
	10/17/08	9 - 10	N	ND (340)	---	ND (0.99)	ND (10)	11.1	---	---	---	9.22	---	---	---	---	---
	10/17/08	9 - 10	FD	ND (340)	---	ND (0.95)	ND (10)	ND (10)	---	---	---	9.05	---	---	---	---	---

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	VOCs (µg/kg)	Total Petroleum Hydrocarbons (mg/kg)			General Chemistry								
									meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level[1] :				**2,870**	**22,000,000**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels[2] :				**35,000**	**22,000,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels[4] :				**NE**	**NE**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[5] :				**2,870**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Fluoride**	**Sulfate**
AOC1-T3c	10/05/08	0 - 0.5	N	ND (330)	---	---	ND (10)	11.2	---	---	---	8.44	---	---	---	---	---
	10/05/08	2 - 3	N	ND (330)	---	ND (1.3)	ND (10)	ND (10)	---	---	---	9.2	---	---	---	---	---
	10/05/08	5 - 6	N	370	---	ND (1.2)	ND (10)	19	---	---	---	9.05	---	---	---	---	---
	10/05/08	9 - 10	N	ND (330)	---	ND (1.5)	ND (10)	10	---	---	---	9.14	---	---	---	---	---
AOC1-T4a	10/03/08	0 - 0.5	N	ND (330)	---	---	21	25 J	---	---	---	8.06	---	---	---	---	---
	10/03/08	2 - 3	N	ND (330)	---	ND (1.3)	ND (10)	15.6 J	---	---	---	8.7	---	---	---	---	---
	10/03/08	5 - 6	N	ND (330)	---	ND (1.4)	ND (10)	ND (10)	---	---	---	8.83	---	---	---	---	---
	10/03/08	9 - 10	N	ND (330)	---	ND (1.4)	ND (10)	ND (10)	---	---	---	8.76	---	---	---	---	---
AOC1-T4b	10/02/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	9.02	---	---	---	---	---
	10/02/08	2 - 3	N	ND (340)	---	ND (1.1)	ND (10)	ND (10)	---	---	---	9.13	---	---	---	---	---
	10/02/08	2 - 3	FD	ND (340)	---	ND (1.2)	ND (10)	34.3	---	---	---	9.11	---	---	---	---	---
	10/02/08	5 - 6	N	ND (340)	---	ND (1.5)	ND (10)	ND (10)	---	---	---	9.89	---	---	---	---	---
	10/02/08	9 - 10	N	ND (340)	---	ND (0.99)	ND (10)	ND (10)	---	---	---	9.99	---	---	---	---	---
AOC1-T4c	10/04/08	0 - 0.5	N	ND (330)	---	---	ND (10) J	ND (10) J	---	---	---	9.35	---	---	---	---	---
	10/04/08	2 - 3	N	ND (340)	ND (6.9)	ND (1.4)	ND (10) J	ND (10) J	---	---	---	8.9	---	---	---	---	---
	10/04/08	5 - 6	N	ND (340)	---	ND (1.3)	ND (10) J	ND (10) J	---	---	---	9.1	---	---	---	---	---
	10/04/08	9 - 10	N	ND (340)	---	ND (1.9)	---	---	---	---	---	9.41	---	---	---	---	---
AOC1-T5a	10/04/08	0 - 0.5	N	ND (330)	---	---	ND (10) J	ND (10) J	---	---	---	8.87	---	---	---	---	---
	10/04/08	2 - 3	N	ND (330)	---	ND (1.2)	---	---	---	---	---	9.17	---	---	---	---	---
	10/04/08	5 - 6	N	ND (330)	---	ND (1.4)	ND (10)	ND (10)	---	---	---	9.44	---	---	---	---	---
	10/04/08	9 - 10	N	ND (340)	---	ND (1.6)	ND (10)	ND (10)	---	---	---	9.25	---	---	---	---	---
	10/04/08	9 - 10	FD	ND (340)	---	ND (1.7)	ND (10)	16.5 J	---	---	---	9.3	---	---	---	---	---
AOC1-T5b	10/04/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	8.98	---	---	---	---	---
	10/04/08	2 - 3	N	ND (340)	ND (7.4)	ND (1.5)	ND (10)	ND (10)	---	---	---	9.13	---	---	---	---	---
	10/04/08	5 - 6	N	ND (330)	---	ND (1.3)	ND (10)	ND (10)	---	---	---	9.05	---	---	---	---	---
	10/04/08	9 - 10	N	ND (340)	---	ND (1.3)	ND (10) J	ND (10) J	---	---	---	9.14	---	---	---	---	---
AOC1-T5c	10/04/08	0 - 0.5	N	ND (330)	---	---	ND (10)	ND (10)	---	---	---	8.91	---	---	---	---	---
	10/04/08	2 - 3	N	ND (330)	---	ND (1.7)	ND (10)	ND (10)	---	---	---	8.82	---	---	---	---	---
	10/04/08	5 - 6	N	ND (330)	---	ND (1.1)	ND (10)	ND (10)	---	---	---	9.01	---	---	---	---	---
	10/04/08	9 - 10	N	ND (330)	---	ND (1.2)	ND (10)	ND (10)	---	---	---	8.83	---	---	---	---	---
AOC1-T6a	09/30/08	0 - 0.5	N	ND (330)	---	---	ND (10)	21.4	---	---	---	8.19	---	---	---	---	---
	09/30/08	2.5 - 3	N	ND (340)	---	ND (0.7)	ND (10)	13.5	---	---	---	8.6	---	---	---	---	---
	09/30/08	2.5 - 3	FD	ND (340)	---	ND (0.78)	ND (10)	13.7	---	---	---	8.81	---	---	---	---	---
	09/30/08	5.5 - 6	N	ND (340)	---	ND (0.71)	ND (10)	ND (10)	---	---	---	8.78	---	---	---	---	---
	09/30/08	9.5 - 10	N	ND (340)	---	ND (0.73)	ND (10)	10.5	---	---	---	8.71	---	---	---	---	---

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	VOCs (µg/kg)	Total Petroleum Hydrocarbons (mg/kg)			General Chemistry								
									meq/100g	mV	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Interim Screening Level[1] :				2,870	22,000,000	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels[2] :				35,000	22,000,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL[3] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels[4] :				NE	NE	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values[5] :				2,870	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background[6] :				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Fluoride**	**Sulfate**
AOC1-T6b	09/30/08	0 - 0.5	N	ND (330)	---	---	ND (10)	10.9	---	---	---	8.54	---	---	---	---	---
	09/30/08	2.5 - 3	N	ND (330)	---	ND (0.91)	ND (10)	ND (10)	---	---	---	8.89	---	---	---	---	---
	09/30/08	5.5 - 6	N	ND (330)	---	ND (0.88)	ND (10)	ND (10)	---	---	---	8.76	---	---	---	---	---
	09/30/08	9.5 - 10	N	ND (330)	---	ND (0.86)	ND (10)	ND (10)	---	---	---	8.59	---	---	---	---	---
	09/30/08	9.5 - 10	FD	ND (330)	---	ND (0.8)	ND (10)	ND (10)	---	---	---	8.79	---	---	---	---	---
AOC1-T6c	09/30/08	0 - 0.5	N	ND (330)	---	---	ND (10)	13.5	---	---	---	8.6	---	---	---	---	---
	09/30/08	2.5 - 3	N	ND (330)	ND (5)	ND (1.1)	ND (10)	ND (10)	---	---	---	9.42	---	---	---	---	---
	09/30/08	5.5 - 6	N	ND (330)	---	ND (0.71)	ND (10)	ND (10)	---	---	---	8.85	---	---	---	---	---
SS-1	06/29/97 [7]	0.5	N	---	---	---	---	---	---	---	---	8.56	---	---	---	---	---
	06/29/97 [7]	1.5	N	---	---	---	---	---	---	---	---	8.3	---	---	---	---	---
SS-2	06/29/97	0.5	N	---	---	---	---	---	---	---	---	8.05	---	---	---	---	---
	06/29/97	1.5	N	---	---	---	---	---	---	---	---	8.46	---	---	---	---	---
SSB-1	06/25/97	1	N	---	---	---	---	---	---	---	---	8.51	---	---	---	---	---
	06/25/97	3	N	---	---	---	---	---	---	---	---	8.79	---	---	---	---	---
	06/25/97	6	N	---	---	---	---	---	---	---	---	8.57	---	---	---	---	---
	06/25/97	10	N	---	---	---	---	---	---	157	327	8.35	---	ND (0.4)	140	---	20
SSB-6	06/30/97	1	N	---	---	---	---	---	---	---	---	8.74	---	---	---	---	---
	06/30/97	3	N	---	---	---	---	---	---	---	---	9.04	---	---	---	---	---
	06/30/97	6	N	---	---	---	---	---	---	---	---	8.8	---	---	---	---	---
	06/30/97	10	N	---	---	---	---	---	---	120	295	8.94	---	ND (0.4)	310	---	22
SSB-7	06/30/97	1	N	---	---	---	---	---	---	---	---	8.61	---	---	---	---	---
	06/30/97	3	N	---	---	---	---	---	---	---	---	8.76	---	---	---	---	---
	06/30/97	6	N	---	---	---	---	---	---	---	---	8.95	---	---	---	---	---
	06/30/97	10	N	---	---	---	---	---	---	122	284	9.48	---	ND (0.4)	ND (100)	---	34
SSB-8	07/10/97	1	N	---	---	---	---	---	---	---	---	8.46	---	---	---	---	---
	07/10/97	3	N	---	---	---	---	---	---	---	---	8.53	---	---	---	---	---
	07/10/97	6	N	---	---	---	---	---	---	---	---	8.2	---	---	---	---	---
	07/10/97	10	N	---	---	---	---	---	---	147.9	204	8.9	---	ND (0.4)	ND (100)	---	12
	07/10/97	10	FD	---	---	---	---	---	---	---	---	8.5	---	---	---	---	---
SSB-9	07/10/97	1	N	---	---	---	---	---	---	---	---	7.95	---	---	---	---	---
	07/10/97	3	N	---	---	---	---	---	---	---	---	8.52	---	---	---	---	---
	07/10/97	6	N	---	---	---	---	---	---	---	---	8.44	---	---	---	---	---
	07/10/97	10	N	---	---	---	---	---	---	141.4	252	8.82	---	ND (0.4)	ND (100)	---	9.2 J

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry

AOC 1 - Area Around Former Percolation Bed

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	**VOCs (µg/kg)**	**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry**								
									meq/100g	**mV**	**mg/kg**		**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Interim Screening Level[1] :				**2,870**	**22,000,000**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels[2] :				**35,000**	**22,000,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels[4] :				**NE**	**NE**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[5] :				**2,870**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Cation Exchange Capacity**	**Electric Conductance**	**Orthophosphate**	**pH**	**Phosphate**	**Sulfide**	**Total organic carbon**	**Fluoride**	**Sulfate**
XMW-9	06/25/97	3	N	---	---	---	---	---	---	---	---	8.47	---	---	---	---	---
	06/25/97	10	N	---	---	---	---	---	---	144	359	9.27	---	ND (0.4)	140	---	21
	06/25/97	10	FD	---	---	---	---	---	---	---	---	9.13	---	---	---	---	---
	06/25/97	30	N	---	---	---	---	---	16.7	140	363	8.53	---	ND (0.4)	110	---	33
	06/25/97	50	N	---	---	---	---	---	---	188	305	8.42	---	ND (0.4)	260	---	21
	06/25/97	70	N	---	---	---	---	---	3.4	97	238	8.56	---	ND (0.4)	ND (100)	---	17

TABLE C2-7

Sample Results: VOCs, SVOCs, TPHs, and General Chemistry
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] For SVOCs and VOCs, interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used. For TPHs, interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, "Office of Environmental Health Hazard Assessment. 2005. Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008."Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28 and ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil". July 1.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

[7] This location is in an area where soil is transitioning into sediment.

[8] Sediment Sample

Results greater than the interim screening level are circled.

Only detected SVOCs and VOCs are presented.

VOCs	volatile organic compounds
SVOCs	semivolatile organic compounds
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
meg/100g	milli-equivalent per 100 grams
mV	milli volts
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-8

Sample Results: Pesticides
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Interim Screening Level[1] :				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels[2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL[3] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values[4] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
AOC4-1	10/14/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2) J	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-BCW1	09/20/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-BCW5	10/04/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-BCW6 [6]	08/22/08	0 - 0.5	N	ND (2.8) *	ND (2.8) *	ND (2.8) *	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (2.8)	ND (1.4)	ND (2.8)	ND (2.8)	ND (2.8)	ND (2.8)	ND (2.8)	ND (1.4)	ND (1.4)	ND (1.4)	ND (1.4)	ND (7.1)	ND (71)
AOC1-T1a	10/16/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-T1b	10/16/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
	10/16/08	0 - 0.5	FD	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-T1c	10/16/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC1-T2b	10/16/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC1-T3a	10/05/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-T4c	10/04/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-T5b	10/04/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC1-T6c	09/30/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] This location is in an area where soil is transitioning into sediment.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-9

Sample Results: Polychlorinated Biphenyls
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level[1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Regional Screening Levels[2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Residential DTSC CHHSL[3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC4-1	10/14/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	24	ND (17)	ND (17)	ND (17)	32.5
AOC4-GB10	02/10/10	0	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	350	ND (18)	---	---	350
AOC4-GB11	02/10/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	350 J	ND (18)	---	---	350 J
	02/10/10	0	FD	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	900 J	ND (18)	---	---	900 J
AOC4-GB12	02/10/10	0	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	420	ND (18)	---	---	420
AOC1-BCW1	09/20/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	91	ND (17)	ND (17)	ND (17)	91
	09/20/08	2 - 3	N	ND (17) J	ND (33) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
AOC1-BCW5	10/04/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC1-BCW6	08/22/08[6]	0 - 0.5	N	ND (23)	ND (47)	ND (23)	ND (23)	ND (23)	ND (23)	ND (23)	ND (23)	ND (23)	ND (11.5)
AOC1-T1a	10/16/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC1-T1b	10/16/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
	10/16/08	0 - 0.5	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC1-T1c	10/16/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	75	ND (17)	ND (17)	ND (17)	75
AOC1-T2b	10/16/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC1-T3a	10/05/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	63	ND (17)	ND (17)	ND (17)	63
	10/17/08	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC1-T4c	10/04/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC1-T5b	10/04/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC1-T6c	09/30/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)

TABLE C2-9

Sample Results: Polychlorinated Biphenyls
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

[1] Interim screening level is the USEPA residential regional screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] This location is in an area where soil is transitioning into sediment.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-10

Sample Results: Dioxins and Furans
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Dioxin/Furans (ng/kg)																	
Interim Screening Level[1] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**4.6**	**NE**	**NE**	**NE**	**4.6**	**NE**	**NE**	**NE**	**1.6**
Residential Regional Screening Levels[2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC GOALS[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**4.6**	**NE**	**NE**	**NE**	**4.6**	**NE**	**NE**	**NE**	**50**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1.6**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1,2,3,4,6,7,8-HpCDD**	**1,2,3,4,6,7,8-HpCDF**	**1,2,3,4,7,8,9-HpCDF**	**1,2,3,4,7,8-HxCDD**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDD**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDD**	**1,2,3,7,8,9-HxCDF**	**1,2,3,7,8-PeCDD**	**1,2,3,7,8-PeCDF**	**2,3,4,6,7,8-HxCDF**	**2,3,4,7,8-PeCDF**	**2,3,7,8-TCDD**	**2,3,7,8-TCDF**	**OCDD**	**OCDF**	**TEQ [6]**
AOC4-GB10	02/10/10	0	N	4,200	140	14	16	ND (21)	88	ND (13)	29	ND (12.5)	ND (12.5) *	ND (12.5)	ND (12.5)	6.5 J	ND (5) *	ND (5)	52,000	260	74.5
AOC4-GB11	02/10/10	0	N	4,700	180	ND (12.5)	ND (13)	ND (28)	110	ND (17)	34	ND (12.5)	ND (12.5) *	3.7 J	ND (14)	6.7 J	1.2 J	ND (5)	33,000	610	76.6
	02/10/10	0	FD	5,300	230	ND (12.5)	21	ND (43)	160	ND (23)	39	ND (12.5)	ND (12.5) *	ND (12.5)	22	14	1.7 J	ND (5)	30,000	440	94.5
AOC4-GB12	02/10/10	0	N	490	26	ND (12.5)	5.5 J	ND (12.5)	14	ND (12.5)	ND (12.5)	ND (12.5)	ND (12.5) *	ND (12.5)	ND (12.5)	1.4 J	ND (5) *	ND (5)	4,400	66	8.9

[1] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values, the EPA Regional Screening Level, or DTSC CHHSL is used.

[2] US EPA. 2008. Regional Screening Levels for Chemical Contaminants at Superfund Sites. http://epaprgs.ornl.govchemicals/index.shtml. September 12.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2009. Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28 and ARCADIS. 2009. Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil. July 1.

[5] CH2M HILL. 2009. Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California. May.

[6] TEQ Human and Ecological Receptors except birds, DTSC/HERD Human Health Risk Assessment (HHRA) NOTE 2, California Department of Toxic Substances Control, January 15, 2009.

Results greater than or equal to the Interim Screening Level are circled.

*	Reporting Limits greater than or equal to the Interim Screening Level.
TEQ	2,3,7,8 TCDD toxicity equivalency quotient = Σ (Concentration x TEF)
ND	not detected at the listed reporting limit
---	not applicable
ng/kg	nanogram per kilogram = picogram per gram (pg/g)
ft bgs	feet below ground surface
N	primary sample
J	concentration or reporting limit estimated by laboratory or data validation
NE	not established

TABLE C2-11

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**Background Threshold Value (BTV) [1]**		**Ecological Comparison Value (ECV) [2]**		**Residential Screening Level (Res SL) [3]**		**RWQCB Environmental Screening Levels (ESL) [4]**		**Commercial Screening Level (Com SL) [5]**		**Interim Screening Level (Int SL) [6]**	
				# of Exceedences [7]	**(BTV)**	**# of Exceedences [8]**	**(ECV)**	**# of Exceedences [8]**	**(Res SL)**	**# of Exceedences [8]**	**(ESL)**	**# of Exceedences [8]**	**(Com SL)**	**# of Exceedences [8]**	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 111 (0%)	ND (5.8) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	106 / 111 (95%)	13	1	(11)	1	(11.4)	1	(0.07) *	NA	(NE)	1	(0.24) *	1	(11)
Barium	mg/kg	130 / 130 (100%)	1,580	2	(410)	2	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	2	(410)
Beryllium	mg/kg	0 / 111 (0%)	ND (2.9) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	0 / 111 (0%)	ND (2.9) ‡	0	(1.1)	0	(0.0151) *	0	(39)	NA	(NE)	0	(500)	0	(1.1)
Chromium, Hexavalent	mg/kg	28 / 173 (16%)	5.73	12	(0.83)	0	(139.6)	0	(17)	NA	(NE)	0	(37)	12	(0.83)
Chromium, total	mg/kg	167 / 167 (100%)	970	24	(39.8)	24	(36.3) *	3	(280)	NA	(NE)	0	(1,400)	24	(39.8)
Cobalt	mg/kg	111 / 111 (100%)	11	0	(12.7)	0	(13)	0	(23)	NA	(NE)	0	(300)	0	(12.7)
Copper	mg/kg	166 / 167 (99%)	170	11	(16.8)	7	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	11	(16.8)
Lead	mg/kg	130 / 130 (100%)	32	19	(8.39)	19	(0.0166) *	0	(80)	NA	(NE)	0	(320)	19	(8.39)
Mercury	mg/kg	0 / 111 (0%)	ND (0.14) ‡	NA	(NE)	0	(0.0125)	0	(18)	NA	(NE)	0	(180)	0	(0.0125)
Molybdenum	mg/kg	38 / 130 (29%)	5.5	22	(1.37)	9	(2.25)	0	(380)	NA	(NE)	0	(4,800)	22	(1.37)
Nickel	mg/kg	167 / 167 (100%)	35.2	3	(27.3)	3	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	3	(27.3)
Selenium	mg/kg	0 / 111 (0%)	ND (2.9) ‡	0	(1.47)	0	(0.177) *	0	(380)	NA	(NE)	0	(4,800)	0	(1.47)
Thallium	mg/kg	0 / 111 (0%)	ND (5.8) ‡	NA	(NE)	0	(2.32)	0	(5)	NA	(NE)	0	(63)	0	(2.32)
Vanadium	mg/kg	130 / 130 (100%)	44.5	0	(52.2)	0	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	0	(52.2)
Zinc	mg/kg	167 / 167 (100%)	132	13	(58)	13	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	13	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	12 / 12 (100%)	14,000	0	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	0	(16,400)
Calcium	mg/kg	12 / 12 (100%)	35,000	0	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(66,500)
Iron	mg/kg	31 / 31 (100%)	22,600	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	12 / 12 (100%)	11,000	0	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(12,100)
Manganese	mg/kg	31 / 31 (100%)	420	1	(402)	1	(220)	0	(1,800)	NA	(NE)	0	(23,000)	1	(402)
Potassium	mg/kg	12 / 12 (100%)	4,000	0	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(4,400)
Sodium	mg/kg	8 / 12 (67%)	660	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 12 (0%)	ND (6.69) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Semivolatile Organic Compounds															
Bis (2-ethylhexyl) phthalate	µg/kg	2 / 108 (1.9%)	810	NA	(NE)	0	(2,870)	0	(35,000)	NA	(NE)	0	(120,000)	0	(2,870)
Volatile Organic Compounds															
Methyl acetate	µg/kg	2 / 12 (17%)	12	NA	(NE)	NA	(NE)	0	(22,000,000)	NA	(NE)	0	(92,000,000)	0	(22,000,000)
Polycyclic Aromatic Hydrocarbons															
2-Methyl naphthalene	µg/kg	1 / 111 (0.9%)	5.2	NA	(NE)	NA	(NE)	0	(310,000)	NA	(NE)	0	(4,100,000)	0	(310,000)
Anthracene	µg/kg	4 / 111 (3.6%)	32	NA	(NE)	NA	(NE)	0	(17,000,000)	NA	(NE)	0	(170,000,000)	0	(17,000,000)
Benzo (a) anthracene	µg/kg	24 / 111 (22%)	380	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Benzo (a) pyrene	µg/kg	25 / 111 (23%)	170	NA	(NE)	NA	(NE)	3	(38)	NA	(NE)	1	(130)	3	(38)
Benzo (b) fluoranthene	µg/kg	29 / 111 (26%)	410	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Benzo (ghi) perylene	µg/kg	26 / 111 (23%)	81	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	21 / 111 (19%)	190	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Chrysene	µg/kg	29 / 111 (26%)	400	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Dibenzo (a,h) anthracene	µg/kg	7 / 111 (6.3%)	37	NA	(NE)	NA	(NE)	0	(110)	NA	(NE)	0	(380)	0	(380)
Fluoranthene	µg/kg	35 / 111 (32%)	560	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)

TABLE C2-11

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV)[1]		Ecological Comparison Value (ECV)[2]		Residential Screening Level (Res SL)[3]		RWQCB Environmental Screening Levels (ESL)[4]		Commercial Screening Level (Com SL)[5]		Interim Screening Level (Int SL)[6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences**[7]	**(BTV)**	**# of Exceedences**[8]	**(ECV)**	**# of Exceedences**[8]	**(Res SL)**	**# of Exceedences**[8]	**(ESL)**	**# of Exceedences**[8]	**(Com SL)**	**# of Exceedences**[8]	**(Int SL)**
Polycyclic Aromatic Hydrocarbons															
Fluorene	µg/kg	1 / 111 (0.9%)	7.9	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Indeno (1,2,3-cd) pyrene	µg/kg	23 / 111 (21%)	78	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Phenanthrene	µg/kg	20 / 111 (18%)	150	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Pyrene	µg/kg	31 / 111 (28%)	560	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	20 / 111 (18%)	180	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	37 / 111 (33%)	2,900	NA	(NE)	1	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	1	(1,160)
B(a)P Equivalent	µg/kg	37 / 111 (33%)	290	NA	(NE)	NA	(NE)	5	(38)	NA	(NE)	1	(130)	5	(38)
Polychlorinated biphenyls															
Aroclor 1254	µg/kg	7 / 17 (41%)	900	NA	(NE)	NA	(NE)	3	(220)	NA	(NE)	1	(740)	3	(220)
Total PCBs	µg/kg	7 / 17 (41%)	920	NA	(NE)	3	(204)	NA	(NE)	NA	(NE)	NA	(NE)	3	(204)
Total Petroleum Hydrocarbons															
TPH as diesel	mg/kg	8 / 106 (7.5%)	28.9	NA	(NE)	NA	(NE)	NA	(NE)	0	(540)	NA	(NE)	0	(540)
TPH as motor oil	mg/kg	43 / 106 (41%)	276	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted.

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C2-12

Central Tendency Comparisons (Site to Background)
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Comparison Test Used	Probability that the Observed Differences Would Occur Purely by Chance	Statistical Decision with 0.05 Significance Level	Mean of Site Detects	Mean of Bkgd Detects	Median of Site Detects	Median of Bkgd Detects	Number of Site Detects	Number of Site Samples	Number of Bkgd Detects	Number of Bkgd Samples	Percent Detects Site	Percent Detects Bkgd
Arsenic	Gehan	0.444	nsd	3.77	4.01	3.3	3.5	106	111	58	59	95	95
Barium	Gehan	1.000	nsd	124	165	110	135	130	130	60	60	100	100
Chromium	Gehan	0.141	nsd	38	22.3	23	21.9	167	167	70	70	100	100
Copper	Gehan	0.816	nsd	11.6	10.5	9.7	10.1	166	167	70	70	99	100
Lead	Gehan	0.609	nsd	4.87	4.38	3.6	3.5	130	130	59	60	100	98
Manganese	Gehan	0.989	nsd	254	298	255	281	31	31	59	59	100	100
Molybdenum	Gehan	0.999	nsd	1.83	1.03	1.5	1	38	130	11	60	29	18
Nickel	Gehan	1.000	nsd	12.1	15.4	12	15	167	167	70	70	100	100
Zinc	Gehan	0.439	nsd	40.1	36.8	37	35.5	167	167	70	70	100	100

Bkgd = background

nsd = no statistical difference
< = less than

TABLE C2-13

Decision 2 Data Gaps Summary - AOC1 and SWMU1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
Compound/Depth	Y or N	Det/# results		Y or N	Y or N [2]		
Metals							
Arsenic				**11 mg/kg (bckg)**	**11.4 mg/kg**		
0-0.5 ft bgs	Y	53 of 54	13 mg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	104 of 108	13 mg/kg	Y	Y		
0-6 ft bgs	Y	152 of 160	13 mg/kg	Y	Y		
0-10 ft bgs	Y	206 of 215	13 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	51 of 54	9.7 mg/kg	N	N		
Scouring Scenario 1: 2-6 ft bgs	Y	99 of 106	12 mg/kg	Y	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	153 of 161	12 mg/kg	Y	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	158 of 166	12 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	47 of 51	12 mg/kg	Y	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	101 of 106	12 mg/kg	Y	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	113 of 118	12 mg/kg	Y	Y		
Barium				**5200 mg/kg**	**410 mg/kg (bckg)**		
0-0.5 ft bgs	Y	54 of 54	320 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	108 of 108	1900 mg/kg	N	Y		
0-6 ft bgs	Y	160 of 160	1900 mg/kg	N	Y		
0-10 ft bgs	Y	228 of 228	1900 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	54 of 54	1900 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	106 of 106	1900 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	174 of 174	1900 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	179 of 179	1900 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	51 of 51	180 mg/kg	N	N		
Scouring Scenario 2: 5-10 ft bgs	Y	119 of 119	257 mg/kg	N	N		
Scouring Scenario 2: 5-15 ft bgs	Y	131 of 131	257 mg/kg	N	N		
Chromium-Total				**280 mg/kg**	**39.8 mg/kg (bckg)**		
0-0.5 ft bgs	Y	77 of 77	2600 mg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	151 of 151	2600 mg/kg	Y	Y		
0-6 ft bgs	Y	218 of 218	3200 mg/kg	Y	Y		
0-10 ft bgs	Y	287 of 287	3200 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	67 of 67	1520 mg/kg	Y	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	134 of 134	3200 mg/kg	Y	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	203 of 203	3200 mg/kg	Y	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	208 of 208	3200 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	63 of 63	3200 mg/kg	Y	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	132 of 132	3200 mg/kg	Y	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	144 of 144	3200 mg/kg	Y	Y		

TABLE C2-13
Decision 2 Data Gaps Summary - AOC1 and SWMU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N	Y or N [2]		
Chromium - Hexavalent				**17 mg/kg**	**139.6 mg/kg**		
0-0.5 ft bgs	Y	26 of 83	47.5 mg/kg	Y	N	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	48 of 157	47.5 mg/kg	Y	N		
0-6 ft bgs	Y	65 of 224	47.5 mg/kg	Y	N		
0-10 ft bgs	Y	75 of 293	47.5 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	17 of 67	22.3 mg/kg	Y	N		
Scouring Scenario 1: 2-6 ft bgs	Y	34 of 134	22.7 mg/kg	Y	N		
Scouring Scenario 1: 2-10 ft bgs	Y	44 of 203	22.8 mg/kg	Y	N		
Scouring Scenario 1: 2-12 ft bgs	Y	44 of 208	22.8 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	15 of 63	22.7 mg/kg	Y	N		
Scouring Scenario 2: 5-10 ft bgs	Y	25 of 132	22.8 mg/kg	Y	N		
Scouring Scenario 2: 5-15 ft bgs	Y	25 of 144	22.8 mg/kg	Y	N		
Cobalt				**23 mg/kg**	**13 mg/kg**		
0-0.5 ft bgs	Y	54 of 54	12 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	108 of 108	19 mg/kg	N	Y		
0-6 ft bgs	Y	160 of 160	19 mg/kg	N	Y		
0-10 ft bgs	Y	215 of 215	19 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	54 of 54	19 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	106 of 106	19 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	161 of 161	19 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	166 of 166	19 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	51 of 51	15 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	106 of 106	15 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	118 of 118	16 mg/kg	N	Y		
Copper				**3000 mg/kg**	**20.6 mg/kg**		
0-0.5 ft bgs	Y	77 of 77	27.2 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	151 of 151	61 mg/kg	N	Y		
0-6 ft bgs	Y	218 of 218	61 mg/kg	N	Y		
0-10 ft bgs	Y	286 of 287	61 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	67 of 67	61 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	134 of 134	61 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	202 of 203	61 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	207 of 208	61 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	63 of 63	33.8 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	131 of 132	35 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	143 of 144	35 mg/kg	N	Y		

TABLE C2-13

Decision 2 Data Gaps Summary - AOC1 and SWMU1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N	Y or N [2]		
Lead				**80 mg/kg**	**8.39 mg/kg (bckg)**		
0-0.5 ft bgs	Y	54 of 54	23 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	108 of 108	32 mg/kg	N	Y		
0-6 ft bgs	Y	160 of 160	32 mg/kg	N	Y		
0-10 ft bgs	Y	228 of 228	32 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	54 of 54	32 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	106 of 106	32 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	174 of 174	32 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	179 of 179	32 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	51 of 51	19 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	119 of 119	19 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	131 of 131	19 mg/kg	N	Y		
Molybdenum				**380 mg/kg**	**2.25 mg/kg**		
0-0.5 ft bgs	Y	11 of 54	7.1 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	28 of 108	7.1 mg/kg	N	Y		
0-6 ft bgs	Y	47 of 160	7.8 mg/kg	N	Y		
0-10 ft bgs	Y	59 of 228	7.8 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	17 of 54	4 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	36 of 106	7.8 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	48 of 174	7.8 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	49 of 179	7.8 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	19 of 51	7.8 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	31 of 119	7.8 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	32 of 131	7.8 mg/kg	N	Y		
Nickel				**1600 mg/kg**	**27.3 mg/kg (bckg)**		
0-0.5 ft bgs	Y	77 of 77	19 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	151 of 151	20 mg/kg	N	N		
0-6 ft bgs	Y	218 of 218	42 mg/kg	N	Y		
0-10 ft bgs	Y	287 of 287	45 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	67 of 67	20 mg/kg	N	N		
Scouring Scenario 1: 2-6 ft bgs	Y	134 of 134	42 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	203 of 203	45 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	208 of 208	51 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	63 of 63	42 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	132 of 132	45 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	144 of 144	51 mg/kg	N	Y		

TABLE C2-13

Decision 2 Data Gaps Summary - AOC1 and SWMU1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
Compound/Depth	Y or N	Det/# results		Y or N	Y or N [2]		
Selenium				**360 mg/kg**	**1.47 mg/kg (bckg)**		
0-0.5 ft bgs	NA	0 of 54	NA mg/kg	N	N	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC as additional sampling would likely result in additional non-detect values.
0-3 ft bgs	N	2 of 108	2.5 mg/kg	N	Y		
0-6 ft bgs	N	4 of 160	2.5 mg/kg	N	Y		
0-10 ft bgs	N	4 of 215	2.5 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	N	2 of 54	2.5 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	N	4 of 106	2.5 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	N	4 of 161	2.5 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	N	4 of 166	2.5 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	N	2 of 51	1.6 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	N	2 of 106	1.6 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	N	2 of 118	1.6 mg/kg	N	Y		
Vanadium				**390 mg/kg**	**52.2 mg/kg (bckg)**		
0-0.5 ft bgs	Y	54 of 54	47 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	108 of 108	47 mg/kg	N	N		
0-6 ft bgs	Y	160 of 160	56 mg/kg	N	Y		
0-10 ft bgs	Y	228 of 228	56 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	54 of 54	40 mg/kg	N	N		
Scouring Scenario 1: 2-6 ft bgs	Y	106 of 106	56 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	174 of 174	56 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	179 of 179	56 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	51 of 51	56 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	119 of 119	56 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	131 of 131	56 mg/kg	N	Y		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	Y	77 of 77	673 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	151 of 151	673 mg/kg	N	Y		
0-6 ft bgs	Y	218 of 218	673 mg/kg	N	Y		
0-10 ft bgs	Y	287 of 287	673 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	67 of 67	360 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	134 of 134	360 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	203 of 203	360 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	208 of 208	360 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	63 of 63	190 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	132 of 132	190 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	144 of 144	190 mg/kg	N	Y		

TABLE C2-13
Decision 2 Data Gaps Summary - AOC1 and SWMU1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N	Y or N [2]		
Contract Laboratory Program Inorganics							
Calcium				**66500 mg/kg (bckg)**	**66500 mg/kg (bckg)**		
0-0.5 ft bgs	Y	30 of 30	280000 mg/kg	Y	Y	None	Compound may exceed HHCV and ECV (both background). Existing data adequate for EPC. Under the scouring scenarios, very limited data are available. However, additional data collection to support the scouring scenarios does not appear warranted given that the concentrations are comparable to background (Attachment 1, Section 3.3). In addition, it is reasonable to assume that the nature and extent of the calcium detected in the 0 to 3.0 ft interval is representative of concentrations at deeper depths.
0-3 ft bgs	Y	30 of 30	280000 mg/kg	Y	Y		
0-6 ft bgs	Y	31 of 31	280000 mg/kg	Y	Y		
0-10 ft bgs	Y	31 of 31	280000 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-6 ft bgs	N	1 of 1	255000 mg/kg	Y	Y		
Scouring Scenario 1: 2-10 ft bgs	N	1 of 1	255000 mg/kg	Y	Y		
Scouring Scenario 1: 2-12 ft bgs	N	1 of 1	255000 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Magnesium				**12100 mg/kg (bckg)**	**12100 mg/kg (bckg)**		
0-0.5 ft bgs	Y	30 of 30	14300 mg/kg	Y	Y	None	Compound may exceed HHCV and ECV (both background). Existing data adequate for EPC. Under the scouring scenarios, very limited data are available. However, additional data collection to support the scouring scenarios does not appear warranted given that the maximum concentration is slightly greater than background. In addition, it is reasonable to assume that the nature and extent of the magnesium detected in the 0 to 3.0 ft interval is representative of concentrations at deeper depths.
0-3 ft bgs	Y	30 of 30	14300 mg/kg	Y	Y		
0-6 ft bgs	Y	31 of 31	14700 mg/kg	Y	Y		
0-10 ft bgs	Y	31 of 31	14700 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-6 ft bgs	N	1 of 1	14700 mg/kg	Y	Y		
Scouring Scenario 1: 2-10 ft bgs	N	1 of 1	14700 mg/kg	Y	Y		
Scouring Scenario 1: 2-12 ft bgs	N	1 of 1	14700 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Potassium				**4400 mg/kg (bckg)**	**4400 mg/kg (bckg)**		
0-0.5 ft bgs	Y	30 of 30	4900 mg/kg	Y	Y	None	Compound may exceed HHCV and ECV (both background). Existing data adequate for EPC. Under the scouring scenarios, very limited data are available. However, additional data collection to support the scouring scenarios does not appear warranted given that the maximum concentration is slightly greater than background. In addition, it is reasonable to assume that the nature and extent of the potassium detected in the 0 to 3.0 ft interval is representative of concentrations at deeper depths.
0-3 ft bgs	Y	30 of 30	4900 mg/kg	Y	Y		
0-6 ft bgs	Y	31 of 31	4900 mg/kg	Y	Y		
0-10 ft bgs	Y	31 of 31	4900 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-6 ft bgs	N	1 of 1	1520 mg/kg	N	N		
Scouring Scenario 1: 2-10 ft bgs	N	1 of 1	1520 mg/kg	N	N		
Scouring Scenario 1: 2-12 ft bgs	N	1 of 1	1520 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		

TABLE C2-13

Decision 2 Data Gaps Summary - AOC1 and SWMU1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	
Compound/Depth	Y or N	Det/# results		Y or N	Y or N [2]		Notes
Polycyclic Aromatic Hydrocarbons							
PAHs (BaP TEQ)				**38 µg/kg**	**NA**		
0-0.5 ft bgs	Y	23 of 54	40 µg/kg	Y	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	37 of 108	80 µg/kg	Y	NA		
0-6 ft bgs	Y	42 of 160	290 µg/kg	Y	NA		
0-10 ft bgs	Y	45 of 215	290 µg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	14 of 54	80 µg/kg	Y	NA		
Scouring Scenario 1: 2-6 ft bgs	Y	19 of 106	290 µg/kg	Y	NA		
Scouring Scenario 1: 2-10 ft bgs	Y	22 of 161	290 µg/kg	Y	NA		
Scouring Scenario 1: 2-12 ft bgs	Y	22 of 166	290 µg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	5 of 51	290 µg/kg	Y	NA		
Scouring Scenario 2: 5-10 ft bgs	Y	8 of 106	290 µg/kg	Y	NA		
Scouring Scenario 2: 5-15 ft bgs	Y	8 of 118	290 µg/kg	Y	NA		
HMW PAHs				**NA**	**1160 µg/kg**		
0-0.5 ft bgs	Y	23 of 54	900 µg/kg	NA	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	37 of 108	900 µg/kg	NA	N		
0-6 ft bgs	Y	42 of 160	2900 µg/kg	NA	Y		
Scouring Scenario 1: 2-3 ft bgs	Y	14 of 54	540 µg/kg	NA	N		
Scouring Scenario 1: 2-6 ft bgs	Y	19 of 106	2900 µg/kg	NA	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	22 of 161	2900 µg/kg	NA	Y		
Scouring Scenario 2: 5-6 ft bgs	Y	5 of 51	2900 µg/kg	NA	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	8 of 106	2900 µg/kg	NA	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	8 of 118	2900 µg/kg	NA	Y		

Footnotes:

[1] The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

[2] AOC1/SWMU1 soil data was evaluated for sufficiency to support the ecological risk assessment including sampling locations in areas of soil transitioning to sediment. These locations are BCW-6 and SS-1.

Acronyms and Abbreviations:

AOC - area of concern
BaP TEQ - benzo(a)pyrene toxic equivalents
ECV - ecological comparison values
EPC - exposure point concentration
ft bgs - feet below ground surface
HHCV - human health comparison values
HMW PAH - high molecular weight polycyclic aromatic hydrocarbons
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
N - no
NA - not applicable
Y - yes

TABLE C2-14
Decision 2 Data Gaps Summary - AOC1 North of Railroad
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable? [1] Y or N	Proposed Sample ID	Notes
Metals						
Arsenic				**11 mg/kg (bckg)**		
0-0.5 ft bgs	Y	6 of 6	13 mg/kg	Y	None	Compound may exceed HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	12 of 12	13 mg/kg	Y		
0-6 ft bgs	Y	16 of 16	13 mg/kg	Y		
0-10 ft bgs	Y	20 of 20	13 mg/kg	Y		
Scouring Scenario 1: 2-3 ft bgs	Y	6 of 6	9.3 mg/kg	N		
Scouring Scenario 1: 2-6 ft bgs	Y	10 of 10	9.3 mg/kg	N		
Scouring Scenario 1: 2-10 ft bgs	Y	14 of 14	9.3 mg/kg	N		
Scouring Scenario 1: 2-12 ft bgs	Y	14 of 14	9.3 mg/kg	N		
Scouring Scenario 2: 5-6 ft bgs	N	4 of 4	4.2 mg/kg	N		
Scouring Scenario 2: 5-10 ft bgs	Y	8 of 8	5.1 mg/kg	N		
Scouring Scenario 2: 5-15 ft bgs	Y	8 of 8	5.1 mg/kg	N		

Footnotes:

[1] The higher value of either the HHCV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

Acronyms and Abbreviations:
AOC - Area of Concern
EPC - exposure point concentration
ft bgs - feet below ground surface
HHCV - human health comparison values
mg/kg - milligrams per kilogram
N - no
NA - not applicable
Y - yes

TABLE C2-15
Decision 2 Data Gaps Summary - AOC1 Sediment Samples
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth[1]	Adequate EPC? [2]		Maximum Detected Value	> TEC or Soil Background[1]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N		
Metals						
Arsenic				**9.79 mg/kg (TEC)**		
0-0.5 ft bgs	N	4 of 5	13 mg/kg	Y	None	Compound exceeds TEC and is less than PEC (33 mg/kg). Existing data not adequate to calculate UCL using ProUCL. Maximum is within two time the TEC and may be naturally occurring at this concentration. Additional sampling is expected to yield comparable concentrations and not significantly change the EPC.
0-2 ft bgs	N	4 of 5	13 mg/kg	Y		
0-3 ft bgs	N	5 of 6	13 mg/kg	Y		
Chromium-Total				**43.4 mg/kg (TEC)**		
0-0.5 ft bgs	N	11 of 11	71 mg/kg	Y	None	Compound exceeds TEC and is less than PEC (111 mg/kg). Existing data adequate to calculate UCL using ProUCL.
0-2 ft bgs	Y	11 of 11	71 mg/kg	Y		
0-3 ft bgs	Y	12 of 12	71 mg/kg	Y		
Chromium-Hexavalent				**0.83 mg/kg (soil background)**		
0-0.5 ft bgs	N	1 of 11	2.63 mg/kg	Y	None	Compound exceeds soil background used as a conservative estimate of sediment background. Existing data are not adequate to calculate UCL using ProUCL; however, collecting additional samples is likely to yield additional non-detected values. Additional data collected to satisfy Decision 1 will be included in the EPC calculations as appropriate. Data for the surface interval include historical sediment samples collected from 0 to 2 feet below sediment surface.
0-2 ft bgs	N	1 of 11	2.63 mg/kg	Y		
0-3 ft bgs	N	1 of 12	2.63 mg/kg	Y		

Footnotes:

[1] Compounds included are those that exceed the TEC. If a TEC was unavailable, soil background was applied as a conservative estimate of sediment background values. The 0 to 0.5 ft exposure interval includes samples collected from 0 to 2 ft below sediment surface.

[2] Samples considered in this evaluation were those from the preliminary AOC-1 sediment exposure area at the mouth of Bat Cave Wash. Samples included were those in sediment or soil transitioning to sediment within the exposure area: AOC1-BCW6-122, AOC1-BCW6-123, SED-10, SED-11, SED-12, SED-5, SED-6, SED-7, SED-8, SED-9, SS-1-0.5, SS-1-1.5. Samples from upriver and downriver (i.e., DrSed-1, DrSed-2, DrSed-3, SED-1, SED-2, SED-3, SED-4, SED-27, SED-28, and SED-29) were not included.

c. The TEC or soil background value is included in this column for the respective compound in **BOLDED BLUE FONT**.

Acronyms and Abbreviations:
AOC - area of concern
EPC - exposure point concentration
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
N - no
NA - not applicable
PEC - probable effects concentration
TEC - threshold effects concentration
UCL - upper confidence limit
Y - yes

TABLE C2-16
Results of Tiered Analysis at AOC 1 – North
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Metal	**Step 1 Do COPCs/COPECs Exceed Background?**	**Step 2 Do COPCs/COPECs Exceed SSL?**	**Step 3 Does Screening Model Eliminate Potential for Leaching to Groundwater?**
Arsenic	√		
Chromium	√		
Chromium, Hexavalent	√	√	Yes
Copper	√		
Lead	√		
Molybdenum	√	√	Yes
Zinc	√		

✓ = Constituents concentration exceeds background and/or SSL.
SSL = soil screening level.

TABLE C2-17

Sample Results Compared to the Calculated Soil Screening Levels

AOC1-North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)						
			Soil Screening Levels : [1]	**39**	**5,500**	**0.36**	**21,000**	**3,400**	**0.73**	**130,000**
			Background : [2]	**11**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC1-BCW1	09/20/08	0 - 0.5	N	4.3	23	ND (0.401)	11	7.5	ND (1)	44
	09/20/08	2 - 3	N	8.4	25	ND (0.404)	15	2	ND (1)	28
AOC1-BCW2	10/04/08	0 - 0.5	N	3.4	21	ND (0.403)	7.6	3.7	ND (1)	40
	10/04/08	2 - 3	N	3.1	34	ND (0.407)	9.2	18	ND (1)	39
	10/04/08	5 - 6	N	3.1	35	ND (0.404)	8.8	4.4	1.5	41
	10/04/08	9 - 10	N	3.8	20	ND (0.426)	8.1	3.8	ND (1.1)	39
AOC1-BCW3	10/04/08	0 - 0.5	N	4.4	25	0.416	11	7.3	ND (1)	51
	10/04/08	2 - 3	N	3.2	25	ND (0.404)	9.8	4	ND (1)	38
	10/04/08	5 - 6	N	4.2	23	ND (0.415)	9.6	2.2	ND (2.1)	43
	10/04/08	9 - 10	N	4	21	ND (0.421)	8.5	2.2	ND (1.1)	38
	10/04/08	9 - 10	FD	4.2	22	ND (0.424)	8.8	2.3	ND (1.1)	41
AOC1-BCW4	10/04/08	0 - 0.5	N	4.4	36	1.3	13	9.4	ND (1)	61
	10/04/08	2 - 3	N	2.9	24	ND (0.407)	8.3	3.6	ND (1)	33
	10/04/08	5 - 6	N	4	23	ND (0.416)	8.4	2.7	ND (1)	45
	10/04/08	9 - 10	N	5.1	22	ND (0.426)	7.6	2.3	ND (2.1)	42
AOC1-BCW5	10/04/08	0 - 0.5	N	3.7	35	0.445	12	6	ND (1)	46
	10/04/08	2 - 3	N	3.5	31	ND (0.407)	9.6	7	ND (1)	42
	10/04/08	5 - 6	N	3.9	26	ND (0.42)	8.4	2.7	ND (1)	44
	10/04/08	9 - 10	N	4.7	22	ND (0.425)	ND (7.4)	3.2	ND (2.1)	40
	10/04/08	9 - 10	FD	4.7	24	ND (0.427)	ND (7.3)	3	ND (2.1)	40
AOC1-BCW6	08/22/08[6]	0 - 0.5	N	13	71	2.63	22	23	ND (2.8)	81
	08/22/08[6]	2 - 3	N	9.3	21	ND (0.608)	14	8.7	ND (2.9)	50
MW-11	06/29/97	1	N	---	12.2	ND (0.05)	7.5	---	---	24.8
	06/29/97	3	N	---	31.1	ND (0.05)	6.6	---	---	29.5
	06/29/97	6	N	---	26.9	ND (0.05)	5.3	---	---	23.2
	06/29/97	10	N	---	13.5	ND (0.05)	8.3	6.3	0.32	38.5
	06/29/97	20	N	---	5.9	ND (0.05)	6	---	---	19.9
	06/29/97	30	N	---	12.6	ND (0.05)	6.9	1.8	0.8	28.4

TABLE C2-17

Sample Results Compared to the Calculated Soil Screening Levels

AOC1-North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)						
			Soil Screening Levels : [1]	**39**	**5,500**	**0.36**	**21,000**	**3,400**	**0.73**	**130,000**
			Background : [2]	**11**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
MW-11	06/29/97	40	N	---	9.8	ND (0.05)	9.8	---	---	28.4
	06/29/97	50	N	---	13.6	ND (0.05)	6.9	---	---	29.8
	06/29/97	60	N	---	9.6	ND (0.05)	5.8	3	0.088 J	26.2
	06/29/97	60	FD	---	10	ND (0.05)	5.74	---	---	19.8
	06/29/97	69	N	---	16.9	ND (0.05)	13.8	5	ND (0.2)	35.7
MW-13	07/09/97	10	N	---	10.8	ND (0.05)	9.3	---	---	27.2
	07/09/97	20	N	---	10.5	ND (0.05)	7.1	2.4	0.14 J	28.3
	07/09/97	25	N	---	---	---	---	2.8	ND (0.2)	---
	07/09/97	30	N	---	12.2	ND (0.05)	8.6	---	---	33.3
	07/09/97	40	N	---	10.7	ND (0.05)	8.1	---	---	30.4
	07/09/97	40	FD	---	6.4	ND (0.05)	5.6	---	---	17.7
AOC1-T2a	10/05/08	0 - 0.5	N	4	26	ND (0.403)	10	4.8	ND (1)	38
	10/16/08	2 - 3	N	6	28	ND (0.407)	10	4	ND (2)	42
	10/16/08	5 - 6	N	2.7	19	ND (0.405)	8.3	2.4	1.1	35
	10/16/08	9 - 10	N	2.9	15	ND (0.416)	7.1	2.1	ND (1)	36
AOC1-T2b	10/16/08	0 - 0.5	N	3.6	26	ND (0.408)	9.3	3.2	ND (1)	39
	10/16/08	2 - 3	N	3	26	ND (0.414)	10	3	2.4	33
	10/16/08	5 - 6	N	3	53	ND (0.407)	8.7	2.4	5.5	32
	10/16/08	9 - 10	N	2.4	18	ND (0.415)	8.5	1.8	1.3	33
	10/16/08	9 - 10	FD	2.3	18	ND (0.413)	9.6	1.6	1.2	35
AOC1-T2c	10/08/08	0 - 0.5	N	3.7	60	1.26	10	5.1	ND (1)	44
	10/08/08	2 - 3	N	3.1	42	ND (0.416)	11	3.3	ND (1)	33
	10/08/08	5 - 6	N	2.3	22	ND (0.412)	9.1	1.8	ND (1)	28
	10/08/08	9 - 10	N	3.7	24	ND (0.419)	9.7	2.6	ND (1)	40
AOC1-T2e	10/16/08	0 - 0.5	N	2.9	34	ND (0.405)	9.3	3.4	2.2	36
	10/16/08	2 - 3	N	2.9	30	ND (0.408)	8.4	3.2	1.4	30
	10/16/08	2 - 3	FD	3.1	32	ND (0.408)	8	3.2	1.3	33
	10/16/08	5 - 6	N	2.6	44	ND (0.402)	8.4	2.3	5.4	32

TABLE C2-17

Sample Results Compared to the Calculated Soil Screening Levels

AOC1-North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)						
			Soil Screening Levels : [1]	**39**	**5,500**	**0.36**	**21,000**	**3,400**	**0.73**	**130,000**
			Background : [2]	**11**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC1-T2e	10/16/08	9 - 10	N	2.5	20	ND (0.415)	4.9	1.1	1.1	27
AOC1-T3a	10/05/08	0 - 0.5	N	4.1	24	ND (0.403)	11	8.4	ND (1)	47
	10/17/08	2 - 3	N	4.4	19	ND (0.407)	9	4.2	ND (1)	37
	10/17/08	5 - 6	N	4.2	23	ND (0.405)	12	14	1.7	39
	10/17/08	9 - 10	N	2.9	15	ND (0.406)	10	1.9	ND (1)	33
AOC1-T3b	10/05/08	0 - 0.5	N	2.6	23	ND (0.402)	8	3.1	ND (1)	29
	10/17/08	2 - 3	N	3.1	170	2.77	13	9.1	ND (1)	120
	10/17/08	5 - 6	N	2.3	46	ND (0.405)	8.6	2.3	4.6	34
	10/17/08	9 - 10	N	2.7	17	ND (0.41)	7.7	1.7	1.1	31
	10/17/08	9 - 10	FD	2.5	16	ND (0.412)	6.5	1.9	1.1	32
AOC1-T3c	10/05/08	0 - 0.5	N	4.6	27	0.42	11	7	ND (1)	46
	10/05/08	2 - 3	N	3.5	30	ND (0.41)	9.7	3.4	ND (1)	39
	10/05/08	5 - 6	N	3.7	89	1.65	12	5.8	1.4	65
	10/05/08	9 - 10	N	2.7	19	ND (0.403)	10	2.4	ND (1)	36
AOC1-T4a	10/03/08	0 - 0.5	N	4.2	28	ND (0.402)	11	5.5	ND (1)	51
	10/03/08	2 - 3	N	3.9	26	ND (0.407)	10	4	ND (1)	40
	10/03/08	5 - 6	N	4	25	ND (0.409)	11	3.3	ND (1)	40
	10/03/08	9 - 10	N	3.7	26	0.525	9.6	4.3	ND (1)	36
AOC1-T4b	10/02/08	0 - 0.5	N	2.9	21	1.26	7.5	2.6	ND (1)	29
	10/02/08	2 - 3	N	3.7	29	ND (0.412)	12	8.8 J	ND (1)	46
	10/02/08	2 - 3	FD	3.5	28	ND (0.408)	11	7 J	ND (1)	50
	10/02/08	5 - 6	N	3.6	24	ND (0.419)	9.6	3.2	ND (1)	39
	10/02/08	9 - 10	N	3.2	19	ND (0.415)	8.8	2.4	ND (1)	37
AOC1-T4c	10/04/08	0 - 0.5	N	4.2	19	ND (0.403)	22	5.9	ND (1)	33
	10/04/08	2 - 3	N	3.8	27	0.816	19	14	ND (1)	67
	10/04/08	5 - 6	N	3.3	28	0.868	21	19	1.3	71
	10/04/08	9 - 10	N	3.1	27	ND (0.413)	13	5.8	ND (1)	47

TABLE C2-17

Sample Results Compared to the Calculated Soil Screening Levels
AOC1-North
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)						
			Soil Screening Levels : [1]	**39**	**5,500**	**0.36**	**21,000**	**3,400**	**0.73**	**130,000**
			Background : [2]	**11**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC1-T5a	10/04/08	0 - 0.5	N	3.1	21	ND (0.402)	13	4	ND (1)	41
	10/04/08	2 - 3	N	2.8	39	ND (0.403)	10	3.2	ND (1)	38
	10/04/08	5 - 6	N	3.8	35	ND (0.405)	24	3.4	2.2	38
	10/04/08	9 - 10	N	2.6	24	ND (0.411)	11	3.6	ND (1)	38
	10/04/08	9 - 10	FD	2.4	27	ND (0.409)	11	3.1	ND (1)	38
AOC1-T5b	10/04/08	0 - 0.5	N	2.4	26	ND (0.402)	11	4.9	ND (1)	33
	10/04/08	2 - 3	N	3.3	41	0.452	9.5	4.4	ND (1)	38
	10/04/08	5 - 6	N	3.4	61	0.596	9.8	4.8	ND (1)	41
	10/04/08	9 - 10	N	3.5	23	ND (0.409)	13	3.4	ND (1)	41
AOC1-T5c	10/04/08	0 - 0.5	N	3.7	15	ND (0.403)	8.8	5.8	ND (1)	37
	10/04/08	2 - 3	N	3.3	31	0.875	12	7.5	ND (1)	53
	10/04/08	5 - 6	N	3.1	36	0.641	12	11	ND (1)	49
	10/04/08	9 - 10	N	3.5	21	0.478	9.8	3.9	ND (1)	39
AOC1-T6a	09/30/08	0 - 0.5	N	3.2	20	ND (0.402)	11	5.6	ND (1)	47
	09/30/08	2.5 - 3	N	3.2	20	ND (0.408)	8.9	5.6	ND (1)	36
	09/30/08	2.5 - 3	FD	3.1	21	ND (0.407)	8.8	5.4	ND (1)	40
	09/30/08	5.5 - 6	N	2.3	16	ND (0.408)	7.9	3.9	ND (1)	34
	09/30/08	9.5 - 10	N	3.2	20	ND (0.41)	8.7	12	ND (1)	40
AOC1-T6b	09/30/08	0 - 0.5	N	3	26	ND (0.401)	9	5.5	ND (1)	41
	09/30/08	2.5 - 3	N	3.4	18	ND (0.404)	7.1	4.4	ND (1)	29
	09/30/08	5.5 - 6	N	2.9	22	ND (0.404)	10	3.2	ND (1)	36
	09/30/08	9.5 - 10	N	2.8	25	ND (0.405)	9.3	3.1 J	ND (1)	37
	09/30/08	9.5 - 10	FD	3	27	ND (0.404)	10	8.5 J	ND (1)	39
AOC1-T6c	09/30/08	0 - 0.5	N	2.9	18	ND (0.401)	8.7	3.2	ND (1)	39
	09/30/08	2.5 - 3	N	5.1	26	ND (0.407)	9.7	5.1	ND (1)	37
	09/30/08	5.5 - 6	N	2.4	21	ND (0.406)	9.4	2.9	ND (1)	37
SS-1	06/29/97[6]	0.5	N	---	38.2	ND (0.05)	16.5	---	---	55
	06/29/97[6]	1.5	N	---	25.3	ND (0.05)	13.6	---	---	43.4

TABLE C2-17

Sample Results Compared to the Calculated Soil Screening Levels
AOC1-North
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)						
			Soil Screening Levels : [1]	**39**	**5,500**	**0.36**	**21,000**	**3,400**	**0.73**	**130,000**
			Background : [2]	**11**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
SS-2	06/29/97	0.5	N	---	18.9	ND (0.05)	14.1	---	---	48.3
	06/29/97	1.5	N	---	10.2	ND (0.05)	12.9	---	---	42.2
SS-4	06/29/97	0.5	N	---	---	ND (0.05)	---	---	---	---
SS-5	06/29/97	0.5	N	---	---	ND (0.05)	---	---	---	---
SS-6	06/29/97	0.5	N	---	---	ND (0.05)	---	---	---	---
SS-7	06/29/97	0.5	N	---	---	ND (0.05)	---	---	---	---
SS-8	06/29/97	0.5	N	---	---	ND (0.05)	---	---	---	---
SSB-6	06/30/97	1	N	---	13.7	ND (0.05)	8.6	---	---	29.1
	06/30/97	3	N	---	27.5	ND (0.05)	6.6	---	---	24.8
	06/30/97	6	N	---	467	0.06	33.8	---	---	132
	06/30/97	10	N	---	14.8	ND (0.05)	9.6	3.1	0.79	33.4
SSB-7	06/30/97	1	N	---	19.8	ND (0.05)	7.7	---	---	28.1
	06/30/97	3	N	---	24.9	ND (0.05)	6.5	---	---	29.4
	06/30/97	6	N	---	8.6	ND (0.05)	14.7	---	---	23
	06/30/97	10	N	---	8.1	ND (0.05)	5.8	1.8	ND (0.2)	23.4
SSB-8	07/10/97	1	N	---	53.1	ND (0.05)	15.1	---	---	38.3
	07/10/97	3	N	---	13.6	ND (0.05)	14.1	---	---	35.3
	07/10/97	6	N	---	15.3	ND (0.05)	7.3	---	---	33.5
	07/10/97	10	N	---	17.1	ND (0.05)	10.7	2.8	0.071 J	35.8
	07/10/97	10	FD	---	13.7	ND (0.05)	8	---	---	30
SSB-9	07/10/97	1	N	---	17.3	ND (0.05)	8.6	---	---	35.5
	07/10/97	3	N	---	11	ND (0.05)	6.1	---	---	31.8
	07/10/97	6	N	---	9.6	ND (0.05)	6.4	---	---	25.3
	07/10/97	10	N	---	15.7	ND (0.05)	7.7	3	0.096 J	33.1

TABLE C2-17

Sample Results Compared to the Calculated Soil Screening Levels
AOC1-North
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C2-18

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)
AOC 1 - Area Around Former Percolation Bed
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

		Maximum Detected Value (mg/kg)	TTLC in mg/kg[1]		STLC in mg/L[1]			TCLP in mg/L[1]		
Parameter	**Frequency of detection**		**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	0 / 111 (0%)	ND (5.8)	0	500	0	150	15	0	NE	NE
Arsenic	106 / 111 (95%)	13	0	500	0	50	5	0	100	5
Barium	130 / 130 (100%)	1,580	0	10000	1	1000	100	0	2000	100
Beryllium	0 / 111 (0%)	ND (2.9)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 111 (0%)	ND (2.9)	0	100	0	10	1	0	20	1
Chromium	167 / 167 (100%)	970	0	2500	13	50	5	6	100	5
Chromium, Hexavalent	28 / 173 (16%)	5.73	0	500	0	50	5	0	NE	NE
Cobalt	111 / 111 (100%)	11	0	8000	0	800	80	0	NE	NE
Copper	166 / 167 (99%)	170	0	2500	0	250	25	0	NE	NE
Lead	130 / 130 (100%)	32	0	1000	0	50	5	0	100	5
Mercury	0 / 111 (0%)	ND (0.14)	0	20	0	2	0.2	0	4	0.2
Molybdenum	38 / 130 (29%)	5.5	0	3500	0	3500	350	0	NE	NE
Nickel	167 / 167 (100%)	35.2	0	2000	0	200	20	0	NE	NE
Selenium	0 / 111 (0%)	ND (2.9)	0	100	0	10	1	0	20	1
Silver	0 / 111 (0%)	ND (2.9)	0	500	0	50	5	0	100	5
Thallium	0 / 111 (0%)	ND (5.8)	0	700	0	70	7	0	NE	NE
Vanadium	130 / 130 (100%)	44.5	0	2400	0	240	24	0	NE	NE
Zinc	167 / 167 (100%)	132	0	5000	0	2500	250	0	NE	NE

Notes:

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC x 10.

TABLE C2-19
Proposed Phase 2 Sampling Locations at AOC 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[b]
AOC1-BCW7	0. 2, 5, 9, 14, and 20	To resolve Data Gaps #5 and #6 - Assess potential impoundment area at IM-3 road crossing and support CMS/FS	Hexavalent chromium, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	Rotosonic
AOC1-BCW8	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW9	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW10	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW11	0, 2, 5, and 9	To resolve Data Gap #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW12	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW13	0, 2, 5, and 9	To resolve Data Gaps #3, and #6 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash support CMS/FS.	Hexavalent chromium, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	Rotosonic
AOC1-BCW14	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW15	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW16	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW17	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic

TABLE C2-19
Proposed Phase 2 Sampling Locations at AOC 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[b]
		tamarisk area near the mouth of Bat Cave Wash.		
AOC1-BCW18	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW19	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW20	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW21	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW22	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW23	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW24	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW25	0, 2, 5, and 9	To resolve Data Gaps #3, and #6 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash support CMS/FS.	Hexavalent chromium, PCBs[a]; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	Rotosonic
AOC1-BCW26	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic
AOC1-BCW27	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic or backhoe
AOC1-BCW28	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic or backhoe

TABLE C2-19
Proposed Phase 2 Sampling Locations at AOC 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[b]
		tamarisk area near the mouth of Bat Cave Wash.		
AOC1-BCW29	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic or backhoe
AOC1-BCW30	0, 2, 5, and 9	To resolve Data Gaps #3 - Chemical concentrations soil and sediment in the vicinity of AOC1-BCW6 and evaluation of tamarisk area near the mouth of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PCBs[a]	Rotosonic or backhoe
AOC1-1 (contingent)	0, 2, 5, 9, 14, 20, and 30	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash. Contingent upon results of AOC1-2 and AOC1-3.	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	Rotosonic
AOC1-2	0, 2, 5, 9, 14, 20, and 30	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash.	Hexavalent chromium, molybdenum, total chromium, PCBs[a]	Rotosonic
AOC1-3	0, 2, 5, 9, 14, 20, 30, 40, 50, 60, 70, and 80	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash.	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	Rotosonic
AOC1-4 (contingent)	0, 2, 5, 9, 14, 20, and 30	To resolve Data Gap #1 - Define lateral extent in bottom of Bat Cave Wash. Contingent upon results of AOC1-2 and AOC1-3.	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	Rotosonic
AOC1-T1e	0, 2, 5, 9, and 14	To resolve Data Gap #1 - Define lateral extent at AOC1-T1c.	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	Rotosonic
AOC1-T1f	0, 2, 5, 9, and 14	To resolve Data Gap #1 - Define lateral extent at AOC1-T1c.	Hexavalent chromium, Title 22 metals, PAHs, pH, PCBs[a]	Rotosonic
AOC1-T2f	0, 2	To resolve Data Gap #4 - Evaluate potential white powder.	Title 22 metals, hexavalent chromium, pH, PCBs[a]	Hand tools/ Repelling
AOC1-T5d	0, 2, 5, 9, 14, and 20	To resolve Data Gaps #1 and #6- Define lateral extent near sample transect AOC1-T5 and support CMS/FS.	Hexavalent chromium, Title 22 metals, PAHs, PCBs[a] ; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	Rotosonic
AOC1-T6d	0, 2, 5, 9, 14, and 20	To resolve Data Gaps #5 and #6 – Assess potential impoundment area near railroad bridge culvert and support CMS/FS.	Hexavalent chromium, Title 22 metals, PAHs, PCBs[a] ; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – 3 samples from boring	Rotosonic

TABLE C2-19
Proposed Phase 2 Sampling Locations at AOC 1
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

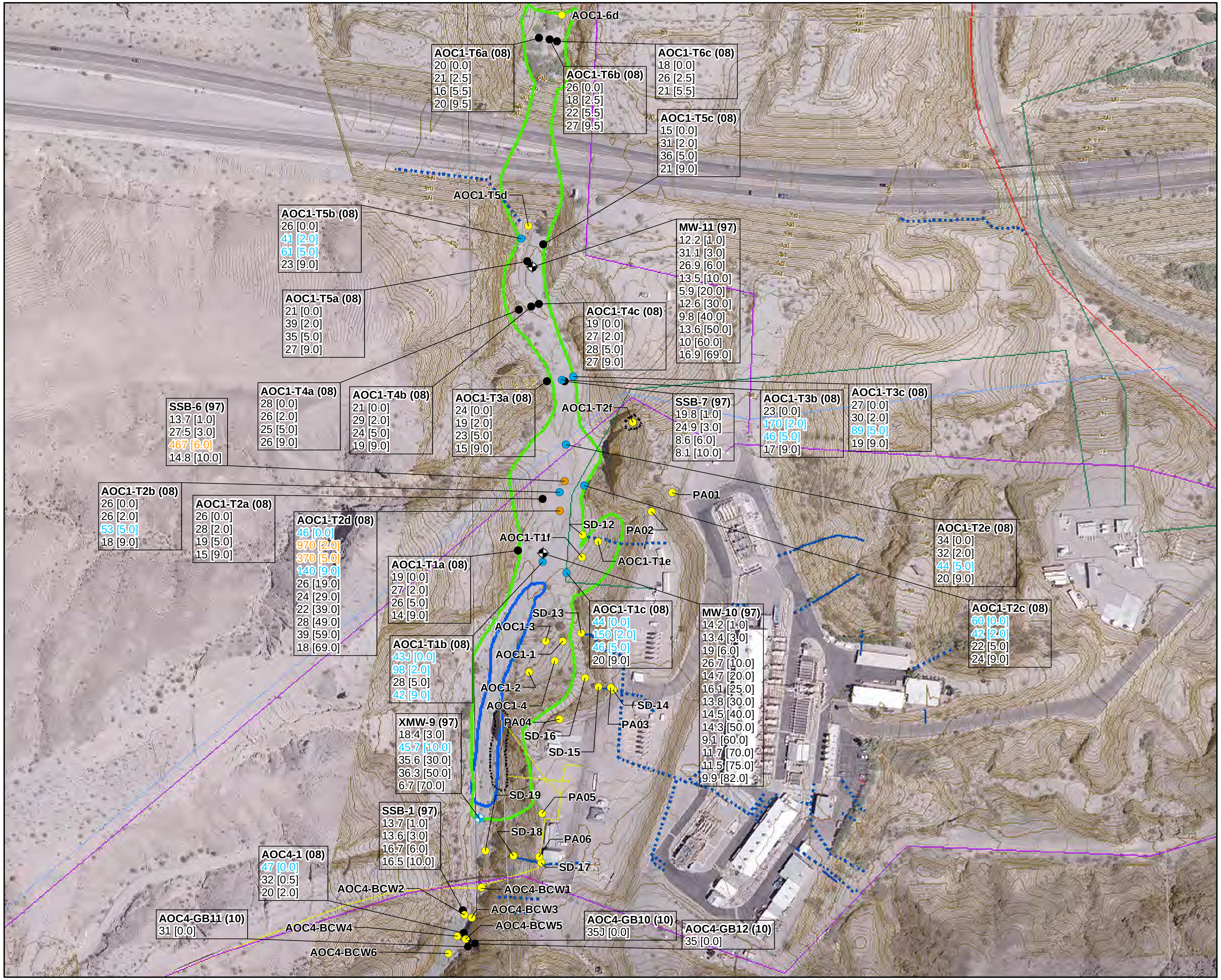
Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[b]
AOC4-BCW1	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs, dioxins/furans	Rotosonic
AOC4-BCW2	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs, dioxins/furans	Rotosonic
AOC4-BCW3	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs, dioxins/furans	Rotosonic
AOC4-BCW4	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs, dioxins/furans	Rotosonic
AOC4-BCW5	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs, dioxins/furans, asbestos (surface soil sample only)	Rotosonic
AOC4-BCW6	0, 2, 5, and 9	To resolve Data Gap #2 - Extent of constituents associated with the discharge from the Debris Ravine (AOC 4).	Title 22 metals, hexavalent chromium , PCBs, dioxins/furans	Rotosonic

Notes:

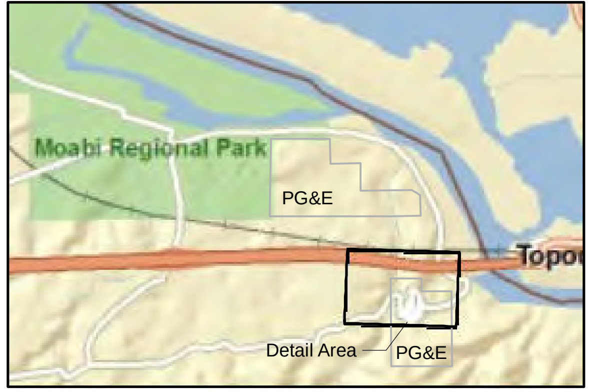
[a] PCB analysis only on soil samples collected at 0 and 2 feet bgs.

[b] Proposed collection methods listed on this table are based on experience and knowledge of the site; actual collection method will be chosen in the field based on field conditions and site access restrictions.

Figures



VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- Property Boundary
- Caltrans ROW
- SWMU1 Boundary
- AOC 1 Boundary
- White Powder Area
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Historical Discharge Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (39.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the U.S. Environmental Protection Agency Residential Regional Screening Level (280 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (36.3 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foot intervals.

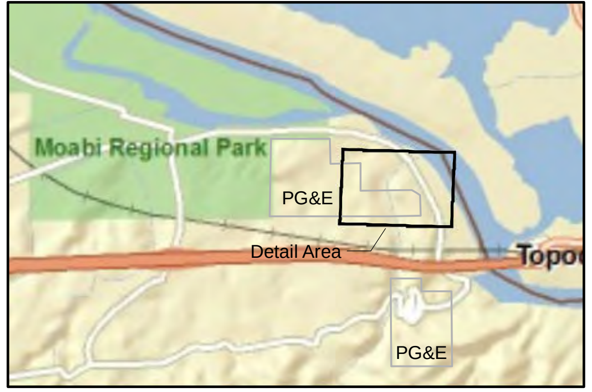
N

0 400 Feet

FIGURE C2-1
Total Chromium Soil Sample Results AOC1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- – – Access Routes
- — Property Boundary
- — PG&E Pipeline
- ☐ 100-Foot Sampling Grid
- ☐ Area of Possible Disturbance

SSB-7 (08) — Sample Location Installation Date
20 [1] — Sample Beginning Depth (ft bgs) Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (39.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the U.S. Environmental Protection Agency Residential Regional Screening Level (280 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (36.3 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foot intervals.

N

0 200 400
Feet

FIGURE C2-2
Total Chromium Soil Sample Results AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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FIGURE C2-3
Conceptual Site Model for AOC-1
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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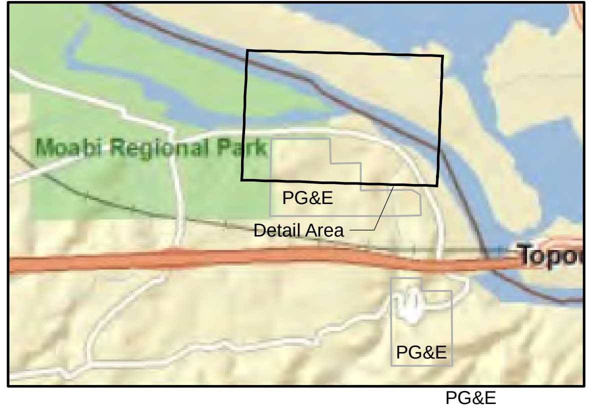
Note:
Topographic contours shown are in 2 foot intervals.

FIGURE C2-4
Conceptual Site Model for AOC-1 North
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

CH2MHILL

VICINITY MAP



LEGEND

- ● Soil Boring
- ▲ Sediment Sample
- Property Boundary
- Transwestern Pipeline

SED-9 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (11 mg/kg) are shown in BLUE.
5. Results greater than or equal to Consensus-based Threshold effect concentration (9.79 mg/kg) are shown in GREEN.
6. Topographic contours shown are in 2 foot intervals.

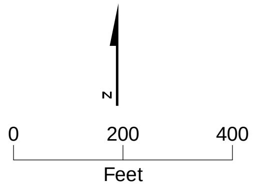


FIGURE C2-5
Arsenic
Sediment Sample Results
AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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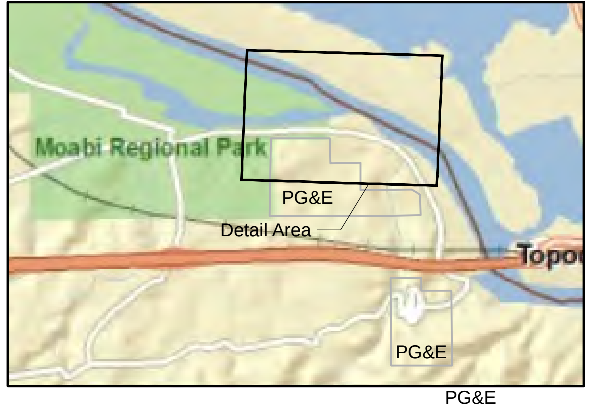
VICINITY MAP



LEGEND

- ▲ Sediment Sample Location
- ● Soil Boring
- — Property Boundary
- — Transwestern Pipeline

SED-9 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (39.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to Consensus-based Threshold effect concentration (43.4 mg/kg) are shown in GREEN.
6. Topographic contours shown are in 2 foot intervals.

N

0 200 400
Feet

FIGURE C2-6
Total Chromium Sediment Sample Results AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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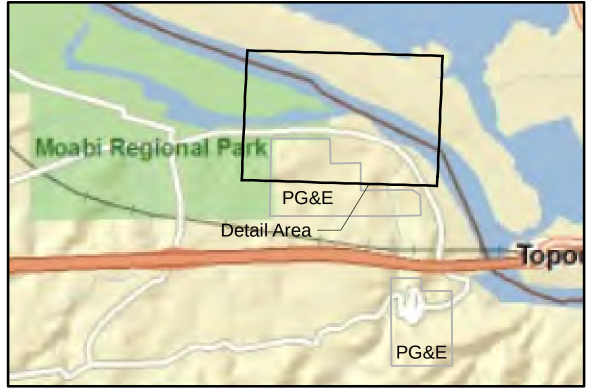


LEGEND

- ● Soil Boring
- ▲ Sediment Sample
- Property Boundary
- Transwestern Pipeline

SED-9 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (0.83 mg/kg) are shown in BLUE.
5. No Consensus-based Threshold effect concentration has been established for Hexavalent Chromium.
6. * = Laboratory reporting limit exceeds screening levels.
7. Topographic contours shown are in 2 foot intervals.

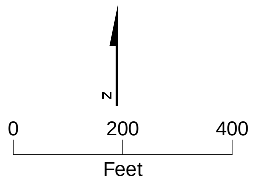
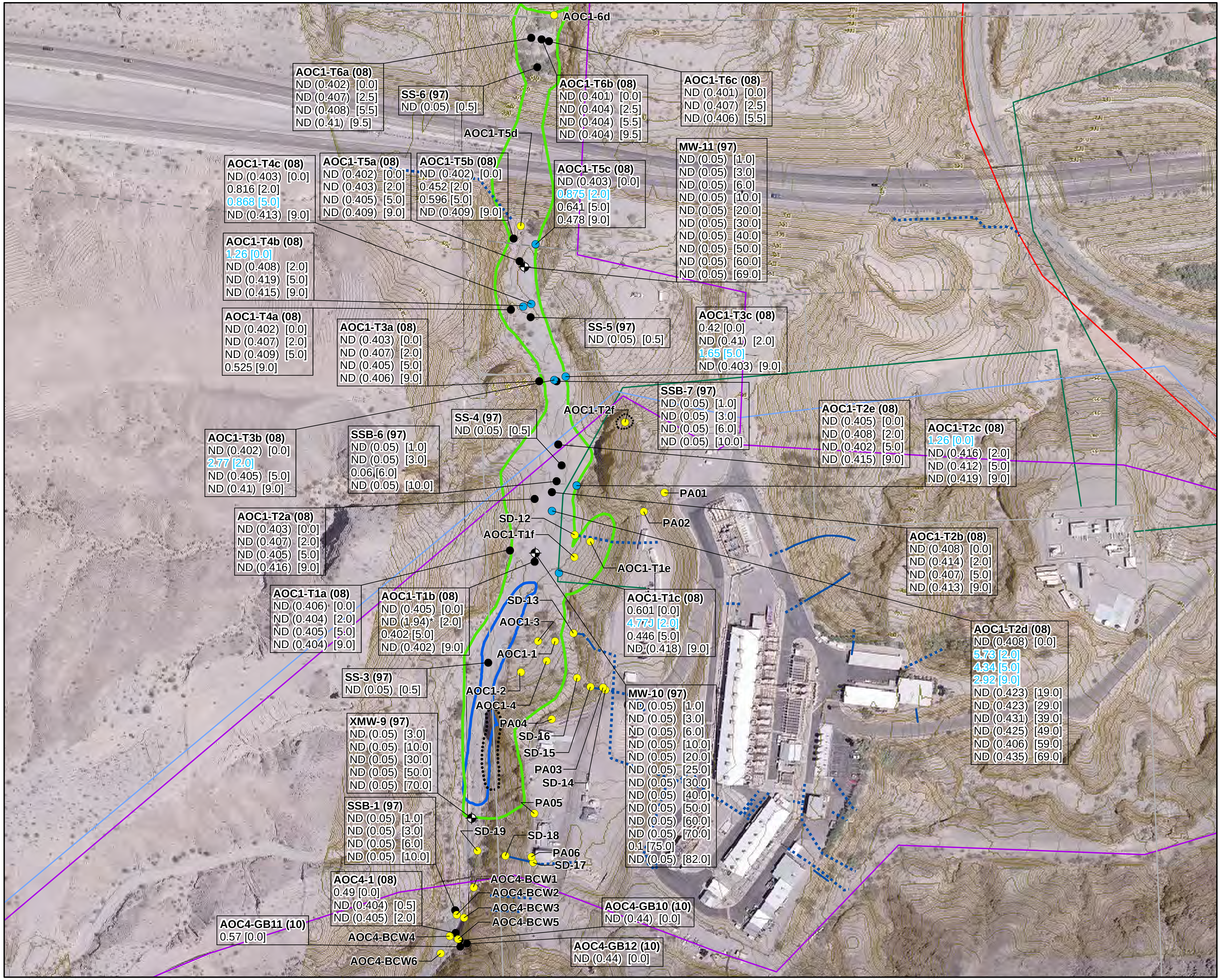


FIGURE C2-7
Hexavalent Chromium Sediment Sample Results AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



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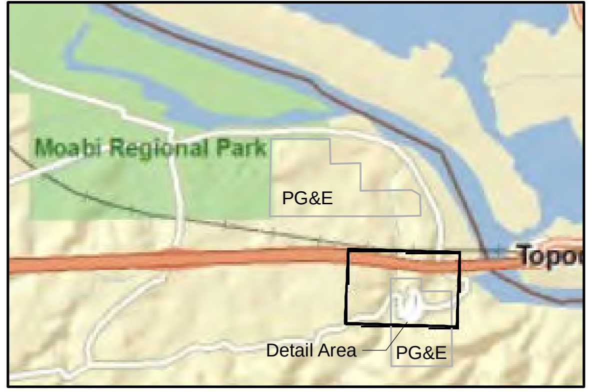


LEGEND

- ● Proposed Phase 2 Sample location
- ● Soil Boring
- ⊕ Monitoring Well
- — Property Boundary
- – – Caltrans ROW
- SWMU1 Boundary
- AOC 1 Boundary
- White Powder Area
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

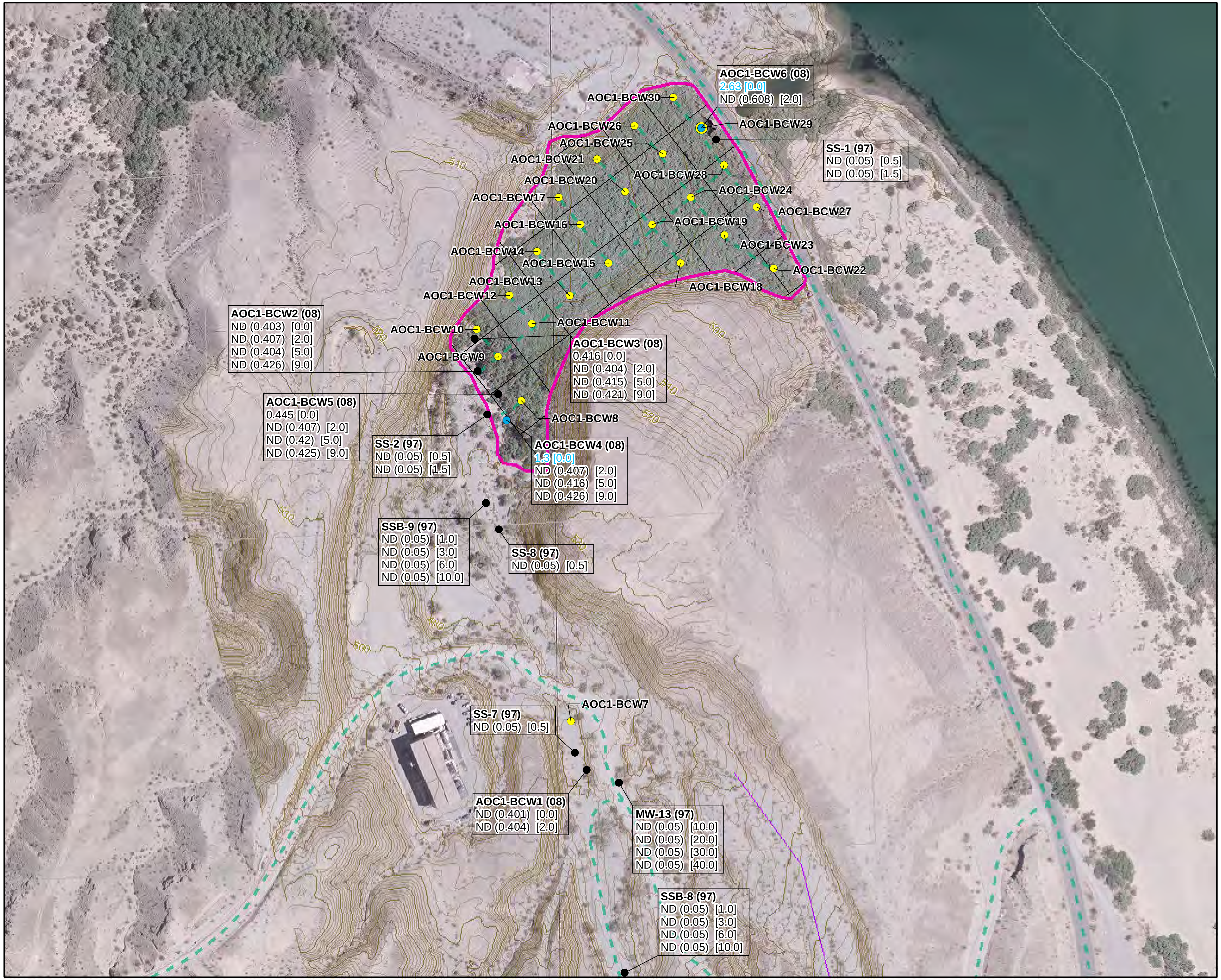
Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (0.83 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparrison Value (139.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (17 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. * = Laboratory reporting limit exceeds screening levels.
9. Topographic contours shown are in 2 foot intervals.

N

0 200 400
Feet

FIGURE C2-8
Hexavalent Chromium Soil Sample Results AOC1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



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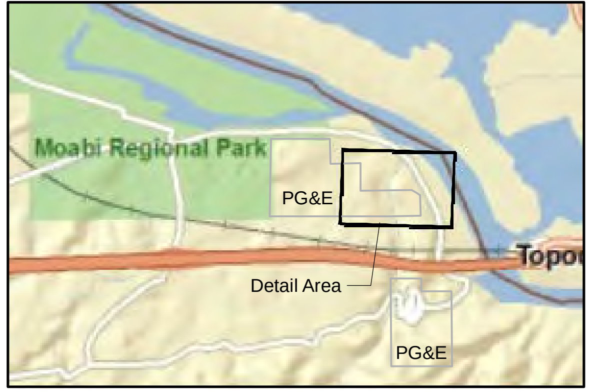

LEGEND

- ● Proposed Phase 2 Sample location
- ● Soil Boring
- ▬ ▬ Access Routes
- — Property Boundary
- — PG&E Pipeline
- ☐ 100-Foot Sampling Grid
- ☐ Area of Possible Disturbance

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (0.83 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparrison Value (139.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Levell (17 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. * = Laboratory reporting limit exceeds screening levels.
9. Topographic contours shown are in 2 foot intervals.

N

0 200 400
Feet

FIGURE C2-9
Hexavalent Chromium Soil Sample Results AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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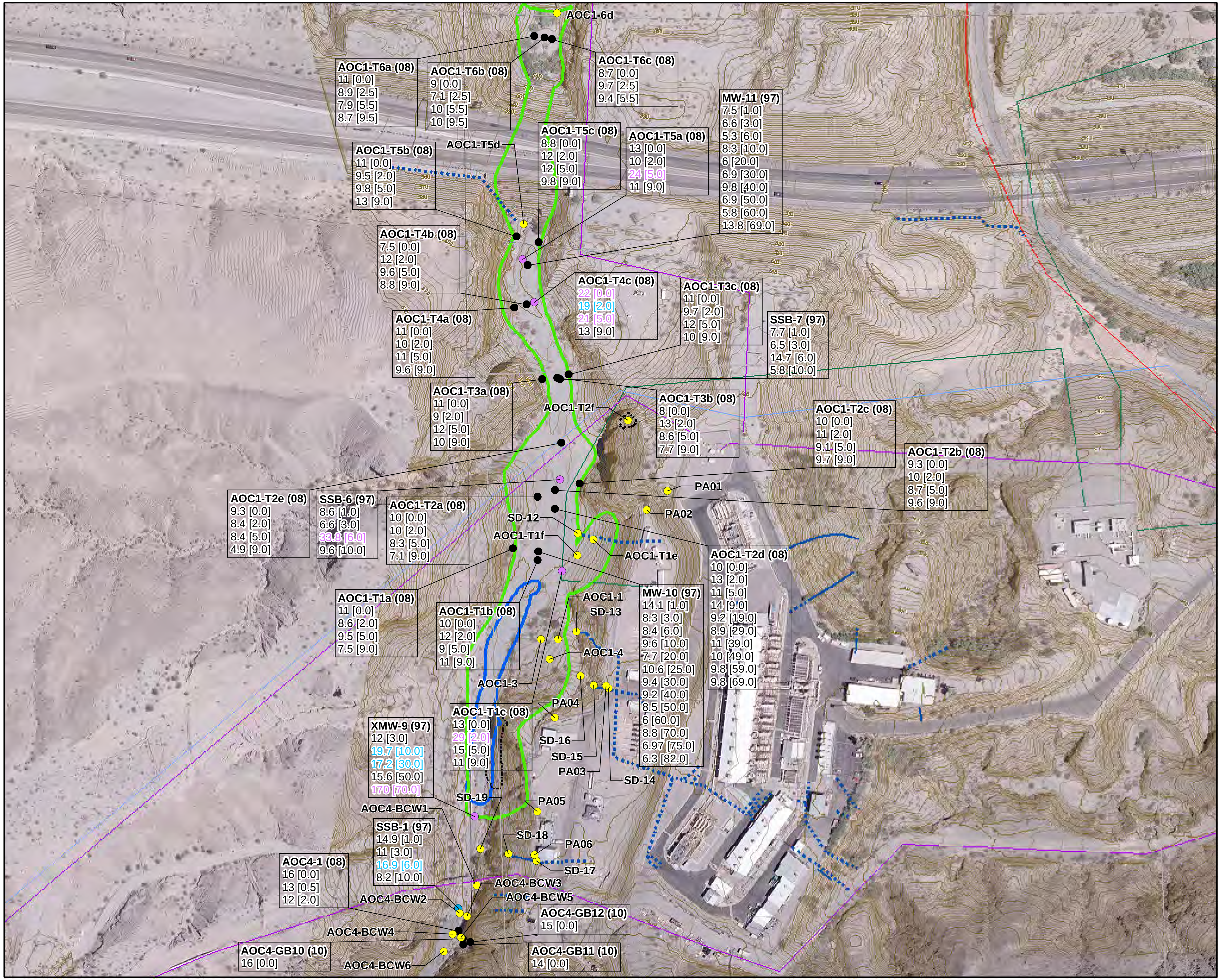

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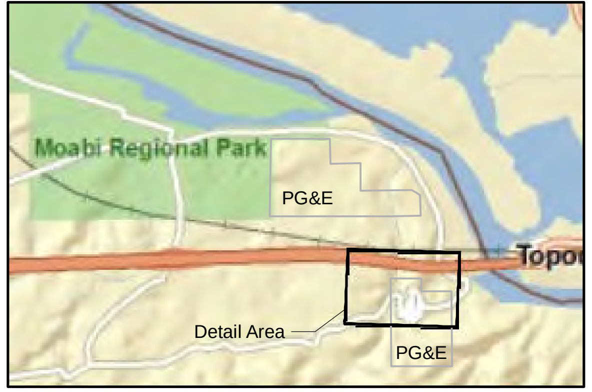

LEGEND

- 🟡 Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- SWMU1 Boundary
- AOC 1 Boundary
- White Powder Area
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (16.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3,000 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. Topographic contours shown are in 2 foot intervals

N

0 200 400
Feet

FIGURE C2-10
Copper
Soil Sample Results
AOC1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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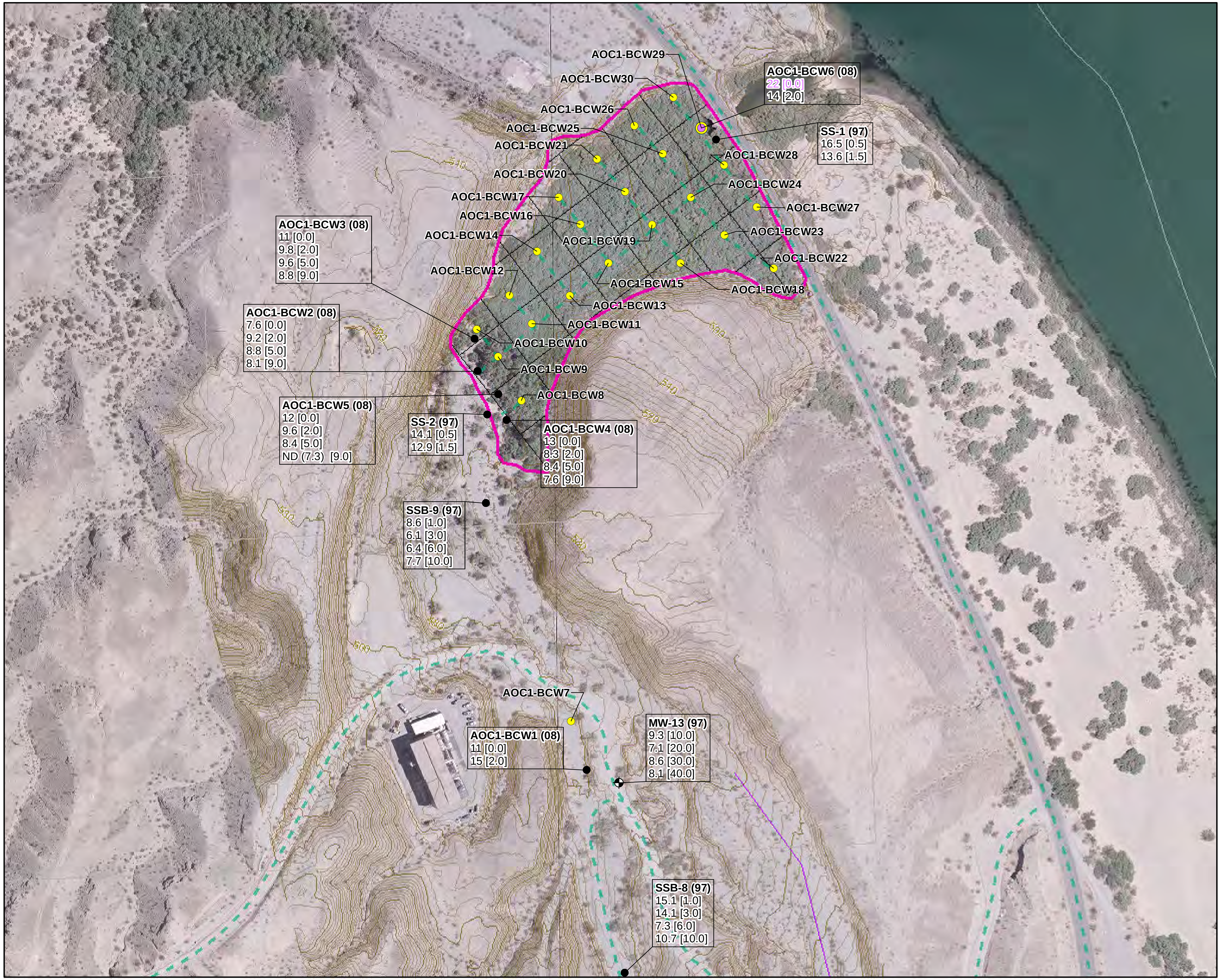

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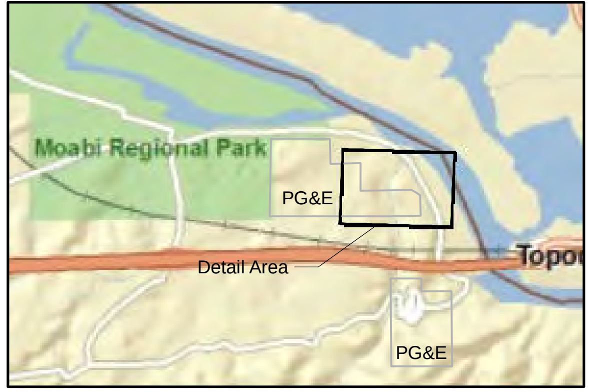

LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ▲ Sediment Sample
- ● Soil Boring
- - - Access Routes
- — Property Boundary
- — PG&E Pipeline
- ☐ 100-Foot Sampling Grid
- ☐ Area of Possible Disturbance

SSB-7 (08) — Sample Location / Installation Date
20 [1] — Sample Beginning Depth (ft) / Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft = feet below ground surface
4. Results greater than Background (16.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3,000 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. Topographic contours shown are in 2 foot intervals.

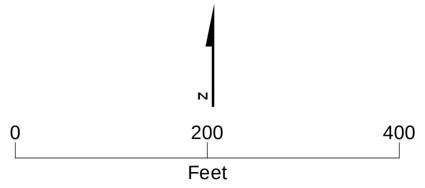

FIGURE C2-11
Copper
Soil Sample Results
AOC1 North
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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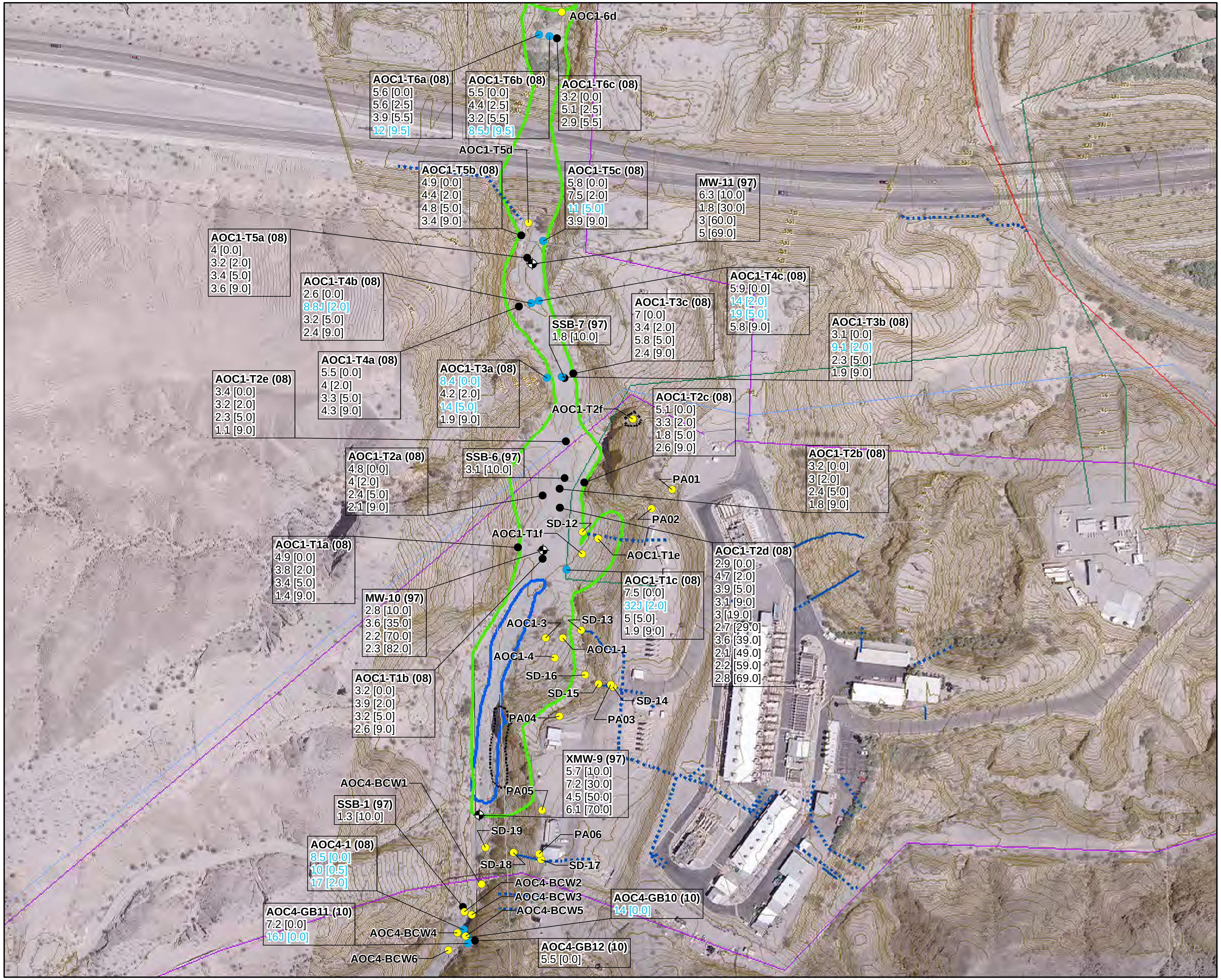
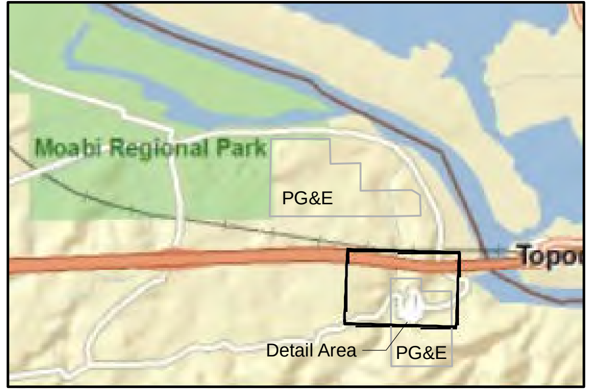


VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- 🟦 SWMU1 Boundary
- 🟩 AOC 1 Boundary
- ⬚ White Powder Area
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location
Installation Date
20 [1]
Sample Beginning Depth (ft bgs)
Soil Concentration (mg/kg)

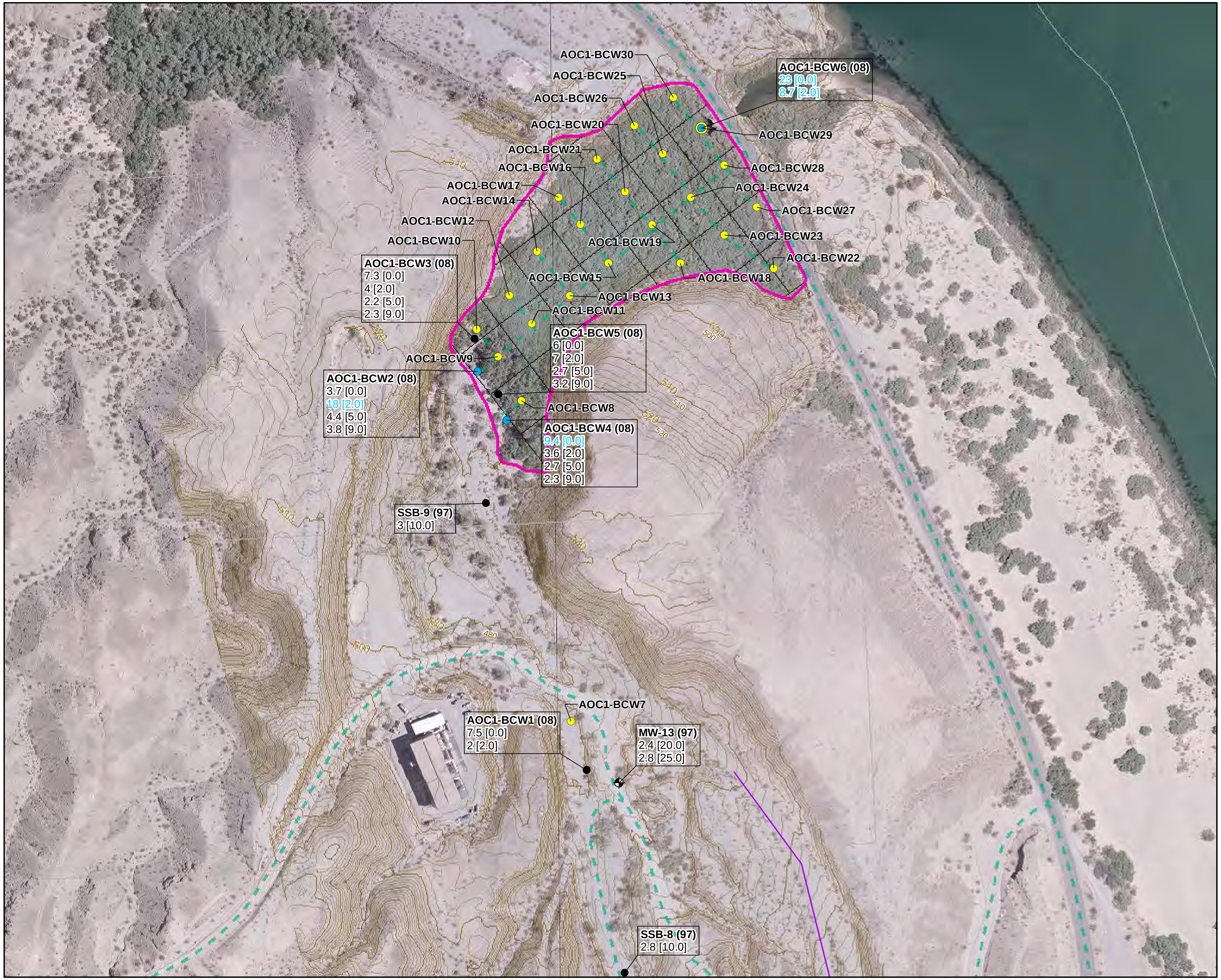
Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (8.39 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (150 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.0166 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foor intervals.

N

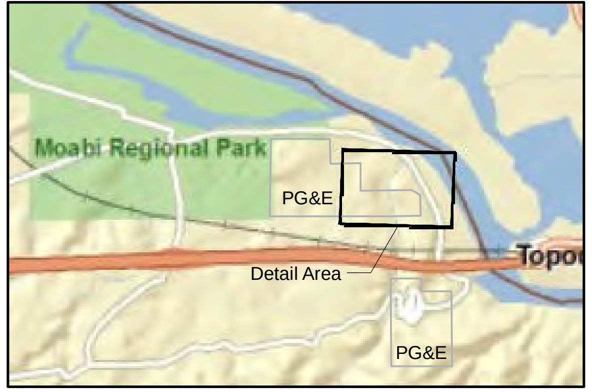
0 200 400
Feet

FIGURE C2-12
Lead
Soil Sample Results
AOC1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- Access Routes
- Property Boundary
- PG&E Pipeline
- ☐ 100-Foot Sampling Grid
- ☐ Area of Possible Disturbance

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (8.39 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (150 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.0166 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are at 2 foot intervals.

N

0 200 400
Feet

FIGURE C2-13
Lead
Soil Sample Results
AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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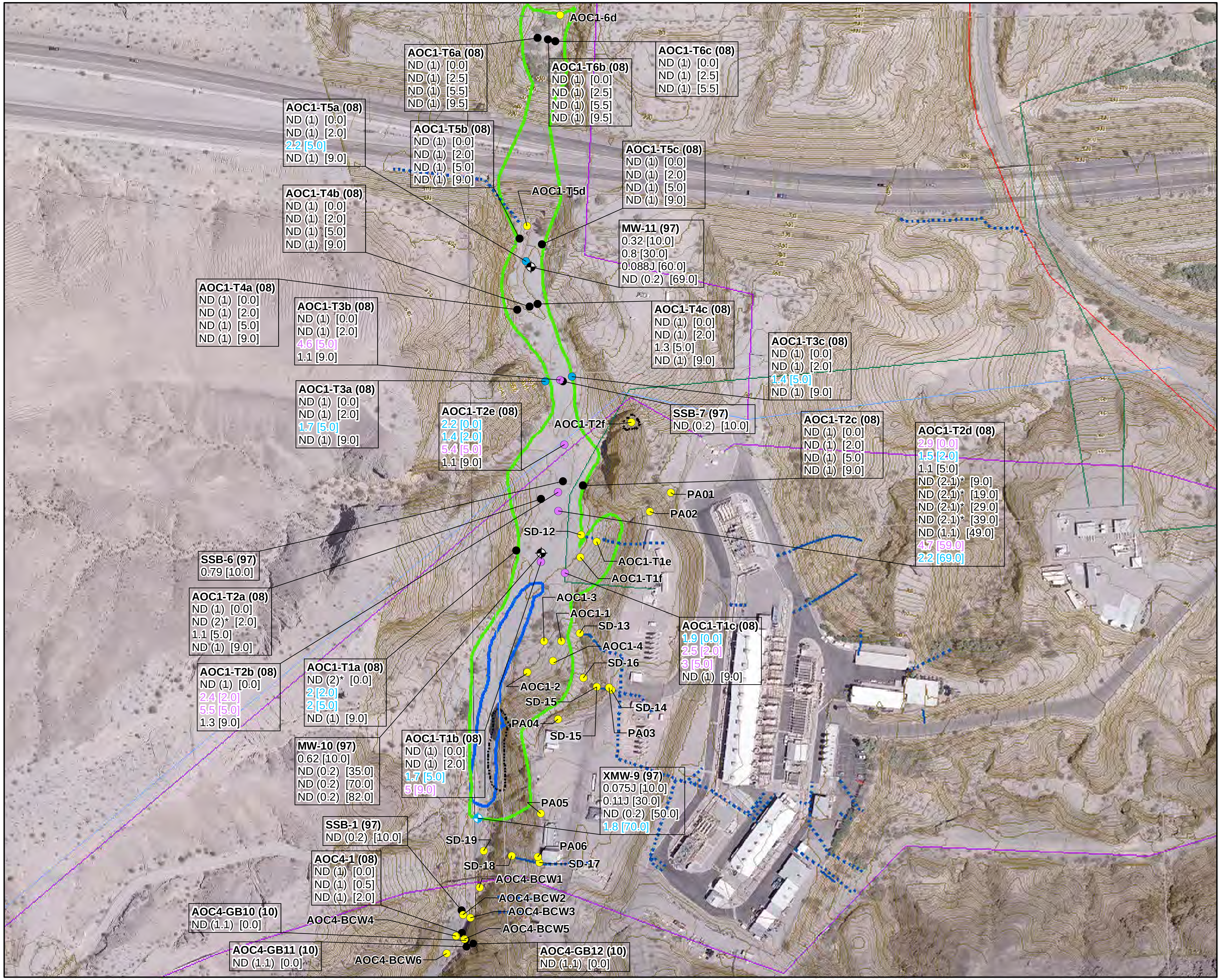

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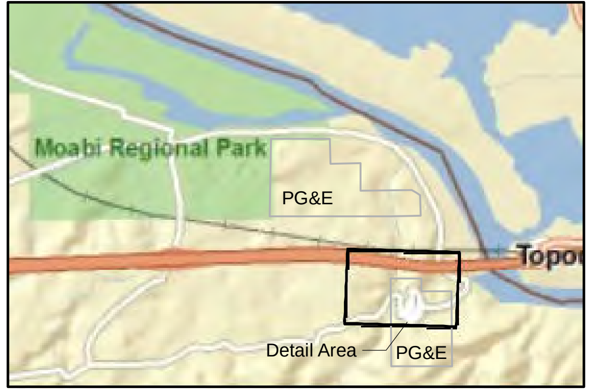


LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Montoring Well
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- SWMU1 Boundary
- AOC 1 Boundary
- White Powder Area
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ····· Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

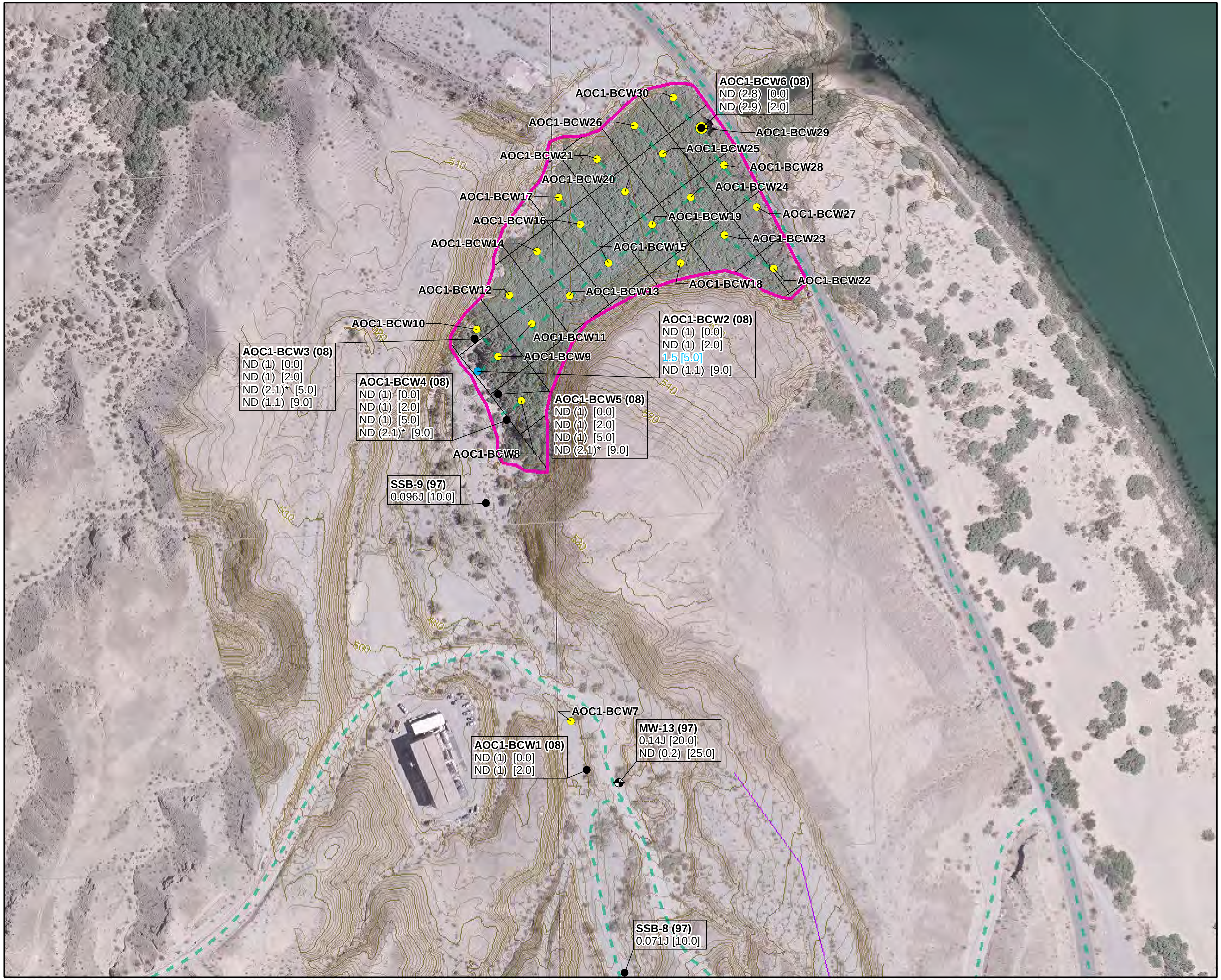
Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (1.37 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (2.25 mg/kg) are in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (380 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. *= Laboratory reporting limit exceeds screening levels.
9. Topographic contours shown are in 2 foot intervals.

N

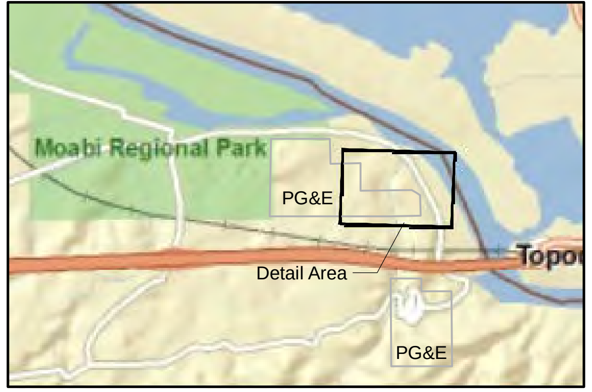
0 200 400
Feet

FIGURE C2-14
Molybdenum
Soil Sample Results
AOC1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- – – Access Routes
- — Property Boundary
- — PG&E Pipeline
- ☐ 100-Foot Sampling Grid
- ☐ Area of Possible Disturbance

SSB-7 (08) — Sample Location Installation Date
20 [1] — Sample Beginning Depth (ft bgs) Soil Concentration (mg/kg)

Notes:

1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (1.37 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (2.25 mg/kg) are in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (380 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. * = Laboratory reporting limit exceeds screening levels.
9. Topographic contours shown are in 2 foot intervals.

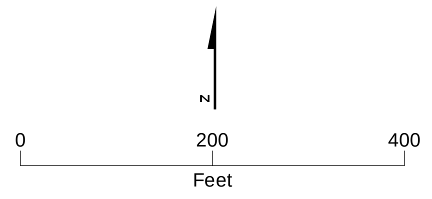
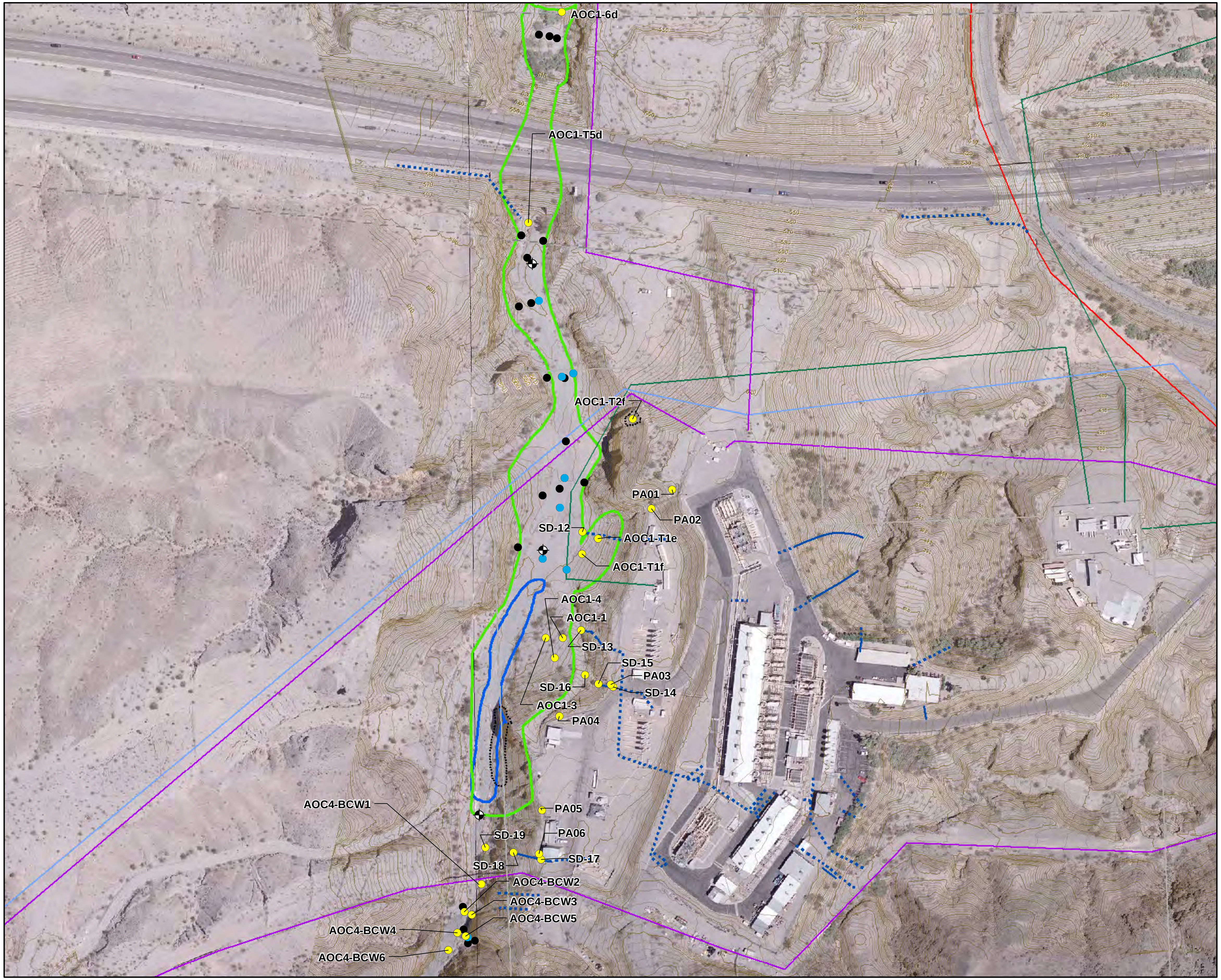


FIGURE C2-15
Molybdenum
Soil Sample Results
AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



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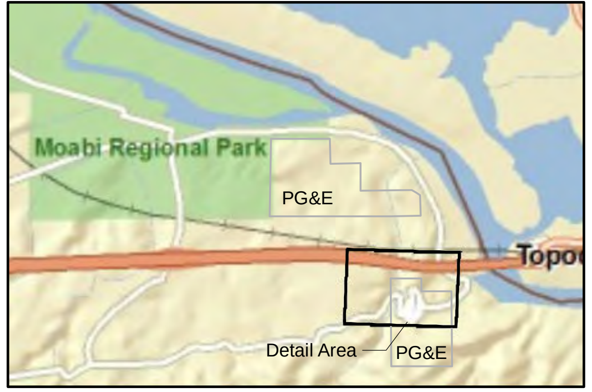

LEGEND

● Proposed Phase 2 Sample location
⊕ Monitoring Well
● Soil Boring
— Property Boundary
– – Caltrans ROW
SWMU1 Boundary
AOC 1 Boundary
White Powder Area
— Transwestern Pipeline
— Mojave Pipeline
— PG&E Pipeline
— SoCal Gas Pipeline
······ Approximate Location of Stormwater Piping Below Ground
— Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:

1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (58 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Levell (23,000 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.164 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foot intervals.

N

0 200 400
Feet

FIGURE C2-16
Zinc
Soil Sample Results
AOC1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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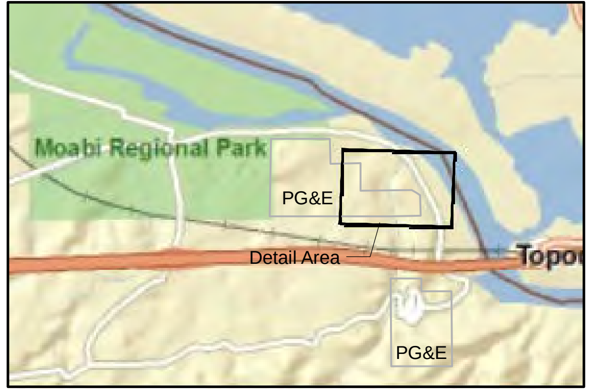
VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample location
- ⊕ Monitoring Well
- ● Soil Boring
- - - Access Routes
- — Property Boundary
- — PG&E Pipeline
- ☐ 100-Foot Sampling Grid
- ☐ Area of Possible Disturbance

SSB-7 (08)
20 [1]

Sample Location
Installation Date
Sample Beginning Depth (ft bgs)
Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (58 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Levell (23,000 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.164 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foot intervals.

N

0 200 400
Feet

FIGURE C2-17
Zinc
Soil Sample Results
AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2011\AOC1\AOC1NORTH_DG_ZN.MXD

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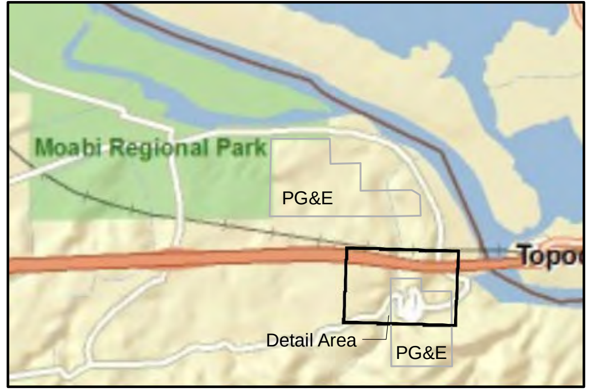
VICINITY MAP



LEGEND

- 🟡 Potential Phase 2 Sample Location
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- SWMU1 Boundary
- AOC 1 Boundary
- White Powder Area
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- — Historical Discharge Piping
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (µg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. µg/kg = micrograms per kilogram
3. ft bgs = feet below ground surface
4. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (38 mg/kg) are shown in ORANGE.
5. J = Estimated Result.
6. Topographic contours shown are in 2 foot intervals.

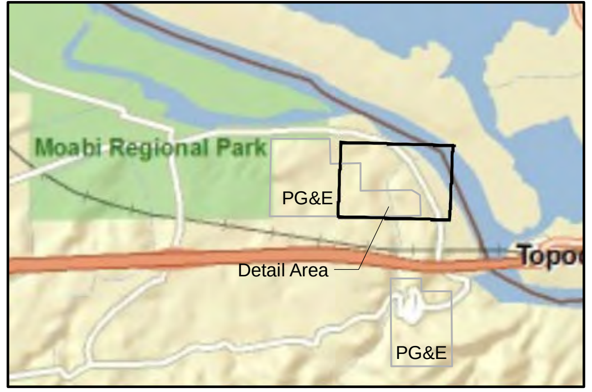
N

0 50 100 200 300 400
Feet

FIGURE C2-18
Benzo(A)pyrene Equivalent Soil Sample Results AOC1

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

- ● Soil Boring
- Property Boundary
- PG&E Pipeline

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (38 µg/kg) are in ORANGE.
5. J = Estimated Result.
6. Topographic contours shown are in 2 foot intervals.

N

0 100 200 400
Feet

FIGURE C2-19
Benzo(A)pyrene Soil Sample Results AOC1 North

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2010\AOC1\AOC1NORTH_DG_BENZOA.MXD JLAMANTI 10/13/2010 18:11:01

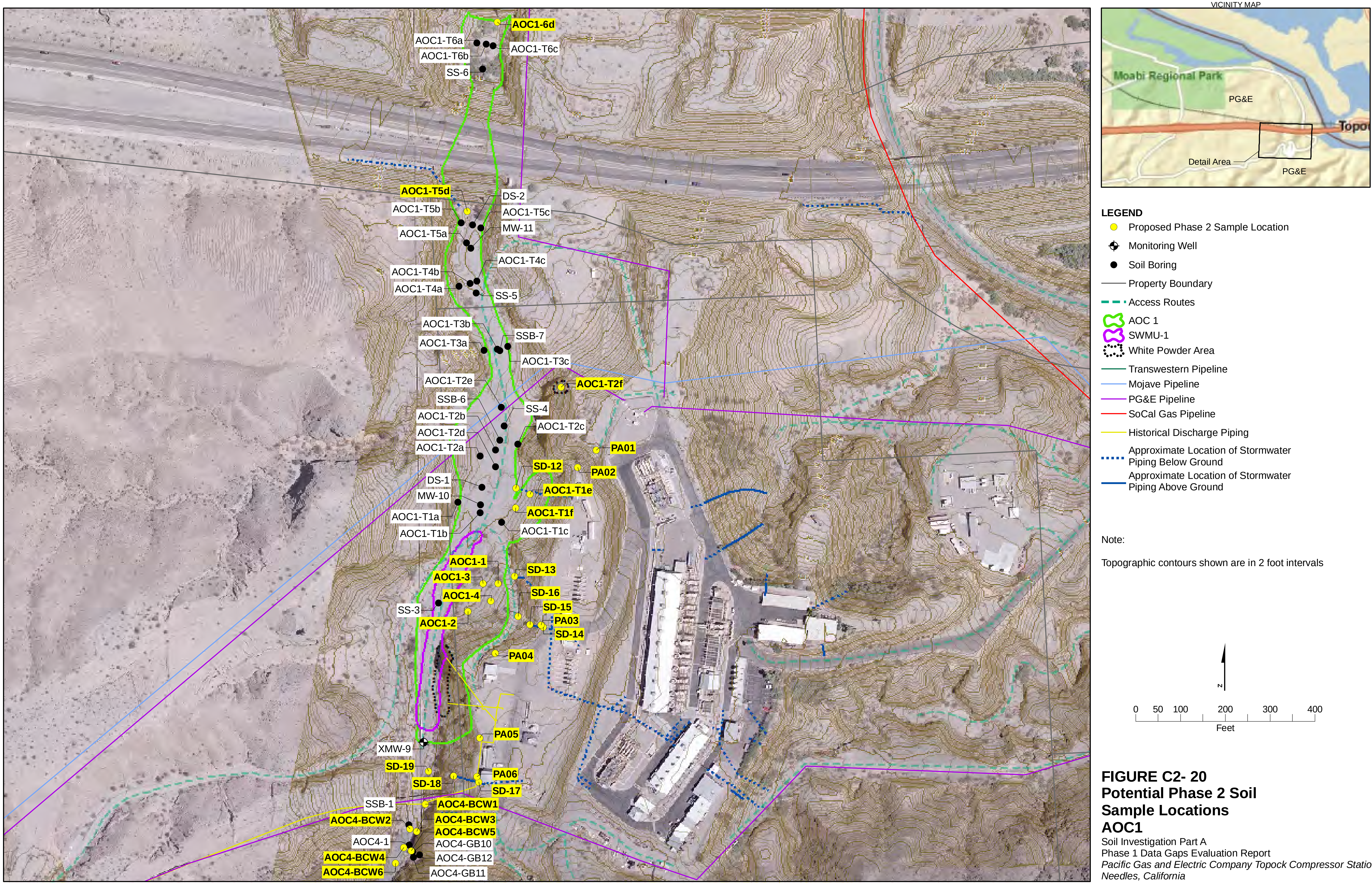


FIGURE C2- 20
Potential Phase 2 Soil Sample Locations AOC1

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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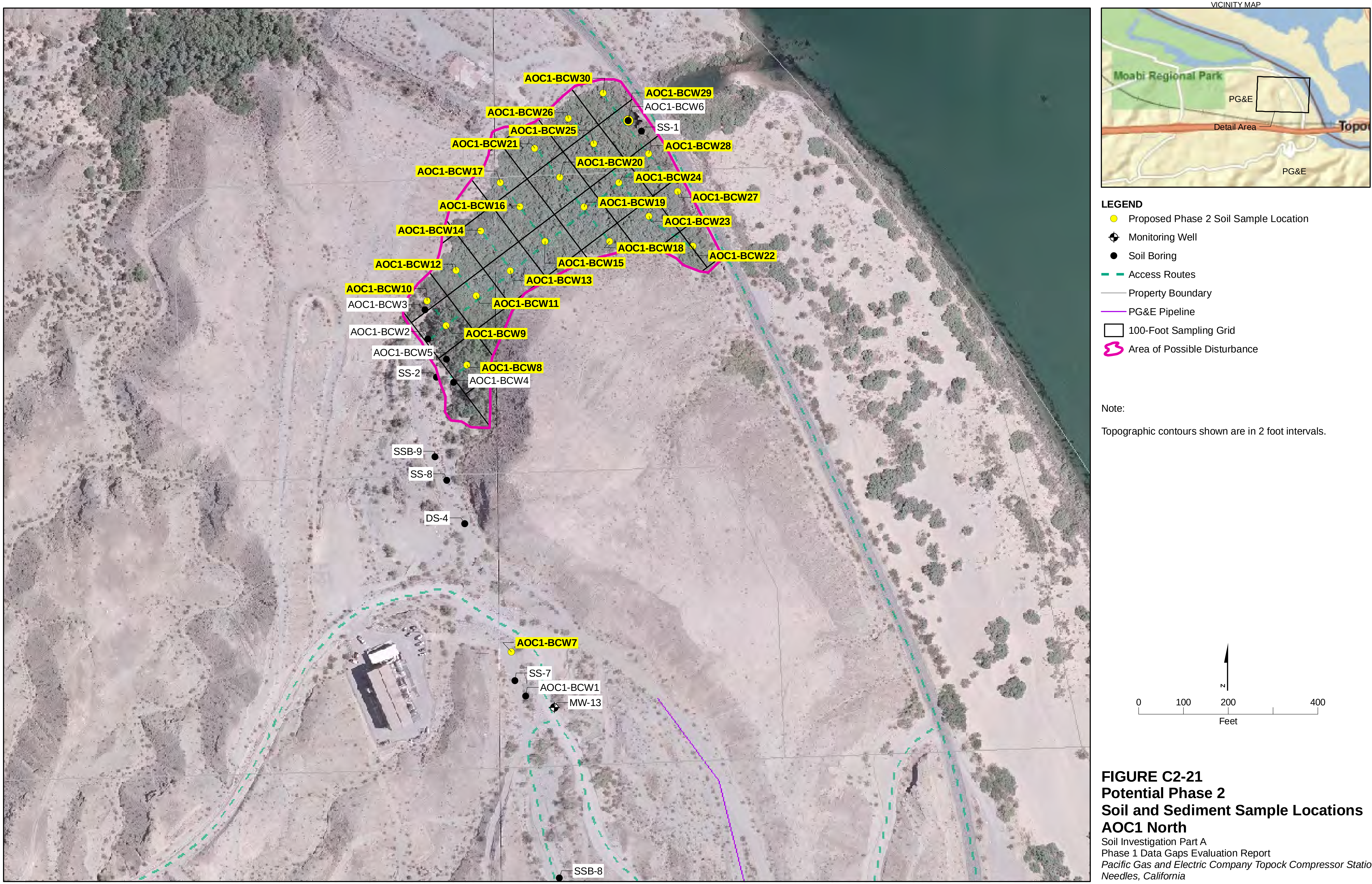
CH2MHILL



LEGEND

- ● Proposed Phase 2 Soil Sample Location
- ⊕ Monitoring Well
- ● Soil Boring
- – – Access Routes
- — Property Boundary
- — PG&E Pipeline
- ☐ 100-Foot Sampling Grid
- Area of Possible Disturbance

Note:

Topographic contours shown are in 2 foot intervals.

FIGURE C2-21
Potential Phase 2
Soil and Sediment Sample Locations
AOC1 North

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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CH2MHILL

Appendix C3
Area of Concern 9 Data Gaps Evaluation Results

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CMS/FS	corrective measures study/feasibility study
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DQO	data quality objective
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
STLC	soluble threshold limit concentrations
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX C3

Area of Concern 9 Data Gaps Evaluation Results

1.0 Introduction and Background

This sub-appendix presents the results of the data gaps evaluation and Part A Phase 2 Sampling Program for Area of Concern (AOC) 9 – Southeast Fence Line at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

AOC 9 is located in the southeast portion of Topock Compressor Station east of the facility fence line and just south of the visitor parking lot, as shown in Figure C3-1. It is located entirely on PG&E-owned property. The original extent of AOC 9 consisted of a small area of discolored soil that had been uncovered due to erosion. A broken stormwater discharge pipe was located in the same area of the stained soil, and information from former employees indicated that the pipe trench leading to the storm drain may have received runoff from leaks originating near the Auxiliary Building. Approximate location of the storm drain is shown on Figure C3-2.

On April 6, 2000, approximately 1.5 cubic yards of the stained soil were excavated and shipped offsite for disposal. The approximate location and size of the excavation is shown in Figure C3-2. After the majority of the stained soil was removed, a new stormwater drainage pipe was installed, and the area was backfilled with clean soil to prevent erosion of the slope. Sampling was conducted after the majority of the stained soil had been removed (PG&E, 2000). Due to the extremely steep slope at AOC 9, removal of additional soil was not feasible at the time. The excavated area was covered with 1 to 2 feet of clean fill (PG&E, 2000).

The approximate location of the storm drain and the April 2000 excavation shown on Figure C3-2 are based on historical employee interviews, site walk observations (i.e., depression in excavation area where backfill had settled), and the April 2000 excavation letter report (PG&E, 2000). However, recent employee interviews have revealed a possible alternate location for this storm drain located further south of the original location. This alternate location of the storm drain is shown on Figure C3-2.

The AOC 9 boundary was extended to include additional sampling locations in response to California Environmental Protection Agency, Department of Toxic Substances Control comments on the *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part A, PG&E Topock Compressor Station, Needles, California,* referred to as the Soil Part A Work Plan (CH2M HILL, 2006). The extension was approximately 100 feet north to south and 50 feet east to west, centered on the alignment of the storm drain.

A graphical conceptual site model has been developed for AOC 9 based on the above site history and background, as shown in Figure C3-2. Table C3-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 9. (All tables and figures appear at the end of this sub-appendix.) A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the Soil Part A Data Quality Objective [DQO] Technical Memorandum, presented as Appendix A to the Data Gaps Evaluation Report.

The primary source of contamination at AOC 9 is historical liquid discharge from a broken storm drain to shallow soil. While the actual depth of the pipe break is not known with certainty, based on similar site facilities and the limitations due to the steep slope at this location, it is expected to have been between 1 to 3 feet below ground surface (bgs). The quantity of liquid released from the broken storm drain is expected to be relatively small since—with the exception of storm events—the drain would have only captured small incidental leaks or spills from various systems at the Topock Compressor Station. The area could also have received surface runoff from the compressor station. Dark soil—what appears to be stained soil—is present along the west side of AOC 9 in a May 19, 1955 aerial photograph. This area is shown in Figure C3-2.

The primary source media at AOC 9 are surface and shallow soils. Liquids released to these areas could have infiltrated to deeper soils and/or flowed downhill in surface or shallow subsurface runoff. These flows would have entered the East Ravine and are addressed as part of AOC 10. Due to the steep angle of the slope at AOC 9, infiltration is likely to be a lesser pathway than surface runoff. Chemicals of potential concern (COPCs) in residual contamination in the area of the former broken stormwater discharge pipe could have migrated to deeper soils. Due to the relatively small quantity of liquid released, the angle of the slope, and shallow depth of the release of cooling water, leaching to groundwater from this area is unlikely; however, this pathway is assessed as part of DQO Decision 3. If present, organic constituents in surface soils would be expected to have been degraded by heat and light.

For AOC 9, a potential secondary release pathway is windblown dust contamination, which could have occurred as a result of dust being transported from the AOC. Windblown contamination, if any, would be limited to surface soils.

Because potential sources of COPCs to this unit are runoff from the compressor station and discharge of chromium-containing cooling water from the facility via a broken stormwater discharge pipe, Part A Phase 1 and historical soil were collected throughout AOC 9, including at the top of the slope near the compressor station, near the bottom of the slope, as confirmation samples following the excavation, and near the broken storm drain pipe and excavation.

1.2 AOC 9 Data

Nine historical soil samples (0 to 0.5 foot bgs) were collected from nine locations (#4 through #12) in AOC 9, as shown in Figure C3-1. These historical samples may have been collected along the alternate location of the storm drain shown on Figure C3-2. Historical soil samples were analyzed for five constituents: total chromium, hexavalent chromium, copper, nickel, and zinc.

During the 2008 Part A Phase 1 soil investigation, 30 soil samples (from 0 to 0.5, 2 to 3, and 5 to 6 feet bgs) were collected from 14 sample locations (AOC9-1 through AOC9-14), as shown in Figure C3-1. Part A Phase 1 soil samples collected in AOC 9 were generally analyzed for Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), pH, asbestos, pesticides, and polychlorinated biphenyls (PCBs). Ten percent of the Phase 1 soil samples collected in AOC 9 (three soil samples) were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). Surface soil samples were not analyzed for VOCs. In addition, synthetic precipitation leaching procedure extraction was conducted on surface soil samples (collected from 0 to 0.5 foot bgs) at sample locations AOC9-7 and AOC9-8. The leachate from the synthetic precipitation leaching procedure extractions was analyzed for total and hexavalent chromium. The leachate results from the synthetic precipitation leaching procedure extractions are presented in Table C3-2. Soil results were validated, and the data quality evaluation is included in Appendix D to the Data Gaps Evaluation Report.

A small area of surficial white powder material was observed in AOC 9 in the immediate vicinity of AOC9-14. A sample of this white powder material was collected at 0.5 foot bgs at sample location AOC9-14. A soil sample was also collected at 2 to 3 feet bgs, beneath the white powder. The white powder sample was analyzed for Title 22 metals, hexavalent chromium, SVOCs, PAHs, asbestos, and pH, and the soil sample was analyzed for Title 22 metals, hexavalent chromium, PAHs, asbestos, and pH.

All historical and Part A Phase 1 data considered Category 1 were used as inputs to the four DQO decisions for AOC 9.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and chemicals of potential ecological concern (COPECs) at AOC 9. Laboratory analytical results for historical and Phase 1 soil samples and the white powder sample at AOC 9 are presented in Tables C3-3 through C3-9. Table C3-10 presents a statistical summary of soil analytical results for COPCs and COPECs that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one or more samples was greater than the interim screening value. The white powder sample results are not included in the statistical summary of soil data. The soil data are discussed first, followed by the data for the white powder sample.

2.1 Summary of AOC 9 Soil Data

Antimony, beryllium, cadmium, selenium, silver, cyanide, TPH-gasoline, VOCs, and SVOCs were not detected in soil samples collected in AOC 9. Table C3-10 lists the 44 detected constituents, including four calculated quantities (benzo(a)pyrene equivalents, total low molecular weight PAHs, total high molecular weight PAHs, and total PCBs). Ten of these constituents (aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, total PCBs, and 4,4-dichlorodiphenyldichloroethylene [4,4-DDE]) were detected in the TAL/TCL samples.

Thirty-two of the constituents detected at AOC 9 (arsenic, barium, cobalt, vanadium, aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, total PCBs, total low molecular weight PAHs, total high molecular weight PAHs, TPH-diesel, and TPH-motor-oil) were detected at concentrations below their respective interim screening levels. Twelve constituents (total chromium, hexavalent chromium, copper, lead, mercury, molybdenum, nickel, thallium, zinc, benzo(a)pyrene, benzo(a)pyrene equivalents, and 4,4-DDE) were detected one or more times at concentrations exceeding the interim screening levels.

Eight constituents (total chromium, hexavalent chromium, copper, lead, mercury, zinc, benzo(a)pyrene, and benzo(a)pyrene equivalents) were detected four or more times at concentrations exceeding the interim screening level; the distribution of these constituents are shown in Figures C3-1 and C3-3 to C3-8.

One sample associated with AOC 10 (AOC 10a-1) is located within approximately 30 feet of the AOC 9 boundary and slightly down/cross-slope. This sample was collected in a stained area below a stormwater pipe outfall. To provide further context for the evaluation of potential data gaps, the data for this sample are also shown in Figures C3-1 and C3-3 to C3-8. Two proposed AOC 10 Phase 2 sample locations (AOC10a-2 and AOC10a-3) associated with sample location AOC10a-1 are reflected in the AOC 9 data gaps evaluation since these proposed AOC 10 Phase 2 sample locations are downslope of AOC 9.

2.2 Nature and Extent Evaluation for Soil

The following subsection discusses the nature and extent of detected COPCs and COPECs detected above interim screening levels at AOC 9. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Section 2.5 of this sub-appendix summarizes the constituents that may require further evaluation, and Section 6.0 of this sub-appendix provides the recommended follow-up sampling for the Part A Phase 2 soil investigation needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

2.2.1 Total Chromium

Total chromium was detected in 38 of 38 soil samples collected at AOC 9. Detected concentrations of total chromium exceeded the interim screening level (39.8 milligrams per kilogram [mg/kg]) (background threshold value [BTV]/ecological comparison value [ECV]) eight times (maximum detected concentration of 398 mg/kg at #10), as shown in Tables C3-3 and C3-10 and Figure C3-1. Only one of the detected concentrations of total chromium (old sample location #10 collected at 0.5 foot bgs) exceeded the United States Environmental Protection Agency 2008 regional screening level (RSL) for residential use (280 mg/kg) but was well below the commercial/industrial regional screening level (1,400 mg/kg). The lateral extent of concentrations exceeding the interim screening level is generally limited to the western AOC 9 boundary, with the exception of two locations (#10 and AOC9-7). Location #10 is located in the north central portion of AOC 9, and AOC9-7 is located outside the AOC boundary and downslope from the AOC.

2.2.2 Hexavalent Chromium

Hexavalent chromium was detected in 22 of 38 soil samples collected at AOC 9. Detected concentrations of hexavalent chromium exceeded the interim screening level (0.83 mg/kg) (BTV) 16 times (maximum detected concentration of 114 mg/kg at #10), as shown in Tables C3-3 and C3-10 and Figure C3-2. Only two of the detected concentrations of hexavalent chromium exceeded the residential California Environmental Protection Agency, Department of Toxic Substances Control residential California human health screening level (CHHSL) of 17 mg/kg and commercial/industrial CHHSL of 37 mg/kg; no detected concentrations exceeded the ECV (139.6 mg/kg). The lateral extent of samples with concentrations exceeding the interim screening level is limited to the northern portion of AOC 9 and areas downslope of this AOC. At many locations, the deepest samples have concentrations exceeding the interim screening level; however, in most cases, only shallow samples (maximum depth of 6 feet bgs) were collected during the Part A Phase 1 and previous investigations.

2.2.3 Copper

Copper was detected in 38 of 38 soil samples collected at AOC 9. Detected concentrations of copper exceeded the interim screening level (16.8 mg/kg) (BTV) 10 times (maximum detected concentration of 50.4 mg/kg at #9), as shown in Tables C3-3 and C3-10 and Figure C3-3. Four samples exceeded the ECV (20.6 mg/kg). The maximum sample result of 50.4 mg/kg at #9 exceeded two times the ECV. None of the detected concentrations exceeded residential or commercial/industrial CHHSLs (3,000 mg/kg and 38,000 mg/kg, respectively). This location is located near the northwest portion of the AOC near the compressor station fence line and the historical broken stormwater discharge pipe. Samples with concentrations below the interim screening level surround this location laterally and vertically. Remaining detected concentrations exceeding the interim screening level ranged from 17 to 35.6 mg/kg.

2.2.4 Lead

Lead was detected in 29 of 29 soil samples collected at AOC 9. Detected concentrations of lead exceeded the interim screening level (8.39 mg/kg) (BTV/ECV) 19 times (maximum detected concentration of 59 mg/kg at AOC9-8), as shown in Tables C3-3 and C3-10 and Figure C3-4. None of the detected concentrations exceeded the residential or commercial/industrial CHHSLs (80 mg/kg and 320 mg/kg, respectively). Lead concentrations exceeded the interim screening level across most of AOC 9. At many locations, the deepest samples, collected at 2 feet bgs, have concentrations exceeding the interim screening level.

2.2.5 Mercury

Mercury was detected in four of 29 samples collected at AOC 9. Detected concentrations of mercury exceeded the interim screening level (0.0125 mg/kg) (ECV) four times (maximum detected concentration of 0.27 mg/kg at AOC9-5), as shown in Tables C3-3 and C3-10 and Figure C3-5. None of the detected concentrations exceeded the residential and commercial/ industrial CHHSLs (18 mg/kg and 180 mg/kg, respectively). The ECV of 0.0125 mg/kg is below the capability of the instrumentation to detect mercury. As a result, the 25 non-detected sample results had reporting limits that exceeded the ECV. These reporting limits ranged from 0.099 to 0.1 mg/kg. The four sample locations with detectable concentrations of mercury are located in the central portion of AOC 9. Samples with concentrations below the detection limits are located to the north and south of these locations but not the east and west. At two of the four locations, only the deeper samples, collected at 2 feet bgs, have detectable concentrations exceeding the interim screening level; mercury concentrations in the shallow samples were below the detection limit.

2.2.6 Molybdenum

Molybdenum was detected in two of 29 soil samples collected from AOC 9, both from boring AOC9-8. One detected concentration of 4.5 mg/kg exceeded the interim screening level of 1.37 mg/kg (BTV) and the ECV (2.25 mg/kg), as shown in Tables C3-3 and C3-10. Neither detected concentration exceeded residential and commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). AOC9-8 is located in the northwestern portion of the AOC near the compressor station fence line and the historical broken stormwater discharge pipe. Samples with concentrations below the interim screening level are located to the north, east, and south of this location. Samples were not collected west of this sample location (closer to the compressor station fence line). The deepest sample at AOC9-8 has a molybdenum concentration below the interim screening level.

2.2.7 Nickel

Nickel was detected in 38 of 38 soil samples collected from AOC 9. As shown in Tables C3-3 and C3-10, one detected concentration of 29 mg/kg at AOC 9-12 slightly exceeded the interim screening level (27.3 mg/kg) (BTV/ECV) but did not exceed the residential and commercial/industrial CHHSLs (1,600 mg/kg and 16,000 mg/kg, respectively). This location is located in the southwestern portion of the AOC near the compressor station fence line. Samples with concentrations below the interim screening level are located to the north and east of this location. Samples were not collected to the west (on the compressor station) or to the south of this location. The exceedance was detected in the deepest soil sample collected at this location.

2.2.8 Thallium

Thallium was detected in one of 29 soil samples collected from AOC 9. As shown in Tables C3-3 and C3-10, the detected concentration of thallium (4.1 mg/kg at AOC9-8) exceeded the interim screening level (2.32 mg/kg) (ECV) but did not exceed the residential and commercial/industrial CHHSLs (5 mg/kg and 63 mg/kg, respectively). This location is located in the northwestern portion of the AOC near the compressor station fence line and the historical broken stormwater discharge pipe. Samples with concentrations below the interim screening level are located to the north, east, and south of this location but were not collected to the west closer to the compressor station fence line. At location AOC9-8, the deepest sample has a nickel concentration below the interim screening level.

2.2.9 Zinc

Zinc was detected in 38 of 38 soil samples collected at AOC 9. Detected concentrations of zinc exceeded the interim screening level (58 mg/kg) (BTV/ECV) 18 times (maximum detected concentration of 1,000 mg/kg at AOC9-8), as shown in Tables C3-3 and C3-10 and Figure C3-6. None of the detected concentrations exceeded residential and commercial/ industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). The lateral extent of samples with concentrations exceeding interim screening level is limited to the central portion of AOC 9 and areas downslope of this AOC. Samples with concentrations below the interim screening level are located to the north and south of these locations but not to the west or to the east. At many locations, the deepest samples have concentrations exceeding the interim screening level; however, in most cases, only shallow samples (maximum depth of 6 feet bgs) were collected during the Part A Phase 1 and previous investigation.

2.2.10 Benzo(a)pyrene, Benzo(a)pyrene Equivalents, and PAHs

Benzo(a)pyrene was detected in 24 of 29 soil samples collected from AOC 9. Detected concentrations of benzo(a)pyrene exceeded the interim screening level (38 micrograms per kilograms [µg/kg]) (residential CHHSL) six times. Several other PAHs were detected in soil samples collected from AOC 9 but had concentrations below respective interim screening levels. To assist with evaluation of PAHs for human health, benzo(a)pyrene equivalents were calculated for each of the soil samples collected at AOC 9, as shown in Table C3-5. Benzo(a)pyrene equivalents values exceeded the interim screening level of 38 µg/kg (residential CHHSL) seven times (maximum calculated concentration of 110 µg/kg at AOC 9-5 and AOC 9-6), as shown in Tables C3-5 and C3-10 and Figure C3-7. The lateral extent of samples with concentrations exceeding interim screening level is limited to the eastern, southern, and western portions of AOC 9. Samples with concentrations below the interim screening level are located to the north but not to the east, south, or west. At two locations (AOC9-5 and AOC9-10), the deepest samples (collected at 3 feet bgs) have concentrations exceeding interim screening level.

To assist with evaluation of PAHs for ecological risk, detected concentrations of low molecular weight PAHs and high molecular weight PAHs were summed and compared to the PAH low molecular weight and PAH high molecular weight ECVs (10,000 µg/kg and 1,160 µg/kg, respectively). None of the sums of detected concentrations exceeded the PAH low molecular weight and PAH high molecular weight ECVs.

2.2.11 Target Analyte List/Target Compound List Constituents

Aluminum, calcium, magnesium, potassium, sodium, Aroclor-1254, and 4,4-DDE were detected in the AOC 9 surface soil samples analyzed for the complete TAL/TCL suite of compounds. These constituents are discussed below.

Aluminum was detected in three of three surface soil samples collected from AOC 9. The maximum detected concentration of aluminum was 13,000 mg/kg at AOC9-12, which is below the interim screening level (16,400 mg/kg) (BTV), as shown in Tables C3-4 and C3-10. Remaining detected concentrations of aluminum are 6,900 and 10,000 mg/kg. None of the detected concentrations exceeded residential and commercial CHHSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in three of three surface soil samples collected from AOC 9. The maximum detected concentration of calcium was 38,000 mg/kg at AOC9-12, which is below the interim screening level (66,500 mg/kg) (background value), as shown in Tables C3-4 and C3-10. Remaining detected concentrations of calcium are both 26,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in three of three surface soil samples collected from AOC 9. The maximum detected concentration of iron was 22,000 mg/kg at AOC9-12, which is below the interim screening level of 55,000 mg/kg (residential RSL), as shown in Tables C3-4 and C3-10. Remaining detected concentrations of iron are 12,000 and 17,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for iron.

Magnesium was detected in three of three surface soil samples collected from AOC 9. The maximum detected concentration of magnesium was 9,600 mg/kg at AOC9-12, which is below the interim screening level (12,100 mg/kg) (background value), as shown in Tables C3-4 and C3-10. Remaining detected concentrations of magnesium are 5,700 and 7,400 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in three of three surface soil samples collected from AOC 9. The maximum detected concentration of manganese was 310 mg/kg at AOC9-12, which is below the interim screening level (402 mg/kg) (BTV/ECV), as shown in Tables C3-4 and C3-10. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (1,800 mg/kg and 23,000 mg/kg, respectively).

Potassium was detected in three of three surface soil samples collected from AOC 9. The maximum detected concentration of potassium was 2,500 mg/kg at AOC9-12, which is below the interim screening level of 4,400 mg/kg (BTV), as shown in Tables C3-4 and C3-10. Remaining detected concentrations of potassium are 1,500 and 2,300 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for potassium.

Sodium was detected in three of three surface soil samples collected from AOC 9. The maximum detected concentration of sodium was 810 mg/kg at AOC9-5, which is below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C3-4 and C3-10. Remaining detected concentrations of sodium are 450 and 620 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

Aroclor-1254 was detected in three of five soil samples collected from AOC 9; both surface and subsurface soil (2 to 3 feet bgs) samples were collected. The maximum detected concentration of Aroclor-1254 was 160 µg/kg at AOC9-5 at 2 to 3 feet bgs, which is below the interim screening level of 220 µg/kg (residential RSL). Remaining detected concentrations of Aroclor 1254 are 44 and 160 µg/kg. To assist with evaluation of PCBs for ecological risk, detected concentrations of the Aroclors detected (only Aroclor-1254 was detected at AOC 9) were summed and the total PCB values were compared to the ECV. The maximum calculated value for total PCBs was 160 µg/kg, which is below the total PCB ECV of 204 µg/kg, as shown in Table C3-8. The remaining calculated total PCB concentrations are 44 and 160 µg/kg (both surface and shallow soil samples at AOC9-5 contained 160 µg/kg total PCBs).

4,4-DDE (3.2 µg/kg at AOC9-11), the daughter product of pesticide 4,4-dichlorodipheynyl-trichloroethane (4,4-DDT), was the only pesticide detected, which was above the interim screening level (2.1 µg/kg, ECV), as shown in Tables C3-7 and C3-10. The detected concentration did not exceed the residential or commercial/industrial CHHSLs (1,600 µg/kg and 6,300 µg/kg, respectively).

The only possible historical source of 4,4-DDT and its daughter products in the area would have been pest (insect) control. As such, any presence of 4,4-DDT and its daughter products would represent a nonpoint source and should be evaluated as such. 4,4-DDE was detected very infrequently in two other AOCs (AOC 11 and AOC 14) in addition to AOC 9. Sitewide, 4,4-DDE was only detected three times above its interim screening value (out of 72 total samples analyzed for this compound).

As discussed in Section C.2 of the main text of this appendix, PG&E recommends that 4,4-DDE not be considered COPC/COPEC for this AOC, and no further sampling is recommended for this constituents. Pesticides and other TAL/TCL constituents have been fully discussed in Section C.2.

2.3 White Powder Sample

As previously mentioned, a sample of white powder material (location AOC9-14 at 0 to 0.5 foot bgs) was collected and sent to the laboratory for analysis. White powder material was encountered only in this one location and only in the surface sample. In addition, a soil sample was collected beneath the white powder at 2 to 3 feet bgs and sent to the laboratory for analysis. The following compounds were detected in the white powder material sample: arsenic, barium, total chromium, hexavalent chromium, copper, lead, nickel, vanadium, zinc, and TPH-motor-oil. Of those compounds detected, arsenic (12 mg/kg), hexavalent chromium (1.7 mg/kg), copper (24 mg/kg), lead (34 mg/kg), and zinc (81 mg/kg) were detected above their respective interim screening levels.

The following compounds were detected in the soil sample collected at 2 to 3 feet bgs, beneath the white powder material: arsenic, barium, total chromium, cobalt, copper, lead, nickel, vanadium, zinc, several PAHs, TPH-diesel, and TPH-motor-oil. Of those compounds detected, only copper (17 mg/kg), lead (13 mg/kg), and zinc (61 mg/kg) were detected above their respective interim screening levels.

The lateral and vertical extents of the white powder material at AOC 9 have been defined. The nature and extent discussion presented above incorporates all of the constituents detected at this location that exceeded the lowest interim screening value, with the exception of arsenic. This was the only location where the arsenic concentration exceeded the interim screening value, and the lateral and vertical extent of arsenic at AOC 9 has been defined.

The white powder sample and the underlying soil sample were also analyzed for asbestos. Bulk samples analyzed by polarized light microscopy indicated that asbestos fibers were present in both samples. To confirm the presence of asbestos fibers, the white powder sample was also analyzed by California Air Resource Board Method 435 and transmission electron microscopy. California Air Resource Board Method 435 did indicate that very low levels of asbestos were present in the soil sample (detected concentration of less than 0.1 percent, where the detection limit was less than 0.1 percent); however, the transmission electron microscopy analysis indicated that asbestos was not detected above the detection limit. Based on these results, a very small percentage of asbestos fibers (less than 0.1 percent) are present in the white powder and soil samples.

2.4 Central Tendency Comparison to Background Threshold Values

Seven metals (total chromium, hexavalent chromium, copper, lead, molybdenum, nickel, and zinc) were detected above their respective Topock site-specific BTVs in soil samples collected from AOC 9. A central tendency comparison was performed for five of these seven metals (total chromium, copper, lead, nickel, and zinc) to compare the AOC 9 soil data set for these metals with the corresponding Topock soil background data set to determine whether a difference exists between the two populations and if additional sampling is required for a given metal (see Table C3-11 at the end of this sub-appendix and Figure 3-1 in the Data Gaps Evaluation Report).

Metals in either the AOC 9 data set or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of molybdenum at AOC 9 to conduct the test, and there were insufficient detections of hexavalent chromium in the background data set to allow for a central tendency comparison.

No statistical difference between the two populations was noted for nickel, as shown in Table C3-11. Results from the Gehan test indicated that site concentrations for total chromium, copper, lead, and zinc may exceed background. The lateral and vertical extents of copper have been adequately defined, and additional sampling is proposed for total chromium, lead, and zinc.

2.5 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates than decision error has been held to an acceptable level. Although a recent employee interview presented a possible alternate location for the storm drain, sufficient data of acceptable quality have been attained through collection of historical/Part A soil samples in areas most likely to have been impacted by incidental leaks and stormwater from the facility via a broken stormwater discharge pipe (e.g., downslope of the approximate location of the broken stormwater pipe and in the former stained soil removal area). Detections of PAHs, lead, pesticides, and PCBs in soils outside of the expected area impacted by the broken discharge pipe may be related to the compressor station runoff or other factors. Evaluation of potential impacts to soil from compressor station runoff or other factors is currently planned to be addressed in the forthcoming Part B perimeter sampling program.

Review of the nature and extent discussions above indicates that the lateral extent of samples with concentrations exceeding the interim screening level is confined primarily to the area near the eastern downslope portion of AOC 9 and along the bottom of the ravine in AOC 10, vertical extent in and downslope of the former stained soil removal area, and vertical extent in the central portion of AOC 9 near the top of the slope close to the fence line. Within these areas, the lateral and/or vertical extents of hexavalent chromium, lead, mercury, PAHs, total chromium, and zinc have not been defined.

Based on the DQO, the following data gaps were identified to resolve Decision 1:

- Data Gap #1 - Vertical extent of contamination in and downslope of the former stained soil removal area.
- Data Gap #2 - Vertical extent of contamination outside of the former stained soil removal area near the top of the AOC 9 slope.
- Data Gap #3 - Lateral and vertical extents of contamination near the eastern (downslope portion of AOC 9) and along the bottom of the ravine.

The proposed Phase 2 soil sample locations to fill the identified data gaps are presented in Section 6.0.

3.0 Decision 2 – Data Sufficient to Estimate Representative Exposure Point Concentrations

For Decision 2, data were evaluated to determine if the AOC 9 data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Evaluation Report. The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC). All available data (including historical data) at AOC 9 were reviewed. The sample designated as “white powder” (AOC9-14 at 0 to 0.5 foot bgs) was included in the data reviewed as a conservative measure, assuming that exposure to material described as “white powder” would not differ significantly from exposure to surrounding soil. Data from AOC 10a-1 were also included in the evaluation to support the ecological risk assessment because this sample location is within approximately 30 feet of the AOC 9 boundary and slightly down/cross-slope. The data for AOC 10a-1 are provided in Appendix C4.

Table C3-10 summarizes the results of the evaluation to determine if data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. In general, existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values (10 metals, PAHs, and total DDT [i.e., DDT-R]), as described below. Phase 2 data will be added to the existing data set to calculate the final EPC (i.e., after Decision 1 is satisfied).

3.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for arsenic, total chromium, hexavalent chromium, copper, lead, nickel, and zinc using ProUCL. For the remaining metals (mercury, molybdenum, and thallium), additional data collection is not expected to significantly change the results of the risk assessment for one or both of the following reasons:

- The compound is very infrequently detected (mercury, molybdenum, and thallium) and additional nondetects would be expected.
- The maximum detected concentration is within two times the lowest risk-based comparison value (thallium).

3.2 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene toxicity equivalents and high molecular weight PAHs using ProUCL.

3.3 Pesticides

4,4-DDE was detected in one of three samples at a concentration near the ECV and the detection limit, as shown in Table C3-12. The data are insufficient to allow calculation of an EPC using ProUCL, and the maximum would be selected as the EPC with the existing data set. The total concentration of DDT and metabolites (DDT-R) (3.2 µg/kg) is less than two times the ECV. Collection of additional data is not expected to yield sufficient detections to strongly influence the EPC. Therefore, no additional data collection is recommended to support EPC development.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, is needed to resolve Decision 3. Additional evaluations will be performed as appropriate as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 - Nature and Extent Evaluation - will provide the final representative data set that will be used to assess the threat to groundwater.

Table C3-13 presents the results of the tiered screening analysis for AOC 9. Ten metals had concentrations in excess of their respective background threshold value. Of those 10, hexavalent chromium, molybdenum, and thallium had one or more concentrations exceeding the calculated soil screening levels, as shown in Table C3-14. Numerical modeling was conducted to evaluate the potential of these three metals to leach into groundwater. Based on initial model screening simulations, the potential for hexavalent chromium and thallium to leach to groundwater could not be ruled out. These two constituents are discussed further below.

4.1 Thallium

At AOC 9, only one out of 29 samples had a detectable concentration of thallium (4.1 mg/kg). This single detection prompted the additional analysis. The simulated leaching concentration of thallium was likely due to the following factors:

- Nondetects in the initial concentration profile were input as one-half of the detection limit, resulting in a non-zero concentration and mass throughout the simulated vadose zone.
- Thallium has a very low Kd (dissociation constant) of 3.2 milliliters per gram.
- The background upper tolerance limit for thallium in groundwater is very low at 0.908 micrograms per liter.

Additional data are not needed for thallium; however, further refinement of the vadose zone model is proposed.

4.2 Hexavalent Chromium

The simulated leaching concentrations of hexavalent chromium were likely due to the following factors:

- The initial screening approach assigned the maximum concentration found at each depth interval across the entire interval, even though many other samples with far lower concentrations were observed at each level.
- The presence of hexavalent chromium at the deepest sampling interval at several locations required assignment of that concentration from that depth down to the water table.

Additional data are needed to better define the vertical extent of hexavalent chromium at AOC 9 and to assess if a current threat to groundwater exists. The screening model will be also refined with the new vertical data to more closely simulate vadose zone soil conditions.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study (CMS/FS). The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite), as discussed in Table 6-1 in the Data Gaps Evaluation Report.
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).

- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies), as discussed in Table 6-1 in the Data Gaps Evaluation Report.
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for AOC 9 that are currently available to support CMS/FS.

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The lateral and vertical extent of the COPCs and COPECs is discussed in Section 2.2, data results for selected constituents are shown in Figure C3-1 and Figures C3-3 through C3-8, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations. The maximum concentrations of these metals were compared to the California Title 22 total threshold limit and none of the metals in AOC 9 exceeded the total threshold limit, as shown in Table C3-15. The maximum detected concentrations were also compared to the soluble threshold limit concentrations, and none of the metals concentrations in AOC 9 exceeded 10 times the soluble threshold limit concentrations, as shown in Table C3-15. Additional data regarding potential COPC/COPEC leachability include synthetic precipitation leaching procedure (SPLP) analysis for total and hexavalent chromium, as shown in Table C3-2. SPLP analysis was conducted only for soil samples (no white powder or debris samples were tested using SPLP).

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 investigation was limited to grain size analysis only. Specific soil physical property data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 of the Data Gaps Evaluation Report.

5.4 Surface and Subsurface Features

While there is extensive information regarding surface and subsurface features at AOC 9, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for AOC 9. However, subsurface utilities, including gas transmission pipelines and any culverts or other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives and to prepare construction specifications.

5.5 Volumes of White Powder and Debris

Only a small patch of white powder was observed and sampled at AOC 9, as discussed in Section 2.3 of this sub-appendix. No debris was observed at AOC 9.

Additional soil physical parameter data are needed to support the corrective measures study/feasibility study.

6.0 Summary of Data Gaps and Proposed Phase 2 Soil Sample Locations to Fill Identified Gaps

Based on the Part A DQO, data gaps were identified for three of the four decisions and are summarized below by decision:

- **Decision 1 (Nature and Extent)** – the following data gaps were identified to resolve this decision:
    - Data Gap #1 – Vertical extent of contamination in and downslope of the previous stained soil removal area.
    - Data Gap #2 – Vertical extent of contamination outside of the previous stained soil removal area near the top of the AOC 9 slope.
    - Data Gap #3 – Lateral and vertical extents of contamination near the western (downslope portion of AOC 9) and along the bottom of the ravine.
- **Decision 2 (Data Sufficient to Estimate Representative Exposure Point Concentrations)** – no data gap was identified for this decision.
- **Decision 3 (Potential Threat to Groundwater from Residual Soil Concentrations)** – the following data gap was identified to resolve this decision:
    - Data Gap #4 – Vertical extent of contamination information to support refinement of the vadose leaching zone model.
- **Decision 4 (Data Sufficient to Support the CMS/FS)** – the following data gap was identified to resolve this decision:
    - Data Gap #5 – Soil physical property parameters to support the corrective measures study/feasibility study.

Table C3-16 summarizes the proposed Phase 2 sample locations, depths, description/ rationale for each location (i.e., which data gaps they would address), and analytes. Proposed Phase 2 sample locations are also shown on Figure C3-9.

6.1 Access Restrictions

AOC 9 is located on a steep slope just outside the compressor station fence line. Most of the proposed Phase 2 sample locations are located on the steep slope or in drainage areas along the pipeline access road located at the toe of the slope beneath the AOC. Due to the unstable nature of the slope and lack of level ground, sample collection methods are limited to hand tools and/or backhoe.

7.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2006. *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part A, PG&E Topock Compressor Station, Needles, California*. November 16.

Pacific Gas and Electric Company (PG&E). 2000. Letter from Mel Wong/PG&E to Robert Senga/DTSC. "Additional Soil Sampling, Corrective Action Consent Agreement for Bat Cave Wash Area, PG&E Topock Compressor Station, Needles, California, USEPA ID No. CAT080011729." April 5.

Tables

TABLE C3-1
Conceptual Site Model – Area of Concern 9
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Runoff from compressor station	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion/enclosed space accumulation Potential extracted groundwater
Discharge from compressor station via broken stormwater/ trench drain pipe	Shallow Soil	Percolation and/or infiltration	Surface Soil Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion/enclosed space accumulation Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C3-2

Synthetic Precipitation Leaching Procedure (SPLP) Extraction Results
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			SPLP Results in mg/L	
Location	**Sample Date**	**Depth (ft bgs)**	**Hexavalent Chromium**	**Chromium (total)**
AOC9				
AOC9-7	09/18/08	0-0.5	0.0238 J	0.0402
AOC9-8	10/01/08	0-0.5	1.57 J	1.7

Notes:

ft bgs	feet below ground surface
mg/L	milligrams per liter
J	concentration estimated by laboratory or data validation

TABLE C3-3
Sample Results: Metals
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC9-1	10/01/08	0 - 0.5	N	ND (2) *	6.2	93	ND (1) *	ND (1)	23	1.03	5.4	9.1	19	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	26	46
	10/01/08	2 - 3	N	ND (2) *	4.1	89	ND (1) *	ND (1)	9.7	ND (0.478)	4.3	5	4.5	ND (0.1) *	ND (1)	7.4	ND (1)	ND (1)	ND (2)	17	17
AOC9-2	09/18/08	0 - 0.5	N	ND (2) *	3.2	120	ND (2) *	ND (1)	16	ND (0.401)	4.7	11	9.6	ND (0.099) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	25	33
	09/18/08	2 - 3	N	ND (2) *	3.3	150	ND (2) *	ND (1)	11	ND (0.406)	3	5.9	4.9	ND (0.1) *	ND (2) *	6.9	ND (1)	ND (2)	ND (4) *	20	20
AOC9-3	09/18/08	0 - 0.5	N	ND (2) *	3.2	110	ND (2) *	ND (1)	25	ND (0.402)	4.1	17	9	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4) *	24	49
	09/18/08	2 - 3	N	ND (2) *	3.5	130	ND (2) *	ND (1)	15	ND (0.454)	3.8	7.3	23	ND (0.1) *	ND (2) *	10	ND (1)	ND (2)	ND (4.1) *	23	92
AOC9-4	09/18/08	0 - 0.5	N	ND (2) *	3.7	120	ND (2) *	ND (1)	22	1.06	5	12	13	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4) *	29	53
	09/18/08	2 - 3	N	ND (2) *	3.9	110	ND (2) *	ND (1)	19	ND (0.402)	4.6	11	11	ND (0.1) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	25	42
AOC9-5	10/01/08	0 - 0.5	N	ND (2) *	4.9	90	ND (1) *	ND (1)	35	0.726	7.1	19	28	ND (0.1) *	ND (1)	17	ND (1)	ND (1)	ND (2)	30	100
	10/01/08	2 - 3	N	ND (2) *	6	130	ND (2) *	ND (1)	38	1	7.6	21	25	0.27	ND (2) *	20	ND (1)	ND (2)	ND (4) *	31	76
	10/01/08	2 - 3	FD	ND (2) *	7	120	ND (2) *	ND (1)	43	0.791	7.7	19	24	0.23	ND (2) *	19	ND (1)	ND (2)	ND (4) *	34	85
AOC9-6	09/18/08	0 - 0.5	N	ND (2) *	3.8	180	ND (2) *	ND (1)	25	0.789	5.4	12	23	0.14	ND (2) *	13	ND (1)	ND (2)	ND (4) *	31	68
	09/18/08	2 - 3	N	ND (2.1) *	3.8	120	ND (2.1) *	ND (1)	16	ND (0.458)	5	9.3	5	ND (0.1) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.2) *	25	31
AOC9-7	09/18/08	0 - 0.5	N	ND (2) *	2.2	94	ND (2) *	ND (1)	72	4.37	4.2	14	15	ND (0.1) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	22	120
	09/18/08	2 - 3	N	ND (2) *	4.3	83	ND (1) *	ND (1)	13	ND (0.411)	2.9	6.7	20	ND (0.1) *	ND (1)	6.7	ND (1)	ND (1)	ND (2)	18	29
AOC9-8	10/01/08	0 - 0.5	N	ND (2) *	3.6	100	ND (1) *	ND (1)	230	48.6 J	4.4	11	20	ND (0.1) *	1	10	ND (1)	ND (1)	ND (2)	20	1,000
	10/01/08	2.5 - 3	N	ND (2.1) *	6.3	130	ND (2.1) *	ND (1)	41	2.41	5.3	13	59	ND (0.1) *	4.5	12	ND (1)	ND (2.1)	4.1	25	130
	10/01/08	5.5 - 6	N	ND (2) *	4	87	ND (1) *	ND (1)	13	1.32	3.7	5.5	4.4	ND (0.1) *	ND (1)	8.1	ND (1)	ND (1)	ND (2)	17	21
AOC9-9	10/01/08	0 - 0.5	N	ND (2) *	5	120	ND (1) *	ND (1)	14	ND (0.404)	3.9	8	7	ND (0.1) *	ND (1)	8.1	ND (1)	ND (1)	ND (2)	19	34
	10/01/08	2.5 - 3	N	ND (2.1) *	4.8	91	ND (1) *	ND (1)	21	ND (0.415)	6.9	10	3.8	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	32	41
	10/01/08	5.5 - 6	N	ND (2.1) *	4.9	97	ND (1) *	ND (1)	28	1.53	7.1	11	4.9	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	31	53
	10/01/08	5.5 - 6	FD	ND (2.1) *	4.5	87	ND (1) *	ND (1)	27	1.28	7.3	10	4.4	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2.1)	30	50
AOC9-10	10/01/08	0 - 0.5	N	ND (2) *	5.1	76	ND (1) *	ND (1)	28	0.418	6.8	11	18	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2)	30	49
	10/01/08	2 - 3	N	ND (2) *	7.3	110	ND (2) *	ND (1)	30	0.494	8.1	15	15	0.11	ND (2) *	19	ND (1)	ND (2)	ND (4) *	35	110
AOC9-11	09/18/08	0 - 0.5	N	ND (2.1) *	3.6	130	ND (2.1) *	ND (1.1) *	18	ND (0.418)	4.5	8.5	7.7	0.13	ND (2.1) *	11	ND (1.1)	ND (2.1)	ND (4.3) *	25	35
	09/18/08	2 - 3	N	ND (2) *	3.4	120	ND (2) *	ND (1)	20	ND (0.406)	4.3	9.7	7.1	ND (0.1) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	24	30
AOC9-12	10/01/08	0 - 0.5	N	ND (2) J*	7.3	190 J	ND (2) *	ND (1)	34	0.727	9.4	19	13	ND (0.1) *	ND (2) *	24	ND (1)	ND (2)	ND (4.1) *	38	57
	10/01/08	2 - 3	N	ND (2.1) *	6.6	220	ND (2.1) *	ND (1)	40	ND (0.415)	11	17	11	ND (0.1) *	ND (2.1) *	29	ND (1)	ND (2.1)	ND (4.1) *	40	50
AOC9-13	09/19/08	0 - 0.5	N	ND (2) J*	5.2	180	ND (2) *	ND (1)	18	ND (0.404)	4.7	13	8.3	ND (0.099) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	27	36
	09/19/08	2 - 3	N	ND (2) *	3.8	130	ND (2) *	ND (1)	23 J	ND (0.409)	4.7	9.8	10	ND (0.1) *	ND (2) *	13	ND (1)	ND (2)	ND (4.1) *	27	35
	09/19/08	2 - 3	FD	ND (2) *	3.6	110	ND (2) *	ND (1)	18 J	ND (0.41)	4.5	9.6	5.6	ND (0.1) *	ND (2) *	13	ND (1)	ND (2)	ND (4.1) *	24	32
AOC9-14	10/02/08[6]	0 - 0.5	N	ND (2.1) *	12	170	ND (5.4) *	ND (1.1) *	31	1.7	ND (5.4)	24	34	ND (0.11) *	ND (5.4) *	10	ND (1.1)	ND (5.4) *	ND (11) *	19	81
	10/02/08	2 - 3	N	ND (2) *	7.1	160	ND (2) *	ND (1)	38	ND (0.412)	8.8	17	13	ND (0.1) *	ND (2) *	22	ND (1)	ND (2)	ND (4.1) *	33	61
#4	04/06/00	0 - 3	N	---	---	---	---	---	53.2	4.2	---	12.4	---	---	---	13.5	---	---	---	---	343
#5	04/06/00	0 - 3	N	---	---	---	---	---	29	2.7	---	13.8	---	---	---	16.3	---	---	---	---	64
#6	04/06/00	0 - 3	N	---	---	---	---	---	33	2.6	---	12.4	---	---	---	13.2	---	---	---	---	92.7
#7	04/06/00	0 - 3	N	---	---	---	---	---	32.1	1.3	---	15.3	---	---	---	16.3	---	---	---	---	68
#8	04/06/00	0 - 3	N	---	---	---	---	---	28.8	2.8	---	12.9	---	---	---	16.4	---	---	---	---	61.1
#9	04/06/00	0 - 3	N	---	---	---	---	---	92.7	2.7	---	50.4	---	---	---	10.1	---	---	---	---	215
#10	04/06/00	0 - 3	N	---	---	---	---	---	398	114	---	17.9	---	---	---	14.8	---	---	---	---	744
#11	04/06/00	0 - 3	N	---	---	---	---	---	31.4	1.4	---	18.7	---	---	---	10.7	---	---	---	---	80.3
#12	04/06/00	0 - 3	N	---	---	---	---	---	38.3	0.8	---	35.6	---	---	---	21.1	---	---	---	---	84

TABLE C3-3

Sample Results: Metals

AOC 9 - Southeast Fence Line

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Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] White powder sample

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C3-4

Sample Results: Contract Laboratory Program Inorganics

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Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
AOC9-5	10/01/08	0 - 0.5	N	10,000	26,000	17,000	7,400	250	2,300	810	ND (1.01) *
AOC9-11	09/18/08	0 - 0.5	N	6,900	26,000	12,000	5,700	210	1,500	450	ND (1.04) *
AOC9-12	10/01/08	0 - 0.5	N	13,000	38,000	22,000 J	9,600 J	310 J	2,500	620	ND (1.04) *

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C3-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC9-1	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5) J	ND (5)	ND (5)	13	18	21	16	20	24	ND (5)	34	ND (5)	16	ND (5)	12	32	12	190	26
	10/01/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1) J	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC9-2	09/18/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.6	9.5	6.2	ND (5)	7.4	ND (5)	10	ND (5)	5.5	ND (5)	ND (5)	9.7	ND	55	9.5
	09/18/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC9-3	09/18/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	12	16	24	14	11	20	ND (5)	32	ND (5)	14	ND (5)	9.1	29	9.1	170	23
	09/18/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC9-4	09/18/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	19	23	32	19	14	27	ND (5)	44	ND (5)	18	ND (5)	13	41	13	240	32
	09/18/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	18	22	31	18	14	28	ND (5)	44	ND (5)	18	ND (5)	15	41	15	230	31
AOC9-5	10/01/08	0 - 0.5	N	160	120	ND (5) J	5.1	ND (5)	60	73	77	58	90	95	17	140	ND (5)	52	16	46	130	350	790	110
	10/01/08	2 - 3	N	220 J	240 J	ND (5.1) J	ND (5.1)	ND (5.1)	57	75	75	62	94	93	18	130	ND (5.1)	53	32	39	120	530	780	110
	10/01/08	2 - 3	FD	120 J	81 J	ND (5.1) J	ND (5.1)	ND (5.1)	44	60	63	53	81	73	15	100	ND (5.1)	48	13	31	100	250	640	89
AOC9-6	09/18/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	54	77	120	50	36	87	12	130	ND (5.1)	43	ND (5.1)	26	130	26	740	110
	09/18/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	5.8	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6.2	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6.2	ND	18	4.9
AOC9-7	09/18/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	17	21	33	20	9.3	26	5.1	44	ND (5)	18	ND (5)	11	38	11	230	31
	09/18/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.3	10	15	6.7	7.4	11	ND (5)	14	ND (5)	6.4	ND (5)	ND (5)	14	ND	91	14
AOC9-8	10/01/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1) J	ND (5.1)	ND (5.1)	36	46	50	36	62	64	12	97	ND (5.1)	35	ND (5.1)	30	88	30	530	69
	10/01/08	2.5 - 3	N	ND (5.1)	ND (5.1)	ND (5.1) J	ND (5.1)	ND (5.1)	16	22	23	18	27	27	6.8	38	ND (5.1)	16	ND (4.8)	14	36	14	230	33
	10/01/08	5.5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1) J	ND (5.1)	ND (5.1)	13	10	12	6.5	12	15	ND (5.1)	27	ND (5.1)	6.1	ND (3.5)	7.5	25	7.5	130	15
AOC9-9	10/01/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1) J	ND (5.1)	ND (5.1)	8.2	15	16	15	18	17	ND (5.1)	21	ND (5.1)	13	ND (5.1)	6.8	20	6.8	140	22
	10/01/08	2.5 - 3	N	ND (5.2)	ND (5.2)	ND (5.2) J	ND (5.2)	ND (5.2)	ND (5.2)	7.2	7.2	7.4	9	7.1	ND (5.2)	7.2	ND (5.2)	6.5	ND (4.4)	ND (5.2)	7.5	ND	59	11
	10/01/08	5.5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2) J	ND (5.2)	ND (5.2)	9	13	14	12	16	15	ND (5.2)	19	ND (5.2)	10	ND (4.6)	5.5	18	5.5	130	19
	10/01/08	5.5 - 6	FD	ND (5.2)	ND (5.2)	ND (5.2) J	ND (5.2)	ND (5.2)	6.3	9	11	9	11	10	ND (5.2)	12	ND (5.2)	7.7	ND (4.1)	ND (5.2)	12	ND	88	14
AOC9-10	10/01/08	0 - 0.5	N	5.9	ND (5)	ND (5) J	ND (5)	ND (5)	30	34	40	33	34	40	11	71	ND (5)	29	ND (5)	22	63	28	390	51
	10/01/08	2 - 3	N	51	36	ND (5.1) J	ND (5.1)	ND (5.1)	30	45	46	41	53	54	14	74	ND (5.1)	36	5.8	21	71	110	460	67
AOC9-11	09/18/08	0 - 0.5	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	11	16	21	13	10	17	ND (5.3)	25	ND (5.3)	12	ND (5.3)	5.5	23	5.5	150	22
	09/18/08	2 - 3	N	45	56	ND (5.1)	ND (5.1)	ND (5.1)	13	15	21	12	9.2	18	ND (5.1)	28	ND (5.1)	12	9	8.4	26	120	150	22
AOC9-12	10/01/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1) J	ND (5.1)	ND (5.1)	8.8	14	18	14	15	17	ND (5.1)	24	ND (5.1)	12	ND (5.1)	7.2	22	7.2	140	20
	10/01/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2) J	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6.3	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6	ND	12	4.5
AOC9-13	09/19/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	31	45	41	25	53	60	9.8	87	ND (5)	27	ND (5)	26	81	26	460	64
	09/19/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	20	8.1	5.9	ND (5.1)	39 J	ND (5.1)	10	ND (5.1)	ND (5.1)	ND (5.1)	49 J	19	49	100	23
	09/19/08	2 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	9.1	14	14	8.6	14	18 J	ND (5.1)	27	ND (5.1)	8.7	ND (4.9)	9 J	24	9	140	20
AOC9-14	10/02/08[6]	0 - 0.5	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/02/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.5 J	15 J	15 J	19 J	17 J	15 J	16 J	17 J	10 J	ND (5.1)	17 J	ND (5.1)	ND (5.1)	11 J	6.5	150	28

TABLE C3-5
Sample Results: Polycyclic Aromatic Hydrocarbons
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] White powder sample

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C3-6

Sample Results: Total Petroleum Hydrocarbons and pH
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry**
			Interim Screening Level [1] :	**540**	**540**	**1,800**	**NE**
			Residential Regional Screening Levels [2] :	**NE**	**NE**	**NE**	**NE**
			Residential DTSC CHHSL [3] :	**NE**	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Levels [4] :	**540**	**540**	**1,800**	**NE**
			Ecological Comparison Values [5] :	**NE**	**NE**	**NE**	**NE**
			Background [6] :	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**pH**
AOC9-1	10/01/08	0 - 0.5	N	---	ND (10)	ND (10)	8.52
	10/01/08	2 - 3	N	ND (0.85) J	ND (10)	14.2	8.17
AOC9-2	09/18/08	0 - 0.5	N	---	ND (10)	ND (10)	8.62
	09/18/08	2 - 3	N	ND (0.93)	ND (10)	ND (10)	8.72
AOC9-3	09/18/08	0 - 0.5	N	---	ND (10)	24.4	7.92
	09/18/08	2 - 3	N	ND (1.2) J	ND (10)	17.3	8.22
AOC9-4	09/18/08	0 - 0.5	N	---	ND (10)	11.8	7.63
	09/18/08	2 - 3	N	ND (3.7)	ND (10)	11.7	7.69
AOC9-5	10/01/08	0 - 0.5	N	---	ND (10)	61.6	9.12
	10/01/08	2 - 3	N	ND (0.88)	ND (10)	55.4	8.91
	10/01/08	2 - 3	FD	ND (0.78)	ND (10)	59.4	9.01
AOC9-6	09/18/08	0 - 0.5	N	---	ND (101)	ND (101)	8.77
	09/18/08	2 - 3	N	ND (66)	ND (10)	ND (10)	8.34
AOC9-7	09/18/08	0 - 0.5	N	---	ND (10)	31.1	8.27
	09/18/08	2 - 3	N	ND (1)	ND (10)	ND (10)	8.71
AOC9-8	10/01/08	0 - 0.5	N	---	ND (10)	42.7	8.2
	10/01/08	2.5 - 3	N	ND (0.92)	ND (10)	48.8	8.68
	10/01/08	5.5 - 6	N	ND (0.79)	ND (10)	15.5	8.42
AOC9-9	10/01/08	0 - 0.5	N	---	ND (10)	20.3	9.13
	10/01/08	2.5 - 3	N	ND (0.96)	ND (10)	ND (10)	8.36
	10/01/08	5.5 - 6	N	ND (0.75)	ND (10)	ND (10)	8.54
	10/01/08	5.5 - 6	FD	ND (0.8)	ND (10)	ND (10)	8.57
AOC9-10	10/01/08	0 - 0.5	N	---	ND (10)	12.1	9.23
	10/01/08	2 - 3	N	ND (1)	ND (10)	22	8.94
AOC9-11	09/18/08	0 - 0.5	N	---	ND (10)	51.8	8.65
	09/18/08	2 - 3	N	ND (1)	ND (10)	46.7	8.07
AOC9-12	10/01/08	0 - 0.5	N	---	ND (10)	19.9	8.48
	10/01/08	2 - 3	N	ND (1)	ND (10)	ND (10)	8.55
AOC9-13	09/19/08	0 - 0.5	N	---	ND (10)	19.2 J	8.57
	09/19/08	2 - 3	N	ND (1.1)	13	77.9 J	8.28
	09/19/08	2 - 3	FD	ND (1.1) J	12.9	62 J	8.45
AOC9-14	10/02/08[7]	0 - 0.5	N	---	ND (10) J	48.4 J	9.41
	10/02/08	2 - 3	N	ND (0.84)	34.8	702 J	9.08

TABLE C3-6

Sample Results: Total Petroleum Hydrocarbons and pH
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry**
Interim Screening Level [1] :				**540**	**540**	**1,800**	**NE**
Residential Regional Screening Levels [2] :				**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**
Ecological Comparison Values [5] :				**NE**	**NE**	**NE**	**NE**
Background [6] :				**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**pH**
#4	04/06/00	0 - 3	N	---	---	---	9.62
#5	04/06/00	0 - 3	N	---	---	---	9.75
#6	04/06/00	0 - 3	N	---	---	---	9.66
#7	04/06/00	0 - 3	N	---	---	---	9.6
#8	04/06/00	0 - 3	N	---	---	---	8.95
#9	04/06/00	0 - 3	N	---	---	---	9.67
#10	04/06/00	0 - 3	N	---	---	---	8.2
#11	04/06/00	0 - 3	N	---	---	---	8.9
#12	04/06/00	0 - 3	N	---	---	---	8.78

[1] Interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

[7] White Powder Sample

Results greater than the interim screening level are circled.

TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C3-7

Sample Results: Pesticides

AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Interim Screening Level [1]:				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels [2]:				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL [3]:				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values [4]:				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
AOC9-5	10/01/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC9-11	09/18/08	0 - 0.5	N	ND (2.1) *	3.2	ND (2.1) *	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (2.1)	ND (1.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (5.3)	ND (53)
AOC9-12	10/01/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C3-8

Sample Results: Polychlorinated Biphenyls
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Regional Screening Levels [2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Residential DTSC CHHSL [3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**NE**
Ecological Comparison Values [4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC9-5	10/01/08	0 - 0.5	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	160	ND (16)	ND (16)	ND (16)	160
	10/01/08	2 - 3	N	ND (17) J	ND (33) J	ND (17) J	ND (17) J	ND (17) J	160 J	ND (17) J	ND (17) J	ND (17) J	160
AOC9-11	09/18/08	0 - 0.5	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (9)
AOC9-12	10/01/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	44	ND (17)	ND (17)	ND (17)	44
	10/01/08	2 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)

[1] Interim screening level is the USEPA residential regional screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C3-9

Sample Results: Asbestos
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Asbestos		
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**PLM/BULK** [1]	**CARB435/** [2] **PLM (%)**	**TEM** [3] **(%)**
AOC9-14	10/02/08 [4]	0 - 0.5	N	Present	ND (<0.1)	ND (0.07)
	10/02/08	2 - 3	N	Present	<0.1	---

[1] Polarized light microscopy of bulk samples

[2] California Air Resource Board Method 435 / polarized light microscopy of bulk samples

[3] Transmission electron microscopy

[4] White powder sample

ft bgs	feet below ground surface
FD	field duplicate
---	not analyzed

TABLE C3-10
Constitiuent Concentrations in Soil Compared to Screening Values
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		**Ecological Comparison Value (ECV)** [2]		**Residential Screening Level (Res SL)** [3]		**RWQCB Environmental Screening Levels (ESL)** [4]		**Commercial Screening Level (Com SL)** [5]		**Interim Screening Level (Int SL)** [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences** [7]	**(BTV)**	**# of Exceedences** [8]	**(ECV)**	**# of Exceedences** [8]	**(Res SL)**	**# of Exceedences** [8]	**(ESL)**	**# of Exceedences** [8]	**(Com SL)**	**# of Exceedences** [8]	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 29 (0%)	ND (2.1) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	29 / 29 (100%)	7.3	0	(11)	0	(11.4)	0	(0.07) *	NA	(NE)	0	(0.24) *	0	(11)
Barium	mg/kg	29 / 29 (100%)	220	0	(410)	0	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	0	(410)
Beryllium	mg/kg	0 / 29 (0%)	ND (2.1) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	0 / 29 (0%)	ND (1.1) ‡	0	(1.1)	0	(0.0151) *	0	(39)	NA	(NE)	0	(500)	0	(1.1)
Chromium	mg/kg	38 / 38 (100%)	398	8	(39.8)	8	(36.3) *	1	(280)	NA	(NE)	0	(1,400)	8	(39.8)
Chromium, Hexavalent	mg/kg	22 / 38 (58%)	114	16	(0.83)	0	(139.6)	2	(17)	NA	(NE)	2	(37)	16	(0.83)
Cobalt	mg/kg	29 / 29 (100%)	11	0	(12.7)	0	(13)	0	(23)	NA	(NE)	0	(300)	0	(12.7)
Copper	mg/kg	38 / 38 (100%)	50.4	10	(16.8)	3	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	10	(16.8)
Lead	mg/kg	29 / 29 (100%)	59	19	(8.39)	19	(0.0166) *	0	(80)	NA	(NE)	0	(320)	19	(8.39)
Mercury	mg/kg	4 / 29 (14%)	0.27	NA	(NE)	4	(0.0125)	0	(18)	NA	(NE)	0	(180)	4	(0.0125)
Molybdenum	mg/kg	2 / 29 (6.9%)	4.5	1	(1.37)	1	(2.25)	0	(380)	NA	(NE)	0	(4,800)	1	(1.37)
Nickel	mg/kg	38 / 38 (100%)	29	1	(27.3)	1	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	1	(27.3)
Thallium	mg/kg	1 / 29 (3.4%)	4.1	NA	(NE)	1	(2.32)	0	(5)	NA	(NE)	0	(63)	1	(2.32)
Vanadium	mg/kg	29 / 29 (100%)	40	0	(52.2)	0	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	0	(52.2)
Zinc	mg/kg	38 / 38 (100%)	1,000	18	(58)	18	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	18	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	3 / 3 (100%)	13,000	0	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	0	(16,400)
Calcium	mg/kg	3 / 3 (100%)	38,000	0	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(66,500)
Iron	mg/kg	3 / 3 (100%)	22,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	3 / 3 (100%)	9,600	0	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(12,100)
Manganese	mg/kg	3 / 3 (100%)	310	0	(402)	0	(220)	0	(1,800)	NA	(NE)	0	(23,000)	0	(402)
Potassium	mg/kg	3 / 3 (100%)	2,500	0	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(4,400)
Sodium	mg/kg	3 / 3 (100%)	810	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 3 (0%)	ND (1.04) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Polycyclic Aromatic Hydrocarbons															
1-Methyl naphthalene	µg/kg	5 / 29 (17%)	220	NA	(NE)	NA	(NE)	0	(22,000)	NA	(NE)	0	(99,000)	0	(22,000)
2-Methyl naphthalene	µg/kg	4 / 29 (14%)	240	NA	(NE)	NA	(NE)	0	(310,000)	NA	(NE)	0	(4,100,000)	0	(310,000)
Acenaphthene	µg/kg	1 / 29 (3.4%)	5.1	NA	(NE)	NA	(NE)	0	(3,400,000)	NA	(NE)	0	(33,000,000)	0	(3,400,000)
Anthracene	µg/kg	1 / 29 (3.4%)	6.5	NA	(NE)	NA	(NE)	0	(17,000,000)	NA	(NE)	0	(170,000,000)	0	(17,000,000)
Benzo (a) anthracene	µg/kg	22 / 29 (76%)	60	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (a) pyrene	µg/kg	24 / 29 (83%)	77	NA	(NE)	NA	(NE)	6	(38)	NA	(NE)	0	(130)	6	(38)
Benzo (b) fluoranthene	µg/kg	25 / 29 (86%)	120	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (ghi) perylene	µg/kg	24 / 29 (83%)	62	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	23 / 29 (79%)	94	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Chrysene	µg/kg	24 / 29 (83%)	95	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Dibenzo (a,h) anthracene	µg/kg	10 / 29 (34%)	18	NA	(NE)	NA	(NE)	0	(110)	NA	(NE)	0	(380)	0	(380)
Fluoranthene	µg/kg	26 / 29 (90%)	140	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Indeno (1,2,3-cd) pyrene	µg/kg	24 / 29 (83%)	53	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Naphthalene	µg/kg	4 / 29 (14%)	32	NA	(NE)	NA	(NE)	0	(3,600)	NA	(NE)	0	(18,000)	0	(3,600)
Phenanthrene	µg/kg	20 / 29 (69%)	49	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Pyrene	µg/kg	26 / 29 (90%)	130	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)

TABLE C3-10

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		**Ecological Comparison Value (ECV)** [2]		**Residential Screening Level (Res SL)** [3]		**RWQCB Environmental Screening Levels (ESL)** [4]		**Commercial Screening Level (Com SL)** [5]		**Interim Screening Level (Int SL)** [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences** [7]	**(BTV)**	**# of Exceedences** [8]	**(ECV)**	**# of Exceedences** [8]	**(Res SL)**	**# of Exceedences** [8]	**(ESL)**	**# of Exceedences** [8]	**(Com SL)**	**# of Exceedences** [8]	**(Int SL)**
Polycyclic Aromatic Hydrocarbons															
PAH Low molecular weight	µg/kg	21 / 29 (72%)	530	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	26 / 29 (90%)	790	NA	(NE)	0	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,160)
B(a)P Equivalent	µg/kg	26 / 29 (90%)	110	NA	(NE)	NA	(NE)	7	(38)	NA	(NE)	0	(130)	7	(38)
Polychlorinated biphenyls															
Aroclor 1254	µg/kg	3 / 5 (60%)	160	NA	(NE)	NA	(NE)	0	(220)	NA	(NE)	0	(740)	0	(220)
Total PCBs	µg/kg	3 / 5 (60%)	160	NA	(NE)	0	(204)	NA	(NE)	NA	(NE)	NA	(NE)	0	(204)
Pesticides															
4,4-DDE	µg/kg	1 / 3 (33%)	3.2	NA	(NE)	1	(2.1)	0	(1,600)	NA	(NE)	0	(6,300)	1	(2.1)
Total Petroleum Hydrocarbons															
TPH as diesel	mg/kg	2 / 29 (6.9%)	34.8	NA	(NE)	NA	(NE)	NA	(NE)	0	(540)	NA	(NE)	0	(540)
TPH as motor oil	mg/kg	20 / 29 (69%)	702	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C3-11
Central Tendency Comparisons (Site to Background)
AOC 9 - Southeast Fence Line
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	**Comparison Test Used**	**Probability that the Observed Differences Would Occur Purely by Chance**	**Statistical Decision with 0.05 Significance Level**	**Mean of Site Detects**	**Mean of Bkgd Detects**	**Median of Site Detects**	**Median of Bkgd Detects**	**Number of Site Detects**	**Number of Site Samples**	**Number of Bkgd Detects**	**Number of Bkgd Samples**	**Percent Detects Site**	**Percent Detects Bkgd**
Chromium	Gehan	0.007	Site > Bkgd	44.1	22.3	28	21.9	38	38	70	70	100	100
Copper	Gehan	0.007	Site > Bkgd	13.9	10.5	12.2	10.1	38	38	70	70	100	100
Lead	Gehan	0.000	Site > Bkgd	14.2	4.38	11	3.5	29	29	59	60	100	98
Nickel	Gehan	0.964	nsd	13.6	15.4	12.5	15	38	38	70	70	100	100
Zinc	Gehan	0.000	Site > Bkgd	113	36.8	55	35.5	38	38	70	70	100	100

Bkgd = background.
NA = not applicable.
nsd = no statistical difference.
< = less than.
> = greater than.

TABLE C3-12

Decision 2 Data Gaps Summary AOC 9 - *Southeast Fence Line*
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value [1]	> HHCV or Background as Applicable? [2]	> ECV or Background as Applicable? [1, 2]	Proposed Sample ID	Notes
	Y or N	Det/# results [1]		Y or N [3]	Y or N		
Metals							
Arsenic				**11 mg/kg (bckg)**	**11.4 mg/kg**		
0-0.5 ft bgs	Y	15 of 15	12 mg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	29 of 29	12 mg/kg	Y	Y		
0-6 ft bgs	Y	31 of 31	12 mg/kg	Y	Y		
0-10 ft bgs	Y	31 of 31	12 mg/kg	Y	NA		
Chromium-Total				**280 mg/kg**	**39.8 mg/kg (bckg)**		
0-0.5 ft bgs	Y	15 of 15	230 mg/kg	N	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	398 mg/kg	Y	Y		
0-6 ft bgs	Y	40 of 40	398 mg/kg	Y	Y		
0-10 ft bgs	Y	40 of 40	398 mg/kg	Y	NA		
Chromium - Hexavalent				**17 mg/kg**	**139.6 mg/kg**		
0-0.5 ft bgs	Y	10 of 15	48.6 mg/kg	Y	N	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	22 of 38	114 mg/kg	Y	N		
0-6 ft bgs	Y	24 of 40	114 mg/kg	Y	N		
0-10 ft bgs	Y	24 of 40	114 mg/kg	Y	NA		
Copper				**3000 mg/kg**	**20.6 mg/kg**		
0-0.5 ft bgs	Y	15 of 15	270 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	270 mg/kg	N	Y		
0-6 ft bgs	Y	40 of 40	270 mg/kg	N	Y		
0-10 ft bgs	Y	40 of 40	270 mg/kg	N	NA		
Lead				**80 mg/kg**	**8.39 mg/kg (bckg)**		
0-0.5 ft bgs	Y	15 of 15	200 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	29 of 29	200 mg/kg	N	Y		
0-6 ft bgs	Y	31 of 31	200 mg/kg	N	Y		
0-10 ft bgs	Y	31 of 31	200 mg/kg	N	NA		
Mercury				**18 mg/kg**	**0.0125 mg/kg**		
0-0.5 ft bgs	N	3 of 15	0.64 mg/kg	N	Y	None	Compound exceeds ECV and no background value has been established. Detection limits are elevated relative to the ECV. Data not adequate (for the 0-0.5 ft bgs exposure interval) to calculate EPC using ProUCL. However, additional data collection is likely to yield additional non-detected values. The EPC has been defined within the limits of the analytical instrumentation.
0-3 ft bgs	Y	5 of 29	0.64 mg/kg	N	Y		
0-6 ft bgs	Y	5 of 31	0.64 mg/kg	N	Y		
0-10 ft bgs	Y	5 of 31	0.64 mg/kg	N	NA		

TABLE C3-12

Decision 2 Data Gaps Summary AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value [1]	> HHCV or Background as Applicable? [2]	> ECV or Background as Applicable? [1, 2]	Proposed Sample ID	Notes
	Y or N	Det/# results [1]		Y or N [3]	Y or N		
Molybdenum				**380 mg/kg**	**2.25 mg/kg**		
0-0.5 ft bgs	N	2 of 15	19 mg/kg	N	Y	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC because additional sampling would likely result in additional non-detect values.
0-3 ft bgs	N	3 of 29	19 mg/kg	N	Y		
0-6 ft bgs	N	3 of 31	19 mg/kg	N	Y		
0-10 ft bgs	N	3 of 31	19 mg/kg	N	NA		
Nickel				**1600 mg/kg**	**27.3 mg/kg (bckg)**		
0-0.5 ft bgs	Y	15 of 15	28 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	29 mg/kg	N	Y		
0-6 ft bgs	Y	40 of 40	29 mg/kg	N	Y		
0-10 ft bgs	Y	40 of 40	29 mg/kg	N	NA		
Thallium				**5 mg/kg**	**2.32 mg/kg**		
0-0.5 ft bgs	NA	0 of 15	NA mg/kg	N	N	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC because additional sampling would likely result in additional non-detect values and because the maximum detected value is within two times the lowest comparison value.
0-3 ft bgs	N	1 of 29	4.1 mg/kg	N	Y		
0-6 ft bgs	N	1 of 31	4.1 mg/kg	N	Y		
0-10 ft bgs	N	1 of 31	4.1 mg/kg	N	NA		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	Y	15 of 15	1000 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	1000 mg/kg	N	Y		
0-6 ft bgs	Y	40 of 40	1000 mg/kg	N	Y		
0-10 ft bgs	Y	40 of 40	1000 mg/kg	N	NA		
Polynuclear Aromatic Hydrocarbons							
PAHs (BaP TEQ)				**38 µg/kg**	NA		
0-0.5 ft bgs	Y	14 of 15	1400 µg/kg	Y	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	25 of 29	1400 µg/kg	Y	NA		
0-6 ft bgs	Y	27 of 31	1400 µg/kg	Y	NA		
0-10 ft bgs	Y	27 of 31	1400 µg/kg	Y	NA		
HMW PAHs				**NA**	**1160 µg/kg**		
0-0.5 ft bgs	Y	14 of 15	9500 µg/kg	NA	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	25 of 29	9500 µg/kg	NA	Y		
0-6 ft bgs	Y	27 of 31	9500 µg/kg	NA	Y		

TABLE C3-12
Decision 2 Data Gaps Summary AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results [1]	Maximum Detected Value [1]	> HHCV or Background as Applicable? [2] Y or N [3]	> ECV or Background as Applicable? [1, 2] Y or N	Proposed Sample ID	Notes
Pesticides							
DDT-R				**1600 µg/kg**	**2.1 µg/kg**		
0-0.5 ft bgs	N	1 of 4	3.2 µg/kg	N	Y	None	Compound exceeds ECV and existing data not adequate to calculate 95% UCL. DDE was detected in 1 of 4 samples (including AOC10a-1); DDT and DDD were not detected. The magnitude of the detection is low relative to the ECV and the detection limit (2 µg/kg). Additional sampling is not expected to significantly change the results (NDs are likely and the EPC would still be the maximum detected value).
0-3 ft bgs	N	1 of 4	3.2 µg/kg	N	Y		
0-6 ft bgs	N	1 of 4	3.2 µg/kg	N	Y		
0-10 ft bgs	N	1 of 4	3.2 µg/kg	N	NA		

Footnotes:

[1] AOC 9 was evaluated for adequacy to support EPC calculations including location AOC10a-1 due to its close proximity to AOC 9 and topography. Number of detects and total sample counts as well as maximum detected value incorporate sample AOC10a-1. Total number of samples exceeding ECVs, or background as applicable, includes location AOC10a-1. A summary of results for AOC10a-1 is provided in Appendix C, Attachment 4.

[2] The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

[3] AOC9 was evaluated for data sufficiency to support the human health risk assessment excluding AOC10a-1.

Acronyms and Abbreviations:
AOC - area of concern
BaP TEQ - benzo(a)pyrene toxic equivalents
ECV - ecological comparison values
EPC - exposure point concentration
ft bgs - feet below ground surface
HHCV - human health comparison values
HMW PAH - high molecular weight polycyclic aromatic hydrocarbons
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
N - no
NA - not applicable
Y - yes

TABLE C3-13
Results of Tiered Analysis at AOC 9
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Metal	**Step 1 Do COPCs/COPECs Exceed Background?**	**Step 2 Do COPCs/COPECs Exceed SSL?**	**Step 3 Does Screening Model Eliminate Potential for Leaching to Groundwater?**
Arsenic	√		
Chromium	√		
Chromium, Hexavalent	√	√	No
Copper	√		
Lead	√		
Mercury	√		
Molybdenum	√	√	Yes
Nickel	√		
Thallium	√	√	No
Zinc	√		

SSL = soil screening level.

TABLE C3-14

Sample Results Compared to the Calculated Soil Screening Levels
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
		Soil Screening Levels : [1]		**39**	**6,400**	**0.42**	**25,000**	**4,000**	**700**	**0.73**	**4,400**	**0.22**	**150,000**
		Background : [2]		**11**	**39.8**	**0.83**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Thallium**	**Zinc**
AOC9-1	10/01/08	0 - 0.5	N	6.2	23	1.03	9.1	19	ND (0.1)	ND (1)	11	ND (2)	46
	10/01/08	2 - 3	N	4.1	9.7	ND (0.478)	5	4.5	ND (0.1)	ND (1)	7.4	ND (2)	17
AOC9-2	09/18/08	0 - 0.5	N	3.2	16	ND (0.401)	11	9.6	ND (0.099)	ND (2)	11	ND (4)	33
	09/18/08	2 - 3	N	3.3	11	ND (0.406)	5.9	4.9	ND (0.1)	ND (2)	6.9	ND (4)	20
AOC9-3	09/18/08	0 - 0.5	N	3.2	25	ND (0.402)	17	9	ND (0.1)	ND (2)	12	ND (4)	49
	09/18/08	2 - 3	N	3.5	15	ND (0.454)	7.3	23	ND (0.1)	ND (2)	10	ND (4.1)	92
AOC9-4	09/18/08	0 - 0.5	N	3.7	22	1.06	12	13	ND (0.1)	ND (2)	12	ND (4)	53
	09/18/08	2 - 3	N	3.9	19	ND (0.402)	11	11	ND (0.1)	ND (2)	11	ND (4)	42
AOC9-5	10/01/08	0 - 0.5	N	4.9	35	0.726	19	28	ND (0.1)	ND (1)	17	ND (2)	100
	10/01/08	2 - 3	N	6	38	1	21	25	0.27	ND (2)	20	ND (4)	76
	10/01/08	2 - 3	FD	7	43	0.791	19	24	0.23	ND (2)	19	ND (4)	85
AOC9-6	09/18/08	0 - 0.5	N	3.8	25	0.789	12	23	0.14	ND (2)	13	ND (4)	68
	09/18/08	2 - 3	N	3.8	16	ND (0.458)	9.3	5	ND (0.1)	ND (2.1)	14	ND (4.2)	31
AOC9-7	09/18/08	0 - 0.5	N	2.2	72	4.37	14	15	ND (0.1)	ND (2)	11	ND (4)	120
	09/18/08	2 - 3	N	4.3	13	ND (0.411)	6.7	20	ND (0.1)	ND (1)	6.7	ND (2)	29
AOC9-8	10/01/08	0 - 0.5	N	3.6	230	48.6 J	11	20	ND (0.1)	1	10	ND (2)	1,000
	10/01/08	2.5 - 3	N	6.3	41	2.41	13	59	ND (0.1)	4.5	12	4.1	130
	10/01/08	5.5 - 6	N	4	13	1.32	5.5	4.4	ND (0.1)	ND (1)	8.1	ND (2)	21
AOC9-9	10/01/08	0 - 0.5	N	5	14	ND (0.404)	8	7	ND (0.1)	ND (1)	8.1	ND (2)	34
	10/01/08	2.5 - 3	N	4.8	21	ND (0.415)	10	3.8	ND (0.1)	ND (1)	15	ND (2.1)	41
	10/01/08	5.5 - 6	N	4.9	28	1.53	11	4.9	ND (0.1)	ND (1)	15	ND (2.1)	53
	10/01/08	5.5 - 6	FD	4.5	27	1.28	10	4.4	ND (0.1)	ND (1)	15	ND (2.1)	50
AOC9-10	10/01/08	0 - 0.5	N	5.1	28	0.418	11	18	ND (0.1)	ND (1)	15	ND (2)	49
	10/01/08	2 - 3	N	7.3	30	0.494	15	15	0.11	ND (2)	19	ND (4)	110
AOC9-11	09/18/08	0 - 0.5	N	3.6	18	ND (0.418)	8.5	7.7	0.13	ND (2.1)	11	ND (4.3)	35
	09/18/08	2 - 3	N	3.4	20	ND (0.406)	9.7	7.1	ND (0.1)	ND (2)	11	ND (4)	30
AOC9-12	10/01/08	0 - 0.5	N	7.3	34	0.727	19	13	ND (0.1)	ND (2)	24	ND (4.1)	57

TABLE C3-14

Sample Results Compared to the Calculated Soil Screening Levels
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
			Soil Screening Levels : [1]	**39**	**6,400**	**0.42**	**25,000**	**4,000**	**700**	**0.73**	**4,400**	**0.22**	**150,000**
			Background : [2]	**11**	**39.8**	**0.83**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Thallium**	**Zinc**
AOC9-12	10/01/08	2 - 3	N	6.6	40	ND (0.415)	17	11	ND (0.1)	ND (2.1)	29	ND (4.1)	50
AOC9-13	09/19/08	0 - 0.5	N	5.2	18	ND (0.404)	13	8.3	ND (0.099)	ND (2)	11	ND (4)	36
	09/19/08	2 - 3	N	3.8	23 J	ND (0.409)	9.8	10	ND (0.1)	ND (2)	13	ND (4.1)	35
	09/19/08	2 - 3	FD	3.6	18 J	ND (0.41)	9.6	5.6	ND (0.1)	ND (2)	13	ND (4.1)	32
AOC9-14	10/02/086	0 - 0.5	N	12	31	1.7	24	34	ND (0.11)	ND (5.4)	10	ND (11)	81
	10/02/08	2 - 3	N	7.1	38	ND (0.412)	17	13	ND (0.1)	ND (2)	22	ND (4.1)	61
#4	04/06/00	0 - 3	N	---	53.2	4.2	12.4	---	---	---	13.5	---	343
#5	04/06/00	0 - 3	N	---	29	2.7	13.8	---	---	---	16.3	---	64
#6	04/06/00	0 - 3	N	---	33	2.6	12.4	---	---	---	13.2	---	92.7
#7	04/06/00	0 - 3	N	---	32.1	1.3	15.3	---	---	---	16.3	---	68
#8	04/06/00	0 - 3	N	---	28.8	2.8	12.9	---	---	---	16.4	---	61.1
#9	04/06/00	0 - 3	N	---	92.7	2.7	50.4	---	---	---	10.1	---	215
#10	04/06/00	0 - 3	N	---	398	114	17.9	---	---	---	14.8	---	744
#11	04/06/00	0 - 3	N	---	31.4	1.4	18.7	---	---	---	10.7	---	80.3
#12	04/06/00	0 - 3	N	---	38.3	0.8	35.6	---	---	---	21.1	---	84

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C3-15

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)
AOC 9 - Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

Parameter	Frequency of detection	Maximum Detected Value (mg/kg)	TTLC in mg/kg[1]		STLC in mg/L[1]			TCLP in mg/L [1]		
			# of Exceedences	TTLC	# of Exceedences of STLC x 10	STLC x 10	STLC	# of Exceedences of TCLP x 20	TCLP x 20	TCLP
Antimony	0 / 29 (0%)	ND (2.1)	0	500	0	150	15	0	NE	NE
Arsenic	29 / 29 (100%)	7.3	0	500	0	50	5	0	100	5
Barium	29 / 29 (100%)	220	0	10000	0	1000	100	0	2000	100
Beryllium	0 / 29 (0%)	ND (2.1)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 29 (0%)	ND (1.1)	0	100	0	10	1	0	20	1
Chromium	38 / 38 (100%)	398	0	2500	5	50	5	2	100	5
Chromium, Hexavalent	22 / 38 (58%)	114	0	500	1	50	5	0	NE	NE
Cobalt	29 / 29 (100%)	11	0	8000	0	800	80	0	NE	NE
Copper	38 / 38 (100%)	50.4	0	2500	0	250	25	0	NE	NE
Lead	29 / 29 (100%)	59	0	1000	1	50	5	0	100	5
Mercury	4 / 29 (14%)	0.27	0	20	0	2	0.2	0	4	0.2
Molybdenum	2 / 29 (6.9%)	4.5	0	3500	0	3500	350	0	NE	NE
Nickel	38 / 38 (100%)	29	0	2000	0	200	20	0	NE	NE
Selenium	0 / 29 (0%)	ND (1.1)	0	100	0	10	1	0	20	1
Silver	0 / 29 (0%)	ND (2.1)	0	500	0	50	5	0	100	5
Thallium	1 / 29 (3.4%)	4.1	0	700	0	70	7	0	NE	NE
Vanadium	29 / 29 (100%)	40	0	2400	0	240	24	0	NE	NE
Zinc	38 / 38 (100%)	1,000	0	5000	0	2500	250	0	NE	NE

Notes:

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC.

TABLE C3-16
Potential Phase 2 Soil Sample Locations at AOC 9 – Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

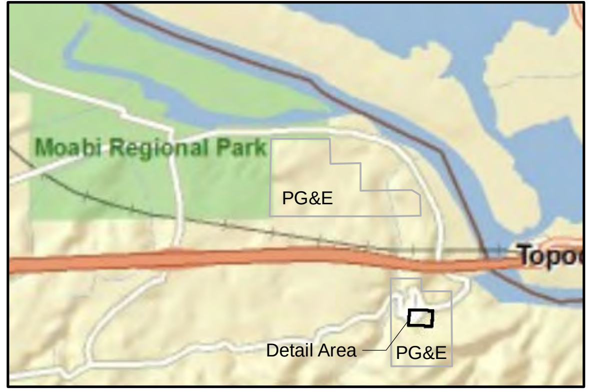
Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[a]
AOC10a-2	0, 2, 5 and 9	To resolve Data Gaps #3 and #4 - Define lateral and vertical extent downslope of AOC 9 and Subarea AOC 10a and support model refinement for Decision 3	Hexavalent chromium, Title 22 metals, PAHs	Backhoe
AOC10a-3	0, 2, 5 and 9	To resolve Data Gap #3 - Define lateral and vertical extent downslope of AOC 9 and Subarea AOC 10a	Hexavalent chromium, Title 22, PAHs	Backhoe
AOC9-15	0, 2, 5 and 9	To resolve Data Gap #3 - Define lateral extent downslope of AOC 9	Hexavalent chromium, Title 22 metals, PAHs, PCBs, pesticides	Backhoe
AOC9-16	0, 2, 5 and 9	To resolve Data Gaps #3 and #5 - Define lateral extent and support CMS/FS	Hexavalent chromium, Title 22 metals, PAHs, PCBs, pesticides; soil physical parameters (porosity, grain size, density, organic carbon content) – three samples from boring	Backhoe
AOC9-17	9 and 14	To resolve Data Gaps #1 and #4 - Define vertical extent at cluster of previous sample locations (#4 through #9 and AOC9-8) and support model refinement for Decision 3	Hexavalent chromium	Backhoe
AOC9-18	5, 9, and 14	To resolve Data Gaps # 2 and 4 - Define vertical extent at previous sample location AOC9-5, and support model refinement for Decision 3	Hexavalent chromium, Title 22 metals, PAHs	Backhoe
AOC9-19	0, 2, 5 and 9	To resolve Data Gaps #3 and #5 - Define lateral and vertical extent and support CMS/FS	Title 22 metals, PAHs, pesticides, PCBs; soil physical parameters (porosity, grain size, density, organic carbon content) – three samples from boring	Backhoe
AOC9-20	0, 2, 5 and 9	To resolve Data Gap #3 - Define lateral extent associated with AOC9-13	Mercury, lead, PAHs, pesticides, PCBs	Backhoe

Notes:

[a] Proposed collection methods listed on this table are based on experience and knowledge of the site; actual collection method will be chosen in the field based on field conditions and site access restrictions.

Figures

VICINITY MAP



LEGEND

- 🟡 Proposed Phase 2 Sample Location
- ● Soil Boring
- 🟩 AOC 9 Boundary
- — Property Boundary
- — PG&E Pipeline
- ┅ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (39.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the U.S. Environmental Protection Agency Residential Regional Screening Level (280 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (36.3 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours are shown at 2 foot intervals.

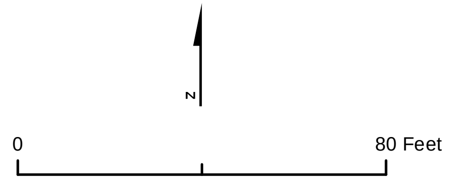


FIGURE C3-1
Total Chromium Soil Sample Results and Proposed Phase 2 Sample Locations AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

FIGURE C3-2
Conceptual Site Model for AOC-9
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

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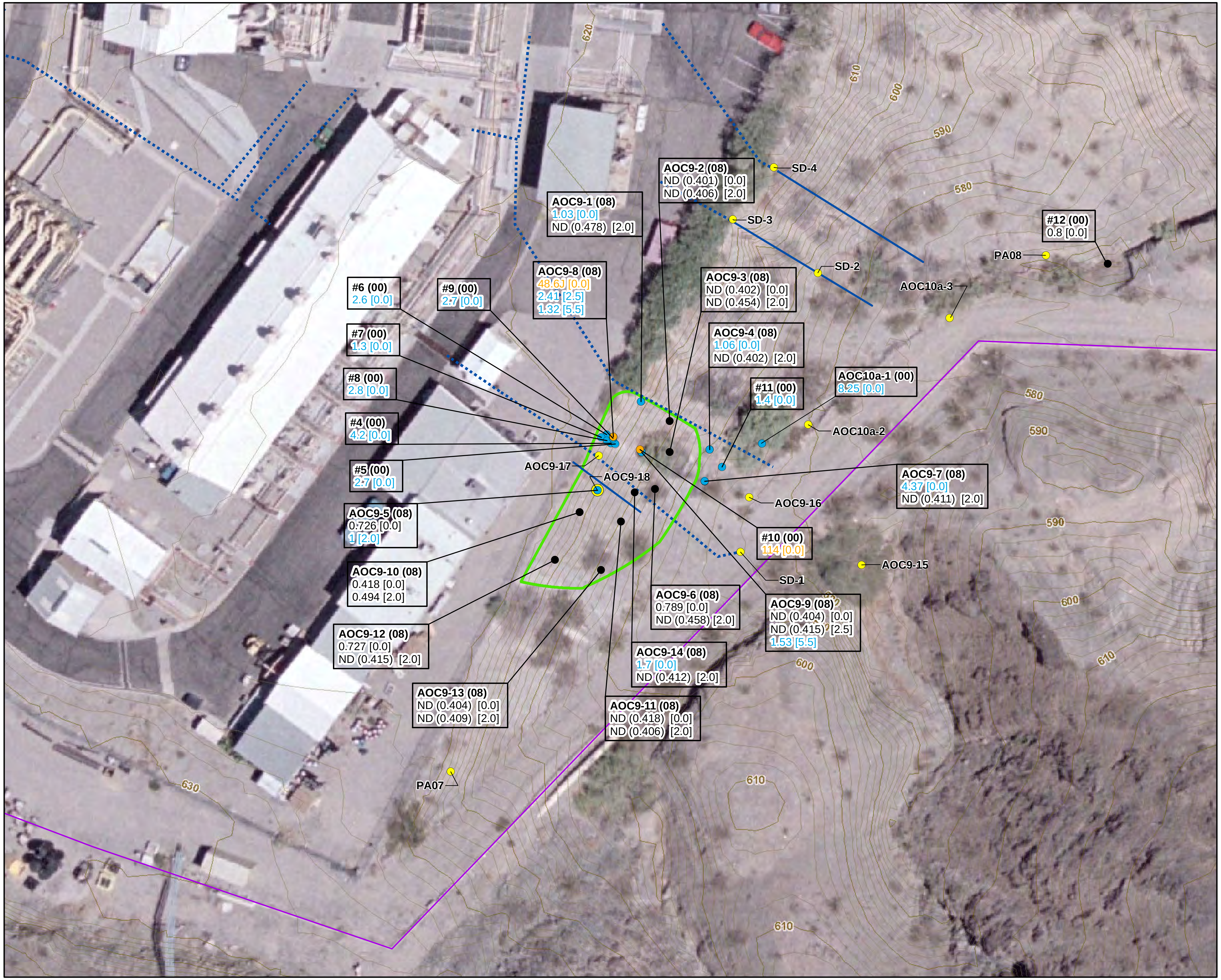

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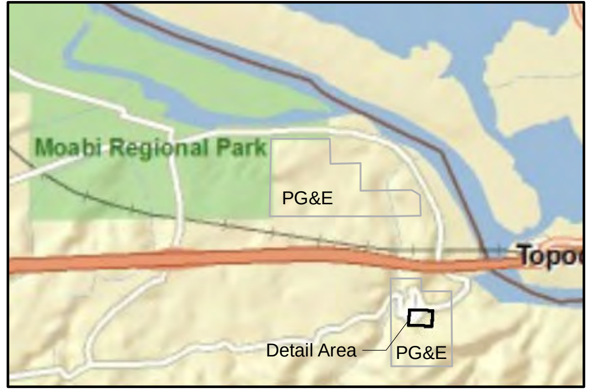


LEGEND

- 🟡 Proposed Phase 2 Sample Location
- ● Soil Boring
- 🟩 AOC 9 Boundary
- ― Property Boundary
- ― PG&E Pipeline
- ┈ Approximate Location of Stormwater Piping Below Ground
- ― Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Year
20 [1] — Sample Beginning Depth (ft BGS), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft BGS = feet below ground surface
4. Results greater than Background (0.83 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (139.6 mg/kg) are in PURPLE.
6. Results greater than or equal to the California Human Health Screening Level (17 mg/kg) are in ORANGE.
7. J = Estimated Result
8. Topographic contours are shown at 2 foot intervals.

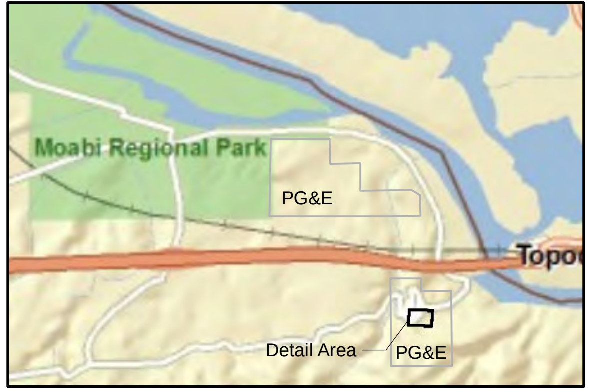
N

0 50 100
Feet

FIGURE C3-3
Hexavalent Chromium Soil Sample Results and Proposed Phase 2 Sample Locations AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- AOC 9 Boundary
- Property Boundary
- PG&E Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (16.8 mg/Kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3000 mg/Kg) are shown in ORANGE.
7. J = Estimated Result
8. Topographic contours are shown at 2 foot intervals.

N

0 50 100
Feet

FIGURE C3-4
Copper
Soil Sample Results and Proposed Phase 2 Sample Location
AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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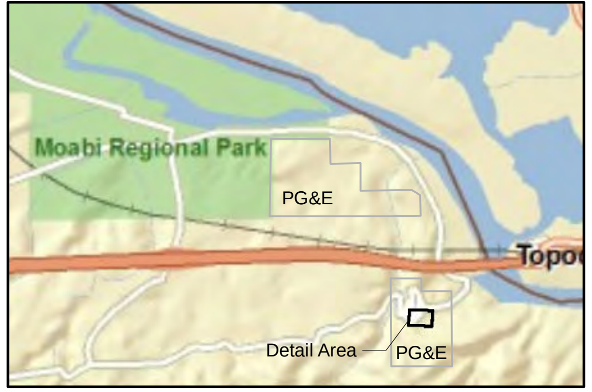
VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- AOC 9 Boundary
- Property Boundary
- PG&E Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:

1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (8.39 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (150 mg/kg) are shown in ORANGE.
6. J = Estimated Result
7. Ecological Comparison Value (0.0166 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours are shown at 2 foot intervals.

N

0 50 100
Feet

FIGURE C3-5
Lead
Soil Sample Results and Proposed Phase 2 Sample Locations AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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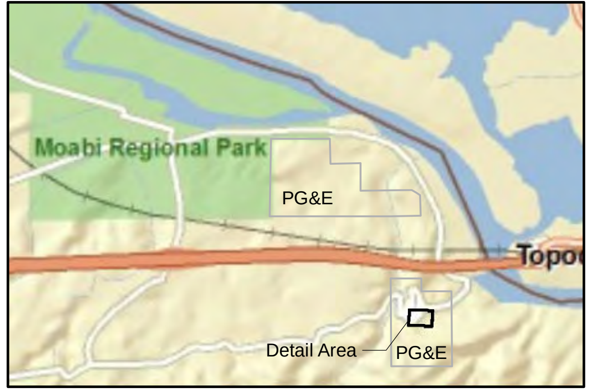
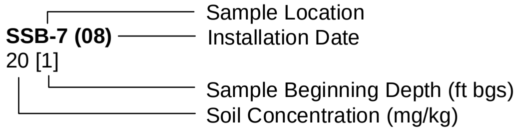


LEGEND

- 🟡 Proposed Phase 2 Sample Location
- ● Soil Boring
- AOC 9 Boundary
- Property Boundary
- PG&E Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground



Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than or equal to the Ecological Comparison Value (0.0125 mg/kg) are in PURPLE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (18 mg/Kg) are shown in ORANGE.
6. J = Estimated Result
7. * = Laboratory reporting limit exceeds screening levels.
8. No background value established
9. Topographic contours are shown at 2 foot intervals.

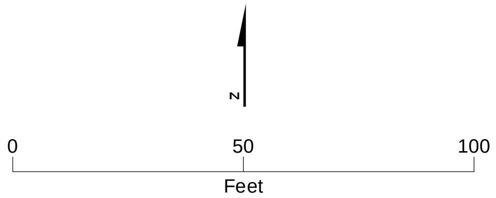


FIGURE C3-6
Mercury
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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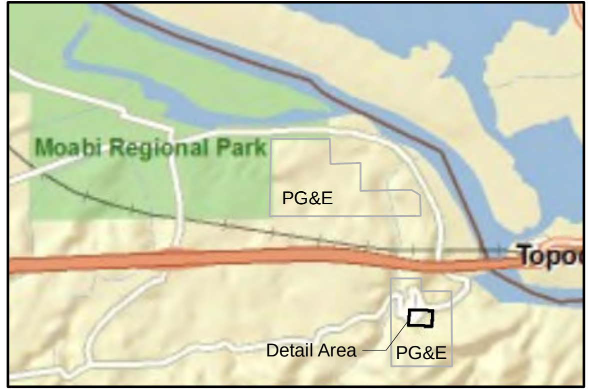
VICINITY MAP



LEGEND

- 🟡 Proposed Phase 2 Sample Location
- ● Soil Boring
- AOC 9 Boundary
- Property Boundary
- PG&E Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08)
20 [1]

Sample Location
Installation Date
Sample Beginning Depth (ft bgs)
Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (58 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (23,000 mg/kg) are shown in ORANGE.
6. J = Estimated Result
7. Ecological Comparison Value (0.164 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours are shown at 2 foot intervals.

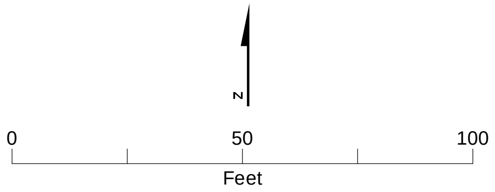
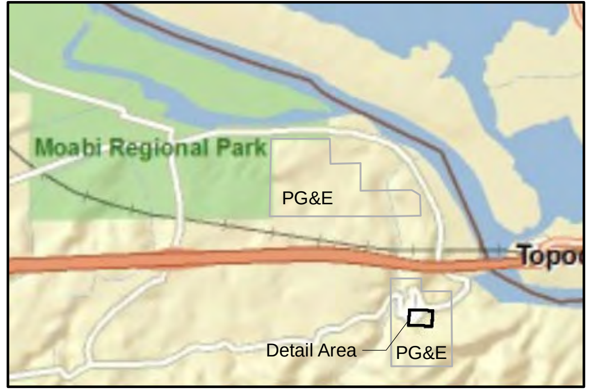


FIGURE C3-7
Zinc
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

🟡 Potential Phase 2 Sample Location

● Soil Boring

AOC 9 Boundary

Property Boundary

PG&E Pipeline

Approximate Location of Stormwater Piping Below Ground

Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (µg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. µg/kg = micrograms per liter
3. ft bgs = feet below ground surface
4. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (38 µg/L) are shown in ORANGE.
5. J = Estimated Result
6. No background level established
7. Topographic contours are shown at 2 foot intervals.

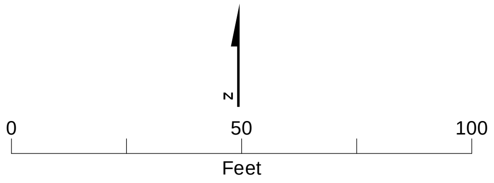


FIGURE C3-8
Benzo(a)Pyrene Equivalent Soil Sample Results and Potential Phase 2 Sample Locations AOC 9 - Southeast Fence Line

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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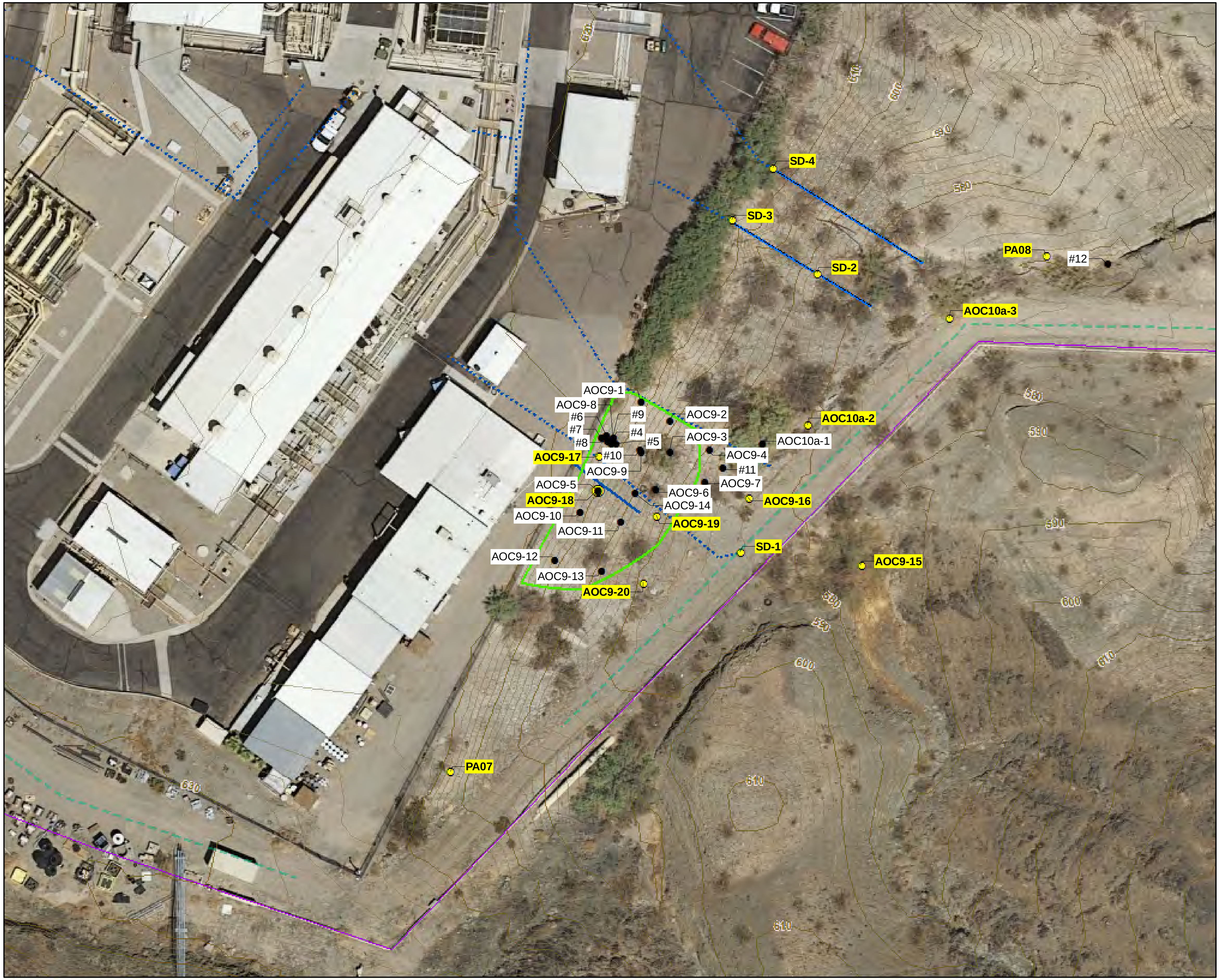

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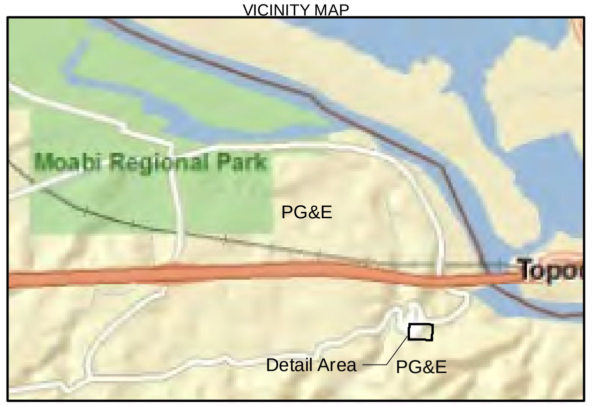

LEGEND

- ● Soil Boring
- ● Potential Phase 2 Sample Location
- Access Routes
- AOC 9 Boundary
- PG&E Pipeline
- Property Boundary
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground
- Downcomers

Note:
Topographic contours are shown at 2 foot intervals.

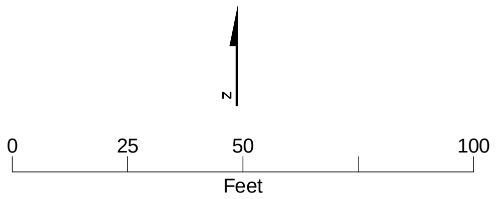

FIGURE C3-9
Potential Phase 2 Soil Sample Locations AOC 9 - Southeast Fence Line

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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Appendix C4
Area of Concern 10 Data Gaps Evaluation Results

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Acronyms and Abbreviations

2009 ERGI	2009 East Ravine Groundwater Investigation
µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CMS/FS	corrective measures study/feasibility study
DQO	data quality objective
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
SSL	soil screening level
STLC	soluble threshold limit concentrations
TAL	Target Analyte List
TCL	Target Compound List
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
XRF	X-ray fluorescence

APPENDIX C4

Area of Concern 10 Data Gaps Evaluation Results

1.0 Introduction and Background

This sub-appendix presents the results of the Data Gaps Evaluation and Part A Phase 2 Sampling Program for Area of Concern (AOC) 10 – East Ravine at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

AOC 10 – East Ravine is a small ravine located on the southeast side of the compressor station. The ravine runs eastward toward the Colorado River. Portions of the East Ravine are on PG&E property outside the facility fence line, and other portions of the ravine are located on property owned by Havasu National Wildlife Refuge.

The East Ravine is approximately 1,600 feet long and is bisected by three constructed berms (one constructed berm and two dirt roads, also constructed berms). The constructed berm was built circa early 1950s, the Southern California Gas Pipeline road was built in the 1950s, and the lower dirt road was built in 1916 and is associated with the old Route 66. The lower dirt road is the only berm that contains a culvert. Due to the berms, surface flow from most of the length of this ravine (west of the lower dirt road that forms the eastern boundary of AOC 10d) does not typically reach the Colorado River. The drainage for this ravine includes runoff from the compressor station access road (a curb was installed along the access road in 2006), runoff from the mountains to the south, and runoff from the compressor station itself.

During a site visit in May 2006, a storm drain was noted leading from the southeastern portion of the compressor station and discharging into the East Ravine. A small area, approximately 3 feet by 3 feet, of stained soil (possibly old hydrocarbon staining) was noted at the discharge of the storm drain. This is shown in Figure C4-1 as Subarea 10a. While discharge from the steam-cleaning area has always been directed to the oily water treatment system, this storm drain may have captured some runoff from the steam-cleaning area before the steam-cleaning area was fully bermed (CH2M HILL, 2006).

Three additional subareas (Subareas 10b, 10c, and 10d) where water and soil collect (either within lower-lying areas along the ravine course or behind berms) have been identified within the East Ravine and are shown in Figure C4-1. Subarea 10b, a natural drainage depression in the upper portion of the ravine, is located in a flat area of the ravine. These three subareas are downstream from Subarea 10a.

In 2008, during a site walk, California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) observed a layer of white powder material in the floor of the wash in three locations between Subareas 10c and 10d and collected samples from this area (sample locations DTSC-AOC10d-1 through DTSC-AOC10d-3). The material was approximately 1 inch wide, 15 inches long, and 0.25 inch thick and was similar in appearance to the white material in Bat Cave Wash and at the Railroad Debris site. Samples collected from the powder indicate it contains elevated concentrations of calcium, chromium, copper, magnesium, sodium, and zinc.

In 2009, in response to DTSC's request in the conditional approval of the Soil Part A Work Plan (CH2M HILL, 2006), PG&E mapped white powder and debris in the East Ravine (results are described in Section 2.5 of this sub-appendix). Furthermore, after a January 2010 storm event, three additional white powder areas were discovered on the northern face of the East Ravine. Per DTSC's request, these three white powder areas are included in this data summary.

A graphical conceptual site model has been developed for AOC 10 based on the above site history and background and is shown in Figure C4-2. Table C4-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 10. Yellow arrows shown in Figure C4-2 represent flow within the East Ravine, and blue arrows represent surface water flow into East Ravine. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in Appendix A of the Data Gaps Evaluation Report.

For AOC 10, the primary potential sources of contamination are (1) runoff from the compressor station, the access road to the compressor station, and AOC 9; (2) discharge from stormwater drain pipes; (3) surface debris disposed of on the slopes of the ravine; and (4) incidental overflows of chromium-containing wastewater via the former trench drain at the top of the station access road. Potential releases would primarily have been in liquid form and would have affected surface soil. Releases from debris, whether consisting of solid particles or dissolved constituents, would also have affected surface soil.

Surface soil is the primary source medium. From surface soil, contaminants could have migrated to shallow and deeper soils; shallow soils may act as a secondary source medium to subsurface soil and subsurface soil may act as a secondary source medium to groundwater. Periodic rainfall events and runoffs to the East Ravine would have pooled in the drainage depressions identified as Subareas 10b, 10c, and 10d. In these subareas, contaminants could potentially be driven deeper and could potentially reach groundwater. If released, volatile organic compounds (VOCs) in surface soils would be expected to have been degraded by heat and light and are likely no longer present.

A secondary source may also include contaminated windblown dust. For AOC 10, windblown dust contamination, either from AOC 9 or other areas of the East Ravine, could have been deposited in the ravine or on shallow portions of the banks of the ravine. Windblown contamination, if any, is expected to be limited to surface soils.

Due to the berms within East Ravine, surface flow to the Colorado River is not considered a significant potential migration pathway. At least one berm was constructed prior to the development of the station, and another was constructed around the time the station was built. Although a culvert exists in the lower dirt road berm, chemicals of potential concern

(COPCs) concentrations east of this road are low, and there are no reports of flow through the culvert. Hexavalent chromium was not detected, and total chromium was below background in the soil sample immediately east of the lower dirt road berm.

In January 2011, additional historical aerial photographs of the compressor station were located and provided to DTSC. One photo (date unknown) indicated potential runoff of fluids from the station into East Ravine (see Figure C4-3). Figure C4-2 shows an overlay of this photo onto the site figure. Runoff can be seen originating from a point upslope of subarea 10A and flowing into East Ravine, and water appears to be impounded in subarea 10C. DTSC directed PG&E in a March 21, 2011 email to be sure that samples are included at appropriate locations along the line of apparent run ff. Soil sample locations have been added and presented in Section 6.0 of this sub-appendix.

1.1.1 AOC 10 Data

Fourteen historical soil samples (0 to 2 feet below ground surface [bgs]) were collected from nine locations (PS-21, PS-22, Bank 1, L-2-2, L-2-3, L-3-2, and L-1 through L3) in AOC 10, as shown in Figure C4-1. Historical soil samples were analyzed for five constituents: total chromium, hexavalent chromium, copper, nickel, and zinc. One historical sample collected at 1 foot bgs at location L-3 was also analyzed for calcium, iron, magnesium, and sodium.

During the 2008 Soil Part A Phase 1 soil investigation, 82 soil samples (generally collected at sample depths of 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs) were collected from 26 sample locations (AOC10-1 through AOC10-8, AOC10a-1, AOC10b-1 through AOC10b-4, AOC10c-1 through AOC10c-5, AOC10d-1 through AOC10d-4, AOC10-XRF-01 through AOC10-XRF-03, and AOC10-XRF-10), as shown in Figure C4-1. Soil Part A Phase 1 soil samples collected in AOC 10 were analyzed for Title 22 metals, hexavalent chromium, VOCs, semivolatile organic compounds, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), general chemistry parameters, pesticides, and polychlorinated biphenyls (PCBs). Surface soil samples were not analyzed for VOCs.

Ten percent of the Phase 1 soil samples collected in AOC 10 (nine soil samples) were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). In addition, synthetic precipitation leaching procedure (SPLP) extraction was performed on the surface soil sample (collected from 0 to 0.5 foot bgs) at sample location AOC10b-3 and soil samples collected at 2 to 3 feet bgs at sample locations AOC10c-1, AOC10c-5, and AOC10d-4. The leachate from the SPLP extractions was analyzed for total and hexavalent chromium. The leachate results from the SPLP extractions are presented in Table C4-2. The soil results were validated and the data quality evaluation is included in Appendix D to the Data Gaps Evaluation Report.

In addition, nine soil samples were collected during the installation of two monitoring wells (MW-57BR and MW-58BR_S) associated with the 2009 East Ravine Groundwater Investigation (2009 ERGI). Soil samples were collected at 3-4, 8-9, and 18-19 feet bgs at location MW-57BR and at 1.5-2, 19-20, 29-30, 39-40, 49-50, and 59-60 feet bgs at location MW-58BR_S and were analyzed for Title 22 metals, hexavalent chromium, VOCs, semivolatile organic compounds, PAHs, TPH, and pH. The soil results for samples collected during the 2009 ERGI were validated, and the data quality evaluation is included in Appendix A of the Final Corrective Measures Study/Feasibility Study (CMS/FS) (see

Appendix E of the *Summary of Findings Associated with the East Ravine Groundwater Investigation, PG&E Topock Compressor Station, Needles, California)* (CH2M HILL, 2009).

The DTSC also collected three soil samples of white powder at locations DTSC-AOC10d-1, DTSC-AOC10d-2, and DTSC-AOC10d-3. The samples were analyzed at two different analytical laboratories, as directed by DTSC and PG&E. The samples were analyzed for Title 22 metals, hexavalent chromium, general minerals, and pH and are included in the data tables for this unit.

All historical data, validated Phase 1 data, and the 2009 ERGI data that are considered Category 1 were used as inputs to the four data quality objective (DQO) decisions for AOC 10.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and chemicals of potential ecological concern (COPECs) at AOC 10. Laboratory analytical results for historical, Phase 1, and 2009 ERGI soil samples at AOC 10 are presented in Tables C4-3 through C4-8. Table C4-9 presents a statistical summary of soil analytical results for COPCs and COPECs that were either (1) detected above the laboratory reporting limits or (2) not detected but where the reporting limits for one more samples was greater than the interim screening value. Data for soil samples are presented first, followed by data for the white powder samples collected by DTSC.

2.1 Summary of AOC 10 Soil Data

Antimony, beryllium, cadmium, selenium, silver, cyanide, VOCs, TPH-gasoline, pesticides, and most species of PCBs were not detected in soil samples collected at AOC 10. Table C4-9 lists the 39 constituents detected, including four calculated quantities: benzo(a)pyrene equivalents, total low molecular weight PAHs, total high molecular weight PAHs, and total PCBs. Nine of these constituents (aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor 1254, and total PCBs) were detected in the TAL/TCL samples.

Fifteen of these constituents (vanadium, iron, potassium, sodium, Aroclor-1254, total PCBs, anthracene, benzo(g,h,i)perylene, chrysene, fluoranthene, phenanthrene, pyrene, low molecular weight PAHs, TPH-diesel, and TPH-motor-oil) were detected at concentrations below their respective interim screening levels. Twenty-four constituents, including two calculated quantities, were detected one or more times at concentrations exceeding the interim screening levels. These constituents included 16 metals (aluminum, arsenic, barium, calcium, total chromium, hexavalent chromium, cobalt, copper, lead, magnesium, manganese, mercury, molybdenum, nickel, thallium, and zinc), six PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz (a,h) anthracene, and indeno (1,2,3-cd)pyrene), and the two calculated quantities (benzo(a)pyrene equivalents and high molecular weight PAHs).

Eleven constituents (arsenic, total chromium, hexavalent chromium, copper, lead, molybdenum, thallium, zinc, benzo(a)pyrene, benzo(a)pyrene equivalents, and high molecular weight PAHs) were detected at concentrations exceeding their respective interim screening levels four or more times. The distributions of total chromium, hexavalent chromium, copper, lead, molybdenum, and zinc are shown in Figure C4-1 and Figures C4-4 to C4-8. The distributions of benzo(a)pyrene equivalents and high molecular weight PAHs are shown in Figures C4-9 and C4-10. Benzo(a)pyrene is not shown separately, as it is encompassed in the benzo(a)pyrene equivalents values. No figures are provided for arsenic and thallium. The four arsenic detections exceeding the arsenic interim screening level (background threshold value [BTV]) are all very close to the BTV (maximum detected concentration of 13 milligrams per kilogram [mg/kg], compared to the BTV of 11 mg/kg). All four detections of thallium exceeding the thallium interim screening level (ECV) were found in one location, in the samples from MW-58BR_S.

Four sample locations associated with AOC 9 (AOC9-4, AOC9-7, #11, and #12) are located within AOC 10 or immediately upslope of AOC 10. To provide further context for the evaluation of potential data gaps, the data for these samples are also shown in Figure C4-1 and Figures C4-4 to C4-10. The nature and extent discussion for the four AOC 9 sample locations are presented in Appendix C3. Two proposed AOC 9 Phase 2 sample locations (AOC9-15 and AOC9-16) located near AOC 10a have been included in the AOC 10 data gaps evaluation because these proposed AOC 9 Phase 2 sample locations are upslope of AOC 10a.

2.2 Nature and Extent Evaluation

The following subsection discusses the nature and extent of COPCs and COPECs detected above interim screening levels at AOC 10. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Section 2.5 of this sub-appendix summarizes the constituents that may require further evaluation, and Section 6.0 of this sub-appendix provides the proposed follow-up sampling for the Part A Phase 2 soil investigation. The proposed Phase 2 sample locations are needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

2.2.1 Arsenic

Arsenic was detected in 84 of 87 soil samples collected at AOC 10. Detected concentrations of arsenic slightly exceeded the interim screening level (11 mg/kg) (BTV) four times (maximum detected concentration of 13 mg/kg at MW-58BR), as shown in Table C4-9. Four of the detected concentrations of arsenic also exceeded the ECV (11.4 mg/kg). The detected concentrations of arsenic slightly exceeding the screening levels ranged from 12 to 13 mg/kg and were collected from two sample locations (MW-58BR at 19 to 20, 29 to 30, and 39 to 40 feet bgs and AOC10-5 at 5 to 6 feet bgs). At MW-58BR deeper samples (at 49 to 50 feet bgs, and 59 to 60 feet bgs) have concentrations below the interim screening level. At AOC10-5, the deepest sample (collected at 6 feet bgs) has a concentration (12 mg/kg) that slightly exceeds the interim screening level.

2.2.2 Barium

Barium was detected in 87 of 87 soil samples collected from AOC 10. Detected concentrations of barium exceeded the interim screening level (410 mg/kg) (BTV/ECV) twice in AOC10-5 (500 mg/kg at 0 to 0.5 foot bgs and 1,300 mg/kg at 5 to 6 feet bgs), as shown in Tables C4-3 and C4-9. None of the detected concentrations exceeded residential and commercial/industrial California human health screening levels (CHHSLs) (5,200 mg/kg and 63,000 mg/kg, respectively). This sample location is located north of the small access road near Subarea 10d in the bottom of the ravine. Samples with concentrations below the screening levels are located to the north and west of this location but not the east the ravine walls. The deepest sample at AOC10-5 (5 to 6 feet bgs), had a concentration exceeding the screening levels.

2.2.3 Total Chromium

Total chromium was detected in 105 of 105 soil samples collected at AOC 10. Detected concentrations of total chromium exceeded the interim screening level (39.8 mg/kg) (BTV/ECV) 41 times (with a maximum detected concentration of 4,000 mg/kg at MW-58BR in the surface sample), as shown in Tables C4-3 and C4-9 and in Figure C4-1. Nine detected concentrations of total chromium exceeded the United States Environmental Protection Agency regional screening level (RSL) for residential use (280 mg/kg), and five detected concentration of total chromium exceeded the RSL for commercial/industrial use (1,400 mg/kg). Total chromium was detected at concentrations below the screening levels in borings MW-57BR, AOC10-5, AOC10-6, AOC10-7, and AOC10-8, which are located in the lower reaches of AOC 10. The lateral extent of samples with concentrations exceeding the screening levels is confined primarily to the ravine bottom, in Subarea 10c, the eastern portion of Subarea 10b, and the southern portion of Subarea 10d. At many locations, the deepest samples have concentrations exceeding the interim screening level; however, in most cases, only shallow samples were collected during the Part A Phase 1 and previous investigations. The deepest sample was collected at 59 to 60 feet bgs at MW-58BR, which had a detected concentration of total chromium (27 mg/kg) below the interim screening level.

2.2.4 Hexavalent Chromium

Hexavalent chromium was detected in 53 of 105 soil samples collected at AOC 10. Detected concentrations of hexavalent chromium exceeded the interim screening level (0.83 mg/kg) (background value) 36 times (with a maximum detected concentration of 150 mg/kg at MW-58BR at 1.5 to 2 feet bgs), as shown in Tables C4-3 and C4-9 and in Figure C4-4. Five of the detected concentrations of hexavalent chromium exceeded the residential CHHSL (17 mg/kg), three exceeded the commercial/industrial CHHSL (37 mg/kg), and one exceeded the ECV (139.6 mg/kg). Hexavalent chromium was detected at concentrations below the screening levels in borings MW-57BR, AOC10-5, AOC10-6, AOC10-7, and AOC10-8, which are located in the lower reaches of AOC 10. The lateral extent of samples with concentrations exceeding the screening levels is confined primarily to the ravine bottom in the portion of East Ravine upstream of the small access road near Subarea 10d. At many locations, the deepest samples have concentrations exceeding the interim screening level; however, in most cases, only shallow samples were collected during the Part A Phase 1 and previous investigations. The deepest sample was collected at 59 to 60 feet bgs at MW-58BR, in which hexavalent chromium was not detected above laboratory reporting limits.

2.2.5 Cobalt

Cobalt was detected in 87 of 87 soil samples collected from AOC 10. In one sample from MW-58BR_S, the detected concentrations of cobalt (13 mg/kg) slightly exceeded the interim screening level (12.7 mg/kg) (background value) and the ECV (13 mg/kg), as shown in Tables C4-3 and C4-9. None of the detected concentrations exceeded residential and commercial/industrial RSLs (23 mg/kg and 300 mg/kg, respectively). This sample location is a monitoring well that was installed behind the berm in Subarea 10c. The detected concentration that slightly exceeds the screening levels was detected in the deepest sample collected at this location (59 to 60 feet bgs).

2.2.6 Copper

Copper was detected in 101 of 101 soil samples collected at AOC 10. Detected concentrations of copper exceeded the interim screening level (16.8 mg/kg) (BTV) 42 times (with a maximum detected concentration of 300 mg/kg at MW-58BR at 1.5 to 2 feet bgs), as shown in Tables C4-3 and C4-9 and in Figure C4-5. Thirty-three detected concentrations of copper exceeded the ECV (20.6 mg/kg). None of the detected concentrations exceeded the residential or commercial/industrial CHHSLs (3,000 mg/kg, and 38,000 mg/kg, respectively). Copper was detected at concentrations below the screening levels in borings MW-57BR, AOC10-5, AOC10-6, AOC10-7, and AOC10-8, which are located in the lower reaches of AOC 10. The lateral extent of samples with concentrations exceeding the screening levels is confined primarily to the ravine bottom. At many locations, the deepest samples have concentrations exceeding the interim screening level; however, in most cases, only shallow samples were collected during the Part A Phase 1 and previous investigations. The deepest sample was collected at 59 to 60 feet bgs at MW-58BR, which had a detected concentration of copper (58 mg/kg) exceeding the interim screening level.

2.2.7 Lead

Lead was detected in 86 of 87 soil samples collected at AOC 10. Detected concentrations of lead exceeded the interim screening level (8.39 mg/kg) (BTV/ECV) 32 times (with a maximum detected concentration of 200 mg/kg at AOC10a-1), as shown In Tables C4-3 and C4-9 and in Figure C4-6. Only two of the detected concentrations (at AOC10a-1 at 0 to 0.5 feet bgs and MW-58BR at 1.5 to 2 feet bgs) exceeded the residential CHHSL (80 mg/kg). None of the detected concentrations exceeded the commercial/industrial CHHSL (320 mg/kg). Lead was detected at concentrations exceeding the interim screening level in most sample locations in AOC 10. With two exceptions (AOC10c-4 and AOC10d-4), the lead exceedances were limited to the upper three feet. The distribution of lead exceedances is not consistent with the site-specific conceptual site model for AOC 10 (i.e., flow in the bottom of the ravine and accumulation of liquids and fine-grained materials behind the berms), suggesting other potential sources. Much of the lead present at AOC 10 is most likely from other anthropogenic sources (i.e., proximity to former Route 66 and the use of lead in gasoline until 1970s), which would cause a more widespread distribution of lead, as discussed in Appendix C, Section C.3.

2.2.8 Mercury

Mercury was detected in two of 87 soil samples collected from AOC 10. Detected concentrations of mercury exceeded the interim screening level (0.0125 mg/kg) (ECV) twice (at AOC10a-1 [0.64 mg/kg at 0 to 0.5 foot bgs] and MW-58BR_S [0.33 mg/kg at 1.5 to 2 feet bgs]), as shown in Tables C4-3 and C4-9. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (18 mg/kg and 180 mg/kg, respectively). The ECV (0.0125 mg/kg) is below the capability of the instrumentation to detect mercury. As a result, the 85 non-detected sample results had reporting limits that exceeded the ECV. The mercury reporting limits ranged from 0.0198 to 0.1 mg/kg. The two samples with detectable concentrations of mercury are located in different subareas of AOC 10 (Subarea 10a and Subarea 10c). Samples with concentrations below the detection level surround location MW-58BR_S, and deeper samples collected at this location had concentrations below the detection level. Only one sample (AOC10a-1) was collected in Subarea 10A; however, four samples collected at AOC 9 contained detectable concentrations of mercury.

2.2.9 Molybdenum

Molybdenum was detected in 15 of 87 soil samples collected from AOC 10. Detected concentrations of molybdenum exceeded the interim screening level (1.37 mg/kg) (BTV) eight times (with a maximum detected concentration of 19 mg/kg at AOC10a-1), as shown in Tables C4-3 and C4-9 and in Figure C4-7. Four detected concentrations exceeded the ECV (2.25 mg/kg). None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). The lateral extent of samples with concentrations exceeding the interim screening level is confined primarily to the ravine bottom in Subareas 10b and 10c (i.e., upstream of the upper most berm), with the exception of the exceedance at location MW-57BR located on the small access road near Subarea 10d. Samples with concentrations below the screening levels are located near and in Subarea 10d. At most locations, the deepest samples have concentrations below the interim screening level, with the exception of locations AOC10a-1 (where only a surface soil could be collected) and MW-57BR (molybdenum was detected at 3 mg/kg at 18 to 19 feet bgs, the deepest depth sampled). Samples from MW-57BR collected at 3 to 4 feet and 8 to 9 feet bgs were below the interim screening level.

2.2.10 Nickel

Nickel was detected in 101 of 101 soil samples collected from AOC 10. As shown in Tables C4-3 and C4-9, one detected concentration (28 mg/kg at AOC10a-1) slightly exceeded the interim screening level (27.3 mg/kg) (BTV/ECV). None of the detected concentrations exceeded the residential and commercial/industrial CHHSLs (1,600 mg/kg and 16,000 mg/kg, respectively).

2.2.11 Thallium

Thallium was detected in four of 87 soil samples collected from AOC 10. Detected concentrations of thallium exceeded the interim screening level (2.32 mg/kg) (ECV) four times; all four exceedances were found in samples from MW-58BR_S in samples collected at 1.5 to 2, 19 to 20, 29 to 30, and 39 to 40 feet bgs, with a maximum detected concentration of 6.1 mg/kg at 1.5 to 2 feet bgs), as shown in Tables C4-3 and C4-9. Only one of the detected concentrations exceeded the residential CHHSL (5 mg/kg), and none exceeded the commercial/industrial CHHSL (63 mg/kg) at location MW-58BR_S, as shown in Table C4-3. Samples with concentrations below the interim screening level surround this location. The deeper samples at this location (at 49 to 50 feet bgs, and 59 to 60 feet bgs) have concentrations below the interim screening level.

2.2.12 Zinc

Zinc was detected in 101 of 101 soil samples collected at AOC 10. Detected concentrations of zinc exceeded the interim screening level (58 mg/kg) (BTV/ECV) 46 times (with a maximum detected concentration of 1,000 mg/kg at AOC10a-1), as shown in Tables C4-3 and C4-9 and in Figure C4-8. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). The lateral extent of samples with concentrations exceeding the screening levels is confined primarily to the ravine bottom, with exceedances of the interim screening level in all four subareas. Zinc was detected at concentrations below the screening levels in borings AOC10-6 and AOC10-7. At many locations, the deepest samples have concentrations exceeding the interim screening level; however, in most cases, only shallow samples were collected during the Part A Phase 1 and previous investigations. The deepest sample collect was collected at 59 to 60 feet bgs at MW-58BR, which had a detected concentration of zinc (41 mg/kg) below the interim screening level.

2.2.13 Polycyclic Aromatic Hydrocarbons

Benzo(a)pyrene was detected in 34 of 86 soil samples collected from AOC 10. Detected concentrations of benzo(a)pyrene exceeded the interim screening level (38 micrograms per kilogram [µg/kg]) (residential CHHSL) 13 times and the commercial/industrial CHHSL (130 µg/kg) four times. Several other PAHs were detected in soil samples collected from AOC 10; only benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected at concentrations above their respective interim screening levels. To assist with evaluation of PAHs for human health, benzo(a)pyrene equivalents were calculated for each of the soil samples collected at AOC 10, as shown in Table C4-5. Benzo(a)pyrene equivalents values exceeded the interim screening level of 38 µg/kg (residential CHHSL) 15 times (maximum calculated concentration of 1,400 µg/kg at AOC10a-1), as shown in Tables C4-5 and C4-9 and in Figure C4-9, and exceeded the commercial/industrial CHHSL (130 µg/kg) five times. PAHs were detected at concentrations exceeding the screening levels in Subareas 10a, 10c, 10d and into the area downstream of a small access road near Subarea 10d. At all locations, PAH exceedances were limited to the upper three feet. With two exceptions (AOC10a-1 and AOC10-6), the deepest samples have concentrations below the interim screening level; only shallow samples could be collected at AOC10a-1 and AOC10-6.

To assist with evaluation of PAHs for ecological risk, detected concentrations of low molecular weight PAHs and high molecular weight PAHs were summed and compared to the PAH low molecular weight and PAH high molecular weight ECVs (10,000 µg/kg and 1,160 µg/kg, respectively). Five PAH high molecular weight sums of detected concentrations exceeded the ECV of 1,160 µg/kg; as shown in Tables C4-5 and C4-9 and Figure C4-10. PAH high molecular weight sums exceeding the interim screening level are collocated with the highest benzo(a)pyrene equivalents detections. As discussed above, none of the sums of detected concentrations exceeded the PAH low molecular weight ECVs.

2.2.14 Target Analyte List/Target Compound List Constituents

As described above, aluminum, calcium, iron, magnesium, manganese, potassium, sodium, and Aroclor 1254 were detected in the AOC 10 soil samples analyzed for the complete TAL/TCL suite of compounds. These constituents are discussed below.

Aluminum was detected in nine of nine surface soil samples collected from AOC 10. Detected concentrations of aluminum exceeded the interim screening level (16,400 mg/kg) (BTV) once at a concentration of 18,000 mg/kg at AOC10-5, as shown in Tables C4-4 and C4-9. Remaining detected concentrations of aluminum ranged from 4,100 to 11,000 mg/kg. None of the detected concentrations exceeded residential and commercial CHHSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in 10 of 10 surface soil samples collected from AOC 10. Detected concentrations of calcium exceeded the interim screening level (66,500 mg/kg) (background value) once at a concentration of 139,000 mg/kg at L-3, as shown in Tables C4-4 and C4-9. Remaining detected concentrations of calcium ranged from 18,000 to 44,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in 10 of 10 surface soil samples collected from AOC 10. The maximum detected concentration of iron was 32,000 mg/kg at AOC10-a1, which is below the interim screening level of 55,000 mg/kg (residential RSL), as shown in Tables C4-4 and C4-9. Remaining detected concentrations of iron ranged from 540 to 28,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for iron.

Magnesium was detected in 10 of 10 surface soil samples collected from AOC 10. Detected concentrations of magnesium exceeded the interim screening level (12,100 mg/kg) (background value) once at a concentration of 12,800 at L-3, as shown in Tables C4-4 and C4-9. Remaining detected concentrations of magnesium ranged from 3,900 to 12,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in nine of nine surface soil samples collected from AOC 10. Detected concentrations of manganese exceeded the interim screening level (402 mg/kg) (BTV) twice (AOC10-5 [1,300 mg/kg] and AOC10-8 [470 mg/kg]), as shown in Tables C4-4 and C4-9. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (1,800 mg/kg and 23,000 mg/kg, respectively). These manganese exceedances are probably not related to compressor station release sources as the lateral extent of samples with concentrations for the majority of the COPCs/COPECs exceeding the screening levels is confined primarily to the ravine bottom in the portion of East Ravine upstream of the small access road near Subarea 10d, whereas these two locations are on the western ravine slope northwest of Subarea 10d and north of the berm on the north side of Subarea 10d.

Potassium was detected in nine of nine surface soil samples collected from AOC 10. The maximum detected concentration of potassium was 4,100 mg/kg at AOC10-5, which is below the interim screening level of 4,400 mg/kg (BTV), as shown in Tables C4-4 and C4-9. Remaining detected concentrations of potassium ranged from 990 to 2,300 mg/kg.

Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for potassium.

Sodium was detected in 10 of 10 surface soil samples collected from AOC 10. The maximum detected concentration of sodium was 1,280 mg/kg at L-3, which is below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C4-4 and C4-9. Remaining detected concentrations of sodium ranged from 160 to 540 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

Aroclor 1254 was detected in seven of 13 soil samples collected from AOC 10; both surface (0 to 0.5 feet bgs) and subsurface soil (2 to 3 feet bgs) samples were collected. The maximum detected concentration of Aroclor 1254 was 71 µg/kg at AOC10a-1, which is well below the interim screening level of 220 µg/kg (residential RSL). Remaining detections of Aroclor 1254 ranged from 19 to 68 µg/kg. To assist with evaluation of PCBs for ecological risk, detected concentrations of the Aroclors (only Aroclor 1254 at AOC 10) were summed, and the total PCB values were compared to the ECV. The maximum calculated value for total PCBs was 71 µg/kg, which is well below the total PCB ECV of 204 µg/kg, as shown in Table C4-8. The remaining calculated total PCB concentrations ranged from 19 to 68 µg/kg.

As discussed in Section C.2 in Appendix C, PG&E recommends that aluminum, calcium, iron, magnesium, manganese, potassium, sodium, and Aroclor 1254 not be considered COPCs/COPECs for this SWMU, and no further sampling for these constituents is proposed. These constituents have been fully discussed in Section C.2.

2.3 White Powder Sample Results (Collected by DTSC)

The three soil samples of white powder collected by DTSC at locations DTSC-AOC10d-1, DTSC-AOC10d-2, and DTSC-AOC10d-3 were analyzed for inorganic constituents only (for Title 22 metals, hexavalent chromium, general minerals and pH). As shown in Tables C4-3 and C4-4, 13 metals were detected in these samples (arsenic, barium, calcium, total chromium, hexavalent chromium, copper, iron, lead, magnesium, potassium, sodium, vanadium, and zinc). Arsenic, iron, potassium, and vanadium did not exceed their respective BTVs. Barium and sodium were detected above their respective BTVs once each, and calcium was detected above its BTV twice. Total chromium, hexavalent chromium, copper, lead, magnesium, and zinc were detected above their respective BTVs in all three samples. Hexavalent chromium also exceeded the residential CHHSL in one sample, and copper exceeded the ECV in all three samples. The remaining metals were not detected above any other comparison values.

2.4 Central Tendency Comparison to Background Threshold Values

Fourteen metals (aluminum, arsenic, barium, calcium, total chromium, hexavalent chromium, cobalt, copper, lead, magnesium, manganese, molybdenum, nickel, and zinc) were detected above their respective background values in the soil data set. A central tendency comparison was performed for 13 of these 14 metals (aluminum, arsenic, barium, calcium, total chromium, cobalt, copper, lead, magnesium, manganese, molybdenum, nickel, and zinc) to compare the AOC 10 soil data set for these metals with the corresponding Topock soil background data set to determine whether a difference exists between the two populations and whether additional sampling may be required for a given metal, as shown in Table C4-10 of this sub-appendix and in Figure 3-1 in the Data Gaps Evaluation Report).

Metals in either the AOC 10 data set or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of hexavalent chromium in the background data set to allow for a central tendency comparison.

No statistical difference between the two populations was noted for aluminum, barium, calcium, cobalt, magnesium, manganese, molybdenum, and nickel, as shown in Table C4-10. However, results from the Gehan test show that site concentrations for arsenic, total chromium, copper, lead, and zinc may exceed background. The lateral and vertical extents of arsenic have been adequately defined, as discussed above; therefore, no additional sampling is proposed for arsenic. Additional sampling is proposed for total chromium, copper, lead, and zinc.

2.5 White Powder and Debris Mapping

As part of the conditional approval of the Soil Part A Work Plan (CH2M HILL, 2006), DTSC requested that the white powder and metal debris observed in AOC 10 be mapped to assist in planning for Phase 2. PG&E conducted a site walk at AOC 10 in May 2009 to map the white powder and debris areas. White powder was observed in the ravine bottom within Subarea 10d and between Subareas 10c and 10d. Several areas of miscellaneous debris were identified, as shown in Figures C4-1, C4-2, and C4-4 through C4-10. Miscellaneous debris consisted of pieces of metal, cans, tires, concrete rubble, tiles, and bricks. A small dirt pile with small pieces of green-colored wood was observed near the access road adjacent to Subarea 10d. Two areas of discolored, light soil were observed in the debris areas located on the northern ravine wall, as shown in Figure C4-1, C4-2, and C4-4 through C4-10 (these were also classified as potential white powder areas). DTSC noted during a site visit that these areas appear to be unusually weathered. Following recent heavy rainfall, an additional white powder area was discovered on the slope near the station access road slightly west of Subarea 10b; this area is also shown in the figures.

Sampling of the white powder and debris is proposed to determine the nature and extent of contamination in the white powder and debris areas. Additional characterization of debris may be needed to assess if asbestos-containing materials are present.

2.6 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates than decision error has been held to an acceptable level. Sufficient data of acceptable quality have been attained by the collection of historical/Part A soil samples in areas most likely to have been impacted by the runoff from the compressor station, discharge from known stormwater drain pipes, and overflows of chromium-containing wastewater from the facility entering the East Ravine from the former trench drain. Those areas include areas down gradient of AOC 9, along the bottom and most of the length of the ravine, in drainage depression areas (Subareas 10b, 10c, and 10d), and on the northern slope of AOC 10, primarily north of Subarea 10c, although low-level contamination from station runoff may be present along other parts of the northern slope. Some of the newly-identified debris and white powder areas have not been sampled.

Review of the nature and extent discussions above indicates that the lateral extent of samples with concentrations exceeding the screening levels is confined primarily to the ravine bottom behind the berms. Within this portion of East Ravine, the lateral and vertical extents of hexavalent chromium, copper, lead, mercury, molybdenum, PAHs, total chromium, and zinc have not been defined. Soil data also indicate that the entire footprint of Subarea AOC 10c may be contaminated. Additional sampling along the side wall of this AOC will not significantly improve remedial decision; therefore, no additional sampling is recommended and uncertainty would be addressed in the CMS/FS.

Based on review of the data and the Part A DQO, data gaps were identified to resolve Decision 1 – Nature and Extent, and limited additional sampling is proposed in Phase 2 to fill the following data gaps:

1. Data Gap #1 – Lateral and vertical extent of contamination in the western portion of AOC10 (Subarea AOC 10a, downslope from AOC9, and downslope from the outfall of the former trench drain).
2. Data Gap #2 – Nature and extent of contamination associated with runoff from station access road to the low point north of Subarea 10d.
3. Data Gap #3 – Nature and extent of contamination associated with the newly identified white powder areas (on the slope below the station access road) and the newly identified debris areas (on the slopes of AOC10).
4. Data Gap #4 - Nature and extent of contamination associated with runoff from pipe upslope from subarea 10a. (Samples associated with perimeter and storm drain sampling programs will evaluate nature and extent on the slope above East Ravine.)

In addition, the location of potential additional storm drains (beyond those identified and mapped in this report) adjacent to the employee parking lot has been identified as a data gap. To address this data gap, PG&E will perform additional research and field reconnaissance. If new information becomes available, it will be incorporated in the Soil Part A Phase 2 Work Plan.

3.0 Decision 2 – Data Sufficient to Estimate Representative Exposure Point Concentrations

For Decision 2, data were evaluated to determine if the AOC 10 data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Evaluation Report. The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC). Data reviewed were all available data at AOC 10 (including historical data, soil data collected during the 2009 ERGI, and white powder samples collected by DTSC). Data from AOC10a-1 were included in the evaluation of AOC 9 (Appendix C3) to support the ecological risk assessment because this sample location is within approximately 30 feet of the AOC 9 boundary, and this is consistent with the ecological risk assessment data set definition for AOC 9/10a in the Human Health and Ecological Risk Assessment Work Plan (ARCADIS, 2008). Therefore, the AOC10a-1 data were only included in the AOC 10 evaluation to support the human health risk assessment.

Table C4-11 summarizes the results of the evaluation to determine whether data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. In general, existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values (10 metals, four Contract Laboratory Program inorganics, and PAHs), as described below. Phase 2 data will be added to the existing data set to calculate the final EPC (i.e., after Decision 1 is satisfied).

3.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for arsenic, barium, total chromium, hexavalent chromium, copper, lead, and zinc using ProUCL. For the remaining metals (mercury, molybdenum, and thallium), additional data collection is not expected to significantly change the results of the risk assessment either because the compound is very infrequently detected (mercury and thallium) (i.e., additional nondetects would be expected) or because the maximum detected concentration (excluding AOC10a-1) is within two times the lowest risk-based comparison value (molybdenum).

3.2 Inorganics

Sufficient data (numbers of samples and detections) are available to calculate EPCs for aluminum, calcium, magnesium, and manganese using ProUCL. No additional data collection appears warranted because it is reasonable to assume that the nature and extent of these inorganics in the shallow exposure intervals (0 to 0.5 or 0 to 3 feet bgs) is representative of the deeper depths. In addition, maximum concentrations of aluminum, magnesium, and calcium detected in the standard exposure intervals (0 to 0.5, 0 to 3, 0 to 6, and 0 to 10 feet bgs) are comparable to background, as discussed in Section 2.3 of this appendix.

3.3 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene toxicity equivalents and high molecular weight PAHs using ProUCL.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, are needed to resolve Decision 3. Additional evaluation will be performed as appropriate, as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 – Nature and Extent evaluation will provide the final representative data set that will be used to assess the threat to groundwater.

As discussed in Section 5.2.2 of the Data Gaps Evaluation Report, AOC 10 historically received discharges of water from annual Topock Compressor Station fire pump tests; therefore, percolation rates may vary within AOC 10. For this analysis, AOC 10 was divided into four separate subareas for this analysis to account for the variable percolation rates, as shown in Figure C-1 in Appendix C.

4.1 Subarea AOC 10a

Table C4-12 presents the results of the tiered analysis for AOC 10a. Seven metals were detected at concentrations above their respective BTVs. Of those seven, hexavalent chromium, molybdenum, and lead exceeded the calculated soil screening levels (SSLs), as shown in Table C4-13. Numerical modeling was conducted to evaluate the potential of these three metals to leach into groundwater. Based on initial model screening simulations, the potential for hexavalent chromium, molybdenum, and lead to leach to groundwater could not be ruled out.

The simulated leaching concentrations of groundwater screening criteria at AOC 10a is likely a result of the lack of samples as a function of depth at AOC 10a. Only one surface sample was collected in this AOC subarea. Initial concentrations were input into the model assuming a constant concentration equal to that from the surficial sample down to the water table across the AOC 10a area.

Additional data are needed to better define the vertical extent of hexavalent chromium, molybdenum, and lead at AOC 10a and to better assess the leaching potential. The model will be refined with the new vertical data to more realistically simulate vadose zone contaminant concentrations.

4.2 Subarea AOC 10b

Table C4-12 presents the results of the tiered analysis for AOC 10b. Six metals were detected at concentrations above their respective BTVs. Of those six, total chromium, hexavalent chromium, and molybdenum exceeded the calculated SSLs, as shown in Table C4-14. Numerical modeling was conducted to evaluate the potential of these three metals to leach into groundwater. Based on initial model screening simulations, the potential for total chromium and molybdenum to leach to groundwater was ruled out.

The simulated leaching concentrations of hexavalent chromium were likely due to the following factors:

- The initial screening approach assigned the maximum concentration found at each depth interval across the entire interval, even though other samples with lower concentrations were observed at each level.
- The presence of hexavalent chromium at the deepest sampling interval at one location required assignment of that concentration from that depth down to the water table for the entire area.

Additional data are needed to better define the vertical extent of hexavalent chromium. The model will be refined with the new vertical data and will be discretized spatially to more realistically simulate vadose zone contaminant concentrations.

4.3 Subarea AOC 10c

Table C4-12 presents the results of the tiered analysis for AOC 10c. Seven metals were detected at concentrations exceeding the BTVs. However, the cobalt BTV was exceeded at only one location, and the concentration was only very slightly above the BTV. At sample location MW58BR_S at 59 to 60 feet bgs, the detected concentration of cobalt was 13 mg/kg, compared to the BTV of 12.7 mg/kg. Cobalt was not detected above the BTV in any sample from the 0 to 10 foot bgs interval, and all concentrations of cobalt in MW58BR_S above the 59 to 60 foot bgs interval were below the BTV. Furthermore, the central tendency comparison indicated that the population of cobalt detections is consistent with the background population. Consequently, although cobalt was detected at 13 mg/kg in one sample, cobalt was not evaluated for Decision 3. Of the six remaining metals with detections exceeding the BTV, total chromium, hexavalent chromium, and molybdenum exceeded the calculated SSLs, as shown in Table C4-15. Numerical modeling was conducted to evaluate the potential of these three metals to leach into groundwater. Based on initial model screening simulations, the potential for total chromium and molybdenum to leach to groundwater was ruled out.

The simulated leaching concentrations of hexavalent chromium were likely due to the following factors:

- The initial screening approach assigned the maximum concentration found at each depth interval across the entire interval, even though other samples with lower concentrations were observed at each level.
- The presence of hexavalent chromium at the deepest sampling interval at one location required assignment of that concentration from that depth down to the water table for the entire area.

Additional data are needed to better define the vertical extent of hexavalent chromium. The model will be also refined with the new vertical data and will be discretized spatially to more realistically simulate vadose zone contaminant concentrations.

4.4 Subarea AOC 10d

Table C4-12 presents the results of the tiered analysis for AOC 10d. Eight metals were detected at concentrations above the BTVs. Of those eight, only hexavalent chromium, barium, and molybdenum exceeded the calculated SSLs, as shown in Table C4-16. Subsequent numerical modeling was conducted to evaluate the potential of these three metals to leach into groundwater. Based on initial model screening simulations, the potential for barium and molybdenum to leach to groundwater was ruled out.

The simulated leaching concentrations of hexavalent chromium were likely due to the following factor:

- The initial screening approach assigned the maximum concentration found at each depth interval across the entire interval, even though other samples with lower concentrations were observed at each level.

Additional data are not needed in area AOC 10d to refine the model. The model will be refined by discretizing the area spatially to more realistically simulate vadose zone contaminant concentrations.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the CMS/FS. The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite), as discussed in Table 6-1 in Data Gaps Evaluation Report.
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies), as discussed in Table 6-1 in Data Gaps Evaluation Report.
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for AOC 10 that are currently available to support CMS/FS.

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The lateral and vertical extent of the COPCs and COPECs is discussed in Section 2.2 above. Data results for selected constituents are shown in Figure C4-1 and Figures C4-4 through C4-10, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLC). The maximum concentrations of these metals for each of the units were compared to the

TTLCs, and total chromium exceeded the TTLCs three times, as shown in Table C4-17. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLCs), and concentrations of five metals in AOC 9 (barium, total chromium, hexavalent chromium, copper, and lead) exceeded 10 times STLC one or more times, as shown in Table C4-17. In addition, total chromium and lead also exceeded 20 times TCLP as indicated in Table C4-17. Because these metals have the potential to exceed STLC or TCLP thresholds, additional leachability testing for waste characterization purposes may be required if soil excavation and offsite disposal is chosen as a remedy. For the purposes of supporting the CMS/FS, the lack of STLC or TCLP analysis is not considered a data gap, for the existing total concentrations are sufficient for the purposes of evaluating various remedial alternatives. Additional data regarding potential COPC/COPEC leachability include SPLP analysis for total and hexavalent chromium, as shown in Table C4-2. SPLP analysis was conducted only for soil samples (no white powder or debris samples were tested using SPLP).

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 soil investigation was limited to grain size analysis only. Specific soil physical properties data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 in the Data Gaps Report.

5.4 Surface and Subsurface Features

While there is extensive information regarding surface and subsurface features at AOC 10, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for AOC 10. However, subsurface utilities, including gas transmission pipelines and any culverts or other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives and to prepare construction specifications.

5.5 Volumes of White Powder and Debris

Preliminary mapping has been conducted to identify the extent and type of debris present in AOC 10; findings of this mapping are presented in Section 3.0 and in Appendix B of this Data Summary Report. Additional soil physical parameter data are needed to support the CMS/FS.

6.0 Summary of Data Gaps and Proposed Phase 2 Soil Sample Locations to Fill the Identified Gaps

Based on the Part A DQO, data gaps were identified for three of the four decisions and are summarized below by decisions:

- **Decision 1 (Nature and Extent)** – the following data gaps were identified to resolve this decision:

  - Data gap #1 – Lateral and vertical extent of contamination in the western portion of AOC10 (Subarea AOC 10a, downslope from AOC9, and downslope from the outfall of the former trench drain).
  - Data gap #2 – Nature and extent of contamination associated with runoff from station access road to the low point north of Subarea 10d.
  - Data gap #3 – Nature and extent of contamination associated with the newly identified white powder areas (on the slope below the station access road) and the newly identified debris areas (on the slopes of AOC10).
  - Data Gap #4 - Nature and extent of contamination associated with runoff from discharge pipe upslope from subarea 10a. (Samples associated with perimeter and storm drain sampling programs will evaluate nature and extent on the slope above East Ravine.)
- **Decision 2 (Data Sufficient to Estimate Representative Exposure Point Concentrations)** – no data gap was identified for this decision.
- **Decision 3 (Potential Threat to Groundwater from Residual Soil Concentrations)** – the following data gap was identified to resolve this decision:
  - Data gap #4 – Vertical extent of contamination information to support refinement of the vadose leaching zone model.
- **Decision 4 (Data Sufficient to Estimate Soil Properties and Contaminant Distribution in Support of the CMS/FS) –** the following data gap was identified to resolve this decision**:**
  - Data gap #5 – Additional soil physical parameter information to support the CMS/FS.

In an effort to reduce intrusive sampling, a portable X-ray fluorescence (XRF) analyzer will be used to assist with identifying possible sample locations in debris areas on the slope of AOC 10 (Data Gap #4). Up to 20 XRF samples will be collected in the debris area. Corrected XRF results will be compared to applicable screening levels on Data Gaps Evaluation Report Table 3-1 on a point-by-point basis. (For field screening purposes, XRF concentration readings will be adjusted using least squares regression equation calculated from the RCRA facility investigation/remedial investigation samples analyzed in the lab and by the XRF.) If the applicable screening levels are not exceeded, no further sampling will occur at that location. However, if applicable screening levels are exceeded, soil samples will be collected at 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet below ground surface at that location and will be submitted to the laboratory for analysis for hexavalent chromium, PAHs, Title 22 metals, and asbestos.

Table C4-18 shows the proposed sample location IDs, sample depths, rationale for each location, and analytes. Proposed Phase 2 sample locations are shown in Figure C4-11. The proposed Phase 2 sample locations are needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

6.1 Access Restrictions

AOC 10 is a ravine with steep sloped side walls. Majority of proposed Phase 2 sample locations are located on the slopes of the ravines, limiting access by sampling equipment. A few of the proposed Phase 2 sample locations are within the ravine bottom near the toe of the slope.

7.0 References

ARCADIS. 2008. *Human and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California.* August.

———. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2006. *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part A, PG&E Topock Compressor Station, Needles, California*. November 16.

———. 2009. *Summary of Findings Associated with the East Ravine Groundwater Investigation, PG&E Topock Compressor Station, Needles, California.*

Tables

TABLE C4-1
Conceptual Site Model – AOC 10 – East Ravine
Soil Investigation Part A Phase 1 Data Gaps Report
PG&E Topock Compressor Station, Needles, California

Primary Source	**Primary Source Media**	**Potential Release Mechanism**	**Secondary Source Media**	**Potential Secondary Release Mechanism**
Runoff from compressor station, compressor station access road, and AOC 9	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion/enclosed space accumulation Potential discharge of groundwater to surface water [a] Potential extracted groundwater[b]
Discharge from compressor station via stormwater drains	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion/enclosed space accumulation Potential discharge of groundwater to surface water [a] Potential extracted groundwater[b]
Disposal of Debris	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion/enclosed space accumulation Potential discharge of groundwater to surface water [a] Potential extracted groundwater[b]

[a] Discharge to surface water is an insignificant transport pathway as evaluated in the Groundwater Risk Assessment (ARCADIS, 2009).

[b] Quantitative evaluation of the groundwater pathway was completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C4-2

Synthetic Precipitation Leaching Procedure (SPLP) Extraction Results
AOC10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			SPLP Results in mg/L	
Location	**Sample Date**	**Depth (ft bgs)**	**Hexavalent Chromium**	**Chromium (total)**
AOC10				
AOC10b-3	09/30/08	0-0.5	0.0115 J	0.0218
AOC10c-1	10/01/08	2-3	0.0414 J	0.0486
AOC10c-5	10/01/08	2-3	0.128 J	0.139
AOC10d-4	09/18/08	2-3	0.031 J	0.0526

Notes:

ft bgs	feet below ground surface
mg/L	milligrams per liter
J	concentration estimated by laboratory or data validation

TABLE C4-3

Sample Results: Metals

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1] :				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2] :				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3] :				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4] :				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5] :				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC10-1	10/02/08	0 - 0.5	N	ND (2) *	3.7	93	ND (1) *	ND (1)	6.6	ND (0.401)	2.7	4.9	9.2	ND (0.1) *	ND (1)	5.5	ND (1)	ND (1)	ND (2)	13	20
	10/02/08	2 - 3	N	ND (2) *	4.2	81	ND (1) *	ND (1)	7.4	ND (0.405)	3	5.6	5.8	ND (0.1) *	ND (1)	6.3	ND (1)	ND (1)	ND (2)	16	21
	10/02/08	5 - 6	N	ND (2) *	4.9	82	ND (1) *	ND (1)	7.5	ND (0.407)	3.2	5.8	5.4	ND (0.1) *	ND (1)	6.4	ND (1)	ND (1)	ND (2)	17	20
	10/02/08	9 - 10	N	ND (2) *	4.7	110	ND (1) *	ND (1)	6.8	ND (0.406)	3	5.7	4.8	ND (0.1) *	ND (1)	6.2	ND (1)	ND (1)	ND (2)	15	21
AOC10-2	10/02/08	0 - 0.5	N	ND (2) *	3.4	93	ND (1) *	ND (1)	4.9	ND (0.402)	2.3	4.1	5.1	ND (0.1) *	ND (1)	4.3	ND (1)	ND (1)	ND (2)	12	14
	10/02/08	2 - 3	N	ND (2.1) *	5.5	370	ND (1) *	ND (1)	17	ND (0.417)	6.4	9.4	3.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2.1)	33	38
	10/02/08	5 - 6	N	ND (2.1) *	9.1	120	ND (2.1) *	ND (1)	19	ND (0.415)	7.4	9.5	4.2	ND (0.1) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.1) *	36	40
	10/02/08	7 - 8	N	ND (2.1) *	6	110	ND (1) *	ND (1)	17	ND (0.412)	6.3	9	3.2	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	30	32
AOC10-3	09/19/08	0 - 0.5	N	ND (2) J*	3.1	160	ND (2) *	ND (1)	62	1.91	4.6	14	7.8	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4) *	23	40
	09/19/08	0 - 0.5	FD	ND (2) *	2.6	150	ND (2) *	ND (1)	64	1.7	4.5	13	7.7	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4) *	22	41
	09/19/08	2 - 3	N	ND (2.1) *	3.3	160	ND (5.1) *	ND (1)	43	ND (0.412)	10	14	ND (5.1)	ND (0.1) *	ND (5.1) *	26	ND (1)	ND (5.1)	ND (10) *	43	47
	09/19/08	5 - 6	N	ND (2.1) *	5.4	220	ND (5.1) *	ND (1)	37	0.705	9.9	16	2.9	ND (0.1) *	ND (5.1) *	25	ND (1)	ND (5.1)	ND (10) *	46	61
	09/19/08	9 - 10	N	ND (2.1) *	7.4	110	ND (1) *	ND (1)	28	ND (0.412)	9	12	2.8	ND (0.1) J*	ND (1)	20	ND (1)	ND (1)	ND (2.1)	33	50
AOC10-4	09/19/08	0 - 0.5	N	ND (2) *	3.5	110	ND (2) *	ND (1)	33	0.55	6.5	14	11	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4) *	32	52
	09/19/08	2 - 3	N	ND (2) *	2.5	130	ND (2) *	ND (1)	26	ND (0.409)	7.1	16	4.4	ND (0.1) *	ND (2) *	19	ND (1)	ND (2)	ND (4.1) *	33	38
	09/19/08	5 - 6	N	ND (2.1) *	5.9	75	ND (5.2) *	ND (1)	27	ND (0.418)	10	16	3	ND (0.11) *	ND (5.2) *	20	ND (1)	ND (5.2) *	ND (10) *	40	63
	09/19/08	9 - 10	N	ND (2.1) *	7.7	48	ND (1) *	ND (1)	18	ND (0.413)	7.9	12	2.7	ND (0.1) J*	ND (1)	14	ND (1)	ND (1)	ND (2.1)	27	48
AOC10-5	09/19/08	0 - 0.5	N	ND (2) *	9.6	500	ND (5.1) *	ND (1)	39	1.01	9.6	27	27	ND (0.1) *	ND (5.1) *	23	ND (1)	ND (5.1)	ND (10) *	52	97
	09/19/08	2 - 3	N	ND (2.1) *	8.2	380	ND (5.1) *	ND (1)	30	0.48	8.3	21	34	ND (0.1) *	ND (5.1) *	20	ND (1)	ND (5.1)	ND (10) *	43	77
	09/19/08	5 - 6	N	ND (4.1) *	12	1,100	ND (5.1) *	ND (2) *	19	ND (0.407)	8.8	40	6.7	ND (0.1) *	ND (5.1) *	16	ND (2) *	ND (5.1)	ND (10) *	36	80
	09/19/08	5 - 6	FD	ND (4.1) *	12	1,300	ND (5.1) *	ND (2) *	18	ND (0.407)	8.5	41	7.3	ND (0.1) *	ND (5.1) *	14	ND (2) *	ND (5.1)	ND (10) *	37	79
AOC10-6	09/20/08	0 - 0.5	N	ND (2) J*	7	220 J	ND (2) *	ND (1)	24	ND (0.402)	7.2	11	26	ND (0.1) *	ND (2) *	16	ND (1)	ND (2)	ND (4) *	32	58
	09/20/08	2 - 3	N	ND (2) *	4.2	220	ND (1) *	ND (1)	23	ND (0.404)	7	9.5	4.1	ND (0.1) *	ND (1)	16	ND (1)	ND (1)	ND (2)	34	45
AOC10-7	09/20/08	0 - 0.5	N	ND (2) *	7.6	250	ND (1) *	ND (1)	22	ND (0.414)	6.7	12	8.6	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	29	54
	09/20/08	2 - 3	N	ND (2) *	8	210	ND (1) *	ND (1)	27	ND (0.406)	7.9	12	8.1	ND (0.1) *	1.1	14	ND (1)	ND (1)	ND (2)	33	58
	09/20/08	5 - 6	N	ND (2) *	9.6	270	ND (2) *	ND (1)	33	ND (0.407)	8.7	13	4.4	ND (0.1) *	ND (2) *	20	ND (1)	ND (2)	ND (4.1) *	38	58
AOC10-8	08/22/08	0 - 0.5	N	ND (4) *	8.6	210	ND (2) *	ND (2) *	16	ND (0.402)	6.4	12	15 J	ND (0.1) *	ND (2) *	14	ND (2) *	ND (2)	ND (4) *	31	87
	08/22/08	0 - 0.5	FD	ND (4) *	8.2	180	ND (2) *	ND (2) *	18	ND (0.416)	7	12	12 J	ND (0.1) *	ND (2) *	14	ND (2) *	ND (2)	ND (4) *	33	75
AOC10a-1	10/17/08	0 - 0.5	N	ND (2.1) J*	8.8	140	ND (1.1) *	ND (1.1) *	80	8.25	5.7	270 J	200 J	0.64	19	28	ND (1.1)	ND (1.1)	ND (2.1)	17	1,000 J
AOC10b-1	09/30/08	0 - 0.5	N	ND (2) *	3.6	130	ND (1) *	ND (1)	24	0.559	4.8	9.8	8.6	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	25	38
	09/30/08	2 - 3	N	ND (2) *	3.1	120	ND (1) *	ND (1)	63	1.39	4.8	28	8.4 J	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	20	110 J
	09/30/08	2 - 3	FD	ND (2) *	2.9	100	ND (1) *	ND (1)	61	1.39	4.2	27	12 J	ND (0.1) *	1.5	10	ND (1)	ND (1)	ND (2)	18	160 J
	09/30/08	5 - 6	N	ND (2) *	3.1	110	ND (1) *	ND (1)	20	0.425	3.9	8	4.3	ND (0.1) *	ND (1)	8.4	ND (1)	ND (1)	ND (2)	16	39
	09/30/08	9 - 10	N	ND (2) *	4.7	120	ND (2) *	ND (1)	29	ND (0.407)	6.2	10	3.7	ND (0.1) *	ND (2) *	16	ND (1)	ND (2)	ND (4) *	24	29
AOC10b-2	09/30/08	0 - 0.5	N	ND (2) *	3	89	ND (1) *	ND (1)	29	0.434	3.8	11	8.2	ND (0.1) *	1.1	8.9	ND (1)	ND (1)	ND (2)	17	40
	09/30/08	2 - 3	N	ND (2) *	2.9	100	ND (1) *	ND (1)	47	1.05	4.3	15	5.2	ND (0.1) *	1.1	10	ND (1)	ND (1)	ND (2)	17	44
	09/30/08	5 - 6	N	ND (2) *	4.1	100	ND (1) *	ND (1)	29	0.453	5.3	8.8	4.2	ND (0.1) *	1	14	ND (1)	ND (1)	ND (2)	22	27
	09/30/08	9 - 10	N	ND (2) *	5.7	120	ND (2) *	ND (1)	39	0.759	8.2	15	3.8	ND (0.1) *	ND (2) *	22	ND (1)	ND (2)	ND (4) *	29	38
AOC10b-3	09/30/08	0 - 0.5	N	ND (2) *	ND (1)	120	ND (1) *	ND (1)	820	27.7	3.6	90	24	ND (0.1) *	1.5	9.2	ND (1)	ND (1)	ND (2)	17	240
	10/01/08	2 - 3	N	ND (2) *	2.9	93	ND (1) *	ND (1)	90	1.82	5.8	23	5	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	22	59
	10/01/08	5 - 6	N	ND (2.1) *	5	110	ND (2.1) *	ND (1)	38	0.429	9.2	14	3.8	ND (0.1) *	ND (2.1) *	24	ND (1)	ND (2.1)	ND (4.1) *	33	40
	10/01/08	5 - 6	FD	ND (2.1) *	5	110	ND (2.1) *	ND (1)	36	ND (0.417)	10	16	3.6	ND (0.1) *	ND (2.1) *	25	ND (1)	ND (2.1)	ND (4.1) *	35	39
	10/01/08	9 - 10	N	ND (2.1) *	6.2	120	ND (2.1) *	ND (1)	36	ND (0.415)	11	13	3.5	ND (0.1) *	ND (2.1) *	26	ND (1)	ND (2.1)	ND (4.1) *	38	44

TABLE C4-3

Sample Results: Metals

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC10b-4	09/30/08	0 - 0.5	N	ND (2) *	3.4	76	ND (1) *	ND (1)	12	ND (0.401)	4	5.8	41	ND (0.1) *	ND (1)	9.1	ND (1)	ND (1)	ND (2)	17	29
	09/30/08	2 - 3	N	ND (2) *	3.6	100	ND (1) *	ND (1)	14	ND (0.403)	4.7	6.7	10	ND (0.1) *	ND (1)	9.6	ND (1)	ND (1)	ND (2)	21	31
	09/30/08	5 - 6	N	ND (2) *	3.8	150	ND (1) *	ND (1)	20	ND (0.407)	6.7	8.9	3.4	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	30	35
	09/30/08	9 - 10	N	ND (2.1) *	4	85	ND (1) *	ND (1)	26	ND (0.415)	7.4	11	2.8	ND (0.1) *	ND (1)	18	ND (1)	ND (1)	ND (2.1)	30	42
AOC10c-1	10/01/08	0 - 0.5	N	ND (2) J*	4.2	110	ND (1) *	ND (1)	55	1.98	5.4	15	7.8	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	23	48
	10/01/08	2 - 3	N	ND (2) *	1.2	140	ND (1) *	ND (1)	490	27.3	5.6	41	18	ND (0.1) *	1.2	13	ND (1)	ND (1)	ND (2)	21	76
	10/01/08	5 - 6	N	ND (2) *	3.4	110	ND (2) *	ND (1)	220	4.78	8.2	17	5.4	ND (0.1) *	ND (2) *	20	ND (1)	ND (2)	ND (4.1) *	28	42
	10/01/08	9 - 10	N	ND (2) *	4	180	ND (1) *	ND (1)	63	1.37	9.2	14	3.4	ND (0.1) *	1	23	ND (1)	ND (1)	ND (2)	33	39
AOC10c-2	10/01/08	0 - 0.5	N	ND (2) *	5.9	130	ND (2) *	ND (1)	51	1.25	5.8	19	12	ND (0.1) *	ND (2) *	13	ND (1)	ND (2)	ND (4) *	24	61
	10/01/08	2 - 3	N	ND (2) *	4.1	150	ND (1) *	ND (1)	190	3.77	5.6	37	17	ND (0.1) *	2.2	13	ND (1)	ND (1)	ND (2)	24	78
	10/01/08	2 - 3	FD	ND (2) *	4.1	150	ND (1) *	ND (1)	180	3.8	5.4	34	16	ND (0.1) *	1.9	13	ND (1)	ND (1)	ND (2)	24	75
	10/01/08	5 - 6	N	ND (2) *	3.4	150	ND (1) *	ND (1)	110	1.92	8.4	24	7	ND (0.1) *	1.9	19	ND (1)	ND (1)	ND (2)	31	51
	10/01/08	9 - 10	N	ND (2) *	4.5	86	ND (1) *	ND (1)	32	0.605	11	13	2.7	ND (0.1) *	ND (1)	22	ND (1)	ND (1)	ND (2)	44	50
AOC10c-3	10/02/08	0 - 0.5	N	ND (2) *	9.4	270	ND (2) *	ND (1)	110	2.56	8	42	32	ND (0.1) *	ND (2) *	19	ND (1)	ND (2)	ND (4.1) *	36	140
	10/02/08	2 - 3	N	ND (2.1) *	3.6	230	ND (2.1) *	ND (1)	690	9.27	7	60	31	ND (0.11) *	ND (2.1) *	16	ND (1)	ND (2.1)	ND (4.1) *	29	140
	10/02/08	2 - 3	FD	ND (2.1) *	3.5	220	ND (2.1) *	ND (1)	660	7.97	6.9	60	26	ND (0.1) *	ND (2.1) *	16	ND (1)	ND (2.1)	ND (4.1) *	28	140
	10/02/08	5 - 6	N	ND (2) *	3.9	140	ND (1) *	ND (1)	29	0.512	7.8	9	4.5	ND (0.1) *	ND (1)	17	ND (1)	ND (1)	ND (2)	28	36
	10/02/08	9 - 10	N	ND (2.1) *	4.4	64	ND (1) *	ND (1)	22	ND (0.412)	7.8	11	2.7	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2.1)	31	41
AOC10c-4	10/01/08	0 - 0.5	N	ND (2.1) *	11	310	ND (2.1) *	ND (1)	120	2.66	8.8	46	36	ND (0.1) *	ND (2.1) *	21	ND (1)	ND (2.1)	ND (4.1) *	42	150
	10/01/08	2 - 3	N	ND (2) *	5.9	170	ND (2) *	ND (1)	90	2.11	9.9	19	8.9	ND (0.1) *	ND (2) *	20	ND (1)	ND (2)	ND (4.1) *	31	52
	10/01/08	5 - 6	N	ND (2) *	4.6	120	ND (1) *	ND (1)	27	2.84	9.1	14	2.6	ND (0.1) *	ND (1)	17	ND (1)	ND (1)	ND (2)	35	47
	10/01/08	9 - 10	N	ND (2.1) *	7.3	200	ND (2.1) *	ND (1)	92	0.436	5.4	25	13	ND (0.1) *	ND (2.1) *	13	ND (1)	ND (2.1)	ND (4.1) *	25	74
AOC10c-5	10/01/08	0 - 0.5	N	ND (2) *	6.6	170	ND (2) *	ND (1)	81	2.49	6.3	29	15	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4) *	27	80
	10/01/08	2 - 3	N	ND (2.1) *	ND (1)	230	ND (2.1) *	ND (1)	1,500	16.4	6.7	110	47	ND (0.1) *	2.9	16	ND (1)	ND (2.1)	ND (4.1) *	27	170
	10/01/08	5 - 6	N	ND (2.1) *	3.7	100	ND (2.1) *	ND (1)	82	1.48	8.6	12	4	ND (0.1) *	ND (2.1) *	19	ND (1)	ND (2.1)	ND (4.1) *	31	44
	10/01/08	9 - 10	N	ND (2) *	4.5	130	ND (1) *	ND (1)	47	0.423	9.1	15	3	ND (0.1) *	ND (1)	21	ND (1)	ND (1)	ND (2)	34	46
AOC10d-1	09/18/08	0 - 0.5	N	ND (2) J*	3.4	120	ND (2) *	ND (1)	49	0.644	6.8	16	8.8	ND (0.1) *	ND (2) *	16	ND (1)	ND (2)	ND (4) *	31	58
	09/18/08	2 - 3	N	ND (2) *	3.9	120	ND (2) *	ND (1)	150	2.86	7.1	31	6.8	ND (0.1) *	ND (2) *	17	ND (1)	ND (2)	ND (4.1) *	35	76
	09/18/08	5 - 6	N	ND (2.1) *	6.9	200	ND (5.2) *	ND (1)	66	1.06	11	23	5.2	ND (0.11) *	ND (5.2) *	27	ND (1)	ND (5.2) *	ND (10) *	45	80
	09/18/08	5 - 6	FD	ND (2.1) *	7.1	210	ND (5.2) *	ND (1)	64	0.703	11	23	5.3	ND (0.1) *	ND (5.2) *	26	ND (1)	ND (5.2) *	ND (10) *	46	74
	09/18/08	9 - 10	N	ND (4.1) *	9.8	140	ND (2.1) *	ND (2.1) *	23	ND (0.414)	9.4	12	3.5	ND (0.1) J*	ND (2.1) *	17	ND (2.1) *	ND (2.1)	ND (4.1) *	31	58
AOC10d-2	09/17/08	0 - 0.5	N	ND (2) *	4.2	180	ND (2) *	ND (1)	22	ND (0.403)	6.2	17	21	ND (0.1) *	ND (2) *	16	ND (1)	ND (2)	ND (4) *	32	61
	09/17/08	2 - 3	N	ND (2) *	3.3	180	ND (2) *	ND (1)	40	1.16	5.4	14	16	ND (0.1) *	ND (2) *	14	ND (1)	ND (2)	ND (4.1) *	30	54
	09/17/08	5 - 6	N	ND (2) *	6.6	210	ND (5.1) *	ND (1)	33	0.597	10	16	6.2	ND (0.1) *	ND (5.1) *	21	ND (1)	ND (5.1)	ND (10) *	45	70
	09/17/08	9 - 10	N	ND (2) *	7.2	150	ND (5.1) *	ND (1)	22	ND (0.406)	8.5	16	3.2	ND (0.1) J*	ND (5.1) *	16	ND (1)	ND (5.1)	ND (10) *	38	73
AOC10d-3	09/17/08	0 - 0.5	N	ND (2) *	3.6	120	ND (2) *	ND (1)	20	ND (0.406)	5.9	12	22	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4) *	29	52
	09/18/08	2 - 3	N	ND (2) *	3.4	270	ND (2) *	ND (1)	64	1.91	6.3	18	21	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4.1) *	33	61
	09/18/08	5 - 6	N	ND (2) *	7.3	280	ND (5.1) *	ND (1)	30	ND (0.407)	10	18	3.3	ND (0.1) *	ND (5.1) *	23	ND (1)	ND (5.1)	ND (10) *	43	60
	09/18/08	5 - 6	FD	ND (2) *	6	330	ND (5.1) *	ND (1)	31	ND (0.407)	10	18	5.1	ND (0.1) *	ND (5.1) *	23	ND (1)	ND (5.1)	ND (10) *	42	59
	09/18/08	9 - 10	N	ND (4.1) *	8.2	150	ND (2) *	ND (2) *	21	ND (0.408)	8.5	11	3.6	ND (0.1) J*	ND (2) *	15	ND (2) *	ND (2)	ND (4.1) *	28	56
AOC10d-4	09/18/08	0 - 0.5	N	ND (2.1) *	9.2	340	ND (5.2) *	ND (1)	29	0.92	8.3	25	25	ND (0.1) *	ND (5.2) *	21	ND (1)	ND (5.2) *	ND (10) *	42	85
	09/18/08	2 - 3	N	ND (2.1) *	5.4	260	ND (2.1) *	ND (1.1) *	130	3.93	6.7	27	26	ND (0.11) *	ND (2.1) *	17	ND (1.1)	ND (2.1)	ND (4.2) *	35	81
	09/18/08	5 - 6	N	ND (2) *	3.6	220	ND (2) *	ND (1)	66	ND (0.415)	6.5	21	17	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4.1) *	31	64
	09/18/08	9 - 10	N	ND (2) *	6.9	220	ND (5.1) *	ND (1)	32	ND (0.41)	11	16	5.2	ND (0.1) J*	ND (5.1) *	24	ND (1)	ND (5.1)	ND (10) *	43	68
DTSC-AOC10d-1	01/18/08 [6]	0	N	ND (4.42) *	8.28	163	ND (4.41) *	ND (8.83) *	652	31.5	ND (4.41)	137	14.3	ND (0.0193) *	ND (2.5) *	ND (4.41)	ND (4.42) *	ND (4.42)	ND (8.83) *	39.5	134

TABLE C4-3

Sample Results: Metals

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
DTSC-AOC10d-2	01/18/08[6]	0	N	ND (4.89) *	7.36	595	ND (4.89) *	ND (9.78) *	243	6.03	ND (4.89)	66.5	13.1	ND (0.0192) *	ND (4.89) *	ND (4.89)	ND (4.89) *	ND (4.89)	ND (9.78) *	36.2	147
DTSC-AOC10d-3	01/18/08[6]	0	N	ND (4.65) *	5.87	264	ND (4.65) *	ND (9.3) *	224	4.38	ND (4.65)	46.5	12	ND (0.0198) *	ND (4.65) *	ND (4.65)	ND (4.65) *	ND (4.65)	ND (9.3) *	34.5	197
MW-57BR	01/14/09	3 - 4	N	ND (2) *	9.2	270	ND (2) *	ND (1)	26	ND (0.16)	7.8	11	6.7	ND (0.1) *	ND (2) *	17	ND (1)	ND (2)	ND (4.1) *	34	52
	01/14/09	8 - 9	N	ND (2.1) *	8	85	ND (1) *	ND (1)	20	ND (0.17)	7.9	11	2.7	ND (0.1) *	1.3	16	ND (1)	ND (1)	ND (2.1)	28	46
	01/14/09	8 - 9	FD	ND (2.1) *	8.4	85	ND (1) *	ND (1)	22	ND (0.16)	8	11	2.9	ND (0.1) *	1.3	16	ND (1)	ND (1)	ND (2.1)	27	48
	01/14/09	18 - 19	N	ND (4.1) *	9.9	240	ND (2.1) *	ND (2.1) *	25	ND (0.16)	10	12	4.3	ND (0.1) *	3	16	ND (2.1) *	ND (2.1)	ND (4.1) *	31	68
MW-58BR_S	01/29/09	1.5 - 2	N	ND (2.1) J*	ND (2.1)	410	ND (2.1) *	ND (1.1) *	4,000	150	8.2	300	160	0.33	3.5	24	ND (1.1)	ND (2.1)	6.1	23	300
	01/29/09	19 - 20	N	ND (2.1) *	12	240	ND (2.1) *	ND (1.1) *	33	0.43	12	24	4	ND (0.11) *	ND (2.1) *	25	ND (1.1)	ND (2.1)	4.7	38	63
	01/29/09	29 - 30	N	ND (2.1) *	13	110	ND (2.1) *	ND (1.1) *	26	ND (0.17)	11	14	3.6	ND (0.11) *	ND (2.1) *	19	ND (1.1)	ND (2.1)	4.8	33	64
	01/29/09	39 - 40	N	ND (2.1) *	12	150	ND (2.1) *	ND (1.1) *	35	0.43	12	17	4.2	ND (0.11) *	ND (2.1) *	22	ND (1.1)	ND (2.1)	4.7	34	51
	01/29/09	49 - 50	N	ND (2.1) *	8.3	180	ND (1.1) *	ND (1.1) *	24	ND (0.17)	8.7	17	3.7	ND (0.11) *	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	28	46
	01/29/09	59 - 60	N	ND (2.2) *	8.4	37	ND (1.1) *	ND (1.1) *	27	ND (0.18)	13	58	3.4	ND (0.11) *	ND (1.1)	22	ND (1.1)	ND (1.1)	ND (2.2)	28	41
AOC10-XRF-01	08/25/08	0 - 0.5	N	---	---	---	---	---	9.2	ND (0.404)	---	---	---	---	---	---	---	---	---	---	---
AOC10-XRF-02	08/25/08	0 - 0.5	N	---	---	---	---	---	11	ND (0.404)	---	---	---	---	---	---	---	---	---	---	---
AOC10-XRF-03	08/25/08	0 - 0.5	N	---	---	---	---	---	10	ND (0.405)	---	---	---	---	---	---	---	---	---	---	---
AOC10-XRF-10	09/21/08	3 - 4	N	---	---	---	---	---	26	ND (0.416)	---	---	---	---	---	---	---	---	---	---	---
Bank 1	03/07/03	0	N	---	---	---	---	---	21.5	ND (4) *	---	13.7	---	---	---	14.3	---	---	---	---	55
L-1	02/20/03	0	N	---	---	---	---	---	88.4	ND (4.1) *	---	34.8	---	---	---	17	---	---	---	---	99.7
	02/20/03	2	N	---	---	---	---	---	217	2.5	---	69.6	---	---	---	10.8	---	---	---	---	123
L-2	02/20/03	0	N	---	---	---	---	---	86.8	ND (4.7) *	---	42.7	---	---	---	22.8	---	---	---	---	122
	02/20/03	2	N	---	---	---	---	---	3,360	13	---	211	---	---	---	18	---	---	---	---	278
L-2-2	03/05/03	2	N	---	---	---	---	---	1,610	41	---	139	---	---	---	19	---	---	---	---	203
L-2-3	03/05/03	2	N	---	---	---	---	---	2,740	99	---	288	---	---	---	25	---	---	---	---	299
L-3	02/20/03	0	N	---	---	---	---	---	28.4	ND (4.5) *	---	22.7	---	---	---	18.1	---	---	---	---	74.3
	02/20/03	1	N	---	---	---	---	---	379	1.2 J	---	79.7	---	---	---	10.1	---	---	---	---	252
	02/20/03	1.5	N	---	---	---	---	---	77.7	ND (4) *	---	17.2	---	---	---	11.9	---	---	---	---	61.9
L-3-2	03/05/03	0.5	N	---	---	---	---	---	228	9.4	---	40.5	---	---	---	15.1	---	---	---	---	129
PS-21	04/13/99	0	N	---	---	---	---	---	16.5	0.9	---	14.2	---	---	---	10.5	---	---	---	---	43.9
	04/13/99	2	N	---	---	---	---	---	90	ND (0.51)	---	12.6	---	---	---	10.8	---	---	---	---	59.1
PS-22	04/13/99	0	N	---	---	---	---	---	24.7	ND (0.5)	---	11.4	---	---	---	10.5	---	---	---	---	85.3

TABLE C4-3

Sample Results: Metals

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] White powder sample

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-4

Sample Results: Contract Laboratory Program Inorganics
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
AOC10-3	09/19/08	0 - 0.5	N	7,100	31,000	13,000 J	7,700 J	260	1,800	480	ND (1) *
	09/19/08	0 - 0.5	FD	7,200	29,000	13,000	7,500	250	1,700	450	ND (0.998) *
AOC10-5	09/19/08	0 - 0.5	N	18,000	44,000	28,000	12,000	1,300	4,100	360	ND (1) *
AOC10-8	08/22/08	0 - 0.5	N	7,900	23,000	17,000	6,100	470	1,600	170	ND (4.86) *
	08/22/08	0 - 0.5	FD	8,100	20,000	18,000	6,300	390	1,500	160	ND (5.06) *
AOC10a-1	10/17/08	0 - 0.5	N	4,100 J	18,000	32,000 J	3,900	270	1,100	540	ND (1.07) *
AOC10b-1	09/30/08	0 - 0.5	N	4,900	20,000	13,000	4,700	180	990	200	ND (1) *
AOC10c-1	10/01/08	0 - 0.5	N	7,500	24,000	15,000	6,500	210	1,500	250	ND (1) *
AOC10c-2	10/01/08	0 - 0.5	N	8,200	25,000	15,000	6,600	230	1,900	330	ND (1.01) *
AOC10d-2	09/17/08	0 - 0.5	N	11,000	28,000	18,000	8,200	370	2,300	210	ND (1) *
AOC10d-3	09/17/08	0 - 0.5	N	8,900	20,000	17,000	6,700	270	1,700	190	ND (1) *
DTSC-AOC10d-1	01/18/08[6]	0	N	---	265,000	8,680	14,300	---	1,730	2,790	---
DTSC-AOC10d-2	01/18/08[6]	0	N	---	234,000	14,000	13,200	---	2,120	1,780	---
DTSC-AOC10d-3	01/18/08[6]	0	N	---	22,500	14,200	12,800	---	2,640	1,820	---
L-3	02/20/03	1	N	---	139,000	540 J	12,800	---	---	1,280 J	---

TABLE C4-4

Sample Results: Contract Laboratory Program Inorganics
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] White powder sample

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC10-1	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7	ND (5)	ND (5)	ND (5)	ND (5)	6.6	ND	14	4.4
	10/02/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.7)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10-2	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/02/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/02/08	7 - 8	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.9)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10-3	09/19/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.2	5.4	ND (5)	5.9	7	ND (5)	11	ND (5)	ND (5)	ND (5)	ND (5)	9.7	ND	44	7.7
	09/19/08	0 - 0.5	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.4	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	5.4	4.4
	09/19/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/19/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/19/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC10-4	09/19/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8	9.2	7.3	8.9	11	ND (5)	17	ND (5)	6.4	ND (5)	5.4	16	5.4	84	12
	09/19/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/19/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/19/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC10-5	09/19/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	44	76	88 J	62	84	100	20	150	ND (5.1)	57	ND (5.1)	42	130	42	810	110
	09/19/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	9.8	190	290	370	240	300	350	61	530	ND (5.1)	230	ND (5.1)	190	500	200	3,100	420
	09/19/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/19/08	5 - 6	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.8	5.9	5.4	6.3	7.6	ND (5.1)	10	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	9.7	ND	51	8.5
AOC10-6	09/20/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	22	36	33	32	46	46	9.2	70	ND (5)	28	ND (5)	22	64	22	390	52
	09/20/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	8.4	39	16	ND (5.1)	ND (5.1)	92	ND (5.1)	24	ND (5.1)	ND (5.1)	ND (5.1)	90	44	90	220	44
AOC10-7	09/20/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.4 J	10 J	9.7 J	8.6 J	11 J	13 J	ND (5)	18 J	ND (5)	7.9 J	ND (5)	5.7 J	17 J	5.7	100	14
	09/20/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.4	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.2	ND	11	4.5
	09/20/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10-8	08/22/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	08/22/08	0 - 0.5	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
AOC10a-1	10/17/08	0 - 0.5	N	ND (80)	ND (80)	ND (80)	ND (80)	86	560	920	1,600	1,400	580	930	340	1,000	ND (80)	1,100	ND (80)	200	1,100	290	9,500	1,400
AOC10b-1	09/30/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.4	10	9.5	10	8.9	ND (5)	7.4	ND (5)	7.4	ND (5)	ND (5)	7.3	ND	68	11
	09/30/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	2 - 3	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C4-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level [1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels [2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values [4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC10b-2	09/30/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.4	14	22	15	17	18	ND (5)	19	ND (5)	13	ND (5)	ND (5)	19	ND	140	21
	09/30/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10b-3	09/30/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	10	10	34	18	18	19	6	8.7	ND (5)	16	ND (5)	ND (5)	8.9	ND	150	20
	10/01/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/01/08	5 - 6	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/01/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC10b-4	09/30/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8.1	11	13	8.6	16	16	ND (5)	20	ND (5)	7.7	ND (5)	5.6	19	5.6	120	16
	09/30/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC10c-1	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7	11	11	11	13	13	ND (5)	18	ND (5)	8.7	ND (5)	ND (5)	18	ND	110	16
	10/01/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	15	21	23	18	27	27	6.3	33	ND (5)	17	ND (5)	9.3	32	9.3	220	32
	10/01/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10c-2	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	16	24	25	20	32	30	7.1	37	ND (5)	19	ND (5)	9.6	36	9.6	250	36
	10/01/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	51	72	73	46	89	92	18	130	ND (5)	46	ND (5)	36	120	36	740	100
	10/01/08	2 - 3	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	54	70	66	43	87	90	17	120	ND (5)	43	ND (5)	36	120	36	710	100
	10/01/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	18	25	24	17	30	30	7.5	38	ND (5)	16	ND (5)	10	37	10	240	37
	10/01/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10c-3	10/02/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	37	63	76	60	80	89	17	110	ND (5.1)	55	ND (5.1)	30	99	30	690	94
	10/02/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	8.4	230 J	180 J	200 J	84 J	170 J	260 J	33 J	400 J	ND (5.2)	92 J	ND (5.2)	72 J	350 J	80	2,000	260
	10/02/08	2 - 3	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	14 J	24 J	36 J	22 J	25 J	30 J	6.2 J	39 J	ND (5.2)	20 J	ND (5.2)	11 J	38 J	11	250	36
	10/02/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (3.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC10c-4	10/01/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	24	49	79	43	60	71	14	87	ND (5.2)	38	ND (5.2)	23	82	23	550	75
	10/01/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	8.9	14	7.7	11	12	ND (5.1)	15	ND (5.1)	7	ND (5.1)	ND (5.1)	15	ND	91	13
	10/01/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	11	17	23	17	24	24	ND (5.2)	30	ND (5.2)	15	ND (5.2)	8.6	29	8.6	190	25
AOC10c-5	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	53	59	71	58	67	84	21	120	ND (5)	50	ND (5)	58	100	58	680	91
	10/01/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	52	69	96	62	68	94	22	100	ND (5.2)	59	ND (5.2)	29	100	29	720	100
	10/01/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	10/01/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C4-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level ^{1} :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels^2 :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL ^{3} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values ^{4} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background ^{5} :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC10d-1	09/18/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	9.9	16	25	18	6.2	12	ND (5)	14	ND (5)	14	ND (5)	ND (5)	14	ND	130	22
	09/18/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/18/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/18/08	5 - 6	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/18/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC10d-2	09/17/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	80	120	160	72	68	140	22	230	ND (5)	76	ND (5)	77	210	77	1,200	170
	09/17/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	11	17	26	14	11	23	ND (5.1)	35	ND (5.1)	14	ND (5.1)	11	32	11	180	24
	09/17/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	9.1	14	20	12	9.8	16	ND (5.1)	26	ND (5.1)	12	ND (5.1)	7.8	24	7.8	140	20
	09/17/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10d-3	09/17/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	7.9	140	190	250	110	120	220	33	360	ND (5)	120	ND (5)	130	340	140	1,900	270
	09/18/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	38	52	73	43	22	58	11	99	ND (5.1)	41	ND (5.1)	34	90	34	530	74
	09/18/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.2	7	ND (5.1)	ND (5.1)	5.4	ND (5.1)	7.9	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	8.2	ND	34	7.6
	09/18/08	5 - 6	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/18/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC10d-4	09/18/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	13	23	41	21	11	32	ND (5.2)	47	ND (5.2)	20	ND (5.2)	15	42	15	250	33
	09/18/08	2 - 3	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	13	29	43	25	15	31	5.8	44	ND (5.3)	23	ND (5.3)	12	42	12	270	41
	09/18/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/18/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
MW-57BR	01/14/09	3 - 4	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	01/14/09	8 - 9	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.6)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	01/14/09	8 - 9	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	01/14/09	18 - 19	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
MW-58BR_S	01/29/09	19 - 20	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	01/29/09	29 - 30	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	01/29/09	39 - 40	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.2)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	01/29/09	49 - 50	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	01/29/09	59 - 60	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.8)	ND (5.5)	ND (5.5)	ND	ND	ND (4.8)

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[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-6

Sample Results: Total Petroleum Hydrocarbons and General Chemistry Parameters
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry (mg/kg)**				
Interim Screening Level [1] :				540	540	1,800	NE	NE	NE	NE	NE
Residential Regional Screening Levels [2] :				NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL [3] :				NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels [4] :				540	540	1,800	NE	NE	NE	NE	NE
Ecological Comparison Values [5] :				NE	NE	NE	NE	NE	NE	NE	NE
Background [6] :				NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Chloride**	**Sulfate**
AOC10-1	10/02/08	0 - 0.5	N	---	ND (10) J	ND (10) J	---	---	8.44	---	---
	10/02/08	2 - 3	N	ND (0.94)	ND (10)	ND (10)	---	---	8.19	---	---
	10/02/08	5 - 6	N	ND (1)	ND (10) J	ND (10) J	---	---	8.06	---	---
	10/02/08	9 - 10	N	ND (0.96)	ND (10)	ND (10)	---	---	---	---	---
AOC10-2	10/02/08	0 - 0.5	N	---	ND (10) J	ND (10) J	---	---	7.98	---	---
	10/02/08	2 - 3	N	ND (0.99)	ND (10)	ND (10)	---	---	8.47	---	---
	10/02/08	5 - 6	N	ND (0.87)	ND (10)	ND (10)	---	---	8.15	---	---
	10/02/08	7 - 8	N	ND (0.89)	ND (10)	ND (10)	---	---	---	---	---
AOC10-3	09/19/08	0 - 0.5	N	---	ND (10)	11.3	---	---	8.86	---	---
	09/19/08	0 - 0.5	FD	---	ND (10)	13	---	---	8.8	---	---
	09/19/08	2 - 3	N	ND (1.6)	ND (10)	ND (10)	---	---	9.26	---	---
	09/19/08	5 - 6	N	ND (1.4)	ND (10)	ND (10)	---	---	9.24	---	---
AOC10-4	09/19/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	8.2	---	---
	09/19/08	2 - 3	N	ND (1.4)	ND (10)	ND (10)	---	---	9.55	---	---
	09/19/08	5 - 6	N	ND (1.4)	ND (10)	ND (10)	---	---	9.28	---	---
AOC10-5	09/19/08	0 - 0.5	N	---	ND (10)	47.1	---	---	7.64	---	---
	09/19/08	2 - 3	N	ND (1.2)	ND (10)	33.1	---	---	8.22	---	---
	09/19/08	5 - 6	N	ND (1.4)	ND (10)	19.7	---	---	8.57	---	---
	09/19/08	5 - 6	FD	ND (1.5)	ND (10)	ND (10)	---	---	8.41	---	---

TABLE C4-6

Sample Results: Total Petroleum Hydrocarbons and pH

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry (mg/kg)**				
Interim Screening Level [1] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Chloride**	**Sulfate**
AOC10-6	09/20/08	0 - 0.5	N	---	ND (10)	15.7	---	---	8.55	---	---
	09/20/08	2 - 3	N	ND (1.5) J	51.8	207	---	---	7.97	---	---
AOC10-7	09/20/08	0 - 0.5	N	---	ND (10)	26.5	---	---	8.05	---	---
	09/20/08	2 - 3	N	ND (1.6) J	ND (10)	14.5	---	---	8.11	---	---
	09/20/08	5 - 6	N	---	ND (10)	11.5	---	---	7.91	---	---
AOC10-8	08/22/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	8.14	---	---
	08/22/08	0 - 0.5	FD	---	ND (10)	ND (10)	---	---	8.44	---	---
AOC10a-1	10/17/08	0 - 0.5	N	---	ND (213) J	297 J	---	---	8.35	---	---
AOC10b-1	09/30/08	0 - 0.5	N	---	ND (10)	10.9	---	---	9.01	---	---
	09/30/08	2 - 3	N	ND (1.1)	ND (10)	13.3	---	---	9.75	---	---
	09/30/08	2 - 3	FD	ND (1.3)	ND (10)	14.5	---	---	9.75	---	---
	09/30/08	5 - 6	N	ND (1.1) J	34.2	ND (10)	---	---	9.86	---	---
	09/30/08	9 - 10	N	ND (1.5)	ND (10)	ND (10)	---	---	---	---	---
AOC10b-2	09/30/08	0 - 0.5	N	---	ND (10)	11.2	---	---	8.93	---	---
	09/30/08	2 - 3	N	ND (1.9)	ND (10)	17	---	---	9.7	---	---
	09/30/08	5 - 6	N	ND (1.3)	ND (10)	ND (10)	---	---	9.68	---	---
	09/30/08	9 - 10	N	ND (1.6)	ND (10)	11	---	---	---	---	---

TABLE C4-6

Sample Results: Total Petroleum Hydrocarbons and pH

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			General Chemistry (mg/kg)				
Interim Screening Level [1] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Chloride**	**Sulfate**
AOC10b-3	09/30/08	0 - 0.5	N	---	ND (10)	56	---	---	8.13	---	---
	10/01/08	2 - 3	N	ND (1.3)	ND (10)	14.4	---	---	9.41	---	---
	10/01/08	5 - 6	N	ND (1.6)	ND (10)	ND (10)	---	---	9.79	---	---
	10/01/08	5 - 6	FD	ND (1.5)	ND (10)	ND (10)	---	---	9.77	---	---
	10/01/08	9 - 10	N	ND (1.4)	ND (10) J	ND (10) J	---	---	---	---	---
AOC10b-4	09/30/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	9	---	---
	09/30/08	2 - 3	N	ND (1.4)	ND (10)	ND (10)	---	---	9.61	---	---
	09/30/08	5 - 6	N	ND (1.1)	ND (10)	ND (10)	---	---	9.25	---	---
	09/30/08	9 - 10	N	ND (1.6)	ND (10)	ND (10)	---	---	---	---	---
AOC10c-1	10/01/08	0 - 0.5	N	---	ND (10)	20.6	---	---	8.93	---	---
	10/01/08	2 - 3	N	ND (1.9) J	ND (10)	34.1	---	---	8.99	---	---
	10/01/08	5 - 6	N	ND (1.6)	ND (10)	13.9	---	---	9.42	---	---
	10/01/08	9 - 10	N	ND (1.3)	ND (10) J	ND (10) J	---	---	---	---	---
AOC10c-2	10/01/08	0 - 0.5	N	---	ND (10)	23.5	---	---	8.9	---	---
	10/01/08	2 - 3	N	ND (1.2)	ND (10)	32.4	---	---	8.74	---	---
	10/01/08	2 - 3	FD	ND (1.4)	ND (10)	34.4	---	---	8.78	---	---
	10/01/08	5 - 6	N	ND (1.3)	ND (10)	14.5	---	---	9.46	---	---
	10/01/08	9 - 10	N	ND (1.7)	ND (10) J	ND (10) J	---	---	---	---	---

TABLE C4-6

Sample Results: Total Petroleum Hydrocarbons and pH

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry (mg/kg)**				
			Interim Screening Level [1] :	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
			Residential Regional Screening Levels [2] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Residential DTSC CHHSL [3] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Levels [4] :	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
			Ecological Comparison Values [5] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Background [6] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Chloride**	**Sulfate**
AOC10c-3	10/02/08	0 - 0.5	N	---	ND (10)	26.1	---	---	7.84	---	---
	10/02/08	2 - 3	N	ND (1.3)	ND (10)	67.4	---	---	9.16	---	---
	10/02/08	2 - 3	FD	ND (3.2)	ND (10)	82.5	---	---	9.29	---	---
	10/02/08	5 - 6	N	ND (1.1)	ND (10)	ND (10)	---	---	9.2	---	---
	10/02/08	9 - 10	N	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---
AOC10c-4	10/01/08	0 - 0.5	N	---	ND (10)	20.5	---	---	7.8	---	---
	10/01/08	2 - 3	N	ND (1.6)	ND (10)	21.6	---	---	9.35	---	---
	10/01/08	5 - 6	N	ND (1.5)	ND (10)	ND (10)	---	---	9.57	---	---
	10/01/08	9 - 10	N	ND (1.4)	ND (10) J	ND (10) J	---	---	---	---	---
AOC10c-5	10/01/08	0 - 0.5	N	---	ND (10)	18.1	---	---	8.14	---	---
	10/01/08	2 - 3	N	ND (1.5)	ND (10)	70.9	---	---	8.79	---	---
	10/01/08	5 - 6	N	ND (1.7)	ND (10)	ND (10)	---	---	9.76	---	---
	10/01/08	9 - 10	N	ND (1.3)	ND (10) J	ND (10) J	---	---	---	---	---
AOC10d-1	09/18/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	8.25	---	---
	09/18/08	2 - 3	N	ND (1.4)	ND (10)	15.3	---	---	8.89	---	---
	09/18/08	5 - 6	N	ND (1.6)	11.1	27.9	---	---	9.02	---	---
	09/18/08	5 - 6	FD	ND (2.7)	ND (10)	ND (10)	---	---	9	---	---

TABLE C4-6

Sample Results: Total Petroleum Hydrocarbons and pH

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry (mg/kg)**				
Interim Screening Level [1] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Chloride**	**Sulfate**
AOC10d-2	09/17/08	0 - 0.5	N	---	ND (10)	ND (10)	---	---	7.78	---	---
	09/17/08	2 - 3	N	ND (1.4)	ND (10)	27.3 J	---	---	8.63	---	---
	09/17/08	5 - 6	N	ND (1.3)	ND (10)	38.3 J	---	---	9.07	---	---
AOC10d-3	09/17/08	0 - 0.5	N	---	ND (10)	16.1 J	---	---	8.13	---	---
	09/18/08	2 - 3	N	ND (1.4)	ND (10)	ND (10)	---	---	8.85	---	---
	09/18/08	5 - 6	N	ND (1.5)	ND (10)	ND (10)	---	---	9.36	---	---
	09/18/08	5 - 6	FD	ND (1.7)	ND (10)	ND (10)	---	---	9.42	---	---
AOC10d-4	09/18/08	0 - 0.5	N	---	ND (10)	11.6	---	---	7.84	---	---
	09/18/08	2 - 3	N	ND (1.4)	ND (10)	16.8	---	---	8.54	---	---
	09/18/08	5 - 6	N	ND (1.5) J	ND (10)	11.6	---	---	9.07	---	---
DTSC-AOC10d-1	01/18/08[7]	0	N	---	---	---	40.4	35.1	7.7	7.02	15.7
DTSC-AOC10d-2	01/18/08[7]	0	N	---	---	---	38.3	35.5	8.46	5.9	27.4
DTSC-AOC10d-3	01/18/08[7]	0	N	---	---	---	38.2	35.4	8.48	ND (4.04)	13.3
MW-57BR	01/14/09	3 - 4	N	ND (0.96)	ND (10)	ND (10)	---	---	---	---	---
	01/14/09	8 - 9	N	ND (0.89)	ND (10)	ND (10)	---	---	---	---	---
	01/14/09	8 - 9	FD	ND (0.92)	ND (10)	ND (10)	---	---	---	---	---
	01/14/09	18 - 19	N	ND (0.83)	ND (10)	ND (10)	---	---	---	---	---

TABLE C4-6

Sample Results: Total Petroleum Hydrocarbons and pH
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			**General Chemistry (mg/kg)**				
			Interim Screening Level [1] :	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
			Residential Regional Screening Levels [2] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Residential DTSC CHHSL [3] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Levels [4] :	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**
			Ecological Comparison Values [5] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Background [6] :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Chloride**	**Sulfate**
MW-58BR_S	01/29/09	19 - 20	N	ND (1.4)	ND (11)	ND (11)	---	---	---	---	---
	01/29/09	29 - 30	N	ND (0.84)	ND (11)	ND (11)	---	---	---	---	---
	01/29/09	39 - 40	N	ND (0.73)	ND (11)	ND (11)	---	---	---	---	---
	01/29/09	49 - 50	N	ND (0.96) J	ND (11)	ND (11)	---	---	---	---	---
	01/29/09	59 - 60	N	ND (1.1)	ND (11)	ND (11)	---	---	---	---	---
Bank 1	03/07/03	0	N	---	---	---	---	---	8.8	---	---
L-1	02/20/03	0	N	---	---	---	---	---	7.5	---	---
	02/20/03	2	N	---	---	---	---	---	8.7	---	---
L-2	02/20/03	0	N	---	---	---	---	---	8.8	---	---
	02/20/03	2	N	---	---	---	---	---	8.7	---	---
L-2-2	03/05/03	2	N	---	---	---	---	---	8.8	---	---
L-2-3	03/05/03	2	N	---	---	---	---	---	8.6	---	---
L-3	02/20/03	0	N	---	---	---	---	---	8.9	---	---
	02/20/03	1	N	---	---	---	452 J	452 J	8.8	3.71	7.25
	02/20/03	1.5	N	---	---	---	---	---	9.4	---	---
L-3-2	03/05/03	0.5	N	---	---	---	---	---	8.8	---	---

TABLE C4-6

Sample Results: Total Petroleum Hydrocarbons and pH

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

[1] Interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] US EPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

[7] White powder sample

Results greater than the interim screening level are circled.

TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Baard	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-7

Sample Results: Pesticides

AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Interim Screening Level [1] :				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels [2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL [3] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values [4] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
AOC10-3	09/19/08	0 - 0.5	N	ND (2)	ND (2) J	ND (2)	ND (1)	ND (1) J	ND (1) J	ND (1)	ND (1) J	ND (2) J	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2) J	ND (1) J	ND (1)	ND (1) J	ND (1) J	ND (5)	ND (50)
	09/19/08	0 - 0.5	FD	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC10-5	09/19/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC10-8	08/22/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
	08/22/08	0 - 0.5	FD	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC10a-1	10/17/08	0 - 0.5	N	ND (2.1) J*	ND (2.1) J*	ND (2.1) J*	ND (1.1) J	ND (1.1) J	ND (1.1) J	ND (1.1) J	ND (1.1) J	ND (2.1) J	ND (1.1) J	ND (2.1) J	ND (2.1) J	ND (2.1) J	ND (2.1) J	ND (2.1) J	ND (1.1) J	ND (1.1) J	ND (1.1) J	ND (1.1) J	ND (5.3) J	ND (53) J
AOC10b-1	09/30/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC10c-1	10/01/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC10c-2	10/01/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC10d-2	09/17/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1) J	ND (1)	ND (1) J	ND (1) J	ND (2) J	ND (1)	ND (2)	ND (2) J	ND (2)	ND (2)	ND (2) J	ND (1) J	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC10d-3	09/17/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-8

Sample Results: Polychlorinated Biphenyls
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Regional Screening Levels [2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Residential DTSC CHHSL [3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**NE**
Ecological Comparison Values [4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC10-3	09/19/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
	09/19/08	0 - 0.5	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17) J	ND (17)	ND (17)	ND (8.5)
AOC10-5	09/19/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	49	ND (17)	ND (17)	ND (17)	49
	09/19/08	2 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	33 J	ND (17) J	ND (17) J	ND (17) J	33
AOC10-8	08/22/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
	08/22/08	0 - 0.5	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC10a-1	10/17/08	0 - 0.5	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	71	ND (18)	ND (18)	ND (18)	71
AOC10b-1	09/30/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)
AOC10c-1	10/01/08	0 - 0.5	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (8)
AOC10c-2	10/01/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	58	ND (17)	ND (17)	ND (17)	58
	10/01/08	2 - 3	N	ND (17) J	ND (33) J	ND (17) J	ND (17) J	ND (17) J	68 J	ND (17) J	ND (17) J	ND (17) J	68
	10/01/08	2 - 3	FD	ND (17) J	ND (33) J	ND (17) J	ND (17) J	ND (17) J	46 J	ND (17) J	ND (17) J	ND (17) J	46
AOC10d-2	09/17/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	20	ND (17)	ND (17)	ND (17)	20
	09/17/08	2 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
AOC10d-3	09/17/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	19	ND (17)	ND (17)	ND (17)	19
	09/18/08	2 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)

TABLE C4-8

Sample Results: Polychlorinated Biphenyls
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

[1] Interim screening level is the USEPA residential regional screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-9

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences [7]**	**(BTV)**	**# of Exceedences [8]**	**(ECV)**	**# of Exceedences [8]**	**(Res SL)**	**# of Exceedences [8]**	**(ESL)**	**# of Exceedences [8]**	**(Com SL)**	**# of Exceedences [8]**	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 87 (0%)	ND (4.1) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	84 / 87 (97%)	13	4	(11)	4	(11.4)	4	(0.07) *	NA	(NE)	4	(0.24) *	4	(11)
Barium	mg/kg	87 / 87 (100%)	1,300	2	(410)	2	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	2	(410)
Beryllium	mg/kg	0 / 87 (0%)	ND (5.2) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	0 / 87 (0%)	ND (2.1) ‡	0	(1.1)	0	(0.0151) *	0	(39)	NA	(NE)	0	(500)	0	(1.1)
Chromium	mg/kg	105 / 105 (100%)	4,000	41	(39.8)	41	(36.3) *	9	(280)	NA	(NE)	5	(1,400)	41	(39.8)
Chromium, Hexavalent	mg/kg	53 / 105 (50%)	150	36	(0.83)	1	(139.6)	5	(17)	NA	(NE)	3	(37)	36	(0.83)
Cobalt	mg/kg	87 / 87 (100%)	13	1	(12.7)	0	(13)	0	(23)	NA	(NE)	0	(300)	1	(12.7)
Copper	mg/kg	101 / 101 (100%)	300	42	(16.8)	33	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	42	(16.8)
Lead	mg/kg	86 / 87 (99%)	200	32	(8.39)	32	(0.0166) *	2	(80)	NA	(NE)	0	(320)	32	(8.39)
Mercury	mg/kg	2 / 87 (2.3%)	0.64	NA	(NE)	2	(0.0125)	0	(18)	NA	(NE)	0	(180)	2	(0.0125)
Molybdenum	mg/kg	15 / 87 (17%)	19	8	(1.37)	4	(2.25)	0	(380)	NA	(NE)	0	(4,800)	8	(1.37)
Nickel	mg/kg	101 / 101 (100%)	28	1	(27.3)	1	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	1	(27.3)
Selenium	mg/kg	0 / 87 (0%)	ND (2.1) ‡	0	(1.47)	0	(0.177) *	0	(380)	NA	(NE)	0	(4,800)	0	(1.47)
Silver	mg/kg	0 / 87 (0%)	ND (5.2) ‡	NA	(NE)	0	(5.15)	0	(380)	NA	(NE)	0	(4,800)	0	(5.15)
Thallium	mg/kg	4 / 87 (4.6%)	6.1	NA	(NE)	4	(2.32)	1	(5)	NA	(NE)	0	(63)	4	(2.32)
Vanadium	mg/kg	87 / 87 (100%)	52	0	(52.2)	0	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	0	(52.2)
Zinc	mg/kg	101 / 101 (100%)	1,000	46	(58)	46	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	46	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	9 / 9 (100%)	18,000	1	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	1	(16,400)
Calcium	mg/kg	10 / 10 (100%)	139,000	1	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	1	(66,500)
Iron	mg/kg	10 / 10 (100%)	32,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	10 / 10 (100%)	12,800	1	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	1	(12,100)
Manganese	mg/kg	9 / 9 (100%)	1,300	2	(402)	2	(220)	0	(1,800)	NA	(NE)	0	(23,000)	2	(402)
Potassium	mg/kg	9 / 9 (100%)	4,100	0	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(4,400)
Sodium	mg/kg	10 / 10 (100%)	1,280	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 9 (0%)	ND (4.86) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Polycyclic Aromatic Hydrocarbons															
Anthracene	µg/kg	4 / 86 (4.7%)	86	NA	(NE)	NA	(NE)	0	(17,000,000)	NA	(NE)	0	(170,000,000)	0	(17,000,000)
Benzo (a) anthracene	µg/kg	28 / 86 (33%)	560	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Benzo (a) pyrene	µg/kg	34 / 86 (40%)	920	NA	(NE)	NA	(NE)	13	(38)	NA	(NE)	4	(130)	13	(38)
Benzo (b) fluoranthene	µg/kg	34 / 86 (40%)	1,600	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	1	(1,300)	1	(380)
Benzo (ghi) perylene	µg/kg	31 / 86 (36%)	1,400	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	32 / 86 (37%)	580	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Chrysene	µg/kg	34 / 86 (40%)	930	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Dibenzo (a,h) anthracene	µg/kg	18 / 86 (21%)	340	NA	(NE)	NA	(NE)	1	(110)	NA	(NE)	0	(380)	0	(380)
Fluoranthene	µg/kg	36 / 86 (42%)	1,000	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Indeno (1,2,3-cd) pyrene	µg/kg	30 / 86 (35%)	1,100	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Phenanthrene	µg/kg	25 / 86 (29%)	200	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Pyrene	µg/kg	36 / 86 (42%)	1,100	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	25 / 86 (29%)	290	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	36 / 86 (42%)	9,500	NA	(NE)	5	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	5	(1,160)

TABLE C4-9

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Units	Frequency of detection	Maximum Detected Value	Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
				# of Exceedences [7]	(BTV)	# of Exceedences [8]	(ECV)	# of Exceedences [8]	(Res SL)	# of Exceedences [8]	(ESL)	# of Exceedences [8]	(Com SL)	# of Exceedences [8]	(Int SL)
Polycyclic Aromatic Hydrocarbons															
B(a)P Equivalent	µg/kg	36 / 86 (42%)	1,400	NA	(NE)	NA	(NE)	15	(38)	NA	(NE)	5	(130)	15	(38)
Polychlorinated biphenyls															
Aroclor 1254	µg/kg	7 / 13 (54%)	71	NA	(NE)	NA	(NE)	0	(220)	NA	(NE)	0	(740)	0	(220)
Total PCBs	µg/kg	7 / 13 (54%)	71	NA	(NE)	0	(204)	NA	(NE)	NA	(NE)	NA	(NE)	0	(204)
Total Petroleum Hydrocarbons															
TPH as diesel	mg/kg	3 / 80 (3.8%)	51.8	NA	(NE)	NA	(NE)	NA	(NE)	0	(540)	NA	(NE)	0	(540)
TPH as motor oil	mg/kg	37 / 80 (46%)	297	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

Table C4-10
Central Tendency Comparisons (Site to Background)
AOC 10 -- East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

Parameter	Comparison Test Used	Probability that the Observed Differences Would Occur Purely by Chance	Statistical Decision with 0.05 Signficance Level	Mean of Site Detects	Mean of Bkgd Detects	Median of Site Detects	Median of Bkgd Detects	Number of Site Detects	Number of Site Samples	Number of Bkgd Detects	Number of Bkgd Samples	Percent Detects Site	Percent Detects Bkgd
Aluminum	Gehan	0.985	nsd	8660	10400	8100	10000	9	9	55	55	100	100
Arsenic	Gehan	0.000	Site > Bkgd	5.87	4.01	4.95	3.5	84	87	58	59	97	98
Barium	Gehan	0.179	nsd	180	165	140	135	87	87	60	60	100	100
Calcium	Gehan	0.066	nsd	37200	24300	24500	20000	10	10	55	55	100	100
Chromium	Gehan	0.000	Site > Bkgd	192	22.3	32	21.9	105	105	70	70	100	100
Cobalt	Gehan	0.783	nsd	7.39	7.85	7.4	7.61	87	87	58	59	100	98
Copper	Gehan	0.000	Site > Bkgd	31.7	10.5	15	10.1	101	101	70	70	100	100
Lead	Gehan	0.000	Site > Bkgd	14.1	4.38	5.4	3.5	86	87	59	60	99	98
Magnesium	Gehan	0.839	nsd	7540	7950	6650	8100	10	10	55	55	100	100
Manganese	Gehan	0.543	nsd	396	298	270	281	9	9	59	59	100	100
Molybdenum	Gehan	0.215	nsd	2.89	1.03	1.5	1	15	87	11	60	17	18
Nickel	Gehan	0.104	nsd	16.3	15.4	16	15	101	101	70	70	100	100
Zinc	Gehan	0.000	Site > Bkgd	82.1	36.8	58	35.5	101	101	70	70	100	100

Bkgd = background.
NA = not applicable.
nsd = no statistical difference.
< = less than.
> = greater than.

TABLE C4-11

Decision 2 Data Gaps Summary AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric CompanyTopock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	**> HHCV or Background as Applicable? [1]**	**> ECV or Background as Applicable? [1]**	**Proposed Sample ID**	**Notes**
Compound/Depth	Y or N	Det/# results		**Y or N**	**Y or N [2]**		
Metals							
Arsenic				**11 mg/kg (bckg)**	**11.4 mg/kg**		
0-0.5 ft bgs	Y	21 of 22	11 mg/kg	N	N	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC. Note that the highest detected value of 12 mg/kg is equal to the highest detected value in the background data set.
0-3 ft bgs	Y	40 of 43	11 mg/kg	N	N		
0-6 ft bgs	Y	60 of 63	12 mg/kg	Y	Y		
0-10 ft bgs	Y	78 of 81	12 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	19 of 20	8.2 mg/kg	N	N		
Scouring Scenario 1: 2-6 ft bgs	Y	39 of 40	12 mg/kg	Y	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	57 of 58	12 mg/kg	Y	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	57 of 58	12 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	19 of 19	12 mg/kg	Y	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	37 of 37	12 mg/kg	Y	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	37 of 37	12 mg/kg	Y	Y		
Barium				**5200 mg/kg**	**410 mg/kg (bckg)**		
0-0.5 ft bgs	Y	22 of 22	500 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	43 of 43	500 mg/kg	N	Y		
0-6 ft bgs	Y	63 of 63	1300 mg/kg	N	Y		
0-10 ft bgs	Y	81 of 81	1300 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	20 of 20	380 mg/kg	N	N		
Scouring Scenario 1: 2-6 ft bgs	Y	40 of 40	1300 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	58 of 58	1300 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	58 of 58	1300 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	19 of 19	1300 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	37 of 37	1300 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	37 of 37	1300 mg/kg	N	Y		
Chromium-Total				**280 mg/kg**	**39.8 mg/kg (bckg)**		
0-0.5 ft bgs	Y	32 of 32	820 mg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	60 of 60	4000 mg/kg	Y	Y		
0-6 ft bgs	Y	81 of 81	4000 mg/kg	Y	Y		
0-10 ft bgs	Y	99 of 99	4000 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	20 of 20	1500 mg/kg	Y	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	41 of 41	1500 mg/kg	Y	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	59 of 59	1500 mg/kg	Y	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	59 of 59	1500 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	19 of 19	220 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	37 of 37	220 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	37 of 37	220 mg/kg	N	Y		

TABLE C4-11

Decision 2 Data Gaps Summary AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric CompanyTopock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N	Y or N [2]		
Chromium - Hexavalent				**17 mg/kg**	**139.6 mg/kg**		
0-0.5 ft bgs	Y	16 of 32	27.7 mg/kg	Y	N	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	35 of 60	150 mg/kg	Y	Y		
0-6 ft bgs	Y	46 of 81	150 mg/kg	Y	Y		
0-10 ft bgs	Y	51 of 99	150 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	13 of 20	27.3 mg/kg	Y	N		
Scouring Scenario 1: 2-6 ft bgs	Y	24 of 41	27.3 mg/kg	Y	N		
Scouring Scenario 1: 2-10 ft bgs	Y	29 of 59	27.3 mg/kg	Y	N		
Scouring Scenario 1: 2-12 ft bgs	Y	29 of 59	27.3 mg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	11 of 19	4.78 mg/kg	N	N		
Scouring Scenario 2: 5-10 ft bgs	Y	16 of 37	4.78 mg/kg	N	N		
Scouring Scenario 2: 5-15 ft bgs	Y	16 of 37	4.78 mg/kg	N	N		
Copper				**3000 mg/kg**	**20.6 mg/kg**		
0-0.5 ft bgs	Y	29 of 29	270 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	57 of 57	300 mg/kg	N	Y		
0-6 ft bgs	Y	77 of 77	300 mg/kg	N	Y		
0-10 ft bgs	Y	95 of 95	300 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	20 of 20	110 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	40 of 40	110 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	58 of 58	110 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	58 of 58	110 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	19 of 19	41 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	37 of 37	41 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	37 of 37	41 mg/kg	N	Y		
Lead				**80 mg/kg**	**8.39 mg/kg (bckg)**		
0-0.5 ft bgs	Y	22 of 22	200 mg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	42 of 43	200 mg/kg	Y	Y		
0-6 ft bgs	Y	62 of 63	200 mg/kg	Y	Y		
0-10 ft bgs	Y	80 of 81	200 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	19 of 20	47 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	39 of 40	47 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	57 of 58	47 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	57 of 58	47 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	19 of 19	17 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	37 of 37	17 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	37 of 37	17 mg/kg	N	Y		

TABLE C4-11

Decision 2 Data Gaps Summary AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric CompanyTopock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	**> HHCV or Background as Applicable?** [1]	**> ECV or Background as Applicable?** [1]		
Compound/Depth	Y or N	Det/# results		**Y or N**	**Y or N** [2]	**Proposed Sample ID**	**Notes**
Mercury				**18 mg/kg**	**0.0125 mg/kg**		
0-0.5 ft bgs	N	1 of 22	0.64 mg/kg	N	N	None	Compound exceeds ECV and no background value has been established. Detection limits are elevated relative to the ECV. Additional data collection is likely to yield additional non-detected values. The EPC has been defined within the limits of the analytical instrumentation.
0-3 ft bgs	N	2 of 43	0.64 mg/kg	N	Y		
0-6 ft bgs	N	2 of 63	0.64 mg/kg	N	Y		
0-10 ft bgs	N	2 of 81	0.64 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 20	NA mg/kg	N	N		
Scouring Scenario 1: 2-6 ft bgs	NA	0 of 40	NA mg/kg	N	N		
Scouring Scenario 1: 2-10 ft bgs	NA	0 of 58	NA mg/kg	N	N		
Scouring Scenario 1: 2-12 ft bgs	NA	0 of 58	NA mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 19	NA mg/kg	N	N		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 37	NA mg/kg	N	N		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 37	NA mg/kg	N	N		
Molybdenum				**380 mg/kg**	**2.25 mg/kg**		
0-0.5 ft bgs	N	3 of 22	19 mg/kg	N	N	None	Compound exceeds ECV but maximum shown (19 mg/kg) is from AOC10a-1 located adjacent to AOC9 and included in AOC9 for the ecological risk assessment (ERA). The maximum from the ERA dataset for the 0 to 0.5 feet bgs exposure interval is 1.5 mg/kg which is less than the ECV. Therefore, no additional molybdenum data are required for the 0 to 0.5 ft exposure interval. The remaining exposure intervals (0 to 3, 0 to 6, and 0 to 10 feet bgs) and intervals under Scouring Scenario 1 have sufficient data to support EPC calculation using ProUCL. The maximum detected concentrations from deep intervals under scouring scenario 2 do not exceed the comparison values and therefore no additional data are needed.
0-3 ft bgs	Y	10 of 43	19 mg/kg	N	Y		
0-6 ft bgs	Y	12 of 63	19 mg/kg	N	Y		
0-10 ft bgs	Y	14 of 81	19 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	6 of 20	2.9 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	8 of 40	2.9 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	10 of 58	2.9 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	10 of 58	2.9 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	N	2 of 19	1.9 mg/kg	N	N		
Scouring Scenario 2: 5-10 ft bgs	N	4 of 37	1.9 mg/kg	N	N		
Scouring Scenario 2: 5-15 ft bgs	N	4 of 37	1.9 mg/kg	N	N		

TABLE C4-11

Decision 2 Data Gaps Summary AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric CompanyTopock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value	**> HHCV or Background as Applicable?** [1]	**> ECV or Background as Applicable?** [1]	**Proposed Sample ID**	**Notes**
	Y or N	Det/# results		**Y or N**	**Y or N** [2]		
Thallium				**5 mg/kg**	**2.32 mg/kg**		
0-0.5 ft bgs	NA	0 of 22	NA mg/kg	N	N	None	Compound exceeds HHCV and ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC because additional sampling would likely result in additional non-detect values.
0-3 ft bgs	N	1 of 43	6.1 mg/kg	Y	Y		
0-6 ft bgs	N	1 of 63	6.1 mg/kg	Y	Y		
0-10 ft bgs	N	1 of 81	6.1 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 20	NA mg/kg	N	N		
Scouring Scenario 1: 2-6 ft bgs	NA	0 of 40	NA mg/kg	N	N		
Scouring Scenario 1: 2-10 ft bgs	NA	0 of 58	NA mg/kg	N	N		
Scouring Scenario 1: 2-12 ft bgs	NA	0 of 58	NA mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 19	NA mg/kg	N	N		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 37	NA mg/kg	N	N		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 37	NA mg/kg	N	N		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	Y	29 of 29	1000 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	57 of 57	1000 mg/kg	N	Y		
0-6 ft bgs	Y	77 of 77	1000 mg/kg	N	Y		
0-10 ft bgs	Y	95 of 95	1000 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	20 of 20	170 mg/kg	N	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	40 of 40	170 mg/kg	N	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	58 of 58	170 mg/kg	N	Y		
Scouring Scenario 1: 2-12 ft bgs	Y	58 of 58	170 mg/kg	N	NA		
Scouring Scenario 2: 5-6 ft bgs	Y	19 of 19	80 mg/kg	N	Y		
Scouring Scenario 2: 5-10 ft bgs	Y	37 of 37	80 mg/kg	N	Y		
Scouring Scenario 2: 5-15 ft bgs	Y	37 of 37	80 mg/kg	N	Y		
Contract Laboratory Program Inorganics							
Aluminum				**77000 mg/kg**	**16400 mg/kg (bckg)**		
0-0.5 ft bgs	Y	9 of 9	18000 mg/kg	N	Y	None	Compound may exceed ECV (background). Existing data adequate for EPC. Under the scouring scenarios, no data are available. However, additional data collection does not appear warranted given that the maximum detected concentration at AOC10 is only slightly greater than background and the remaining detections are well below background. In addition, it is reasonable to assume that the nature and extent of the aluminum detected in the 0-0.5 interval is representative of concentrations at deeper depths.
0-3 ft bgs	Y	9 of 9	18000 mg/kg	N	Y		
0-6 ft bgs	Y	9 of 9	18000 mg/kg	N	Y		
0-10 ft bgs	Y	9 of 9	18000 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-12 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		

TABLE C4-11

Decision 2 Data Gaps Summary AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric CompanyTopock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	**> HHCV or Background as Applicable?** [1]	**> ECV or Background as Applicable?** [1]	**Proposed Sample ID**	
Compound/Depth	Y or N	Det/# results		**Y or N**	**Y or N** [2]		**Notes**
Calcium				**66500 mg/kg (bckg)**	**66500 mg/kg (bckg)**		
0-0.5 ft bgs	Y	9 of 9	44000 mg/kg	N	N	None	Compound may exceed HHCV and ECV (both background). Existing data adequate for EPC. Under the scouring scenarios, no data are available. However, additional data collection to support the scouring scenarios does not appear warranted given that the concentrations are comparable to background (Section 3.3). In addition, it is reasonable to assume that the nature and extent of the calcium detected in the 0 to 3.0 ft interval is representative of concentrations at deeper depths.
0-3 ft bgs	Y	10 of 10	139000 mg/kg	Y	Y		
0-6 ft bgs	Y	10 of 10	139000 mg/kg	Y	Y		
0-10 ft bgs	Y	10 of 10	139000 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-12 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Magnesium				**12100 mg/kg (bckg)**	**12100 mg/kg (bckg)**		
0-0.5 ft bgs	Y	9 of 9	12000 mg/kg	N	N	None	Compound may exceed HHCV and ECV (both background). Existing data adequate for EPC. Under the scouring scenarios, no data are available. However, additional data collection to support the scouring scenarios does not appear warranted given that the maximum concentration is approximately equal to background. In addition, it is reasonable to assume that the nature and extent of the magnesium detected in the 0 to 3.0 ft interval is representative of concentrations at deeper depths.
0-3 ft bgs	Y	10 of 10	12800 mg/kg	Y	Y		
0-6 ft bgs	Y	10 of 10	12800 mg/kg	Y	Y		
0-10 ft bgs	Y	10 of 10	12800 mg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-12 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		

TABLE C4-11

Decision 2 Data Gaps Summary AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric CompanyTopock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	**> HHCV or Background as Applicable? [1]**	**> ECV or Background as Applicable? [1]**	**Proposed Sample ID**	**Notes**
Compound/Depth	Y or N	Det/# results		**Y or N**	**Y or N [2]**		
Manganese				**1800 mg/kg**	**402 mg/kg (bckg)**		
0-0.5 ft bgs	Y	9 of 9	1300 mg/kg	N	Y	None	Compound may exceed ECV (background). Existing data adequate for EPC. Only one of nine samples (AOC10-5) significantly exceeds background. Under the scouring scenarios, no data are available. However, additional data collection to support developing EPCs for the scouring scenarios does not appear warranted as it is reasonable to assume that the nature and extent of the manganese detected in the 0-0.5 interval is representative of concentrations at deeper depths.
0-3 ft bgs	Y	9 of 9	1300 mg/kg	N	Y		
0-6 ft bgs	Y	9 of 9	1300 mg/kg	N	Y		
0-10 ft bgs	Y	9 of 9	1300 mg/kg	N	NA		
Scouring Scenario 1: 2-3 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 1: 2-12 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-6 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-10 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Scouring Scenario 2: 5-15 ft bgs	NA	0 of 0	NA mg/kg	NA	NA		
Polynuclear Aromatic Hydrocarbons							
PAHs (BaP TEQ)				**38 µg/kg**	**NA**		
0-0.5 ft bgs	Y	20 of 22	1400 µg/kg	Y	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	31 of 42	1400 µg/kg	Y	NA		
0-6 ft bgs	Y	35 of 62	1400 µg/kg	Y	NA		
0-10 ft bgs	Y	36 of 80	1400 µg/kg	Y	NA		
Scouring Scenario 1: 2-3 ft bgs	Y	11 of 20	420 µg/kg	Y	NA		
Scouring Scenario 1: 2-6 ft bgs	Y	15 of 40	420 µg/kg	Y	NA		
Scouring Scenario 1: 2-10 ft bgs	Y	16 of 58	420 µg/kg	Y	NA		
Scouring Scenario 1: 2-12 ft bgs	Y	16 of 58	420 µg/kg	Y	NA		
Scouring Scenario 2: 5-6 ft bgs	N	4 of 19	37 µg/kg	N	NA		
Scouring Scenario 2: 5-10 ft bgs	Y	5 of 37	37 µg/kg	N	NA		
Scouring Scenario 2: 5-15 ft bgs	Y	5 of 37	37 µg/kg	N	NA		

TABLE C4-11

Decision 2 Data Gaps Summary AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric CompanyTopock Compressor Station, Needles, California

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	**> HHCV or Background as Applicable?** [1] **Y or N**	**> ECV or Background as Applicable?** [1] **Y or N** [2]	**Proposed Sample ID**	**Notes**
HMW PAHs				**NA**	**1160 µg/kg**		
0-0.5 ft bgs	Y	20 of 22	9500 µg/kg	NA	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	31 of 42	9500 µg/kg	NA	Y		
0-6 ft bgs	Y	35 of 62	9500 µg/kg	NA	Y		
Scouring Scenario 1: 2-3 ft bgs	Y	11 of 20	3100 µg/kg	NA	Y		
Scouring Scenario 1: 2-6 ft bgs	Y	15 of 40	3100 µg/kg	NA	Y		
Scouring Scenario 1: 2-10 ft bgs	Y	16 of 58	3100 µg/kg	NA	Y		
Scouring Scenario 2: 5-6 ft bgs	N	4 of 19	240 µg/kg	NA	N		
Scouring Scenario 2: 5-10 ft bgs	Y	5 of 37	240 µg/kg	NA	N		
Scouring Scenario 2: 5-15 ft bgs	Y	5 of 37	240 µg/kg	NA	N		

Footnotes:

[1] The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

[2] AOC10 was evaluated for data sufficiency to support the ecological risk assessment excluding AOC10a-1. This sample was included in AOC 9 evaluation for adequacy to support EPC calculations for the ecological risk assessment due to its close proximity to AOC 9 and topography.

Acronyms and Abbreviations:

AOC - area of concern
BaP TEQ - benzo(a)pyrene toxic equivalents
ECV - ecological comparison values
EPC - exposure point concentration
ft bgs - feet below ground surface
HHCV - human health comparison values
HMW PAH - high molecular weight polycyclic aromatic hydrocarbons
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
N - no
NA - not applicable
Y - yes

TABLE C4-12
Results of Tiered Analysis at AOC 10a through AOC 10d – East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

Metal	Step 1 Do COPCs/COPECs Exceed Background?	Step 2 Do COPCs/COPECs Exceed SSL?	Step 3 Does Screening Model Eliminate Potential for Leaching to Groundwater?
AOC 10a			
Chromium	√		
Chromium, Hexavalent	√	√	No
Copper	√		
Lead	√	√	No
Molybdenum	√	√	No
Nickel	√		
Zinc	√		
AOC 10b			
Chromium	√	√	Yes
Chromium, Hexavalent	√	√	No
Copper	√		
Lead	√		
Molybdenum	√	√	Yes
Zinc	√		
AOC 10c			
Chromium	√	√	Yes
Chromium, Hexavalent	√	√	No
Copper	√		
Lead	√		
Molybdenum	√	√	Yes
Zinc	√		
AOC 10d			
Arsenic	√		
Barium	√	√	Yes
Chromium	√		
Chromium, Hexavalent	√	√	No
Copper	√		
Lead	√		
Molybdenum	√	√	Yes
Zinc	√		

✓ = Constituents concentration exceeds background and/or SSL

TABLE C4-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10a - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)						
Soil Screening Levels : [1]				**380**	**0.02**	**690**	**120**	**0.73**	**130**	**4,200**
Background : [2]				**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**27.3**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Zinc**
AOC10a-1	10/17/08	0 - 0.5	N	80	8.25	270 J	200 J	19	28	1,000 J

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-14

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10b - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)					
			Soil Screening Levels : [1]	**480**	**0.03**	**1,100**	**180**	**0.73**	**6,600**
			Background : [2]	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC10-1	10/02/08	0 - 0.5	N	6.6	ND (0.401)	4.9	9.2	ND (1)	20
	10/02/08	2 - 3	N	7.4	ND (0.405)	5.6	5.8	ND (1)	21
	10/02/08	5 - 6	N	7.5	ND (0.407)	5.8	5.4	ND (1)	20
	10/02/08	9 - 10	N	6.8	ND (0.406)	5.7	4.8	ND (1)	21
AOC10b-1	09/30/08	0 - 0.5	N	24	0.559	9.8	8.6	ND (1)	38
	09/30/08	2 - 3	N	63	1.39	28	8.4 J	ND (1)	110 J
	09/30/08	2 - 3	FD	61	1.39	27	12 J	1.5	160 J
	09/30/08	5 - 6	N	20	0.425	8	4.3	ND (1)	39
	09/30/08	9 - 10	N	29	ND (0.407)	10	3.7	ND (2)	29
AOC10b-2	09/30/08	0 - 0.5	N	29	0.434	11	8.2	1.1	40
	09/30/08	2 - 3	N	47	1.05	15	5.2	1.1	44
	09/30/08	5 - 6	N	29	0.453	8.8	4.2	1	27
	09/30/08	9 - 10	N	39	0.759	15	3.8	ND (2)	38
AOC10b-3	09/30/08	0 - 0.5	N	820	27.7	90	24	1.5	240
	10/01/08	2 - 3	N	90	1.82	23	5	ND (1)	59
	10/01/08	5 - 6	N	38	0.429	14	3.8	ND (2.1)	40
	10/01/08	5 - 6	FD	36	ND (0.417)	16	3.6	ND (2.1)	39
	10/01/08	9 - 10	N	36	ND (0.415)	13	3.5	ND (2.1)	44
AOC10b-4	09/30/08	0 - 0.5	N	12	ND (0.401)	5.8	41	ND (1)	29
	09/30/08	2 - 3	N	14	ND (0.403)	6.7	10	ND (1)	31
	09/30/08	5 - 6	N	20	ND (0.407)	8.9	3.4	ND (1)	35
	09/30/08	9 - 10	N	26	ND (0.415)	11	2.8	ND (1)	42
Bank 1	03/07/03	0	N	21.5	ND (4)	13.7	---	---	55
L-1	02/20/03	0	N	88.4	ND (4.1)	34.8	---	---	99.7
	02/20/03	2	N	217	2.5	69.6	---	---	123
PS-21	04/13/99	0	N	16.5	0.9	14.2	---	---	43.9
	04/13/99	2	N	90	ND (0.51)	12.6	---	---	59.1

TABLE C4-14

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10b - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)					
			Soil Screening Levels : [1]	**480**	**0.03**	**1,100**	**180**	**0.73**	**6,600**
			Background : [2]	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
PS-22	04/13/99	0	N	24.7	ND (0.5)	11.4	---	---	85.3

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-15

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10c - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
			Soil Screening Levels : [1]	**39**	**500**	**0.03**	**3.8**	**1,200**	**200**	**34**	**0.73**	**0.01**	**7,200**
			Background : [2]	**11**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Thallium**	**Zinc**
AOC10c-1	10/01/08	0 - 0.5	N	4.2	55	1.98	5.4	15	7.8	ND (0.1)	ND (1)	ND (2)	48
	10/01/08	2 - 3	N	1.2	490	27.3	5.6	41	18	ND (0.1)	1.2	ND (2)	76
	10/01/08	5 - 6	N	3.4	220	4.78	8.2	17	5.4	ND (0.1)	ND (2)	ND (4.1)	42
	10/01/08	9 - 10	N	4	63	1.37	9.2	14	3.4	ND (0.1)	1	ND (2)	39
AOC10c-2	10/01/08	0 - 0.5	N	5.9	51	1.25	5.8	19	12	ND (0.1)	ND (2)	ND (4)	61
	10/01/08	2 - 3	N	4.1	190	3.77	5.6	37	17	ND (0.1)	2.2	ND (2)	78
	10/01/08	2 - 3	FD	4.1	180	3.8	5.4	34	16	ND (0.1)	1.9	ND (2)	75
	10/01/08	5 - 6	N	3.4	110	1.92	8.4	24	7	ND (0.1)	1.9	ND (2)	51
	10/01/08	9 - 10	N	4.5	32	0.605	11	13	2.7	ND (0.1)	ND (1)	ND (2)	50
AOC10c-3	10/02/08	0 - 0.5	N	9.4	110	2.56	8	42	32	ND (0.1)	ND (2)	ND (4.1)	140
	10/02/08	2 - 3	N	3.6	690	9.27	7	60	31	ND (0.11)	ND (2.1)	ND (4.1)	140
	10/02/08	2 - 3	FD	3.5	660	7.97	6.9	60	26	ND (0.1)	ND (2.1)	ND (4.1)	140
	10/02/08	5 - 6	N	3.9	29	0.512	7.8	9	4.5	ND (0.1)	ND (1)	ND (2)	36
	10/02/08	9 - 10	N	4.4	22	ND (0.412)	7.8	11	2.7	ND (0.1)	ND (1)	ND (2.1)	41
AOC10c-4	10/01/08	0 - 0.5	N	11	120	2.66	8.8	46	36	ND (0.1)	ND (2.1)	ND (4.1)	150
	10/01/08	2 - 3	N	5.9	90	2.11	9.9	19	8.9	ND (0.1)	ND (2)	ND (4.1)	52
	10/01/08	5 - 6	N	4.6	27	2.84	9.1	14	2.6	ND (0.1)	ND (1)	ND (2)	47
	10/01/08	9 - 10	N	7.3	92	0.436	5.4	25	13	ND (0.1)	ND (2.1)	ND (4.1)	74
AOC10c-5	10/01/08	0 - 0.5	N	6.6	81	2.49	6.3	29	15	ND (0.1)	ND (2)	ND (4)	80
	10/01/08	2 - 3	N	ND (1)	1,500	16.4	6.7	110	47	ND (0.1)	2.9	ND (4.1)	170
	10/01/08	5 - 6	N	3.7	82	1.48	8.6	12	4	ND (0.1)	ND (2.1)	ND (4.1)	44
	10/01/08	9 - 10	N	4.5	47	0.423	9.1	15	3	ND (0.1)	ND (1)	ND (2)	46
MW-58BR_S	01/29/09	1.5 - 2	N	ND (2.1)	4,000	150	8.2	300	160	0.33	3.5	6.1	300
	01/29/09	19 - 20	N	12	33	0.43	12	24	4	ND (0.11)	ND (2.1)	4.7	63
	01/29/09	29 - 30	N	13	26	ND (0.17)	11	14	3.6	ND (0.11)	ND (2.1)	4.8	64
	01/29/09	39 - 40	N	12	35	0.43	12	17	4.2	ND (0.11)	ND (2.1)	4.7	51
	01/29/09	49 - 50	N	8.3	24	ND (0.17)	8.7	17	3.7	ND (0.11)	ND (1.1)	ND (2.1)	46
	01/29/09	59 - 60	N	8.4	27	ND (0.18)	13	58	3.4	ND (0.11)	ND (1.1)	ND (2.2)	41

TABLE C4-15

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10c - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
		Soil Screening Levels : [1]		**39**	**500**	**0.03**	**3.8**	**1,200**	**200**	**34**	**0.73**	**0.01**	**7,200**
		Background : [2]		**11**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium**	**Chromium Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Thallium**	**Zinc**
AOC10-XRF-01	08/25/08	0 - 0.5	N	---	9.2	ND (0.404)	---	---	---	---	---	---	---
AOC10-XRF-02	08/25/08	0 - 0.5	N	---	11	ND (0.404)	---	---	---	---	---	---	---
AOC10-XRF-03	08/25/08	0 - 0.5	N	---	10	ND (0.405)	---	---	---	---	---	---	---
AOC10-XRF-10	09/21/08	3 - 4	N	---	26	ND (0.416)	---	---	---	---	---	---	---
L-2	02/20/03	0	N	---	86.8	ND (4.7)	---	42.7	---	---	---	---	122
	02/20/03	2	N	---	3,360	13	---	211	---	---	---	---	278
L-2-2	03/05/03	2	N	---	1,610	41	---	139	---	---	---	---	203
L-2-3	03/05/03	2	N	---	2,740	99	---	288	---	---	---	---	299

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-16

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10d - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)							
Soil Screening Levels : [1]				**39**	**1,200**	**1,700**	**0.11**	**5,900**	**1,000**	**0.73**	**36,000**
Background : [2]				**11**	**410**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC10-3	09/19/08	0 - 0.5	N	3.1	160	62	1.91	14	7.8	ND (2)	40
	09/19/08	0 - 0.5	FD	2.6	150	64	1.7	13	7.7	ND (2)	41
	09/19/08	2 - 3	N	3.3	160	43	ND (0.412)	14	ND (5.1)	ND (5.1)	47
	09/19/08	5 - 6	N	5.4	220	37	0.705	16	2.9	ND (5.1)	61
	09/19/08	9 - 10	N	7.4	110	28	ND (0.412)	12	2.8	ND (1)	50
AOC10-4	09/19/08	0 - 0.5	N	3.5	110	33	0.55	14	11	ND (2)	52
	09/19/08	2 - 3	N	2.5	130	26	ND (0.409)	16	4.4	ND (2)	38
	09/19/08	5 - 6	N	5.9	75	27	ND (0.418)	16	3	ND (5.2)	63
	09/19/08	9 - 10	N	7.7	48	18	ND (0.413)	12	2.7	ND (1)	48
AOC10-5	09/19/08	0 - 0.5	N	9.6	500	39	1.01	27	27	ND (5.1)	97
	09/19/08	2 - 3	N	8.2	380	30	0.48	21	34	ND (5.1)	77
	09/19/08	5 - 6	N	12	1,100	19	ND (0.407)	40	6.7	ND (5.1)	80
	09/19/08	5 - 6	FD	12	1,300	18	ND (0.407)	41	7.3	ND (5.1)	79
AOC10-6	09/20/08	0 - 0.5	N	7	220 J	24	ND (0.402)	11	26	ND (2)	58
	09/20/08	2 - 3	N	4.2	220	23	ND (0.404)	9.5	4.1	ND (1)	45
AOC10-7	09/20/08	0 - 0.5	N	7.6	250	22	ND (0.414)	12	8.6	ND (1)	54
	09/20/08	2 - 3	N	8	210	27	ND (0.406)	12	8.1	1.1	58
	09/20/08	5 - 6	N	9.6	270	33	ND (0.407)	13	4.4	ND (2)	58
AOC10-8	08/22/08	0 - 0.5	N	8.6	210	16	ND (0.402)	12	15 J	ND (2)	87
	08/22/08	0 - 0.5	FD	8.2	180	18	ND (0.416)	12	12 J	ND (2)	75
AOC10d-1	09/18/08	0 - 0.5	N	3.4	120	49	0.644	16	8.8	ND (2)	58
	09/18/08	2 - 3	N	3.9	120	150	2.86	31	6.8	ND (2)	76
	09/18/08	5 - 6	N	6.9	200	66	1.06	23	5.2	ND (5.2)	80
	09/18/08	5 - 6	FD	7.1	210	64	0.703	23	5.3	ND (5.2)	74
	09/18/08	9 - 10	N	9.8	140	23	ND (0.414)	12	3.5	ND (2.1)	58
AOC10d-2	09/17/08	0 - 0.5	N	4.2	180	22	ND (0.403)	17	21	ND (2)	61
	09/17/08	2 - 3	N	3.3	180	40	1.16	14	16	ND (2)	54

TABLE C4-16

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10d - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)							
			Soil Screening Levels : [1]	**39**	**1,200**	**1,700**	**0.11**	**5,900**	**1,000**	**0.73**	**36,000**
			Background : [2]	**11**	**410**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC10d-2	09/17/08	5 - 6	N	6.6	210	33	0.597	16	6.2	ND (5.1)	70
	09/17/08	9 - 10	N	7.2	150	22	ND (0.406)	16	3.2	ND (5.1)	73
AOC10d-3	09/17/08	0 - 0.5	N	3.6	120	20	ND (0.406)	12	22	ND (2)	52
	09/18/08	2 - 3	N	3.4	270	64	1.91	18	21	ND (2)	61
	09/18/08	5 - 6	N	7.3	280	30	ND (0.407)	18	3.3	ND (5.1)	60
	09/18/08	5 - 6	FD	6	330	31	ND (0.407)	18	5.1	ND (5.1)	59
	09/18/08	9 - 10	N	8.2	150	21	ND (0.408)	11	3.6	ND (2)	56
AOC10d-4	09/18/08	0 - 0.5	N	9.2	340	29	0.92	25	25	ND (5.2)	85
	09/18/08	2 - 3	N	5.4	260	130	3.93	27	26	ND (2.1)	81
	09/18/08	5 - 6	N	3.6	220	66	ND (0.415)	21	17	ND (2)	64
	09/18/08	9 - 10	N	6.9	220	32	ND (0.41)	16	5.2	ND (5.1)	68
MW-57BR	01/14/09	3 - 4	N	9.2	270	26	ND (0.16)	11	6.7	ND (2)	52
	01/14/09	8 - 9	N	8	85	20	ND (0.17)	11	2.7	1.3	46
	01/14/09	8 - 9	FD	8.4	85	22	ND (0.16)	11	2.9	1.3	48
	01/14/09	18 - 19	N	9.9	240	25	ND (0.16)	12	4.3	3	68
L-3	02/20/03	0	N	---	---	28.4	ND (4.5)	22.7	---	---	74.3
	02/20/03	1	N	---	---	379	1.2 J	79.7	---	---	252
	02/20/03	1.5	N	---	---	77.7	ND (4)	17.2	---	---	61.9
L-3-2	03/05/03	0.5	N	---	---	228	9.4	40.5	---	---	129

TABLE C4-16

Sample Results Compared to the Calculated Soil Screening Levels
AOC 10d - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C4-17

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)
AOC10 - East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

		Maximum Detected Value (mg/kg)	**TTLC in mg/kg[1]**		**STLC in mg/L[1]**			**TCLP in mg/L [1]**		
Parameter	**Frequency of detection**		**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	0 / 87 (0%)	ND (4.1)	0	500	0	150	15	0	NE	NE
Arsenic	84 / 87 (97%)	13	0	500	0	50	5	0	100	5
Barium	87 / 87 (100%)	1,300	0	10000	1	1000	100	0	2000	100
Beryllium	0 / 87 (0%)	ND (5.2)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 87 (0%)	ND (2.1)	0	100	0	10	1	0	20	1
Chromium	105 / 105 (100%)	4,000	3	2500	36	50	5	18	100	5
Chromium, Hexavalent	53 / 105 (50%)	150	0	500	2	50	5	0	NE	NE
Cobalt	87 / 87 (100%)	13	0	8000	0	800	80	0	NE	NE
Copper	101 / 101 (100%)	300	0	2500	3	250	25	0	NE	NE
Lead	86 / 87 (99%)	200	0	1000	2	50	5	2	100	5
Mercury	2 / 87 (2.3%)	0.64	0	20	0	2	0.2	0	4	0.2
Molybdenum	15 / 87 (17%)	19	0	3500	0	3500	350	0	NE	NE
Nickel	101 / 101 (100%)	28	0	2000	0	200	20	0	NE	NE
Selenium	0 / 87 (0%)	ND (2.1)	0	100	0	10	1	0	20	1
Silver	0 / 87 (0%)	ND (5.2)	0	500	0	50	5	0	100	5
Thallium	4 / 87 (4.6%)	6.1	0	700	0	70	7	0	NE	NE
Vanadium	87 / 87 (100%)	52	0	2400	0	240	24	0	NE	NE
Zinc	101 / 101 (100%)	1,000	0	5000	0	2500	250	0	NE	NE

Notes

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC.

TABLE C4-18
Proposed Phase 2 Soil Sampling Locations at AOC10 – East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Anticipated Collection Methods[a]
AOC9-15	0, 2, 5 and 9	To resolve Data Gap #1 - Define lateral extent associated with western portion of AOC 10 and down slope of AOC9	Hexavalent chromium, Title 22 metals, PAHs, PCBs, pesticides	Backhoe
AOC9-16	0, 2, 5 and 9	To resolve Data Gaps #1 and 5 - Define lateral extent associated with western portion of AOC 10 and down slope of AOC9 and support CMS/FS	Hexavalent chromium, Title 22 metals, PAHs, PCBs, pesticides; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Backhoe
AOC10-9	0, 2, 5, and 9	To resolve data gap #2 – Assess nature and extent associated with runoff from station access road to the low point north of Subarea 10d	Hexavalent chromium, Title 22 metals, PAHs	Backhoe
AOC10-10	0, 2, 5, and 9	To resolve data gap #1- Assess lateral extent associated with PS-21 and nature and extent of potential impact from soil down slope from the outfall	Hexavalent chromium, Title 22 metals	Rotosonic
AOC10-11	0, 2, 5, and 9	To resolve data gaps #1, 3, and 5 - Assess potential impacts from debris on south slope and support CMS/FS, and the lateral extent between Subareas 10b and 10c	Hexavalent chromium, Title 22 metals, PAHs; pH, TPH, SVOCs, dioxins and furans (if burn material present), PCBs soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution))	Rotosonic
AOC10-12	0, 2, 5, and 9	To resolve data gap #3 -Assess potential impacts from debris on south slope (may not be technically feasible to get to proposed depth)	Hexavalent chromium, Title 22 metals, PAHs	Rotosonic
AOC10-13	White powder only	To resolve data gap #3 - Assess white powder material on north slope	Hexavalent chromium, PAHs, pH, Title 22 metals	Hand tools
AOC10-14	White powder only and discolored soil	To resolve data gap #3 - Assess white powder material on north slope	Hexavalent chromium, PAHs, pH, Title 22 metals	Rotosonic

TABLE C4-18
Proposed Phase 2 Soil Sampling Locations at AOC10 – East Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

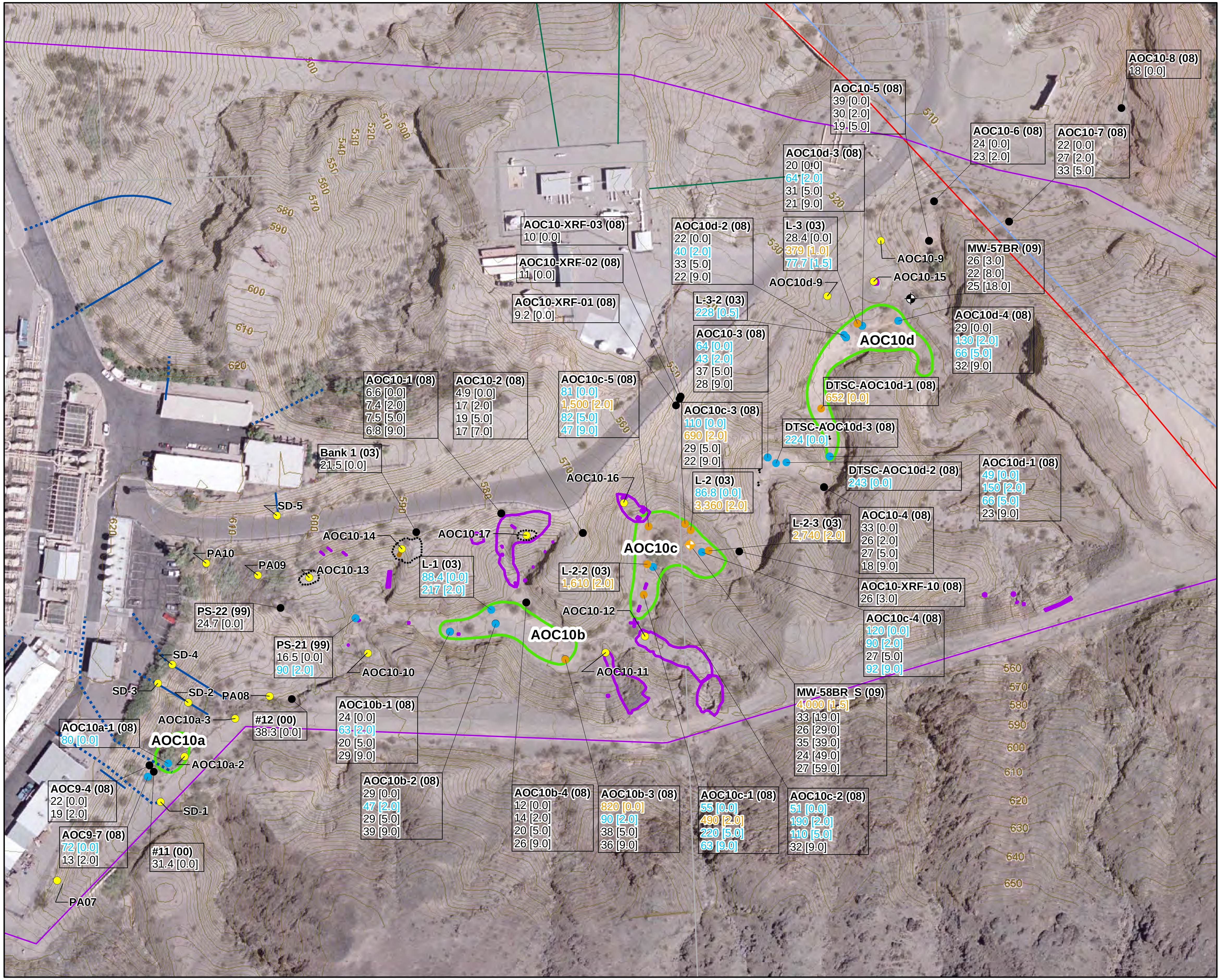
Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Anticipated Collection Methods[a]
AOC10-15	0, 2, 5, and 9	To resolve data gap #3 – Assess potential impact from debris (dirt pile with green-colored wood*)*	Hexavalent chromium, Title 22 metals, PAHs, pH, TPH, SVOCs, dioxins and furans (if burn material present), PCBs	Backhoe
AOC10-16	0, 2, 5, and 9	To resolve data gap #3 - Assess potential impacts from debris on south slope (may not be technically feasible to get to proposed depth)	Hexavalent chromium, PAHs, pH, Title 22 metals	Hand tools
AOC10-17	White powder and discolored soil only	To resolve data gap #3 -Assess white powder material and discolored soil on north slope	Hexavalent chromium, PAHs, pH, Title 22 metals	Hand tools
AOC10a-2	0, 2, 5, and 9	To resolve data gaps # 1 and #4 - Assess vertical and lateral extent and collect data to assess current threat to groundwater.	Hexavalent chromium, Title 22 metals, PAHs	Backhoe
AOC10a-3	0, 2, 5, and 9	To resolve data gap #1 -Assess lateral extent (down slope of AOC9 and Subarea 10a)	Hexavalent chromium, Title 22 metals, PAHs	Backhoe
AOC10d-9	0, 2, 5, and 9	To resolve data gap #2 -Assess lateral extent associated with AOC 10d-3 and L-3	Hexavalent chromium, Title 22 metals, PAHs	Backhoe

Notes:

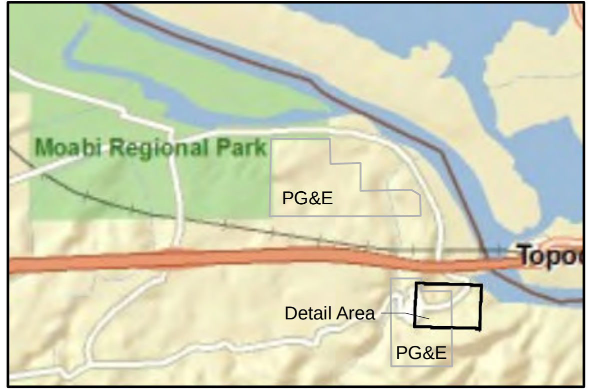
ACM = asbestos-containing material.

[a] Anticipated collection methods listed on this table are best guess based on experience and knowledge of the site; actual collection method will be chosen in the field based on field conditions and site access restrictions.

Figures



VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- ⊕ Monitoring Well
- — Property Boundary
- — 2 Foot Contour
- 🟩 AOC 10 Boundary
- 🟪 Debris Feature
- 🟫 Stained Soil
- ⬚ White Powder
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (39.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the U.S. Environmental Protection Agency Residential Regional Screening Level (280 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (36.3 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foot intervals.

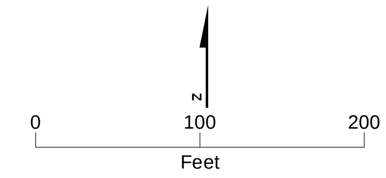


FIGURE C4-1
Total Chromium Soil Sample Results and Proposed Phase 2 Sample Locations AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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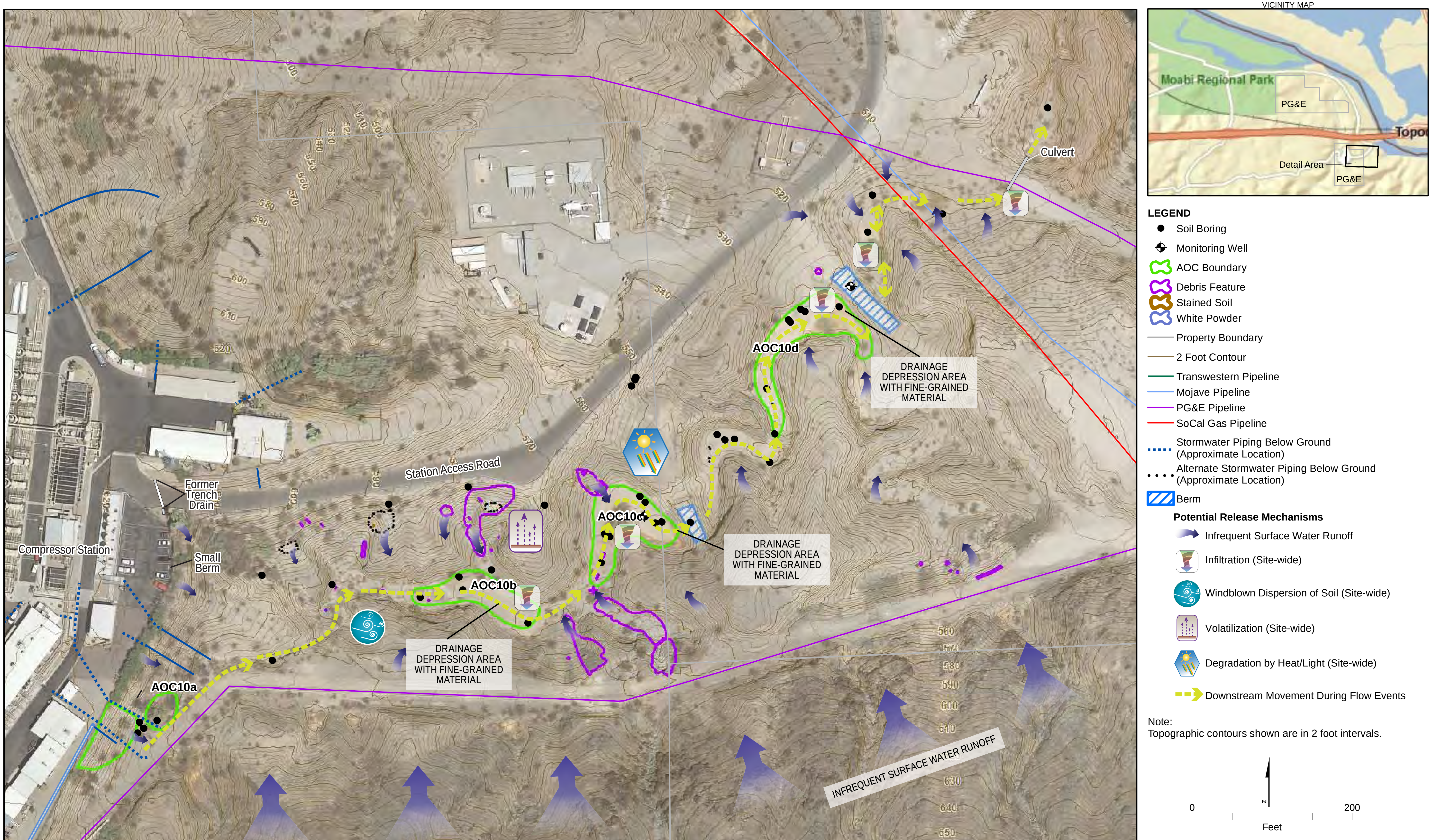
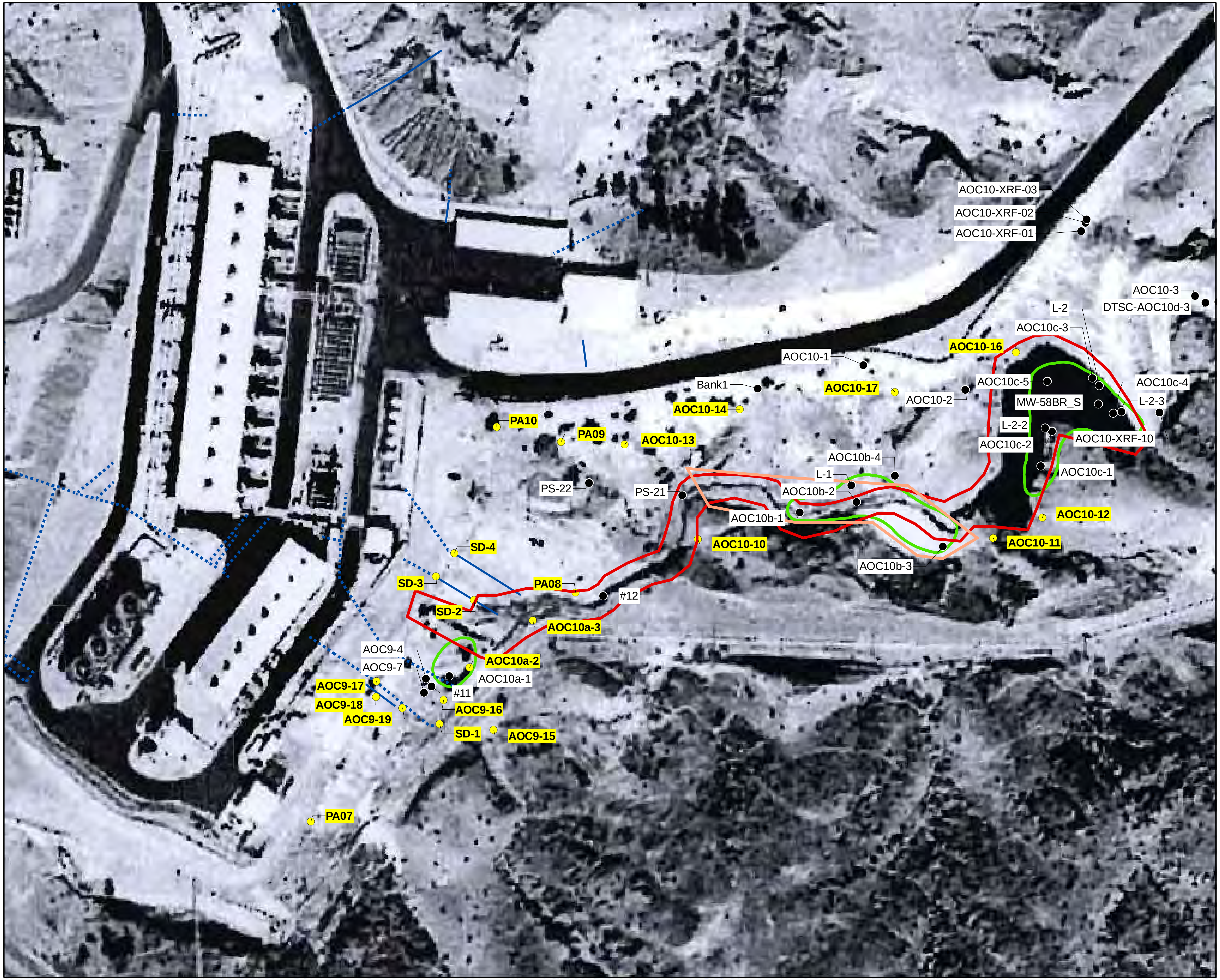


FIGURE C4-2
Conceptual Site Model for AOC-10
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California



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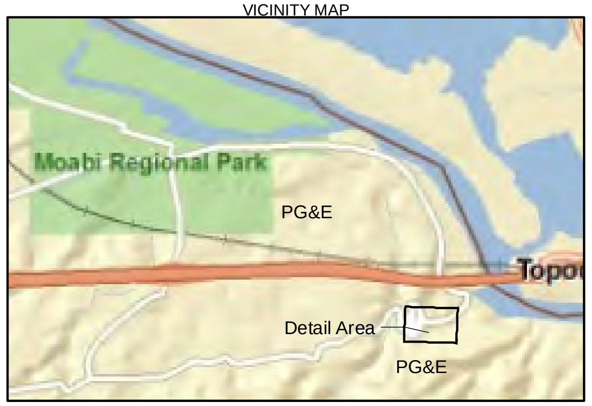

LEGEND

- ● Existing Soil Sample Location
- ● Proposed Phase 2 Sample Locations
- 🟥 Line of Fluid Discharge Enamting from the compressor station leading to the impoundment
- 🟧 East Ravine Investigation Area H
- 🟩 AOC 10 Boundary
- ┅ Approximate Location of Stormwater Piping Below Ground
- ― Approximate Location of Stormwater Piping Above Ground

Note:

Topographic contours shown are at 2 foot intervals

N

0 50 100 200
Feet

FIGURE C4-3
Potential Phase 2 Soil Sample Locations And Historic Fluid Discharge AOC 10 - East Ravine

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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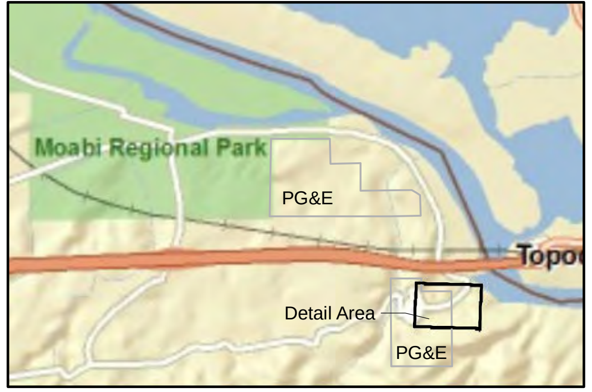
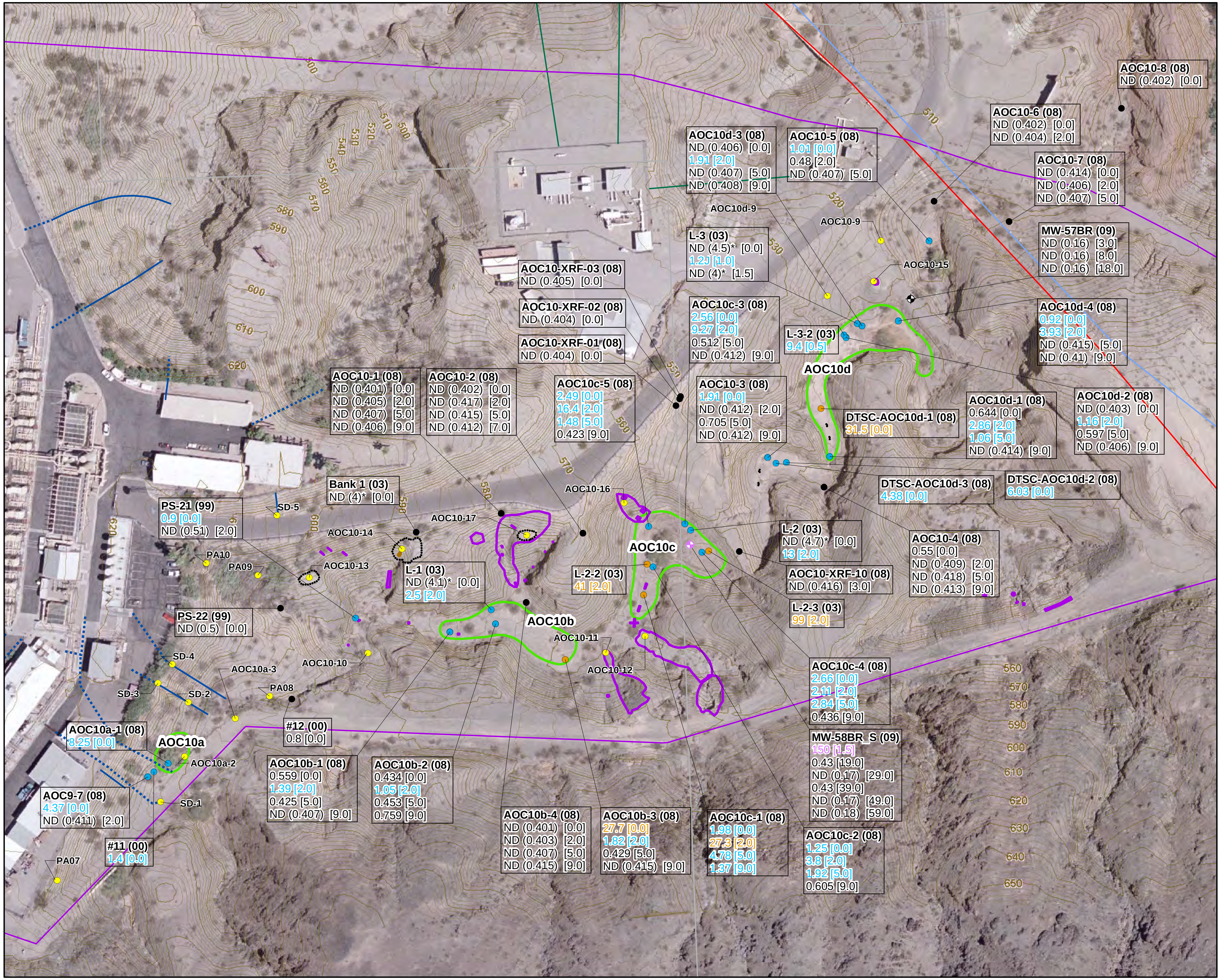
VICINITY MAP





LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- ⯐ Monitoring Well
- — Property Boundary
- — 2 Foot Contour
- AOC 10 Boundary
- Debris Feature
- Stained Soil
- White Powder
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ┅ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location Installation Date
20 [1] — Sample Beginning Depth (ft bgs) Soil Concentration (mg/kg)

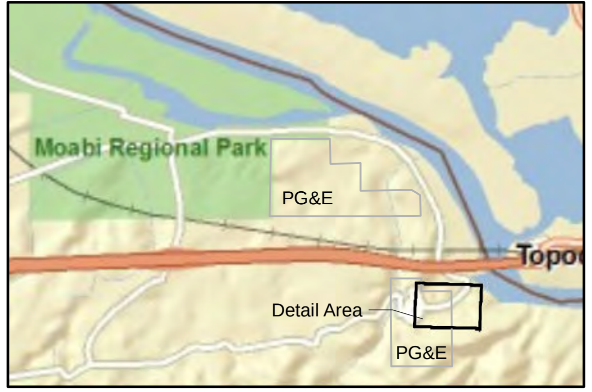
Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (0.83 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (139.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (17 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. * = Laboratory reporting limit exceeds screening levels.
9. Topographic contours shown are in 2 foot intervals.

N
0 200
Feet

FIGURE C4-4
Hexavalent Chromium Soil Sample Results and Proposed Phase 2 Sampling Locations AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- ⊕ Monitoring Well
- — 2 Foot Contour
- — Property Boundary
- 🟩 AOC 10 Boundary
- 🟪 Debris Feature
- 🟫 Stained Soil
- ⬚ White Powder
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ┅ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (16.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3,000 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. Topographic contours shown are in 2 foot intervals

N

0 200
Feet

FIGURE C4-5
Copper
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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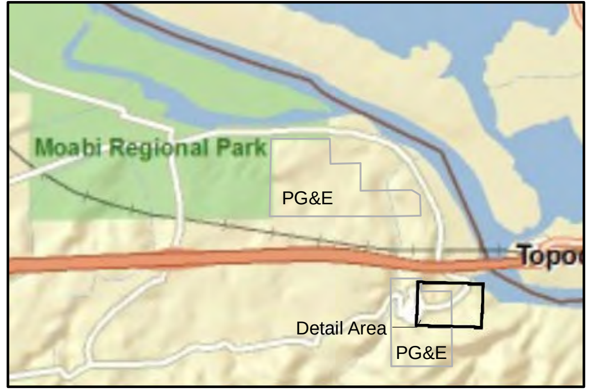


LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- ⊕ Monitoring Well
- — Property Boundary
- — 2 Foot Contour
- AOC 10 Boundary
- Debris Feature
- Stained Soil
- White Powder
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (8.39 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (150 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.0166 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foot intervals.

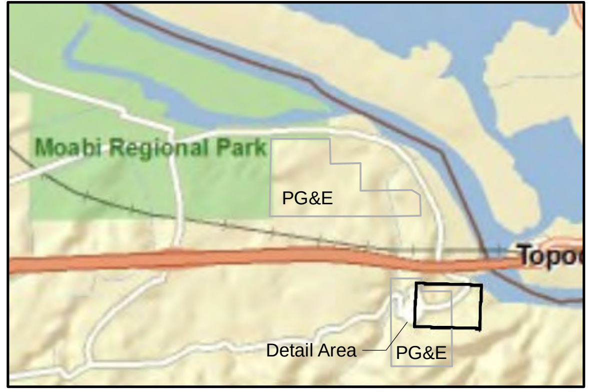
N

0 100 200
Feet

FIGURE C4-6
Lead
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample Location
- ⊕ Monitoring Well
- ● Soil Boring
- — Property Boundary
- — 2 Foot Contour
- 🟩 AOC 10 Boundary
- 🟪 Debris Feature
- 🟫 Stained Soil
- ⬚ White Powder
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (1.37 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (2.25 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential Califonia Regional Screening Level (380 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. * = Laboratory reporting limit exceeds screening levels.
9. Topographic contours shown are in 2 foot intervals.

0 N 200
Feet

FIGURE C4-7
Molybdenum
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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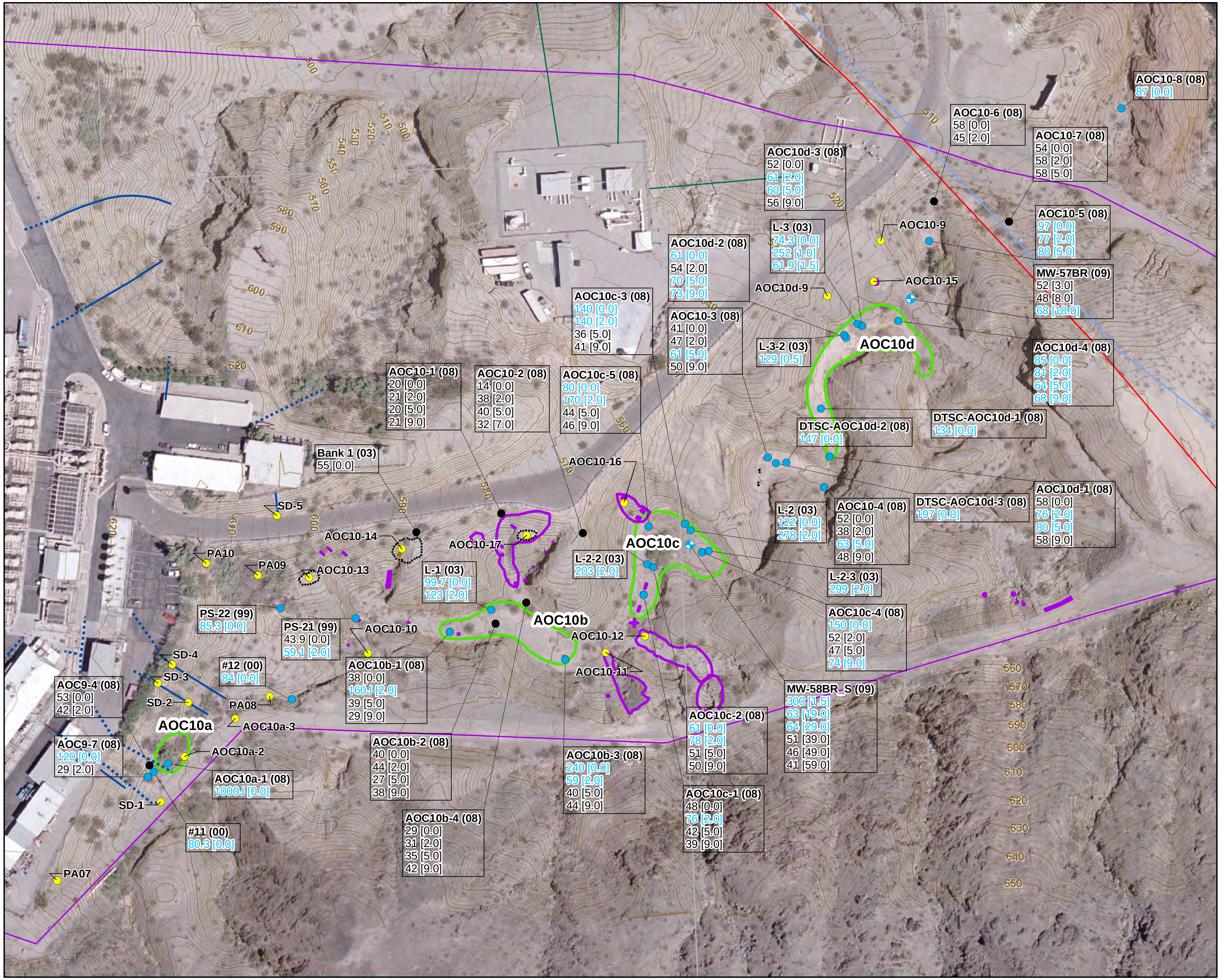

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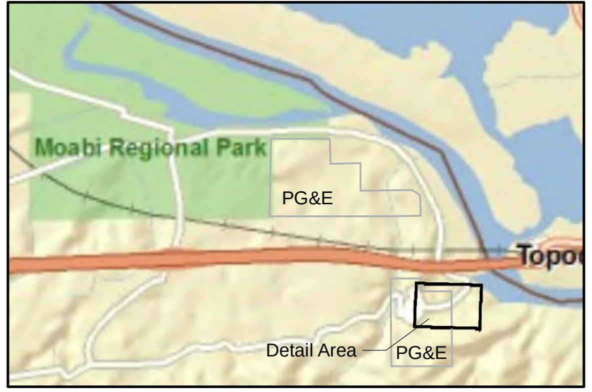

LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- ⊕ Monitoring Well
- Property Boundary
- 2 Foot Contour
- AOC 10 Boundary
- Debris Feature
- Stained Soil
- White Powder
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:

1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (58 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (23,000 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.164 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foot intervals.

N

FIGURE C4-8
Zinc
Soil Sample Results and Proposed Phase 2 Sample Locations AOC 10 East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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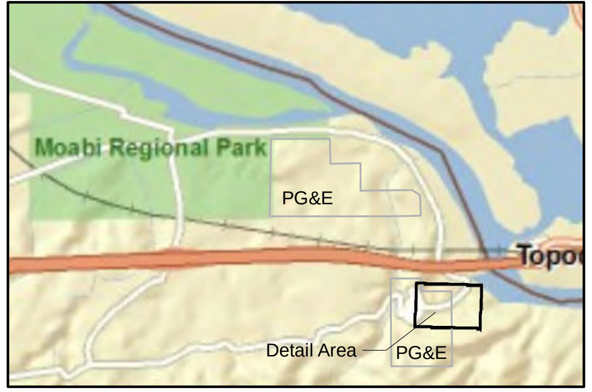
VICINITY MAP



LEGEND

- 🟡 Potential Phase 2 Sample Location
- ● Soil Boring
- ⊕ Monitoring Well
- Property Boundary
- 2 Foot Contour
- AOC 10 Boundary
- Debris Feature
- Stained Soil
- White Powder
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft), Soil Concentration (µg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. µg/kg = micrograms per kilogram
3. ft bgs = feet below ground surface
4. Results greater than or equal to California Department of Toxic Substances Control Residential California Human Health Screening Level (38 mg/kg) are shown in ORANGE.
5. J = Estimated Result.
6. No background level established.
7. Topographic contours shown are in 2 foot intervals.

N

0 100 200

Feet

FIGURE C4-9
Benzo(a)Pyrene Equivalent Soil Sample Results and Potential Phase 2 Sample Locations AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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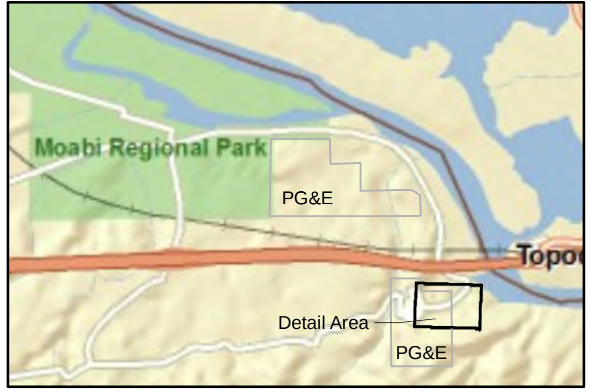
VICINITY MAP



LEGEND

- ● Potential Phase 2 Sample Location
- ● Soil Boring
- ⊕ Monitoring Well
- — Property Boundary
- — 2 Foot Contour
- AOC 10 Boundary
- Debris Feature
- Stained Soil
- White Powder
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location
20 [1] CR6 — Soil Concentration (µg/kg)
Installation Date
Analyte Abbreviation
Sample Beginning Depth (ft bgs)

Notes:
1. PAHHigh = PAH High Molecular Weight
2. ND = Not Detected (Reporting Limit in parentheses)
3. µg/kg = micrograms per kilogram
4. ft bgs = feet below ground surface
5. Results greater than or equal to the Ecological Comparison Value(1,160 µg/kg) are shown in PURPLE.
6. J = Estimated Result.
7. Topographic contours shown are in 2 foot intervals.

N

0 200
Feet

FIGURE C4-10
Benzo(A)Pyrene High Molecular Weight Soil Sample Results and Potential Phase 2 Sample Locations AOC 10 - East Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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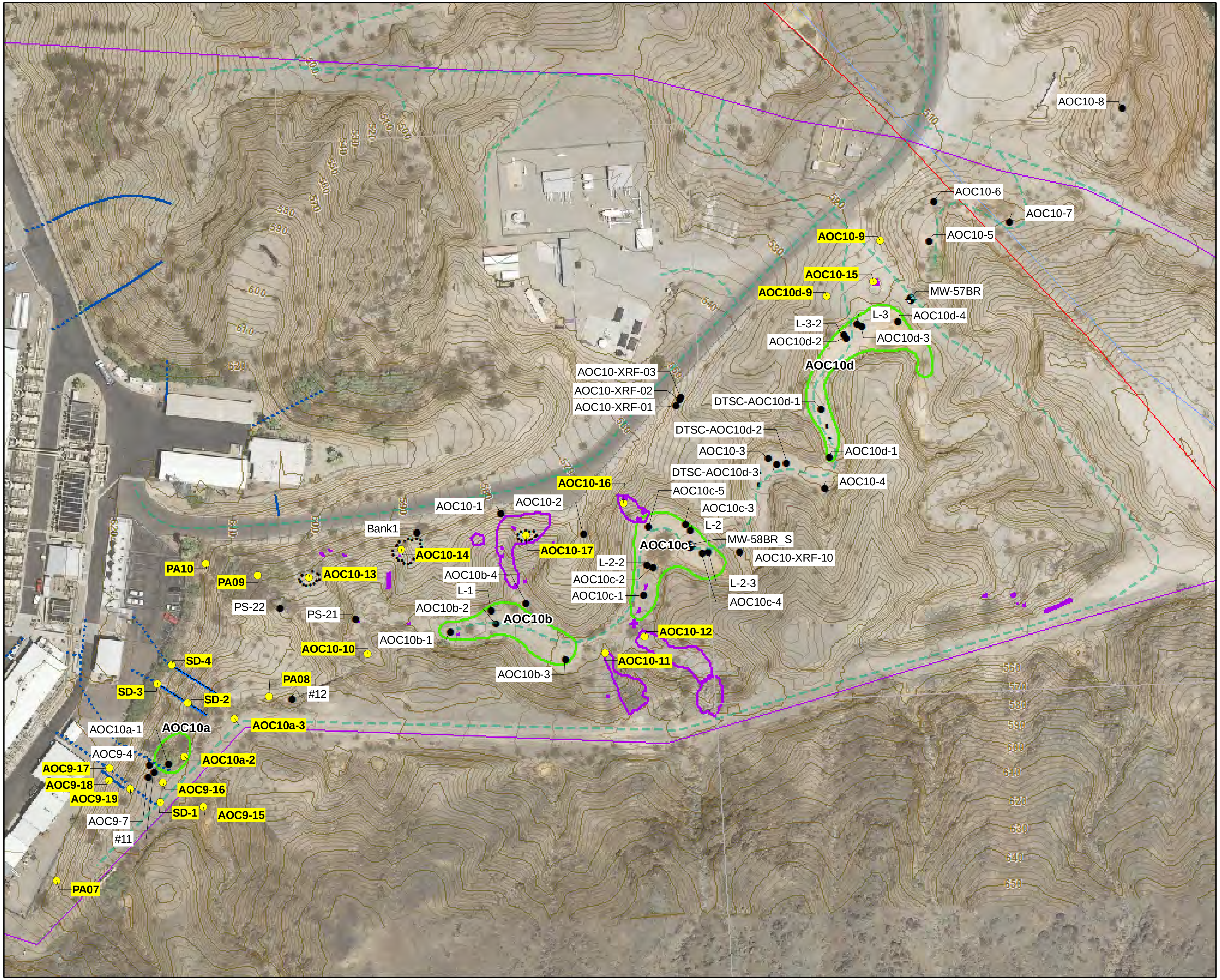
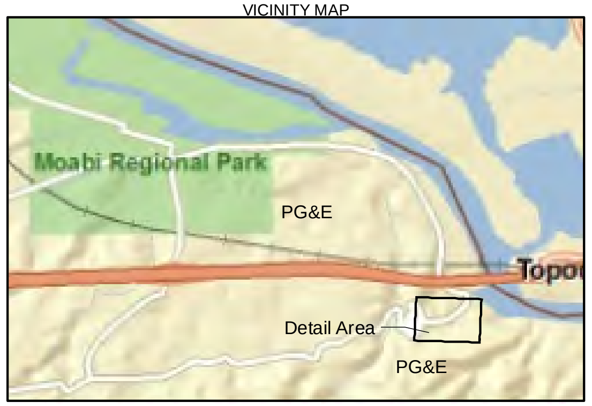


VICINITY MAP



LEGEND

- ● Proposed Phase 2 Sample Locations
- ● Soil Boring
- ⊕ Monitoring Well
- - - Access Routes
- — Property Boundary
- 🟩 AOC 10 Boundary
- 🟪 Debris Features
- ⁘ White Powder
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ···· Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground
- — Downcomers

Note:
1. Topographic contours shown are at 2 foot intervals

FIGURE C4-11
Potential Phase 2 Soil Sample Locations AOC 10 - East Ravine

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

Appendix C5
Area of Concern 11 Data Gaps Evaluation Results

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
CMS/FS	corrective measures study/feasibility study
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyl trichloroethane
DQO	data quality objective
ECV	ecological comparison value
EPC	exposure point concentration
I-40	Interstate 40
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
SSL	soil screening levels
STLC	soluble threshold limit concentration
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
VOC	volatile organic compound

APPENDIX C5

Area of Concern 11 Data Gaps Evaluation Results

1.0 Introduction and Background

This sub-appendix presents the results of the Data Gaps Evaluation and Part A Phase 2 Sampling Program for Area of Concern (AOC) 11 – Topographic Low Areas at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

The five topographic low areas that comprise AOC 11 are depicted in Figure C5-1. Low areas AOC 11a, AOC 11b, AOC 11c, and AOC 11d are located on Havasu National Wildlife Refuge property, and 11e is located on PG&E property.

At least three compressor station storm drain outlets may discharge to AOC 11. Two of these storm drains are known to be active; it is not known whether there are any other active storm drains that may discharge into this area. There is an inactive storm drain south of the compressor station office building area that may have discharged into AOC 11. Stormwater runoff from the northeastern portion of the station and from the area containing the Transwestern Meter Station may also have flowed to AOC 11. In addition, stormwater runoff from Interstate 40 (I-40) discharges to AOC 11. A former employee reported that he observed a release from Cooling Tower B that entered the ravine containing AOC 11 (the Northeast Ravine).

Low areas AOC 11c and AOC 11e are associated with the remnants of two small former check berms identified in the Northeast Ravine. Small amounts of fine-grained soils appear to be present behind the remnant of the upper check berm, and a larger volume of fine-grained soil is present behind the lower check dam, which has greater integrity. These check berms may have been constructed to prevent stormwater damage to a gas pipeline and a former access road to the compressor station.

The original plant access road ran through the area now identified as AOC 11a. A stormwater pipe that captures runoff from I-40 and National Trails Highway discharges into AOC 11 north of AOC 11a immediately south of the I-40 overcrossing. Stormwater runoff from I-40 could have resulted in the release of total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), lead, and wear metals (including barium, chromium, copper, nickel, and zinc) into AOC 11, and specifically AOC 11a, that are not due to PG&E's operations at the Topock Compressor Station. Substantial flow from the I-40 stormwater pipe has been observed. After storm events, water pools in area AOC 11a and does not readily percolate.

1.2 Potential Burn Area and Debris Mapping and Newly Identified White Powder and Topographic Low Areas

As discussed in Section 1.2 of the Data Gaps Evaluation Report and in Appendix B to the Data Gaps Evaluation Report, as a result of employee interviews conducted in late 2009/ early 2010 and subsequent additional site reconnaissance, two new topographic low areas, a potential burn area, and a small new white powder area were identified in the vicinity of AOC 11. These new areas are described below.

1.2.1 Topographic Low Areas

Two new topographic low areas that may receive runoff from the compressor station were identified. New Investigation Area 1, shown in Figure C5-1, consists of the drainage area beginning near the current decontamination pad and Transwestern Meter Station and extending downslope to the low area across from AOC 11b. It captures a portion of runoff originating from the compressor station that flows down the station access road. A reported burn area is located within the proposed boundary of New Investigation Area 1 (see Section 2.5.2 of this sub-appendix). Another topographic low area is located between the station access road and the Colorado River west of the Route 66 sign. This area may have also received runoff from the station access road. It is designated New Investigation Area 2.

In addition, miscellaneous debris (concrete and other materials) was noted in areas to the west of the station access road (near the Transwestern Meter Station area). As requested by California Environmental Protection Agency, Department of Toxic Substances Control (AOC/SWMU Specific Comment #5 in the August 10, 2007 Part A Work Plan comment letter), this area will be investigated in conjunction with AOC 11 as part of New Investigation Area 1. Neither of the new investigation areas has been sampled.

1.2.2 Potential Burn Area

According to former employee interviews, fire training exercises were conducted near the location of the current decontamination pad and Transwestern Meter Station. Materials that were burned during fire training exercises consisted primarily of scrap wood. Fire drills were reportedly later expanded to include extinguishing diesel fires in a 55-gallon drum. This area is located in the potential drainage area for one of the newly identified topographic low areas and was therefore incorporated into the boundaries of the new topographic low area (New Investigation Area 1, shown in Figure C5-1).

1.2.3 White Powder Area

A new white powder area was identified upslope of AOC 11e following the January 2010 rain event. This area is located on the steep slope below the northeastern portion of the compressor station and may represent native materials. This area is not accessible by equipment.

1.3 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 11 based on the above site history, background, and newly identified areas, as shown in Figure C5-2. Table C5-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 11. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the Soil Part A Data Quality Objective (DQO) Tech Memo, which is included as Appendix A to the Data Gaps Evaluation Report.

The primary source of contamination to AOC 11 is runoff from the compressor station, the access road to the compressor station, potential railroad debris below the station access road (asphalt, a metal sign, ceramic plates, glass resistors, and concrete were observed during 2008 field activities), the Transwestern Meter Station area, and I-40. Stormwater runoff from the compressor station could have entered the stormwater drains that discharge to AOC 11. Sheet flow surface runoff from the station could also have entered this unit from areas where the edge of the compressor station lacked curbs. Stormwater runoff from the Transwestern Meter Station area and the station access road could also have entered this AOC, including the two new potential investigation areas. Stormwater runoff from I-40 could have resulted in the release of TPH, PAHs, lead, and wear metals (including barium, chromium, copper, nickel, and zinc) into AOC 11, especially AOC 11a, that are not due to PG&E's operations at the Topock Compressor Station. Runoff from the various potential source areas would have discharged to surface soil and collected in low areas within the AOC.

The primary source medium therefore is surface soil. From surface soil, contaminants could have migrated to shallow and deeper soils. Shallow soils may act as a secondary source medium to subsurface soil, and subsurface soil may act as a secondary source medium to groundwater. After storm events, water pools in AOC 11a (the largest topographic low area) and does not readily infiltrate. Historically, water may have also pooled behind the two check berms in AOC 11c and AOC 11e; these structures have been breached and no longer retain water; however, accumulated fine-grained soils are present behind the berm at AOC 11c. Laterally, chemicals of potential concern/chemicals of ecological concern (COPCs/COPECs) in soil would generally be expected to be limited to the area along the topographic drainages. All of the low points within this unit are terminal low points, and there would not have been any flow out of AOC 11. At these low points, contaminants could potentially be driven deeper and potentially could reach groundwater. If released, volatile organic compounds (VOCs) in surface soils would be expected to have been degraded by heat and light and are likely no longer present.

Within the newly identified burn and runoff areas, COPCs/COPECs may be present in surface soil at the burn area and along the runoff pathways. Surface soil would therefore be the primary source medium for these new areas. Contamination may have migrated vertically downward to affect shallow soil at the burn area and shallow and potentially subsurface soil along the runoff pathways. Laterally, COPCs/COPECs in soil would generally be expected to be limited to the immediate vicinity of the burn area and linearly along the topographic drainages (including depressions where runoff might accumulate) from the burn area and compressor station.

Another potential source of contamination to AOC 11 may also include contaminated windblown dust. Contaminated surface soil (either within AOC 11 or from the adjacent compressor station) may have been eroded by wind and deposited at the ground surface within AOC 11.

Part A Phase 1 and historical soil samples were collected at or near the exit drain point of the stormwater drains, bottom of the ravine, in drainage depression areas, and on the western slope near the compressor station.

1.3.1 AOC 11 Data

Historical sampling has not occurred at AOC 11. During Phase 1, 74 soil samples (generally collected at 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet below ground surface [bgs]) were collected from 19 sample locations (AOC11a-1 through AOC11a-5, AOC11b-1, AOC11b-2, AOC11c-1, AOC11c-2, AOC11d-1, AOC11e-1, AOC11e-2, AOC11a-SS-1 through AOC11a-SS-3, AOC11c-SS-1, AOC11c-SS-2, AOC11e-SS1, and AOC11e-SS-2), as shown in Figure C5-3. Part A Phase 1 soil samples collected in AOC 11 were generally analyzed for Title 22 metals, hexavalent chromium, VOCs, semivolatile organic compounds, PAHs, TPH, pH, polychlorinated biphenyls (PCBs), and pesticides. Surface soil samples were not analyzed for VOCs. Ten percent of the Phase 1 soil samples collected in AOC 11 (seven soil samples) were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). In addition, synthetic precipitation leaching procedure (SPLP) extraction was performed on a soil sample collected at 2 to 3 feet bgs at sample location AOC11e-2 and a soil sample collected at 9 to 10 feet bgs at sample location AOC11c-1. The leachate from the SPLP extractions was analyzed for total and hexavalent chromium; results are presented in Table C5-2. The soil results were validated, and the data quality evaluation is included as Appendix D to the Data Gaps Evaluation Report.

All validated Part A Phase 1 data are Category 1. Category 1 historical soil data and validated Part A Phase 1 data were used as inputs to the four DQO decisions for AOC 11.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and COPECs at AOC 11. Laboratory analytical results for Phase 1 soil samples at AOC 11 are presented in Tables C5-3 through C5-8. Table C5-9 presents a statistical summary of soil analytical results for COPCs and COPECs that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one or more samples was greater than the interim screening value.

2.1 Summary of AOC 11 Soil Data

Antimony, beryllium, cadmium, mercury, silver, thallium, cyanide, TPH-gasoline, and most species of PCBs were not detected in soil samples collected at AOC 11. Table C5-9 lists the 45 constituents detected at AOC 11, including four calculated quantities: benzo(a)pyrene equivalents, total low molecular weight PAHs, total high molecular weight PAHs, and total PCBs. Fourteen of these constituents (aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, Aroclor-1260, total PCBs, 4,4-dichlorodiphenyldichloroethylene [4,4-DDE], alpha-chlordane, dieldrin, and gamma-chlordane) were detected in the samples analyzed for the full TAL/TCL suite of compounds.

Twenty-three of the constituents detected at AOC 11 (cobalt, nickel, vanadium, calcium, iron, magnesium, sodium, methyl acetate, anthracene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, low molecular weight PAHs, Aroclor-1254, alpha-chlordane, gamma-chlordane, TPH-diesel, and TPH-motor-oil) were detected at concentrations below their respective interim screening levels. Twenty-two constituents, including three calculated quantities, were detected one or more times at concentrations exceeding their respective interim screening levels. These constituents included 12 metals (aluminum, arsenic, barium, total chromium, hexavalent chromium, copper, lead, manganese, molybdenum, potassium, selenium, and zinc), four PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene), one PCB isomer (Aroclor-1260), two pesticides (4,4-DDE and dieldrin), and three calculated quantities (benzo(a)pyrene equivalents, total high molecular weight PAHs, and total PCBs).

Nine constituents (barium, total chromium, hexavalent chromium, copper, lead, molybdenum, zinc, benzo(a)pyrene, and benzo(a)pyrene equivalents) were each detected four or more times at concentrations exceeding their respective interim screening levels; the distributions of these constituents are shown in C5-3 to C5-10.

2.2 Nature and Extent Evaluation

The following subsection discusses the nature and extent of COPCs and COPECs detected above their respective screening levels at AOC 11. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Section 2.4 of this sub-appendix summarizes the constituents that may require further evaluation and Section 5.0 of this sub-appendix provides the recommended follow-up sampling for the Part A Phase 2 soil investigation.

2.2.1 Arsenic

Arsenic was detected in 74 of 74 soil samples collected from AOC 11. Only one detected concentrations of arsenic (13 milligrams per kilogram [mg/kg]) collected at AOC 11b-2 at 2 to 3 feet bgs slightly exceeded the interim screening level of 11 mg/kg (background threshold value [BTV]); this same sample also exceeded the ecological comparison value (ECV) of 11.4 mg/kg, as shown in Tables C5-3 and C5-9. This sample was collected in AOC 11b. Sample concentrations in the other samples collected in AOC 11b (AOC11b-1) had concentrations below the interim screening level. The deepest samples in AOC 11b (collected at 9 to 10 feet bgs) have arsenic concentrations below the interim screening level.

2.2.2 Barium

Barium was detected in 74 of 74 soil samples collected at AOC 11. Detected concentrations of barium exceeded the interim screening level (410 mg/kg, BTV) four times (maximum detected concentration of 1,300 mg/kg at AOC11a-2 at 5 to 6 feet bgs), as shown in Tables C5-3 and C5-9 and Figure C5-3. None of the detected concentrations exceeded residential or commercial/industrial California Department of Toxic Substances Control California human health screening levels (CHHSLs) (5,200 mg/kg and 63,000 mg/kg, respectively). The lateral extent of samples with concentrations exceeding the interim screening level is limited to the eastern portion of AOC 11a. Samples with concentrations below the screening levels are located upslope of AOC 11a. At these locations, the deepest samples (collected at 9 to 10 feet bgs) have concentrations exceeding the interim screening level.

2.2.3 Total Chromium

Total chromium was detected in 74 of 74 soil samples collected at AOC 11. Detected concentrations of total chromium exceeded the interim screening level (39.8 mg/kg) (BTV) 14 times (maximum detected concentration of 130 mg/kg at AOC11c-1 at 9 to 10 feet bgs), as shown in Tables C5-3 and C5-9 and Figure C5-4. None of the detected concentrations of total chromium exceeded the United States Environmental Protection Agency residential regional screening level (RSLs) for residential use (280 mg/kg) or the RSL for commercial/industrial use (1,400 mg/kg). The lateral extent of samples with concentrations exceeding the interim screening level is limited the upper reaches of AOC 11 at and between AOC 11e and AOC 11c, with the exception of one sample (AOC11a-3) collected in AOC 11a. Samples with concentrations below the interim screening level are located downslope of AOC 11e and AOC 11c, but no samples have been collected upslope of these areas. Samples with concentrations below the interim screening level surround location AOC11a-2. At three locations in AOC 11c and one location in AOC 11e, the deepest samples (collected at 9 to 10 feet bgs) have concentrations exceeding the interim screening level.

2.2.4 Hexavalent Chromium

Hexavalent chromium was detected in 31 of 74 soil samples collected at AOC 11. Detected concentrations of hexavalent chromium exceeded the interim screening level (0.83 mg/kg) (BTV) 18 times (maximum detected concentration of 7.78 mg/kg), as shown in Tables C5-3 and C5-9 and Figure C5-5. None of the detected concentrations of hexavalent chromium exceeded the residential or commercial CHHSLs (17 mg/kg and 37 mg/kg, respectively) or the ECV (139.6 mg/kg). The lateral extent of samples with concentrations exceeding the interim screening level is limited to the upper reaches of AOC 11, including all of AOC 11e and AOC 11c and the eastern portion of AOC 11a. Samples with concentrations below the interim screening level are located in the western portion of AOC 11a, which is downstream of Subareas 11e and 11c, but no samples have been collected upslope of these areas. At five locations (one in AOC 11a, three in AOC 11c, and one in AOC 11e), the deepest samples (collected at 9 to 10 feet bgs) have concentrations exceeding the interim screening level.

2.2.5 Copper

Copper was detected in 74 of 74 soil samples collected at AOC 11. Detected concentrations of copper exceeded the interim screening level (16.8 mg/kg) (BTV) 16 times (maximum detected concentration of 41 mg/kg at AOC11e-1), as shown in Tables C5-3 and C5-9 and Figure C5-6. Five detected concentrations exceeded the ECV (20.6 mg/kg), and no detected concentrations of copper exceeded the residential or commercial/industrial CHHSLs (3,000 mg/kg, and 38,000 mg/kg, respectively). The lateral extent of concentrations exceeding the interim screening level is limited to the upper reaches of AOC 11, including AOC 11c, AOC 11d, and AOC 11e and a small area near the western portion of AOC 11a. Copper was not detected at concentrations exceeding the screening levels in AOC 11b. Samples with concentrations below the interim screening level are located downslope of AOC 11c, AOC 11d, and AOC 11e, but no samples have been collected upslope of these areas. In four locations in AOC 11c and AOC 11e (two locations in each area), the deepest samples (collected at 9 to 10 feet bgs) have concentrations exceeding the interim screening level.

The small area near the western portion of AOC 11a with copper concentrations above the BTV (locations AOC11a-2, AOC11a-4, AOC 11a-5, and AOC11a-SS-3) is surrounded by samples with concentrations below the interim screening level, and the deepest soil samples at these locations have concentrations below the interim screening level.

2.2.6 Lead

Lead was detected in 74 of 74 soil samples collected at AOC 11. Detected concentrations of lead exceeded the interim screening level (8.39 mg/kg) (BTV/ECV) 36 times (maximum detected concentration of 45 mg/kg at AOC11b-2 at 0 to 0.5 feet bgs), as shown in Tables C5-3 and C5-9 and Figure C5-7. None of the detected concentrations exceeded the residential or commercial/industrial CHHSLs (80 mg/kg and 320 mg/kg, respectively). Lead was detected at concentrations exceeding the interim screening level across most of AOC 11, with the exception of the area north of AOC 11a, where no concentrations were detected above the interim screening level. At seven locations, the deepest (collected at 9 to 10 feet bgs) samples have concentrations exceeding the interim screening level.

2.2.7 Molybdenum

Molybdenum was detected in 17 of 74 soil samples collected from AOC 11. Detected concentrations of molybdenum exceeded the interim screening level (1.37 mg/kg) (BTV) 10 times (maximum detected concentration of 2.9 mg/kg at AOC11c-SS-1 at 5 to 6 feet bgs), as shown in Tables C5-3 and C5-9 and Figure C5-8. Eight detected concentrations exceeded the ECV (2.25 mg/kg), and no detected concentrations of molybdenum exceeded the residential and commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). Concentrations exceeding the interim screening level are limited to AOC 11a, AOC 11c, and AOC 11e. Samples with concentrations below the interim screening level surround the locations in AOC 11a and AOC 11e. At AOC 11c, samples with concentrations below the interim screening level are located up- and downslope of this area; however, within AOC 11c, all sample locations have concentrations exceeding the interim screening levels. At each location, with the exception of location AOC11a-5, the deepest samples (collected at 9 to 10 feet bgs) have concentrations below the interim screening level.

2.2.8 Selenium

Selenium was detected in two of 74 soil samples collected from AOC 11. The two detected concentrations of selenium at AOC11a-1 (1.6 mg/kg at 5 to 6 feet bgs) and AOC11a-5 (3.2 mg/kg at 5 to 6 feet bgs) exceeded the interim screening level (1.47 mg/kg) (BTV/ECV) in both samples, as shown in Tables C5-3 and C5-9. Neither of the detected concentrations exceeded the residential and commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). These locations are both in AOC 11a. Samples with concentrations below the interim screening level surround these locations. At both locations, the deepest samples (collected at 9 to 10 feet bgs) have concentrations below the interim screening level.

2.2.9 Zinc

Zinc was detected in 74 of 74 soil samples collected at AOC 11. Detected concentrations of zinc exceeded the interim screening level (58 mg/kg) (BTV/ECV) 30 times (with a maximum detected concentration of 290 mg/kg at AOC11c-SS-1 at 9 to 10 feet bgs), as shown in Tables C5-3 and C5-9 and Figure C5-9. None of the detected concentrations exceeded the residential and commercial/industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). Zinc was detected at concentrations exceeding the interim screening level across most of AOC 11, with the exception of the areas north of AOC 11a and west of AOC 11e. At six locations, the deepest samples (collected at 9 to 10 feet bgs) have concentrations exceeding the interim screening level.

2.2.10 Polycyclic Aromatic Hydrocarbons

Benzo(a)pyrene was detected in 32 of 74 soil samples collected from AOC 11. Detected concentrations of benzo(a)pyrene exceeded the interim screening level of 38 micrograms per kilograms (µg/kg) (residential CHHSL) 12 times. Several other PAHs were detected in soil samples collected from AOC 11; only benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected at concentrations above their respective interim screening levels. To assist with evaluation of PAHs for human health, benzo(a)pyrene equivalents were calculated for each of the soil samples collected at AOC 11, as shown in Tables C5-5 and C5-9. Benzo(a)pyrene equivalent values exceeded the interim screening level of 38 µg/kg (residential CHHSL) 17 times (maximum calculated concentration of 510 µg/kg at AOC11e-2 at 0 to 0.5 feet bgs), as shown in Tables C5-5 and C5-9 and Figure C5-10. The lateral extent of concentrations exceeding the interim screening level is limited to the upper and lower reaches of AOC 11, including AOC 11c, AOC 11d, AOC 11e, and AOC 11b. Samples within and surrounding AOC 11a have concentrations below the screening levels. At all locations, except AOC11b-1, the deepest samples (collected at 9 to 10 feet bgs) have concentrations below the interim screening levels.

To assist with evaluation of PAHs for ecological risk, detected concentrations of low molecular weight PAHs and high molecular weight PAHs were summed and compared to the PAH low molecular weight and PAH high molecular weight ECVs (10,000 µg/kg and 1,160 µg/kg, respectively). Three PAH high molecular weight sums of detected concentrations exceeded the ECV (1,160 µg/kg); the maximum sum concentration was 4,900 µg/kg in a surface soil sample collected at location AOC11e-2. None of the sums of detected concentrations exceeded the PAH low molecular weight ECVs.

2.2.11 Target Analyte List/Target Compound List Constituents

Aluminum, calcium, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, Aroclor-1260, 4,4-DDE, dieldrin, alpha-chlordane, and gamma-chlordane were detected in the AOC 11 soil samples analyzed for the complete TAL/TCL suite of compounds. These constituents are discussed below.

Aluminum was detected in seven of seven surface soil samples collected from AOC 11. Detected concentrations of aluminum exceeded the interim screening level (16,400 mg/kg) (BTV) twice (AOC11a-2 [20,000 mg/kg at 0 to 0.5 foot bgs] and AOC11d-1 [19,000 mg/kg at 0 to 0.5 foot bgs]), as shown in Tables C5-4 and C5-9. Remaining concentrations of aluminum ranged from 7,900 to 15,000 mg/kg. None of the detected concentrations exceeded the residential or commercial/industrial RSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in seven of seven surface soil samples collected from AOC 11. The maximum detected concentration of calcium was 45,000 mg/kg at AOC11a-2, which is below the interim screening level (66,500 mg/kg) (BTV), as shown in Tables C5-4 and C5-9. Remaining detected concentrations of calcium range from 23,000 to 43,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in seven of seven surface soil samples collected from AOC 11. The maximum detected concentration of iron was 26,000 mg/kg at AOC11b-1, which is below the interim screening level of 55,000 mg/kg (residential RSL), as shown in Tables C5-4 and C5-9. Remaining detected concentrations of iron range from 12,000 to 25,000 mg/kg. A BTV and an ECV have not been established for iron.

Magnesium was detected in seven of seven surface soil samples collected from AOC 11. The maximum detected concentration of magnesium was 12,000 mg/kg at AOC11a-2 and AOC11d-1, which is below the interim screening level (12,100 mg/kg) (BTV), as shown in Tables C5-4 and C5-9. Remaining detected concentrations of magnesium range from 6,400 to 11,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in seven of seven surface soil samples collected from AOC 11. One detected concentrations of manganese (440 mg/kg at AOC11b-1 at 0 to 0.5 foot bgs) slightly exceeded the interim screening level (402 mg/kg) (BTV/ECV), as shown in Tables C5-4 and C5-9. Remaining detected concentrations of manganese range from 220 to 390 mg/kg. None of the detected concentrations exceeded the residential or commercial/industrial RSLs (1,800 mg/kg and 23,000 mg/kg, respectively).

Potassium was detected in seven of seven surface soil samples collected from AOC 11. Detected concentrations of potassium exceeded the interim screening level (4,400 mg/kg) (BTV) twice (AOC11a-2 [5,000 mg/kg at 0 to 0.5 foot bgs] and AOC11d-1 [5,300 mg/kg at 0 to 0.5 foot bgs]), as shown in Tables C5-4 and C5-9. Remaining concentrations of potassium range from 2,200 to 3,400 mg/kg. Residential and commercial CHHSLs and an ECV have not been established for potassium.

Sodium was detected in six of seven surface soil samples collected from AOC 11. The maximum detected concentration of sodium was 710 mg/kg at AOC11a-2, which is below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C5-4 and C5-9. Remaining detected concentrations of sodium range from 180 to 580 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

The PCB Aroclor-1254 was detected in nine of 20 soil samples collected from AOC 11; both surface and subsurface soil (up to 10 feet bgs) samples were collected. The maximum detected concentration of Aroclor-1254 of 190 µg/kg was detected at AOC11c-2 at 2 to 3 feet bgs and AOC11e-2 at 0 to 0.5 foot bgs. Remaining detected concentrations of Aroclor-1254 range from 18 to 76 µg/kg. None of the detected concentrations of Aroclor-1254 exceeded the interim screening level of 220 µg/kg (residential RSL), as shown in Tables C5-8 and 5-9.

The PCB Aroclor-1260 was detected in one of 20 soil samples collected from AOC 11. The detected concentrations of Aroclor-1260 (240 µg/kg at AOC11e-2 at 0 to 0.5 foot bgs) exceeded the interim screening level (220 µg/kg) (residential RSL), as shown in Tables C5-8 and C5-9. The detected concentration did not exceed the commercial/industrial RSL (740 µg/kg). To assist with evaluation of PCBs for ecological risk, total PCB values were calculated at AOC 11. The sample containing Aroclor-1260 also exceeded the total PCB screening value (ECV) of 204 µg/kg. Remaining total PCB concentrations range from 26.5 to 199 µg/kg. The location with the exceedance is in the upper reaches of AOC 11 in AOC 11e. No samples were collected immediately downslope of this area. At this location, the deepest sample (collected at 9 to 10 feet bgs) had a concentration below the screening level.

4,4-DDE was detected in one of seven surface soil samples collected from AOC 11. The detected concentration of 4,4-DDE (6.1 µg/kg at AOC11d-1) exceeded the interim screening level (2.1 µg/kg) (ECV), as shown in Tables C5-7 and C5-9. The detected concentration did not exceed the residential or commercial/industrial CHHSLs (1,600 µg/kg and 6,300 µg/kg, respectively). No samples were collected immediately downslope of this area.

Dieldrin was detected in one of seven surface soil samples collected from AOC 11. The detected concentration of dieldrin (6.7 µg/kg at AOC11d-1) exceeded the interim screening level (5 µg/kg) (ECV), as shown in Tables C5-7 and C5-9. The detected concentration did not exceed the residential or commercial/industrial CHHSLs (35 µg/kg and 130 µg/kg, respectively). No samples were collected immediately downslope of this area.

Alpha– and gamma-chlordane were detected in one of seven surface soil samples collected from AOC 11. The detected concentrations of alpha- and gamma-chlordane (12J µg/kg and 13J µg/kg, respectively; at location AOC11d-1) were below the interim screening level (430 µg/kg) (residential CHHSL), as shown in Tables C5-7 and C5-9. The detected concentration did not exceed the ECV (470 µg/kg). Sub-area 11d is a small internally draining drainage depression, with no exit for storm water to flow.

As discussed in Section C.2 of Appendix C, PG&E recommends that PCBs be evaluated further in AOC 11. PG&E also recommends that aluminum, calcium, iron, magnesium, manganese, potassium, sodium, 4,4-DDE, dieldrin, alpha-chlordane, and gamma-chlordane not be considered COPCs/COPECs for this AOC. These constituents have been fully discussed in Section C.2.

2.3 Central Tendency Comparison to Background Threshold Values

Twelve metals, (aluminum, arsenic, barium, total chromium, hexavalent chromium, copper, lead, magnesium, molybdenum, selenium, potassium, and zinc) were detected above their respective Topock BTVs in soil collected from AOC 11. A central tendency comparison was performed for seven of these 12 metals (arsenic, barium, total chromium, copper, lead, molybdenum, and zinc) to compare the AOC 11 soil data set for these metals with the corresponding Topock soil background data set to determine whether a difference exists between the two populations and whether additional sampling may be required for a given metal, as discussed in Table C5-10 of this sub-appendix and in Figure 3-1 of the Data Gaps Evaluation Report.

Metals in either the AOC 11 data set or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of aluminum, magnesium, selenium, and potassium at AOC 11 to conduct the test, and there were insufficient detections of hexavalent chromium in the background data set to allow for a central tendency comparison.

No statistical difference between the two populations was noted for barium or molybdenum, as shown in Table C5-10. However, results from the Gehan test suggest that site concentrations for arsenic, total chromium, copper, lead, and zinc may exceed background. Additional sampling is proposed for total chromium, copper, lead, and zinc. Arsenic was detected above the BTV of 11 mg/kg only once at a concentration of 13 mg/kg in a soil sample collected at 2 to 3 feet bgs at sample location AOC11b-2. After careful review of AOC 11 site data and background data set for arsenic, the statistical difference between the two populations is not considered significant enough to warrant additional sampling for arsenic at AOC 11.

2.4 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates that decision error has been held to an acceptable level. Sufficient data of acceptable quality have been attained through collection of historical/Part A soil samples in areas most likely to have been impacted by runoff from the compressor station, the access road to the compressor station, potential railroad debris below the station access road, the Transwestern Meter Station area, and I-40. Stormwater runoff from the compressor station could have entered the stormwater drains that discharge to AOC 11. These areas include the topographic drainage areas (AOC 11a), where water pools after storm events, and areas behind two check berms (AOC 11c and AOC 11e), where historically water may have pooled. The newly identified topographic low areas, burn area, and white powder areas have not been sampled.

Within the topographic low areas in AOC 11, the lateral and/or vertical extents of barium (vertical extent only), hexavalent chromium, copper, lead, molybdenum, PAHs, PCBs, total chromium, and zinc have not been defined.

Based on the DQOs, the following data gaps were identified to resolve Decision 1:

- Data Gap #1 – Lateral and vertical extent of contamination within AOC 11c.
- Data Gap #2 - Lateral extent of contamination upslope of AOC 11c and AOC 11e.
- Data Gap #3 – Lateral and vertical extent of contamination within AOC 11e.
- Data Gap #4 - Nature and extent of contamination associated with New Investigation Areas 1 and 2, the newly identified burn area (near the location of the current decontamination pad and Transwestern Meter Station), and the white powder area (upslope of AOC 11e).

The proposed Phase 2 soil sample locations to fill the identified data gaps are presented in Section 6.0 of this sub-appendix.

3.0 Decision 2 – Data Sufficient to Calculate Exposure Point Concentrations

For Decision 2, data were evaluated to determine whether the AOC 11 data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Evaluation Report. The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC). Data reviewed were Part A Phase 1 data at AOC 11; no historical sampling was conducted at this AOC.

Table C5-11 summarizes the results of the evaluation to determine whether data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. In general, existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values (eight metals, three Contract Laboratory Program inorganics, PAHs, PCBs, and two pesticides), as described below.

3.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for arsenic, barium, total chromium, copper, lead, and zinc using ProUCL. For the remaining metals (molybdenum and selenium), additional data collection is not expected to significantly change the results of the risk assessment because the magnitude of the maximum detected concentrations are low relative to the ECVs (i.e., within approximately two times the ECV). Molybdenum concentrations at AOC 11 are also comparable to background. For selenium, additional data collection would also likely result in additional non-detected values and, consequently, would not influence the EPC. Therefore, no additional data collection is recommended for metals to provide data for EPC calculations.

3.2 Inorganics

Sufficient data (numbers of samples and detections) are available to calculate EPCs for all detected inorganics that exceeded one or more comparison values (aluminum, manganese, and potassium) using ProUCL.

3.3 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene equivalents and high molecular weight PAHs using ProUCL.

3.4 Pesticides

4,4-DDE and dieldrin were detected in a single sample, as shown in Table C5-7. The data are insufficient to allow calculation of EPCs using ProUCL. The total concentration of dichlorodiphenyl trichloroethane (DDT) and metabolites (DDT-R) is approximately three times the ECV. Dieldrin was detected at less than two times the ECV. Collection of additional data is not expected to yield sufficient detections to strongly influence the EPC for either DDT-R or dieldrin. The EPC would likely remain the maximum detected concentration; therefore, no additional data collection is recommended to support EPC development.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

A conservative, three-tiered approach will be used in the evaluation to assess the potential impact to groundwater from source areas in the vadose zone. A full description of the three-tiered approach is provided in Section 5.0 of the Data Gaps Evaluation Report. The analysis of AOC 11 was divided into five separate analyses based on the AOC 11 areas shown in Figure C-1 in Appendix C.

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, are needed to resolve Decision 3. Additional evaluation will be performed, as appropriate, as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 – Nature and Extent evaluation will provide the final representative data set that will be used to assess the threat to groundwater.

4.1 AOC 11a

Table C5-12 presents the results of the tiered analysis for AOC 11a. Eight metals were detected at concentrations above the BTVs. Of those eight metals, hexavalent chromium and molybdenum exceeded the calculated soil screening levels (SSLs), as shown in Table C5-13. Numerical modeling was conducted to evaluate the potential of these two metals to leach into groundwater. Based on the initial screening model, the potential for molybdenum to leach to groundwater was ruled out. Based on the screening model, the potential for hexavalent chromium to leach to groundwater could not be ruled out.

The simulated leaching concentrations of hexavalent chromium were likely due to the following factors:

- The initial screening approach assigned the maximum concentration found at each depth interval across the entire interval, even though other samples with lower concentrations were observed at each level.
- The presence of hexavalent chromium at the deepest sampling interval at one location required assignment of that concentration from that depth down to the water table for the entire area.

Additional data are needed to better define the vertical extent of hexavalent chromium to better assess the leaching potential. The model will be refined with the new vertical data and will be discretized spatially to more realistically simulate vadose zone contaminant concentrations.

4.2 AOC 11b

Table C5-12 presents the results of the tiered analysis for AOC 11b. Three metals (arsenic, lead, and zinc) were detected at concentrations above the BTVs. None of these metals exceeded the calculated SSL, as shown in Table C5-14. Therefore, numerical modeling was not required for AOC 11b, and a current or potential threat to groundwater from this area was ruled out.

4.3 AOC 11c

Table C5-12 presents the results of the tiered analysis for AOC 11c. Six metals were detected at concentrations above the BTVs. Of those six, only hexavalent chromium and molybdenum exceeded the calculated SSLs, as shown in Table C5-15. Numerical modeling was conducted to evaluate the potential of these two metals to leach into groundwater. Based on the initial screening model, the potential for molybdenum to leach to groundwater was ruled out. Based on the screening model, the potential for hexavalent chromium to leach to groundwater could not be ruled out.

The simulated leaching concentration of hexavalent chromium at AOC 11c is likely due to the presence of hexavalent chromium at the deepest sampling interval at one location, which required assignment of that concentration from that depth down to the water table for the entire area.

Additional data are needed to better define the vertical extent of hexavalent chromium to better assess the leaching potential. The model will be refined with the new vertical data and will be discretized spatially to more realistically simulate vadose zone contaminant concentrations.

4.4 AOC 11d

Table C5-12 presents the results of the tiered analysis for AOC 11d. Four metals were detected at concentrations above the BTVs. None of the metals exceeded the calculated SSLs, as shown in Table C5-16. Therefore, numerical modeling was not required for AOC 11d, and a current or potential threat to groundwater from this area was ruled out.

4.5 AOC 11e

Table C5-12 presents the results of the tiered analysis for AOC 11e. Six metals were detected at concentrations above the BTVs. Of those six, only hexavalent chromium and molybdenum exceeded the calculated SSLs, as shown in Table C5-17. Numerical modeling was conducted to evaluate the potential of these two metals to leach into groundwater. Based on the initial screening model, the potential for molybdenum to leach to groundwater was ruled out. Based on the screening model, the potential for hexavalent chromium to leach to groundwater could not be ruled out.

The simulated leaching concentration of hexavalent chromium at AOC 11e is likely due to the presence of hexavalent chromium at the deepest sampling interval at one location, which required assignment of that concentration from that depth down to the water table for the entire area.

Additional data are needed to better define the vertical extent of hexavalent chromium to better assess the leaching potential. The model will be refined with the new vertical data and will be discretized spatially to more realistically simulate vadose zone contaminant concentrations.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study (CMS/FS). The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite).
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies).
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for AOC 11 that are currently available to support CMS/FS. Data gaps identified for Decision 4 will be filled using samples being collected to fill data gaps identified for other decisions. Data will not be collected to solely fill Decision 4 data gaps.

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. Data results for selected constituents are shown in Figures C5-3 through C5-9, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0 of this sub-appendix.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLCs). The maximum concentrations of these metals for each of the units were compared to the TTLCs, and none of the metals exceeded the TTLC, as shown in Table C5-18. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLCs), and concentrations of barium and total chromium in AOC 11 exceeded 10 times the STLC one or more times, as shown in Table C5-18. In addition, total chromium also exceeded 20 times the toxicity characteristic leaching procedure (TCLP), as indicated in

Table C5-18. Because these metals have the potential to exceed STLC or TCLP thresholds, additional leachability testing for waste characterization purposes may be required if soil excavation and offsite disposal is chosen as a remedy. For the purposes of supporting the CMS/FS, the lack of STLC or TCLP analysis is not considered a data gap, for the existing total concentrations are sufficient for the purposes of evaluating various remedial alternatives. Additional data regarding potential COPC/COPEC leachability include SPLP analysis for total and hexavalent chromium, as shown in Table C5-2. SPLP analysis was conducted only for soil samples (no white powder or debris samples were tested using SPLP).

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 soil investigation was limited to grain size analysis only. Specific soil physical properties data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 in the Data Gaps Report. Additional soil physical parameter data are needed to support the CMS/FS.

5.4 Surface and Subsurface Features

While there is extensive information regarding surface and subsurface features at AOC 11, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for AOC 11. However, subsurface utilities, including gas transmission pipelines and any culverts or other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives and to prepare construction specifications.

5.5 Volumes of White Powder and Debris

Mapping may be required to assess the extent of debris in New Investigation Areas 1 and 2, as well as the extent of the white powder on the upper slope of AOC 11 near AOC 11 e.

6.0 Summary of Data Gaps and Proposed Phase 2 Soil Sample Locations to Fill Identified Gaps

Based on the Part A DQOs, data gaps were identified for three of the four decisions and are summarized below by decisions:

- **Decision 1 (Nature and Extent)**. The following data gaps were identified to resolve this decision:
  - Data Gap #1 – Lateral and vertical extent of contamination within AOC 11c.
  - Data Gap #2 – Lateral extent of contamination upslope of AOC 11c and AOC 11e.
  - Data Gap #3 – Lateral and vertical extent of contamination within AOC 11e.
  - Data Gap #4 – Nature and extent of contamination associated with New Investigation Areas 1 and 2, the newly identified burn area (near the location of the

current decontamination pad and Transwestern Meter Station), and the white powder area (upslope of AOC 11e).

- **Decision 2 (Data Sufficient to Estimate Representative Exposure Point Concentrations)**. No data gap was identified for this decision.
- **Decision 3 (Potential Threat to Groundwater from Residual Soil Concentrations)**. The following data gap was identified to resolve this decision:
  - Data gap #5 – Vertical extent of hexavalent chromium contamination in AOC 11a, AOC 11C, and AOC 11e to support refinement of the vadose leaching zone model.
- **Decision 4 (Data Sufficient to Estimate Soil Properties and Contaminant Distribution in Support of the CMS/FS).** The following data gap was identified to resolve this decision**:**
  - Data gap #6 – Additional soil physical parameter information to support the CMS/FS.
  - Data gap #7 – Volume and extent of debris in New Investigation Areas 1 and 2, and volume and extent of white powder material on the upper slope of AOC 11, if applicable.

Table C5-19 shows the proposed sample location IDs, sample depths, rationale for each location, and analytes, and proposed locations are shown in Figure C5-11. The proposed Phase 2 sample locations are needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

6.1 Access Restrictions

The following access restrictions apply and may impact soil sampling in AOC 11:

- Several underground natural gas transmission lines cross AOC 11. Portions of these lines are buried fewer than 6 inches below the ground surface and are above the ground surface in some of the lower-lying areas of this AOC. Sampling cannot occur within 10 feet of these lines and crossing these lines with heavy equipment is restricted.
- Remnants of two former check berms are located in the Northeast Ravine. The check berm associated with area AOC 11c was breached during the 2008 Part A Phase 1 sampling event to allow drilling equipment to access the upper areas of the AOC. Only minor grading occurred at the other former check berm, which is associated with area AOC 11e. Several proposed Phase 2 sample locations are proposed in the upper areas of the AOC. Additional modification of these check berms may be necessary to access these Phase 2 sample locations.

7.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2006.

Tables

TABLE C5-1
Conceptual Site Model – AOC 11
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Primary Source	**Primary Source Media**	**Potential Release Mechanism**	**Secondary Source Media**	**Potential Secondary Release Mechanism**
Runoff from compressor station, compressor station access road, and I-40	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
		Potential entrainment in stormwater/surface water runoff	Subsurface Soil	Potential volatilization and atmospheric dispersion/
			Potential Groundwater	Potential extracted groundwater[a]
Discharge from compressor station via stormwater drains	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
		Potential entrainment in stormwater/surface water runoff	Subsurface Soil	Potential volatilization and atmospheric dispersion
			Potential Groundwater	Potential extracted groundwater[a]
Disposal of Debris	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Subsurface Soil	Potential volatilization and atmospheric dispersion
			Potential Groundwater	Potential extracted groundwater[a]
Burned Material	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
		Potential entrainment in stormwater/surface water runoff	Subsurface Soil	

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part A Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C5-2

Synthetic Precipitation Leaching Procedure (SPLP) Extraction Results

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Topock Compressor Station, Needles, California

			SPLP Results in mg/L	
Location	**Sample Date**	**Depth (ft bgs)**	**Hexavalent Chromium**	**Chromium (total)**
AOC11				
AOC11c-1	09/22/08	9-10	0.0164 J	0.0399
AOC11e-2	09/24/08	2-3	0.0044 J	0.011

Notes:

ft bgs	feet below ground surface
mg/L	milligrams per liter
J	concentration estimated by laboratory or data validation

TABLE C5-3

Sample Results: Metals

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level ^{1} :				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels ^{2} :				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL ^{3} :				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values ^{4} :				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background ^{5} :				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC11a-1	09/21/08	0 - 0.5	N	ND (2) *	6	170	ND (2) *	ND (1)	19	ND (0.403)	5.8	12	9.9	ND (0.1) *	ND (2) *	13	ND (1)	ND (2)	ND (4) *	23	46
	09/21/08	2 - 3	N	ND (2.1) J*	6.4	190	ND (2.1) *	ND (1)	23	ND (0.411)	6.6	14	20	ND (0.1) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.1) *	30	58
	09/21/08	5 - 6	N	ND (2) *	4.6	190	ND (1) *	ND (1)	22	ND (0.41)	7.1	9	4.7	ND (0.1) *	ND (1)	14	1.6	ND (1)	ND (2)	31	44
	09/21/08	9 - 10	N	ND (2) *	6.9	190	ND (2) *	ND (1)	19	3	5.8	10	9.2	ND (0.1) J*	ND (2) *	13	ND (1)	ND (2)	ND (4) *	22	44
AOC11a-2	09/21/08	0 - 0.5	N	ND (2.1) *	8.3	210	ND (2.1) *	ND (1)	32	0.417	6.8	20	15	ND (0.11) *	ND (2.1) *	18	ND (2.1) *	ND (2.1)	ND (4.1) *	32	75
	09/21/08	2 - 3	N	ND (2.1) *	5.5	220	ND (2.1) *	ND (1)	19	ND (0.413)	6.9	10	7.7	ND (0.11) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.2) *	32	42
	09/21/08	5 - 6	N	ND (2) *	5.5	1,300	ND (2) *	ND (1)	25	ND (0.408)	8.9	14	3.4	ND (0.1) *	ND (2) *	19	ND (2) *	ND (2)	ND (4.1) *	41	56
	09/21/08	9 - 10	N	ND (2) *	5.2	480	ND (1) *	ND (1)	19	ND (0.412)	8.3	6.5	2.2	ND (0.1) J*	1	14	ND (1)	ND (1)	ND (2)	35	47
AOC11a-3	09/20/08	0 - 0.5	N	ND (2) *	6.9	190	ND (2) *	ND (1)	22	ND (0.411)	6.1	16	13	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4.1) *	24	62
	09/20/08	2 - 3	N	ND (2.1) *	6.6	220	ND (2.1) *	ND (1)	24	ND (0.423)	7	14	17	ND (0.1) *	2.2	16	ND (1)	ND (2.1)	ND (4.2) *	30	63
	09/20/08	2 - 3	FD	ND (2.1) *	7.4	220	ND (2.1) *	ND (1)	24	ND (0.418)	7.1	14	16	ND (0.1) *	2.4	16	ND (1)	ND (2.1)	ND (4.2) *	31	61
	09/20/08	5 - 6	N	ND (2.1) *	6.8	410	ND (2.1) *	ND (1)	76	0.634	7.4	15	25	ND (0.1) *	ND (2.1) *	17	ND (1)	ND (2.1)	ND (4.1) *	36	75
	09/20/08	9 - 10	N	ND (2) *	5.4	110	ND (1) *	ND (1)	23	ND (0.407)	8.1	11	2.9	ND (0.1) J*	1.1	17	ND (1)	ND (1)	ND (2)	33	48
AOC11a-4	09/20/08	0 - 0.5	N	ND (2) *	7.7	180	ND (2) *	ND (1)	25	ND (0.409)	6.4	18	17	ND (0.1) *	ND (2) *	17	ND (1)	ND (2)	ND (4.1) *	28	79
	09/20/08	2 - 3	N	ND (2) *	6.2	210	ND (2) *	ND (1)	27	ND (0.41)	8.5	13	8	ND (0.1) *	ND (2) *	20	ND (1)	ND (2)	ND (4.1) *	37	52
	09/20/08	5 - 6	N	ND (2) *	5	140	ND (2) *	ND (1)	25	ND (0.407) J	8.7	11	3.7	ND (0.1) *	ND (2) *	19	ND (1)	ND (2)	ND (4.1) *	38	54
	09/20/08	9 - 10	N	ND (2) *	7.5	640	ND (2) *	ND (1)	27	ND (0.41)	9.6	14	3.5	ND (0.1) J*	ND (2) *	22	ND (1)	ND (2)	ND (4.1) *	43	59
AOC11a-5	09/21/08	0 - 0.5	N	ND (2.1) *	7.8	210	ND (2.1) *	ND (1)	32	0.652	6.8	17	14	ND (0.1) *	ND (2.1) *	16	ND (1)	ND (2.1)	ND (4.1) *	32	71
	09/21/08	2 - 3	N	ND (2.1) *	6	370	ND (2.1) *	ND (1)	30	ND (0.412)	8.5	12	9.4	ND (0.1) *	2.5	18	ND (1)	ND (2.1)	ND (4.2) *	38	57
	09/21/08	5 - 6	N	ND (2.1) *	4.4	82	ND (1) *	ND (1)	18	ND (0.411)	8.7	9.2	3	ND (0.1) *	1.5	14	ND (1)	ND (1)	ND (2.1)	34	53
	09/21/08	5 - 6	FD	ND (2) *	4.1	84	ND (1) *	ND (1)	18	ND (0.412)	8	9.6	3.1	ND (0.1) *	1.6	14	3.2	ND (1)	ND (2)	33	51
	09/21/08	9 - 10	N	ND (2.1) J*	7.6	1,000	ND (2.1) *	ND (1)	24	ND (0.415)	8.4	9.8	3.1	ND (0.1) J*	2.5	19	ND (1)	ND (2.1)	ND (4.1) *	37	62
AOC11a-SS1	09/21/08	0 - 0.5	N	ND (2) *	3.6	88	ND (1) *	ND (1)	13	ND (0.402)	3.2	9.4	5.6	ND (0.1) J*	1.1	7.8	ND (1)	ND (1)	ND (2)	13	54
	09/21/08	2 - 3	N	ND (2) *	7.2	130	ND (2) *	ND (1)	19	ND (0.404)	6.7	8.9	6	ND (0.1) J*	ND (2) *	14	ND (1)	ND (2)	ND (4) *	29	48
	09/21/08	5 - 6	N	ND (2) *	6.1	77	ND (1) *	ND (1)	16	ND (0.408)	6.7	7.6	3	ND (0.1) J*	ND (1)	13	ND (1)	ND (1)	ND (2)	29	42
	09/21/08	9 - 10	N	ND (2) *	6.6	230	ND (1) *	ND (1)	13	ND (0.414)	6.2	7	3	ND (0.1) J*	ND (1)	11	ND (1)	ND (1)	ND (2)	29	40
AOC11a-SS2	09/21/08	0 - 0.5	N	ND (2) *	5.2	120	ND (1) *	ND (1)	15	ND (0.414)	5.1	8.1	7.1	ND (0.1) J*	ND (1)	11	ND (1)	ND (1)	ND (2)	21	42
	09/21/08	2 - 3	N	ND (2) *	5.3	140	ND (1) *	ND (1)	19	ND (0.402)	6	15	5.9	ND (0.1) J*	ND (1)	14	ND (1)	ND (1)	ND (2)	26	53
AOC11a-SS3	09/20/08	0 - 0.5	N	ND (2) *	9	240	ND (2) *	ND (1)	29	0.622	6.8	17	16	ND (0.1) J*	ND (2) *	17	ND (1)	ND (2)	ND (4) *	27	73
	09/20/08	2 - 3	N	ND (2) *	8.8	270	ND (2) *	ND (1)	27	ND (0.409)	8.5	15	5.7	ND (0.1) J*	ND (2) *	19	ND (1)	ND (2)	ND (4.1) *	38	57
	09/20/08	5 - 6	N	ND (2) *	8.5	51	ND (1) *	ND (1)	19	ND (0.412)	6.8	9.5	3.7	ND (0.1) J*	1.1	14	ND (1)	ND (1)	ND (2)	32	46
	09/20/08	9 - 10	N	ND (2.1) *	7.1	150	ND (1) *	ND (1)	24	ND (0.413)	7.7	11	3	ND (0.1) J*	1.4	19	ND (1)	ND (1)	ND (2.1)	30	48
AOC11b-1	09/17/08	0 - 0.5	N	ND (2) J*	6.7	200 J	ND (5) *	ND (1)	27	ND (0.402)	8.1	16	25	ND (0.1) *	ND (5) *	20	ND (1)	ND (5)	ND (10) *	41	71
	09/17/08	0 - 0.5	FD	ND (2) *	6.4	180	ND (5) *	ND (1)	25	0.553	8.1	15	12	ND (0.1) *	ND (5) *	19	ND (1)	ND (5)	ND (10) *	38	68
	09/17/08	2 - 3	N	ND (2) *	5.2	110	ND (2) *	ND (1)	17	ND (0.404)	3.6	7	8.2	ND (0.1) *	ND (2) *	8.9	ND (1)	ND (2)	ND (4) *	33	28
	09/17/08	5 - 6	N	ND (2) *	6.2	230	ND (2) *	ND (1)	21	ND (0.411)	6.5	15	22	ND (0.1) *	ND (2) *	15	ND (1)	ND (2)	ND (4.1) *	37	72
	09/17/08	9 - 10	N	ND (2.1) *	6	250	ND (2.1) *	ND (1)	20	ND (0.411)	5.7	13	13	ND (0.1) J*	ND (2.1) *	15	ND (1)	ND (2.1)	ND (4.1) *	33	65
AOC11b-2	09/17/08	0 - 0.5	N	ND (2) *	4.8	190	ND (2) *	ND (1)	21	0.645	5.6	13	45	ND (0.1) *	ND (2) *	13	ND (1)	ND (2)	ND (4) *	30	76
	09/17/08	2 - 3	N	ND (2) *	13	270	ND (5.1) *	ND (1)	32	ND (0.41)	9.1	15	7.6	ND (0.1) *	ND (5.1) *	20	ND (1)	ND (5.1)	ND (10) *	43	74
	09/17/08	5 - 6	N	ND (2) *	10	150	ND (5.1) *	ND (1)	24	ND (0.411)	8.3	14	5.9	ND (0.1) *	ND (5.1) *	18	ND (1)	ND (5.1)	ND (10) *	40	75
	09/17/08	9 - 10	N	ND (2) *	9	330	ND (5.1) *	ND (1)	24	ND (0.407)	8.3	15	8.2	ND (0.1) J*	ND (5.1) *	18	ND (1)	ND (5.1)	ND (10) *	40	86

TABLE C5-3
Sample Results: Metals
AOC 11 - Topographic Low Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC11c-1	09/21/08	0 - 0.5	N	ND (2) *	4.8	120	ND (2) *	ND (1)	26	ND (0.4)	4.8	9.7	30	ND (0.098) *	2.7	9.8	ND (1)	ND (2)	ND (4) *	19	47
	09/22/08	2 - 3	N	ND (2.1) *	7.9	220	ND (2.1) *	ND (1)	64	2.03	6.5	20	26	ND (0.11) *	2.1	16	ND (1)	ND (2.1)	ND (4.1) *	32	110
	09/22/08	2 - 3	FD	ND (2.1) *	7.4	220	ND (2.1) *	ND (1)	63	1.47	6.5	19	25	ND (0.11) *	2.3	16	ND (1)	ND (2.1)	ND (4.1) *	31	110
	09/22/08	5 - 6	N	ND (2.1) *	7.7	200	ND (2.1) *	ND (1)	64	2.03	7.4	20	24	ND (0.1) *	ND (2.1) *	18	ND (1)	ND (2.1)	ND (4.1) *	35	110
	09/22/08	9 - 10	N	ND (2) *	5.3	140	ND (2) *	ND (1)	130	3.33	5.8	17	11	ND (0.1) J*	ND (2) *	13	ND (1)	ND (2)	ND (4.1) *	24	62
AOC11c-2	09/21/08	0 - 0.5	N	ND (2) *	5.1	170	ND (2) *	ND (1)	26	0.744	5.7	12	11	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4) *	23	52
	09/22/08	2 - 3	N	ND (2.1) *	7.6	220	ND (2.1) *	ND (1.1) *	81	2.74	6.8	21	28	ND (0.11) *	2.7	16	ND (1.1)	ND (2.1)	ND (4.3) *	32	130
	09/22/08	5 - 6	N	ND (2.1) *	6.6	190	ND (2.1) *	ND (1)	56	1.3	6	16	18	ND (0.11) *	ND (2.1) *	14	ND (1)	ND (2.1)	ND (4.2) *	27	93
	09/22/08	9 - 10	N	ND (2) *	6.3	160	ND (2) *	ND (1)	70	2.05	6.2	16	10	ND (0.1) J*	ND (2) *	14	ND (1)	ND (2)	ND (4) *	27	70
AOC11c-SS1	09/21/08	0 - 0.5	N	ND (2) *	3.6	75	ND (1) *	ND (1)	12	ND (0.401)	3.3	5.2	6.8	ND (0.1) J*	ND (1)	6.8	ND (1)	ND (1)	ND (2)	14	23
	09/22/08	2 - 3	N	ND (2) *	4.3	91	ND (1) *	ND (1)	16	ND (0.403)	4.4	11	5.5	ND (0.1) J*	ND (1)	8.6	ND (1)	ND (1)	ND (2)	17	30
	09/22/08	5 - 6	N	ND (2) *	6.9	160	ND (2) *	ND (1)	37	1.14	6.1	13	11	ND (0.1) J*	2.9	14	ND (1)	ND (2)	ND (4.1) *	25	57
	09/22/08	9 - 10	N	ND (2) *	5.8	110	ND (2) *	ND (1)	19	ND (0.408)	5.9	6.2	5	ND (0.1) J*	ND (2) *	12	ND (1)	ND (2)	ND (4.1) *	21	31
AOC11c-SS2	09/22/08	0 - 0.5	N	ND (2) *	3.5	71	ND (1) *	ND (1)	14	ND (0.401)	3.4	4.9	8	ND (0.1) J*	ND (1)	6.6	ND (1)	ND (1)	ND (2)	14	25
	09/22/08	2 - 3	N	ND (2) *	3.6	77	ND (1) *	ND (1)	16	ND (0.402)	3.9	4.9	6.5	ND (0.1) J*	ND (1)	7.5	ND (1)	ND (1)	ND (2)	16	30
	09/22/08	5 - 6	N	ND (2) *	3.6	100	ND (1) *	ND (1)	32	7.78	4.2	11	8.9	ND (0.1) J*	ND (1)	9.2	ND (1)	ND (1)	ND (2)	18	54
	09/22/08	9 - 10	N	ND (2.1) *	3.4	98	ND (1) *	ND (1)	73	2.06	3.4	30	8.6	ND (0.1) J*	ND (1)	7.7	ND (1)	ND (1)	ND (2.1)	15	290
AOC11d-1	09/23/08	0 - 0.5	N	ND (2.1) J*	9.5	310 J	ND (2.1) *	ND (1)	31	0.677	8.2	19	16	ND (0.1) *	ND (2.1) *	18	ND (1)	ND (2.1)	ND (4.1) *	43	73
	09/23/08	0 - 0.5	FD	ND (2) *	9.2	250 J	ND (2) *	ND (1)	33	0.628	8.6	20	14	ND (0.1) *	ND (2) *	19	ND (1)	ND (2)	ND (4) *	44	76
	09/23/08	2.5 - 3	N	ND (2.1) *	4.5	86	ND (1) *	ND (1)	24	ND (0.414)	9	12	4.8	ND (0.1) *	1.2	17	ND (1)	ND (1)	ND (2.1)	32	48
	09/23/08	5 - 6	N	ND (2.1) *	5.9	94	ND (2.1) *	ND (1)	29	ND (0.416)	8.4	12	5	ND (0.1) *	ND (2.1) *	21	ND (1)	ND (2.1)	ND (4.1) *	39	52
	09/23/08	9 - 10	N	ND (2.1) *	8.6	180	ND (2.1) *	ND (1)	28	0.659	7.1	11	9.3	ND (0.1) J*	ND (2.1) *	16	ND (1)	ND (2.1)	ND (4.1) *	31	49
AOC11e-1	09/23/08	0 - 0.5	N	ND (2) *	5.8	180	ND (2) *	ND (1)	43	0.959	5.4	10	10	ND (0.098) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	22	54
	09/23/08	2.5 - 3	N	ND (2) *	3.4	110	ND (1) *	ND (1)	92	3.19	5.8	41	9	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	26	170
	09/23/08	5.5 - 6	N	ND (2) *	4	100	ND (1) *	ND (1)	48	0.961	5.8	17	6.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	28	59
	09/23/08	9.5 - 10	N	ND (2) *	4.6	110	ND (1) *	ND (1)	84	3.2	4.6	31	13	ND (0.1) J*	ND (1)	9.8	ND (1)	ND (1)	ND (2)	20	140
AOC11e-2	09/24/08	0 - 0.5	N	ND (2) *	4.8	140	ND (1) *	ND (1)	37	1.4	5.1	12	28	ND (0.1) *	1.1	11	ND (1)	ND (1)	ND (2)	24	160
	09/24/08	2 - 3	N	ND (2) *	3	88	ND (1) *	ND (1)	130	3.78	3.4	19	11	ND (0.099) *	2.6	7.1	ND (1)	ND (1)	ND (2)	14	130
	09/24/08	2 - 3	FD	ND (2.2) *	3.3	78	ND (1.1) *	ND (1.1) *	130	3.51	3.5	18	11	ND (0.11) *	2.9	7.3	ND (1.1)	ND (1.1)	ND (2.2)	15	120
	09/24/08	5 - 6	N	ND (2) *	3.3	100	ND (1) *	ND (1)	98	2.25	4.7	30	9.6	ND (0.1) *	1.3	9.3	ND (1)	ND (1)	ND (2)	20	150
	09/24/08	9 - 10	N	ND (2.1) *	5.2	100	ND (2.1) *	ND (1)	36	ND (0.436)	8.6	19	4.6	ND (0.11) J*	ND (2.1) *	19	ND (1)	ND (2.1)	ND (4.2) *	38	53
AOC11e-SS1	09/23/08	0 - 0.5	N	ND (2) J*	4.6	96 J	ND (1) *	ND (1)	20	0.698	3.9	8.7	8.6	ND (0.1) J*	ND (1)	8.7	ND (1)	ND (1)	ND (2)	18	35 J
	09/23/08	2.5 - 3	N	ND (2) *	4.6	87	ND (1) *	ND (1)	21	ND (0.411)	4.5	7.7	4.8	ND (0.1) J*	ND (1)	8.3	ND (1)	ND (1)	ND (2)	20	27
	09/23/08	5.5 - 6	N	ND (2) *	4.6	110	ND (1) *	ND (1)	9.2	ND (0.407)	3.8	5.1	5.2	ND (0.1) J*	ND (1)	6	ND (1)	ND (1)	ND (2)	16	20
	09/23/08	9.5 - 10	N	ND (2) *	4.7	100	ND (1) *	ND (1)	10	ND (0.407)	3.2	10	5.4	ND (0.1) J*	ND (1)	6.3	ND (1)	ND (1)	ND (2)	15	19
AOC11e-SS2	09/23/08	0 - 0.5	N	ND (2) *	4.5	120	ND (1) *	ND (1)	28	1.38	4.3	8.1	9.5	ND (0.1) J*	ND (1)	8.7	ND (1)	ND (1)	ND (2)	17	39
	09/23/08	2.5 - 3	N	ND (2) *	6.6	110	ND (2) *	ND (1)	21	0.438	6.2	9.7	7.4	ND (0.1) J*	ND (2) *	13	ND (1)	ND (2)	ND (4.1) *	24	35
	09/23/08	5.5 - 6	N	ND (2.1) *	4.8	98	ND (1) *	ND (1)	26	0.466	6.3	10	5.1	ND (0.1) J*	ND (1)	13	ND (1)	ND (1)	ND (2.1)	28	39
	09/23/08	5.5 - 6	FD	ND (2) *	4.5	100	ND (1) *	ND (1)	27	0.437	5.6	9.6	5.5	ND (0.1) J*	ND (1)	11	ND (1)	ND (1)	ND (2)	24	37
	09/23/08	9.5 - 10	N	ND (2.1) *	4.5	100	ND (1.1) *	ND (1.1) *	21	0.5	7.4	11	3.8	ND (0.11) J*	ND (1.1)	15	ND (1.1)	ND (1.1)	ND (2.1)	34	37

TABLE C5-3
Sample Results: Metals
AOC 11 - Topographic Low Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-4

Sample Results: Contract Laboratory Program Inorganics
AOC 11 - Topographic Low Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
AOC11a-1	09/21/08	0 - 0.5	N	11,000	33,000	14,000	8,500	330	2,500	580	ND (1.01) *
AOC11a-2	09/21/08	0 - 0.5	N	20,000	45,000	20,000	12,000	350	5,000	710	ND (1.03) *
AOC11a-3	09/20/08	0 - 0.5	N	15,000	42,000	16,000	11,000	320	3,400	530	ND (1.03) *
AOC11b-1	09/17/08	0 - 0.5	N	11,000	27,000	26,000	8,200	440	2,400	180	ND (1) *
	09/17/08	0 - 0.5	FD	11,000	25,000	25,000	8,300	430	2,200	180	ND (1.01) *
AOC11c-2	09/21/08	0 - 0.5	N	9,000	33,000	13,000	8,400	300	2,500	430	ND (1) *
AOC11d-1	09/23/08	0 - 0.5	N	19,000 J	43,000 J	21,000 J	11,000 J	390 J	4,900	450	ND (1.04) *
	09/23/08	0 - 0.5	FD	19,000	33,000 J	23,000	12,000	400	5,300	440	ND (1.01) *
AOC11e-2	09/24/08	0 - 0.5	N	7,900	23,000	12,000	6,400	220	2,300	ND (580)	ND (1.02) *

TABLE C5-4

Sample Results: Contract Laboratory Program Inorganics
AOC 11 - Topographic Low Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC11a-1	09/21/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.2	5.2	5.2	6.8	ND (5)	8	ND (5)	ND (5)	ND (5)	ND (5)	7.7	ND	38	5
	09/21/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/21/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11a-2	09/21/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	7.5	10	9.3	9	12	ND (5.2)	15	ND (5.2)	7.5	ND (5.2)	ND (5.2)	13	ND	83	11
	09/21/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/21/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11a-3	09/20/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.5	9	8.9	9.5	12	ND (5.1)	15	ND (5.1)	7.3	ND (5.1)	ND (5.1)	13	ND	82	11
	09/20/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	5.3	5.7	ND (5.2)	6.2	7	ND (5.2)	7.5	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	7.1	ND	39	8
	09/20/08	2 - 3	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	5.8	ND (5.2)	6.9	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6.3	ND	19	4.6
	09/20/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/20/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11a-4	09/20/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.3	8.4	8	8.9	13	ND (5.1)	18	ND (5.1)	5.6	ND (5.1)	ND (5.1)	14	ND	82	9.8
	09/20/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	26	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	26	4.5
	09/20/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/20/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11a-5	09/21/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	10	16	19	14	16	24	ND (5.2)	30	ND (5.2)	12	ND (5.2)	8.9	27	8.9	170	23
	09/21/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6.9	8.1	5.8	6.5	7.6	ND (5.2)	8	ND (5.2)	5.4	ND (5.2)	ND (5.2)	8.1	ND	56	10
	09/21/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	5 - 6	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11a-SS1	09/21/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.9	ND (5)	6.7	ND (5)	6.6	ND (5)	ND (5)	ND (5)	ND (5)	5.7	ND	26	4.4
	09/21/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/21/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/21/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11a-SS2	09/21/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.3	5.4	ND (5)	ND (5)	ND (5)	5.9	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	17	4.7
	09/21/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
AOC11a-SS3	09/20/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	25	37	59	36	43	59	11	89	ND (5)	30	ND (5)	26	78	26	470	57
	09/20/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/20/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/20/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C5-5
Sample Results: Polycyclic Aromatic Hydrocarbons
AOC 11 - Topographic Low Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC11b-1	09/17/08	0 - 0.5	N	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	44	65	98	52	41	88	ND (25)	120	ND (25)	49	ND (25)	30	110	30	670	93
	09/17/08	0 - 0.5	FD	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	50	59	85	52	39	78	ND (25)	120	ND (25)	47	ND (25)	28	110	28	640	86
	09/17/08	2 - 3	N	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	80	110	150	74	67	130	ND (25)	190	ND (25)	75	ND (5.6)	45	180	45	1,100	150
	09/17/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	21	31	44	19	21	38	5.1	56	ND (5.1)	19	ND (5.1)	14	53	14	310	44
	09/17/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	56	54	52	34	57	67	11	100	ND (5.1)	33	ND (5.1)	25	94	25	560	78
AOC11b-2	09/17/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	12	290	360	530	170	140	430	56	860	ND (5)	180	ND (5)	180	660	190	3,700	500
	09/17/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	14	18	24	13	10	21	ND (5.1)	34	ND (5.1)	13	ND (5.1)	9.5	30	9.5	180	25
	09/17/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/17/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11c-1	09/21/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	27	35	36	21	32	45	6.7	67	ND (5)	21	ND (5)	25	61	25	350	49
	09/22/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	52	68	66	60	73	90	19	400	ND (5.2)	58	ND (5.2)	48	370	48	1,300	100
	09/22/08	2 - 3	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	34	43	43	38	51	62	12	94	ND (5.2)	37	ND (5.2)	38	84	38	500	64
	09/22/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	31	46	49	46	54	60	12	78	ND (5.2)	44	ND (5.2)	24	74	24	490	68
	09/22/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11c-2	09/21/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	14	20	21	13	18	26	ND (5)	37	ND (5)	13	ND (5)	15	34	15	200	28
	09/22/08	2 - 3	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	75	110	99	98	140	140	28	180	ND (5.4)	95	ND (5.4)	61	170	61	1,100	160
	09/22/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	7.3	77	89	82	73	120 J	120	24	170	ND (5.2)	69	ND (5.2)	71	160	78	980	130
	09/22/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	17	23	23	20	30	31	5.7	40	ND (5.1)	18	ND (5.1)	12	37	12	240	34
AOC11c-SS1	09/21/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5	ND (5)	ND (5)	ND (5)	5.1	ND (5)	ND (5)	ND (5)	ND (5)	5.3	ND	15	4.4
	09/22/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6	ND (5)	ND (5)	ND (5)	ND (5)	6	ND	12	4.4
	09/22/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.7	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.3	ND	11	4.5
	09/22/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11c-SS2	09/22/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.9	7.3	6.3	8.3	8.6	ND (5)	12	ND (5)	5.3	ND (5)	ND (5)	11	ND	66	10
	09/22/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	34	41	40	31	48	51	9.1	69	ND (5)	29	ND (5)	25	66	25	420	60
	09/22/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	9	18	16	17	21	16	7	18	ND (5.1)	17	ND (5.1)	8.2	16	8.2	160	27
	09/22/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.9	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	5.9	4.5
AOC11d-1	09/23/08	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	26	44	46	43	61 J	62	12	100	ND (5.2)	38	ND (5.2)	33	93	33	530	66
	09/23/08	0 - 0.5	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	31	39	46	35	55 J	65	12	120	ND (5.1)	31	ND (5.1)	36	100	36	530	60
	09/23/08	2.5 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/23/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (3.5)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/23/08	9 - 10	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.1)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC11e-1	09/23/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	47	67	68	61	85 J	91	21	130	ND (5)	56	ND (5)	56	130	56	760	100
	09/23/08	2.5 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	16	17	18	14	22 J	27	ND (5)	50	ND (5)	13	ND (5)	26	43	26	220	25
	09/23/08	5.5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.5	6	6.9	5.4	8.1 J	9.1	ND (5.1)	17	ND (5.1)	ND (5.1)	ND (4.6)	8.6	15	8.6	73	9.3
	09/23/08	9.5 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	45	35	49	32	48	60	12	87	ND (5.1)	30	ND (5)	43	78	43	480	57

TABLE C5-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC11e-2	09/24/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	440	380	400	22	380	530	6.4	1,500	ND (5)	20	5	590	1,200	600	4,900	510
	09/24/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.2	ND (5)	ND (5)	ND (5)	ND (5)	8.2	ND	15	4.4
	09/24/08	2 - 3	FD	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	10	ND (5.5)	ND (5.5)	ND (5)	6	11	6	21	4.8
	09/24/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.6	ND (5.1)	ND (5.1)	5.6	ND (5.1)	10	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	8.2	ND	29	4.8
	09/24/08	9 - 10	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
AOC11e-SS1	09/23/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	16	25	34	25	27	36	6.6	53	ND (5)	23	ND (5)	19	49	19	290	38
	09/23/08	2.5 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/23/08	5.5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (3.9)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/23/08	9.5 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC11e-SS2	09/23/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	14	23	29	24	26	31	6.7	44	ND (5)	21	ND (5)	16	42	16	260	35
	09/23/08	2.5 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/23/08	5.5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	13	11	16	7.7	12	20	ND (5.2)	38 J	ND (5.2)	7.3	ND (4.8)	28 J	31 J	28	160	17
	09/23/08	5.5 - 6	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1) J	ND (5.1)	ND (5.1)	ND (4.7)	ND (5.1) J	ND (5.1) J	ND	ND	ND (4.5)
	09/23/08	9.5 - 10	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-6

Sample Results: VOCs, SVOCs, Total Petroleum Hydrocarbons and pH

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				VOCs (µg/kg)	**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry**
Interim Screening Level[1] :				**22,000,000**	**540**	**540**	**1,800**	**NE**
Residential Regional Screening Levels[2] :				**22,000,000**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**NE**	**540**	**540**	**1,800**	**NE**
Ecological Comparison Values[5] :				**NE**	**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**pH**
AOC11a-1	09/21/08	0 - 0.5	N	---	---	ND (10)	45.7 J	8.26
	09/21/08	2 - 3	N	ND (8.6)	ND (1.4)	ND (10)	10.1 J	8.76
	09/21/08	5 - 6	N	---	ND (1.3)	ND (10)	ND (10)	9.8
AOC11a-2	09/21/08	0 - 0.5	N	---	---	ND (10)	ND (10)	8.19
	09/21/08	2 - 3	N	ND (8.2)	ND (1.5)	ND (10)	ND (10)	8.89
	09/21/08	5 - 6	N	---	ND (1.4)	ND (10)	ND (10)	8.97
AOC11a-3	09/20/08	0 - 0.5	N	---	---	ND (10)	ND (10)	8.25
	09/20/08	2 - 3	N	ND (9.3)	ND (1.5)	ND (10)	ND (10)	8.6
	09/20/08	2 - 3	FD	ND (7.4)	ND (1.4)	ND (10)	ND (10)	8.96
	09/20/08	5 - 6	N	---	ND (1.1)	ND (10) J	35.6 J	8.99
AOC11a-4	09/20/08	0 - 0.5	N	---	---	10.3	14 J	7.99
	09/20/08	2 - 3	N	---	ND (1.1)	ND (10)	47.5 J	9.09
	09/20/08	5 - 6	N	---	ND (1.6)	ND (10)	11.9 J	9.34
AOC11a-5	09/21/08	0 - 0.5	N	---	---	ND (10)	11.2 J	8.37
	09/21/08	2 - 3	N	---	ND (1.1)	ND (10)	37.4 J	9.29
	09/21/08	5 - 6	N	---	ND (1.4)	ND (10)	11.3 J	9.61
	09/21/08	5 - 6	FD	---	ND (1.1)	ND (10)	ND (10)	9.51
AOC11b-1	09/17/08	0 - 0.5	N	---	---	ND (101)	ND (101)	7.64
	09/17/08	0 - 0.5	FD	---	---	ND (101)	ND (101)	7.48
	09/17/08	2 - 3	N	ND (5.6)	ND (1.2)	ND (10)	ND (10)	8.36
	09/17/08	5 - 6	N	---	ND (1.3)	ND (10)	16	8.39
AOC11b-2	09/17/08	0 - 0.5	N	---	---	ND (101)	ND (101)	7.88
	09/17/08	2 - 3	N	---	ND (1.4)	ND (10)	ND (10)	8.24
	09/17/08	5 - 6	N	---	ND (1.3)	ND (10)	ND (10)	8.13
AOC11c-1	09/21/08	0 - 0.5	N	---	---	ND (10)	ND (10)	8.74
	09/22/08	2 - 3	N	---	ND (3.8) J	ND (10) J	53.5	7.73
	09/22/08	2 - 3	FD	---	ND (2.4) J	78 J	71.2	8.03
	09/22/08	5 - 6	N	---	ND (1.5) J	ND (10)	76.5	7.9
AOC11c-2	09/21/08	0 - 0.5	N	---	---	ND (10)	ND (10)	8.56
	09/22/08	2 - 3	N	ND (16) J	ND (2.3) J	10	79.2	7.92
	09/22/08	5 - 6	N	---	ND (1.5) J	ND (10)	43.1	7.99
AOC11d-1	09/23/08	0 - 0.5	N	---	---	ND (10)	ND (10)	8.06
	09/23/08	0 - 0.5	FD	---	---	ND (10)	15.4	7.63
	09/23/08	2.5 - 3	N	ND (4.4)	ND (1)	ND (10)	ND (10)	8.7
	09/23/08	5 - 6	N	---	ND (0.96)	ND (10)	ND (10)	8.91
	09/23/08	9 - 10	N	---	ND (0.92)	ND (10) J	ND (10) J	---
AOC11e-1	09/23/08	0 - 0.5	N	---	---	ND (10)	11.7	7.94
	09/23/08	2.5 - 3	N	---	ND (0.99)	ND (10)	42.2 J	8.3
	09/23/08	5.5 - 6	N	---	ND (1.1)	ND (10)	23.6	7.87
	09/23/08	9.5 - 10	N	---	ND (0.93)	ND (10) J	17.7 J	---

TABLE C5-6

Sample Results: VOCs, SVOCs, Total Petroleum Hydrocarbons and pH

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				VOCs (µg/kg)	**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry**
Interim Screening Level[1] :				**22,000,000**	**540**	**540**	**1,800**	**NE**
Residential Regional Screening Levels[2] :				**22,000,000**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**NE**	**540**	**540**	**1,800**	**NE**
Ecological Comparison Values[5] :				**NE**	**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Methyl acetate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**pH**
AOC11e-2	09/24/08	0 - 0.5	N	---	---	13.8	166	8.05
	09/24/08	2 - 3	N	17	ND (0.9) J	ND (10)	471	7.72
	09/24/08	2 - 3	FD	---	ND (1.1) J	10.1	544	7.58
	09/24/08	5 - 6	N	---	ND (1) J	15.6	105	7.8
	09/24/08	9 - 10	N	---	ND (0.79)	ND (10) J	ND (10) J	---
AOC11e-SS1	09/23/08	0 - 0.5	N	---	---	ND (10) J	ND (10) J	---
	09/23/08	2.5 - 3	N	---	ND (0.91)	ND (10) J	ND (10) J	---
	09/23/08	5.5 - 6	N	---	ND (0.97)	ND (10) J	10.5 J	---
	09/23/08	9.5 - 10	N	---	ND (0.97)	ND (10) J	ND (10) J	---
AOC11e-SS2	09/23/08	0 - 0.5	N	---	---	ND (10) J	ND (10) J	---
	09/23/08	2.5 - 3	N	---	ND (1)	ND (10) J	ND (10) J	---
	09/23/08	5.5 - 6	N	---	ND (0.87)	ND (10) J	ND (10) J	---
	09/23/08	5.5 - 6	FD	---	ND (0.84)	ND (10) J	ND (10) J	---
	09/23/08	9.5 - 10	N	---	ND (1.1) J	10 J	ND (10) J	---

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[1] For VOCs, interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used. For TPHs, interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28 and ARCADIS. 2009. Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil". July 1.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

Results greater than the interim screening level are circled.

Only detected VOCs and SVOCs are presented.

VOCs	volatile organic compounds
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-7

Sample Results: Pesticides

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Interim Screening Level[1] :				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels[2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL[3] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values[4] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
AOC11a-1	09/21/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC11a-2	09/21/08	0 - 0.5	N	ND (2.1) *	ND (2.1) *	ND (2.1) *	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2.1)	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.2)	ND (52)
AOC11a-3	09/20/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC11b-1	09/17/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
	09/17/08	0 - 0.5	FD	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC11c-2	09/21/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC11d-1	09/23/08	0 - 0.5	N	ND (2.1) *	6.1	ND (2.1) *	ND (1)	ND (1)	12 J	ND (1)	ND (1)	6.7	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	13 J	ND (1)	ND (1)	ND (5.2)	ND (52)
	09/23/08	0 - 0.5	FD	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1) J	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1) J	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC11e-2	09/24/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-8

Sample Results: Polychlorinated Biphenyls

AOC 11 - Topographic Low Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level[1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Regional Screening Levels[2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Residential DTSC CHHSL[3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC11a-1	09/21/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC11a-2	09/21/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC11a-3	09/20/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC11b-1	09/17/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	09/17/08	0 - 0.5	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC11c-2	09/21/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	29	ND (17)	ND (17)	ND (17)	37.5
	09/22/08	2 - 3	N	ND (18) J	ND (35) J	ND (18) J	ND (18) J	ND (18) J	190 J	ND (18) J	ND (18) J	ND (18) J	199
AOC11d-1	09/23/08	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	76	ND (17)	ND (17)	ND (17)	84.5
	09/23/08	0 - 0.5	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	41	ND (17)	ND (17)	ND (17)	49.5
	09/23/08	2.5 - 3	N	ND (17) J	ND (34) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17)
AOC11e-2	09/24/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	190	240	ND (17)	ND (17)	430
	09/24/08	2 - 3	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	09/24/08	2 - 3	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	26	ND (17)	ND (17)	ND (17)	34.5
	09/24/08	5 - 6	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	18	ND (17)	ND (17)	ND (17)	26.5
	09/24/08	9 - 10	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC11e-SS1	09/23/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	30	ND (17)	ND (17)	ND (17)	38.5
	09/23/08	2.5 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	09/23/08	5.5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	09/23/08	9.5 - 10	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC11e-SS2	09/23/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	40	ND (17)	ND (17)	ND (17)	48.5
	09/23/08	2.5 - 3	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	09/23/08	5.5 - 6	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	30	ND (17)	ND (17)	ND (17)	38.5
	09/23/08	5.5 - 6	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	19	ND (17)	ND (17)	ND (17)	27.5
	09/23/08	9.5 - 10	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)

[1] Interim screening level is the USEPA residential regional screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

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Results greater than or equal to the interim screening level are circled.

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USEPA	United States Environmental Protection Agency
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CHHSL	California human health screening levels
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µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-9

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 11 - Topographic Low Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences** [7]	**(BTV)**	**# of Exceedences** [8]	**(ECV)**	**# of Exceedences** [8]	**(Res SL)**	**# of Exceedences** [8]	**(ESL)**	**# of Exceedences** [8]	**(Com SL)**	**# of Exceedences** [8]	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 74 (0%)	ND (2.1) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	74 / 74 (100%)	13	1	(11)	1	(11.4)	1	(0.07) *	NA	(NE)	1	(0.24) *	1	(11)
Barium	mg/kg	74 / 74 (100%)	1,300	4	(410)	4	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	4	(410)
Beryllium	mg/kg	0 / 74 (0%)	ND (5.1) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	0 / 74 (0%)	ND (1.1) ‡	0	(1.1)	0	(0.0151) *	0	(39)	NA	(NE)	0	(500)	0	(1.1)
Chromium	mg/kg	74 / 74 (100%)	130	14	(39.8)	14	(36.3) *	0	(280)	NA	(NE)	0	(1,400)	14	(39.8)
Chromium, Hexavalent	mg/kg	31 / 74 (42%)	7.78	18	(0.83)	0	(139.6)	0	(17)	NA	(NE)	0	(37)	18	(0.83)
Cobalt	mg/kg	74 / 74 (100%)	9.6	0	(12.7)	0	(13)	0	(23)	NA	(NE)	0	(300)	0	(12.7)
Copper	mg/kg	74 / 74 (100%)	41	16	(16.8)	5	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	16	(16.8)
Lead	mg/kg	74 / 74 (100%)	45	36	(8.39)	36	(0.0166) *	0	(80)	NA	(NE)	0	(320)	36	(8.39)
Mercury	mg/kg	0 / 74 (0%)	ND (0.11) ‡	NA	(NE)	0	(0.0125)	0	(18)	NA	(NE)	0	(180)	0	(0.0125)
Molybdenum	mg/kg	17 / 74 (23%)	2.9	10	(1.37)	8	(2.25)	0	(380)	NA	(NE)	0	(4,800)	10	(1.37)
Nickel	mg/kg	74 / 74 (100%)	22	0	(27.3)	0	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	0	(27.3)
Selenium	mg/kg	2 / 74 (2.7%)	3.2	2	(1.47)	2	(0.177) *	0	(380)	NA	(NE)	0	(4,800)	2	(1.47)
Thallium	mg/kg	0 / 74 (0%)	ND (10) ‡	NA	(NE)	0	(2.32)	0	(5)	NA	(NE)	0	(63)	0	(2.32)
Vanadium	mg/kg	74 / 74 (100%)	44	0	(52.2)	0	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	0	(52.2)
Zinc	mg/kg	74 / 74 (100%)	290	30	(58)	30	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	30	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	7 / 7 (100%)	20,000	2	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	2	(16,400)
Calcium	mg/kg	7 / 7 (100%)	45,000	0	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(66,500)
Iron	mg/kg	7 / 7 (100%)	26,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	7 / 7 (100%)	12,000	0	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(12,100)
Manganese	mg/kg	7 / 7 (100%)	440	1	(402)	1	(220)	0	(1,800)	NA	(NE)	0	(23,000)	1	(402)
Potassium	mg/kg	7 / 7 (100%)	5,300	2	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	2	(4,400)
Sodium	mg/kg	6 / 7 (86%)	710	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 7 (0%)	ND (1.03) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Volatile Organic Compounds															
Methyl acetate	µg/kg	1 / 7 (14%)	17	NA	(NE)	NA	(NE)	0	(22,000,000)	NA	(NE)	0	(92,000,000)	0	(22,000,000)
Polycyclic Aromatic Hydrocarbons															
Anthracene	µg/kg	2 / 74 (2.7%)	12	NA	(NE)	NA	(NE)	0	(17,000,000)	NA	(NE)	0	(170,000,000)	0	(17,000,000)
Benzo (a) anthracene	µg/kg	26 / 74 (35%)	440	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Benzo (a) pyrene	µg/kg	32 / 74 (43%)	380	NA	(NE)	NA	(NE)	12	(38)	NA	(NE)	2	(130)	12	(38)
Benzo (b) fluoranthene	µg/kg	35 / 74 (47%)	530	NA	(NE)	NA	(NE)	2	(380)	NA	(NE)	0	(1,300)	2	(380)
Benzo (ghi) perylene	µg/kg	36 / 74 (49%)	170	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	33 / 74 (45%)	380	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Chrysene	µg/kg	35 / 74 (47%)	530	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Dibenzo (a,h) anthracene	µg/kg	18 / 74 (24%)	56	NA	(NE)	NA	(NE)	0	(110)	NA	(NE)	0	(380)	0	(380)
Fluoranthene	µg/kg	41 / 74 (55%)	1,500	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Indeno (1,2,3-cd) pyrene	µg/kg	30 / 74 (41%)	180	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Naphthalene	µg/kg	1 / 74 (1.4%)	5	NA	(NE)	NA	(NE)	0	(3,600)	NA	(NE)	0	(18,000)	0	(3,600)
Phenanthrene	µg/kg	27 / 74 (36%)	590	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)

TABLE C5-9

Constitiuent Concentrations in Soil Compared to Screening Values

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Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV)[1]		Ecological Comparison Value (ECV)[2]		Residential Screening Level (Res SL)[3]		RWQCB Environmental Screening Levels (ESL)[4]		Commercial Screening Level (Com SL)[5]		Interim Screening Level (Int SL)[6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences[7]**	**(BTV)**	**# of Exceedences[8]**	**(ECV)**	**# of Exceedences[8]**	**(Res SL)**	**# of Exceedences[8]**	**(ESL)**	**# of Exceedences[8]**	**(Com SL)**	**# of Exceedences[8]**	**(Int SL)**
Polycyclic Aromatic Hydrocarbons															
Pyrene	µg/kg	39 / 74 (53%)	1,200	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	27 / 74 (36%)	600	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	42 / 74 (57%)	4,900	NA	(NE)	3	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	3	(1,160)
B(a)P Equivalent	µg/kg	42 / 74 (57%)	510	NA	(NE)	NA	(NE)	17	(38)	NA	(NE)	5	(130)	17	(38)
Polychlorinated biphenyls															
Aroclor 1254	µg/kg	9 / 20 (45%)	190	NA	(NE)	NA	(NE)	0	(220)	NA	(NE)	0	(740)	0	(220)
Aroclor 1260	µg/kg	1 / 20 (5.0%)	240	NA	(NE)	NA	(NE)	1	(220)	NA	(NE)	0	(740)	1	(220)
Total PCBs	µg/kg	9 / 20 (45%)	430	NA	(NE)	1	(204)	NA	(NE)	NA	(NE)	NA	(NE)	1	(204)
Pesticides															
4,4-DDE	µg/kg	1 / 7 (14%)	6.1	NA	(NE)	1	(2.1)	0	(1,600)	NA	(NE)	0	(6,300)	1	(2.1)
alpha-Chlordane	µg/kg	1 / 7 (14%)	12	NA	(NE)	0	(470)	0	(430)	NA	(NE)	0	(1,700)	0	(430)
Dieldrin	µg/kg	1 / 7 (14%)	6.7	NA	(NE)	1	(5)	0	(35)	NA	(NE)	0	(130)	1	(5)
gamma-Chlordane	µg/kg	1 / 7 (14%)	13	NA	(NE)	0	(470)	0	(430)	NA	(NE)	0	(1,700)	0	(430)
Total Petroleum Hydrocarbons															
TPH as diesel	mg/kg	7 / 47 (15%)	78	NA	(NE)	NA	(NE)	NA	(NE)	0	(540)	NA	(NE)	0	(540)
TPH as motor oil	mg/kg	23 / 47 (49%)	544	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

TABLE C5-9

Constitiuent Concentrations in Soil Compared to Screening Values
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Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C5-10

Central Tendency Comparisons (Site to Background), AOC 11 - Topographic Low Areas

Soil Investigation Part A Phase 1 Data Summary Report,

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Comparison Test Used	Probability that the Observed Differences Would Occur Purely by Chance	Statistical Decision with 0.05 Significance Level	Mean of Site Detects	Mean of Bkgd Detects	Median of Site Detects	Median of Bkgd Detects	Number of Site Detects	Number of Site Samples	Number of Bkgd Detects	Number of Bkgd Samples	Percent Detects Site	Percent Detects Bkgd
Arsenic	Gehan	0.000	Site > Bkgd	5.99	4.01	5.8	3.5	74	74	58	59	100	98
Barium	Gehan	0.133	nsd	197	165	150	135	74	74	60	60	100	100
Chromium	Gehan	0.004	Site > Bkgd	33.6	22.3	24.5	21.9	74	74	70	70	100	100
Copper	Gehan	0.001	Site > Bkgd	13.4	10.5	12	10.1	74	74	70	70	100	100
Lead	Gehan	0.000	Site > Bkgd	10.6	4.38	8.2	3.5	74	74	59	60	100	98
Molybdenum	Gehan	0.265	nsd	1.87	1.03	1.6	1	17	74	11	60	23	18
Zinc	Gehan	0.000	Site > Bkgd	64.9	36.8	54	35.5	74	74	70	70	100	100

Bkgd = background

nsd = no statistical difference

> = greater than
< = less than

TABLE C5-11

Decision 2 Data Gaps Summary AOC 11
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed	
Compound/Depth	Y or N	Det/# results	Value	Y or N	Y or N	Sample ID	Notes
Metals							
Arsenic				**11 mg/kg (bckg)**	**11.4 mg/kg**		
0-0.5 ft bgs	Y	19 of 19	9.5 mg/kg	N	N	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	13 mg/kg	Y	Y		
0-6 ft bgs	Y	56 of 56	13 mg/kg	Y	Y		
0-10 ft bgs	Y	74 of 74	13 mg/kg	Y	NA		
Barium				**5200 mg/kg**	**410 mg/kg (bckg)**		
0-0.5 ft bgs	Y	19 of 19	310 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	370 mg/kg	N	N		
0-6 ft bgs	Y	56 of 56	1300 mg/kg	N	Y		
0-10 ft bgs	Y	74 of 74	1300 mg/kg	N	NA		
Chromium-Total				**280 mg/kg**	**39.8 mg/kg (bckg)**		
0-0.5 ft bgs	Y	19 of 19	43 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	130 mg/kg	N	Y		
0-6 ft bgs	Y	56 of 56	130 mg/kg	N	Y		
0-10 ft bgs	Y	74 of 74	130 mg/kg	N	NA		
Copper				**3000 mg/kg**	**20.6 mg/kg**		
0-0.5 ft bgs	Y	19 of 19	20 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	41 mg/kg	N	Y		
0-6 ft bgs	Y	56 of 56	41 mg/kg	N	Y		
0-10 ft bgs	Y	74 of 74	41 mg/kg	N	NA		
Lead				**80 mg/kg**	**8.39 mg/kg (bckg)**		
0-0.5 ft bgs	Y	19 of 19	45 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	45 mg/kg	N	Y		
0-6 ft bgs	Y	56 of 56	45 mg/kg	N	Y		
0-10 ft bgs	Y	74 of 74	45 mg/kg	N	NA		
Molybdenum				**380 mg/kg**	**2.25 mg/kg**		
0-0.5 ft bgs	N	3 of 19	2.7 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC with the exception of the 0-0.5 ft bgs exposure interval. While this is insufficient to calculate an EPC using ProUCL for this exposure interval, the maximum concentration is low (i.e., does not exceed two times the lowest comparison value). Therefore, using the maximum result as the EPC is not expected to significantly impact the results of the risk assessment.
0-3 ft bgs	Y	9 of 38	2.9 mg/kg	N	Y		
0-6 ft bgs	Y	13 of 56	2.9 mg/kg	N	Y		
0-10 ft bgs	Y	17 of 74	2.9 mg/kg	N	NA		

TABLE C5-11

Decision 2 Data Gaps Summary AOC 11
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N	Y or N		
Selenium				**380 mg/kg**	**1.47 mg/kg (bckg)**		
0-0.5 ft bgs	NA	0 of 19	NA mg/kg	N	N	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC because additional sampling would likely result in additional non-detect values.
0-3 ft bgs	NA	0 of 38	NA mg/kg	N	N		
0-6 ft bgs	N	2 of 56	3.2 mg/kg	N	Y		
0-10 ft bgs	N	2 of 74	3.2 mg/kg	N	NA		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	Y	19 of 19	160 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	38 of 38	170 mg/kg	N	Y		
0-6 ft bgs	Y	56 of 56	170 mg/kg	N	Y		
0-10 ft bgs	Y	74 of 74	290 mg/kg	N	NA		
Contract Laboratory Program Inorganics							
Aluminum				**77000 mg/kg**	**16400 mg/kg (bckg)**		
0-0.5 ft bgs	Y	7 of 7	20000 mg/kg	N	Y	None	Compound exceeds ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	7 of 7	20000 mg/kg	N	Y		
0-6 ft bgs	Y	7 of 7	20000 mg/kg	N	Y		
0-10 ft bgs	Y	7 of 7	20000 mg/kg	N	NA		
Manganese				**1800 mg/kg**	**402 mg/kg (bckg)**		
0-0.5 ft bgs	Y	7 of 7	440 mg/kg	N	Y	None	Compound exceeds ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	7 of 7	440 mg/kg	N	Y		
0-6 ft bgs	Y	7 of 7	440 mg/kg	N	Y		
0-10 ft bgs	Y	7 of 7	440 mg/kg	N	NA		
Potassium				**4400 mg/kg (bckg)**	**4400 mg/kg (bckg)**		
0-0.5 ft bgs	Y	7 of 7	5300 mg/kg	Y	Y	None	Compound exceeds HHCV and ECV (both background). Existing data adequate for EPC.
0-3 ft bgs	Y	7 of 7	5300 mg/kg	Y	Y		
0-6 ft bgs	Y	7 of 7	5300 mg/kg	Y	Y		
0-10 ft bgs	Y	7 of 7	5300 mg/kg	Y	NA		
Polynuclear Aromatic Hydrocarbons							
PAHs (BaP TEQ)				**38 µg/kg**	**NA**		
0-0.5 ft bgs	Y	19 of 19	510 µg/kg	Y	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	30 of 38	510 µg/kg	Y	NA		
0-6 ft bgs	Y	38 of 56	510 µg/kg	Y	NA		
0-10 ft bgs	Y	42 of 74	510 µg/kg	Y	NA		

TABLE C5-11
Decision 2 Data Gaps Summary AOC 11
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable? [1] Y or N	> ECV or Background as Applicable? [1] Y or N	Proposed Sample ID	Notes
HMW PAHs				**NA**	**1160 µg/kg**		
0-0.5 ft bgs	Y	19 of 19	4900 µg/kg	NA	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	30 of 38	4900 µg/kg	NA	Y		
0-6 ft bgs	Y	38 of 56	4900 µg/kg	NA	Y		
Polychlorinated Biphenyls							
Total PCBs				**220 µg/kg**	**204 µg/kg**		
0-0.5 ft bgs	Y	5 of 9	430 µg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	7 of 14	430 µg/kg	Y	Y		
0-6 ft bgs	Y	9 of 17	430 µg/kg	Y	Y		
0-10 ft bgs	Y	9 of 20	430 µg/kg	Y	NA		
Pesticides							
DDT-R				**1600 µg/kg**	**2.1 µg/kg**		
0-0.5 ft bgs	N	1 of 7	6.1 µg/kg	N	Y	None	Compound exceeds ECV and existing data not adequate to calculate 95% UCL. DDE was detected in 1 of 7 samples; DDT and DDD were not detected. Additional sampling is not expected to significantly change the results (NDs are likely and the EPC would still be the maximum detected value).
0-3 ft bgs	N	1 of 7	6.1 µg/kg	N	Y		
0-6 ft bgs	N	1 of 7	6.1 µg/kg	N	Y		
0-10 ft bgs	N	1 of 7	6.1 µg/kg	N	NA		
Dieldrin				**35 µg/kg**	**5 µg/kg**		
0-0.5 ft bgs	N	1 of 7	6.7 µg/kg	N	Y	None	Compound exceeds ECV and existing data not adequate to calculate 95% UCL. The magnitude of the detection is low relative to the ECV. Additional sampling is not expected to significantly change the results (NDs are likely and the EPC would still be the maximum detected value).
0-3 ft bgs	N	1 of 7	6.7 µg/kg	N	Y		
0-6 ft bgs	N	1 of 7	6.7 µg/kg	N	Y		
0-10 ft bgs	N	1 of 7	6.7 µg/kg	N	NA		

Footnotes:

[1] The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

Acronyms and Abbreviations:
AOC - area of concern
BaP TEQ - benzo(a)pyrene toxic equivalents
ECV - ecological comparison values
EPC - exposure point concentration

TABLE C5-11

Decision 2 Data Gaps Summary AOC 11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable? [1] Y or N	> ECV or Background as Applicable? [1] Y or N	Proposed Sample ID	Notes

ft bgs - feet below ground surface
HHCV - human health comparison values
HMW PAH - high molecular weight polycyclic aromatic hydrocarbons
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
N - no
NA - not applicable
Y - yes

TABLE C5-12
Results of Tiered Analysis at AOCs 11a through 11e
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Metal	Step 1 Do COPCs/COPECs Exceed Background?	Step 2 Do COPCs/COPECs Exceed SSL?	Step 3 Does Screening Model Eliminate Potential for Impact to Groundwater?
AOC 11a			
Barium	✓		
Chromium	✓		
Chromium, Hexavalent	✓	✓	No
Copper	✓		
Lead	✓		
Molybdenum	✓	✓	Yes
Selenium	✓		
Zinc	✓		
AOC 11b			
Chromium	✓		
Chromium, Hexavalent	✓	✓	No
Copper	✓		
Lead	✓		
AOC 11c			
Chromium	✓		
Chromium, Hexavalent	✓	✓	No
Copper	✓		
Lead	✓		
Molybdenum	✓	✓	Yes
Zinc	✓		
AOC 11d			
Chromium, Hexavalent	✓		
Copper	✓		
Lead	✓		
Zinc	✓		
AOC 11e			
Chromium	✓		
Chromium, Hexavalent	✓	✓	No
Copper	✓		
Lead	✓		
Molybdenum	✓	✓	
Zinc	✓		

✓ = Constituents concentration exceeds background and/or SSL.

TABLE C5-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC11a
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)							
		Soil Screening Levels : [1]		**12,000**	**16,000**	**1**	**63,000**	**10,000**	**0.73**	**120**	**380,000**
		Background : [2]		**410**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**1.47**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Selenium**	**Zinc**
AOC11a-1	09/21/08	0 - 0.5	N	170	19	ND (0.403)	12	9.9	ND (2)	ND (1)	46
	09/21/08	2 - 3	N	190	23	ND (0.411)	14	20	ND (2.1)	ND (1)	58
	09/21/08	5 - 6	N	190	22	ND (0.41)	9	4.7	ND (1)	1.6	44
	09/21/08	9 - 10	N	190	19	3	10	9.2	ND (2)	ND (1)	44
AOC11a-2	09/21/08	0 - 0.5	N	210	32	0.417	20	15	ND (2.1)	ND (2.1)	75
	09/21/08	2 - 3	N	220	19	ND (0.413)	10	7.7	ND (2.1)	ND (1)	42
	09/21/08	5 - 6	N	1,300	25	ND (0.408)	14	3.4	ND (2)	ND (2)	56
	09/21/08	9 - 10	N	480	19	ND (0.412)	6.5	2.2	1	ND (1)	47
AOC11a-3	09/20/08	0 - 0.5	N	190	22	ND (0.411)	16	13	ND (2)	ND (1)	62
	09/20/08	2 - 3	N	220	24	ND (0.423)	14	17	2.2	ND (1)	63
	09/20/08	2 - 3	FD	220	24	ND (0.418)	14	16	2.4	ND (1)	61
	09/20/08	5 - 6	N	410	76	0.634	15	25	ND (2.1)	ND (1)	75
	09/20/08	9 - 10	N	110	23	ND (0.407)	11	2.9	1.1	ND (1)	48
AOC11a-4	09/20/08	0 - 0.5	N	180	25	ND (0.409)	18	17	ND (2)	ND (1)	79
	09/20/08	2 - 3	N	210	27	ND (0.41)	13	8	ND (2)	ND (1)	52
	09/20/08	5 - 6	N	140	25	ND (0.407) J	11	3.7	ND (2)	ND (1)	54
	09/20/08	9 - 10	N	640	27	ND (0.41)	14	3.5	ND (2)	ND (1)	59
AOC11a-5	09/21/08	0 - 0.5	N	210	32	0.652	17	14	ND (2.1)	ND (1)	71
	09/21/08	2 - 3	N	370	30	ND (0.412)	12	9.4	2.5	ND (1)	57
	09/21/08	5 - 6	N	82	18	ND (0.411)	9.2	3	1.5	ND (1)	53
	09/21/08	5 - 6	FD	84	18	ND (0.412)	9.6	3.1	1.6	3.2	51
	09/21/08	9 - 10	N	1,000	24	ND (0.415)	9.8	3.1	2.5	ND (1)	62
AOC11a-SS1	09/21/08	0 - 0.5	N	88	13	ND (0.402)	9.4	5.6	1.1	ND (1)	54
	09/21/08	2 - 3	N	130	19	ND (0.404)	8.9	6	ND (2)	ND (1)	48
	09/21/08	5 - 6	N	77	16	ND (0.408)	7.6	3	ND (1)	ND (1)	42
	09/21/08	9 - 10	N	230	13	ND (0.414)	7	3	ND (1)	ND (1)	40
AOC11a-SS2	09/21/08	0 - 0.5	N	120	15	ND (0.414)	8.1	7.1	ND (1)	ND (1)	42
	09/21/08	2 - 3	N	140	19	ND (0.402)	15	5.9	ND (1)	ND (1)	53

TABLE C5-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC11a
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)							
			Soil Screening Levels : [1]	**12,000**	**16,000**	**1**	**63,000**	**10,000**	**0.73**	**120**	**380,000**
			Background : [2]	**410**	**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**1.47**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Barium**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Selenium**	**Zinc**
AOC11a-SS3	09/20/08	0 - 0.5	N	240	29	0.622	17	16	ND (2)	ND (1)	73
	09/20/08	2 - 3	N	270	27	ND (0.409)	15	5.7	ND (2)	ND (1)	57
	09/20/08	5 - 6	N	51	19	ND (0.412)	9.5	3.7	1.1	ND (1)	46
	09/20/08	9 - 10	N	150	24	ND (0.413)	11	3	1.4	ND (1)	48

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-14

Sample Results Compared to the Calculated Soil Screening Levels

AOC11b

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)			
Soil Screening Levels : [1]				**39**	**0.12**	**1,000**	**39,000**
Background : [2]				**11**	**0.83**	**8.39**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Chromium Hexavalent**	**Lead**	**Zinc**
AOC11b-1	09/17/08	0 - 0.5	N	6.7	ND (0.402)	25	71
	09/17/08	0 - 0.5	FD	6.4	0.553	12	68
	09/17/08	2 - 3	N	5.2	ND (0.404)	8.2	28
	09/17/08	5 - 6	N	6.2	ND (0.411)	22	72
	09/17/08	9 - 10	N	6	ND (0.411)	13	65
AOC11b-2	09/17/08	0 - 0.5	N	4.8	0.645	45	76
	09/17/08	2 - 3	N	13	ND (0.41)	7.6	74
	09/17/08	5 - 6	N	10	ND (0.411)	5.9	75
	09/17/08	9 - 10	N	9	ND (0.407)	8.2	86

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-15

Sample Results Compared to the Calculated Soil Screening Levels
AOC11c
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)					
		Soil Screening Levels : [1]		**16,000**	**1.1**	**64,000**	**10,000**	**0.73**	**390,000**
		Background : [2]		**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC11c-1	09/21/08	0 - 0.5	N	26	ND (0.4)	9.7	30	2.7	47
	09/22/08	2 - 3	N	64	2.03	20	26	2.1	110
	09/22/08	2 - 3	FD	63	1.47	19	25	2.3	110
	09/22/08	5 - 6	N	64	2.03	20	24	ND (2.1)	110
	09/22/08	9 - 10	N	130	3.33	17	11	ND (2)	62
AOC11c-2	09/21/08	0 - 0.5	N	26	0.744	12	11	ND (2)	52
	09/22/08	2 - 3	N	81	2.74	21	28	2.7	130
	09/22/08	5 - 6	N	56	1.3	16	18	ND (2.1)	93
	09/22/08	9 - 10	N	70	2.05	16	10	ND (2)	70
AOC11c-SS2	09/22/08	0 - 0.5	N	14	ND (0.401)	4.9	8	ND (1)	25
	09/22/08	2 - 3	N	16	ND (0.402)	4.9	6.5	ND (1)	30
	09/22/08	5 - 6	N	32	7.78	11	8.9	ND (1)	54
	09/22/08	9 - 10	N	73	2.06	30	8.6	ND (1)	290

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-16

Sample Results Compared to the Calculated Soil Screening Levels
AOC11d
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)			
		Soil Screening Levels : [1]		**0.71**	**43,000**	**7,000**	**260,000**
		Background : [2]		**0.83**	**16.8**	**8.39**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium Hexavalent**	**Copper**	**Lead**	**Zinc**
AOC11d-1	09/23/08	0 - 0.5	N	0.677	19	16	73
	09/23/08	0 - 0.5	FD	0.628	20	14	76
	09/23/08	2.5 - 3	N	ND (0.414)	12	4.8	48
	09/23/08	5 - 6	N	ND (0.416)	12	5	52
	09/23/08	9 - 10	N	0.659	11	9.3	49

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-17

Sample Results Compared to the Calculated Soil Screening Levels
AOC11e
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)					
Soil Screening Levels : [1]				**8,800**	**0.58**	**35,000**	**5,600**	**0.73**	**210,000**
Background : [2]				**39.8**	**0.83**	**16.8**	**8.39**	**1.37**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Molybdenum**	**Zinc**
AOC11e-1	09/23/08	0 - 0.5	N	43	0.959	10	10	ND (2)	54
	09/23/08	2.5 - 3	N	92	3.19	41	9	ND (1)	170
	09/23/08	5.5 - 6	N	48	0.961	17	6.4	ND (1)	59
	09/23/08	9.5 - 10	N	84	3.2	31	13	ND (1)	140
AOC11e-2	09/24/08	0 - 0.5	N	37	1.4	12	28	1.1	160
	09/24/08	2 - 3	N	130	3.78	19	11	2.6	130
	09/24/08	2 - 3	FD	130	3.51	18	11	2.9	120
	09/24/08	5 - 6	N	98	2.25	30	9.6	1.3	150
	09/24/08	9 - 10	N	36	ND (0.436)	19	4.6	ND (2.1)	53
AOC11e-SS1	09/23/08	0 - 0.5	N	20	0.698	8.7	8.6	ND (1)	35 J
	09/23/08	2.5 - 3	N	21	ND (0.411)	7.7	4.8	ND (1)	27
	09/23/08	5.5 - 6	N	9.2	ND (0.407)	5.1	5.2	ND (1)	20
	09/23/08	9.5 - 10	N	10	ND (0.407)	10	5.4	ND (1)	19
AOC11e-SS2	09/23/08	0 - 0.5	N	28	1.38	8.1	9.5	ND (1)	39
	09/23/08	2.5 - 3	N	21	0.438	9.7	7.4	ND (2)	35
	09/23/08	5.5 - 6	N	26	0.466	10	5.1	ND (1)	39
	09/23/08	5.5 - 6	FD	27	0.437	9.6	5.5	ND (1)	37
	09/23/08	9.5 - 10	N	21	0.5	11	3.8	ND (1.1)	37

TABLE C5-17

Sample Results Compared to the Calculated Soil Screening Levels

AOC11e

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C5-18

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)
AOC 11 - Topographic Low Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			TTLC in mg/kg[1]		**STLC in mg/L**[1]			**TCLP in mg/L**[1]		
Parameter	**Frequency of detection**	**Maximum Detected Value (mg/kg)**	**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	0 / 74 (0%)	ND (2.1)	0	500	0	150	15	0	NE	NE
Arsenic	74 / 74 (100%)	13	0	500	0	50	5	0	100	5
Barium	74 / 74 (100%)	1,300	0	10000	1	1000	100	0	2000	100
Beryllium	0 / 74 (0%)	ND (5.1)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 74 (0%)	ND (1.1)	0	100	0	10	1	0	20	1
Chromium	74 / 74 (100%)	130	0	2500	12	50	5	2	100	5
Chromium, Hexavalent	31 / 74 (42%)	7.78	0	500	0	50	5	0	NE	NE
Cobalt	74 / 74 (100%)	9.6	0	8000	0	800	80	0	NE	NE
Copper	74 / 74 (100%)	41	0	2500	0	250	25	0	NE	NE
Lead	74 / 74 (100%)	45	0	1000	0	50	5	0	100	5
Mercury	0 / 74 (0%)	ND (0.11)	0	20	0	2	0.2	0	4	0.2
Molybdenum	17 / 74 (23%)	2.9	0	3500	0	3500	350	0	NE	NE
Nickel	74 / 74 (100%)	22	0	2000	0	200	20	0	NE	NE
Selenium	2 / 74 (2.7%)	3.2	0	100	0	10	1	0	20	1
Silver	0 / 74 (0%)	ND (5.1)	0	500	0	50	5	0	100	5
Thallium	0 / 74 (0%)	ND (10)	0	700	0	70	7	0	NE	NE
Vanadium	74 / 74 (100%)	44	0	2400	0	240	24	0	NE	NE
Zinc	74 / 74 (100%)	290	0	5000	0	2500	250	0	NE	NE

Notes:

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC.

TABLE C5-19
Proposed Phase 2 Sampling Locations at AOC 11
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[a]
AOC11c-3	14, 19, 29, 39, 49, 59, and 69 (to groundwater)	To resolve Data Gaps #1, #5, and #6 - Define vertical extent at previous sample location AOC11c-SS2. Collect data to assess current threat to groundwater and support CMS/FS	Hexavalent chromium, Title 22 metals, PCBs soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Rotosonic
AOC11c-4	0, 2, 5, 9 and 14, 19	To resolve Data Gaps #1 and #5 - Define lateral and vertical extent in AOC11c. Collect data to assess current threat to groundwater.	Hexavalent chromium, Title 22 metals, PAHs, PCBs	Rotosonic
AOC11e-3	0, 2, 5, 9, and 14	To resolve Data Gap #2 - Define lateral and vertical extent upslope of AOC 11e (may not be technically feasible to get to depth)	Hexavalent chromium, Title 22 metals, PAHs, PCBs	Backhoe
AOC11e-4	0, 2, 5, 9, and 14	To resolve Data Gaps #2 and #6- Define lateral and vertical extent upslope of AOC 11e (may not be technically feasible to get to depth)) and support CMS/FS.	Hexavalent chromium, Title 22 metals, PAHs, PCBs; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Backhoe
AOC11e-5	14, 19, 29, 39, 49, 59, and 69 (to groundwater)	To resolve Data Gaps #3 and #5 - Define vertical extent in AOC 11e. Refine vadose zone leaching model.	Hexavalent chromium, Title 22 metals, PAHs, PCBs	Backhoe
AOC11e-6	0	To resolve Data Gaps #4 and #7– Assess white powder material in newly identified white powder area	Title 22 metals, hexavalent chromium, general chemistry, pH	Hand tools
AOC11-1	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	Rotosonic
AOC11-2	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area (burn area)	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs, dioxins and furans	Rotosonic
AOC11-3	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area (burn area)	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs , dioxins and furans	Rotosonic
AOC11-4	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs, dioxins and furans	Backhoe
AOC11-5	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs, dioxins and furans	Backhoe

TABLE C5-19
Proposed Phase 2 Sampling Locations at AOC 11
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

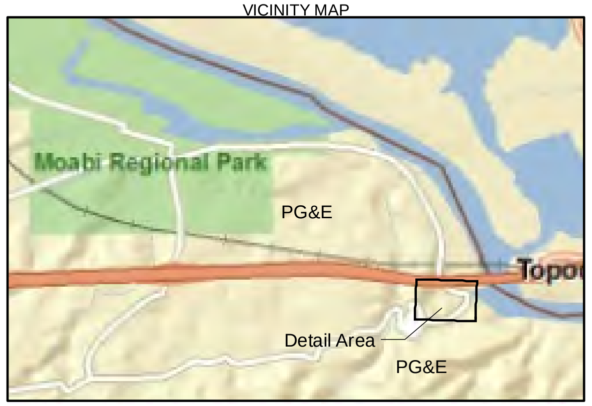
Location ID	**Depths (ft bgs)**	**Description/Rationale**	**Analytes**	**Proposed Collection Method**[a]
AOC11-6	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	Rotosonic
AOC11-7	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	Rotosonic drill rig
AOC11-8 (contingent)	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area. Contingent based on results of AOC11-6 and AOC 11-7.	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	Hand tools
AOC11-9 (contingent)	0, 2, 5, and 9	To resolve Data Gaps #4 and #7–Assess newly identified area. Contingent based on results of AOC11-6 and AOC 11-	Title 22 Metals, hexavalent chromium, pH, TPH, SVOCs, PAHs	Hand tools

Notes:

[a] Proposed collection methods listed on this table are based on experience and knowledge of the site; actual collection method will be chosen in the field based on field conditions and site access restrictions.

SVOC = semivolatile organic compound.

Figures



LEGEND

— —	Access Routes
🟩	AOC 11 Boundary
🟧	New Investigation Area
⁘	White Powder
▨	Potential Burning Related Location
—	Transwestern Pipeline
—	Mojave Pipeline
—	PG&E Pipeline
—	SoCal Gas Pipeline
—	Stormwater Piping Above Ground
- - -	Stormwater Piping Above Ground
— —	Caltrans ROW
—	Property Boundary

Note:
1.Topographic contours shown are in 2 foot intervals.

N

0 50 100 200
Feet

FIGURE C5-1
Burn Areas and New Topographic Low Areas AOC11

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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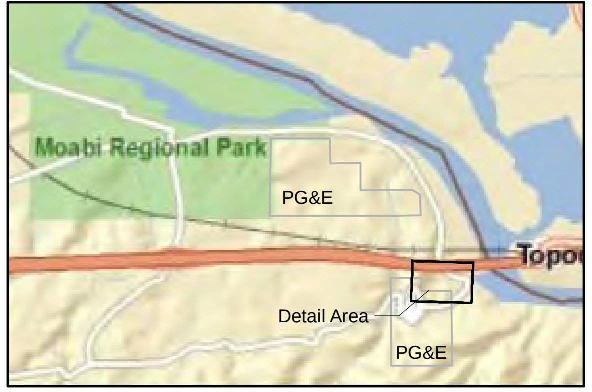
VICINITY MAP



LEGEND

● Soil Boring

Property Boundary

Caltrans ROW

AOC 11 Boundary

Potential New Investigation Area

White Powder

Potential Burning Related Location

Transwestern Pipeline

Mojave Pipeline

PG&E Pipeline

SoCal Gas Pipeline

Approximate Location of Stormwater Piping Below Ground

Approximate Location of Stormwater Piping Above Ground

Potential Release Mechanisms

Infrequent Surface Water Runoff

Infiltration (Site-wide)

Windblown Dispersion of Soil (Site-wide)

Volatilization (Site-wide)

Degradation by Heat/Light (Site-wide)

Downstream Movement During Flow Events

Note:
Topographic contours shown are in 2 foor intervals.

N

0 50 100
Feet

FIGURE C5-2
Conceptual Site Model for AOC-11
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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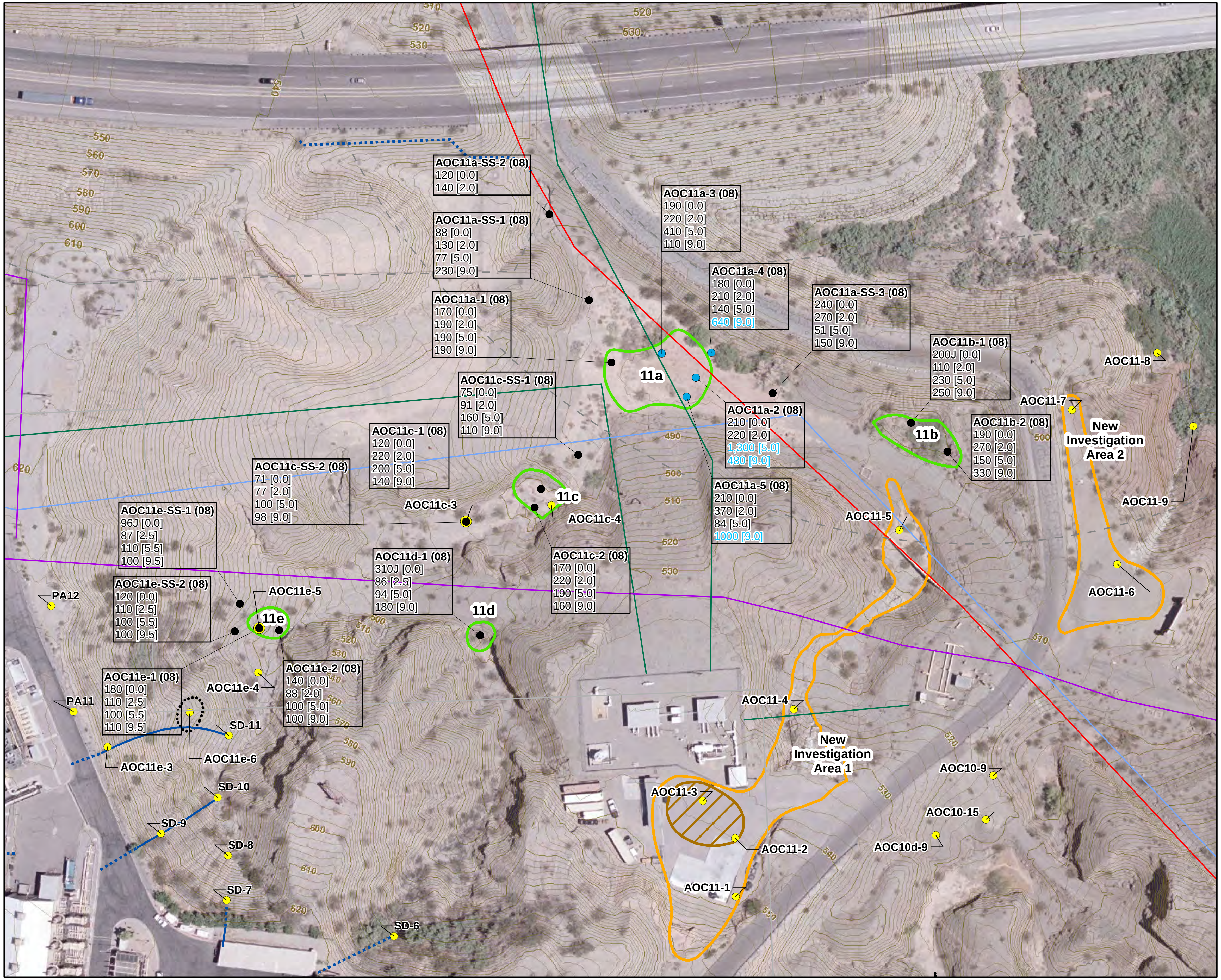

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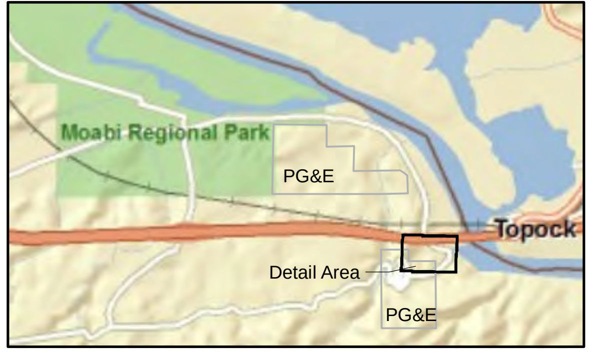


LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- ┅ White Powder
- 🟩 AOC 11 Boundary
- 🟧 Potential New Investigation Area
- ▨ Potential Burning Related Location
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ┅ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location / Installation Date
20 [1] — Sample Beginning Depth (ft bgs) / Soil Concentration (mg/kg)

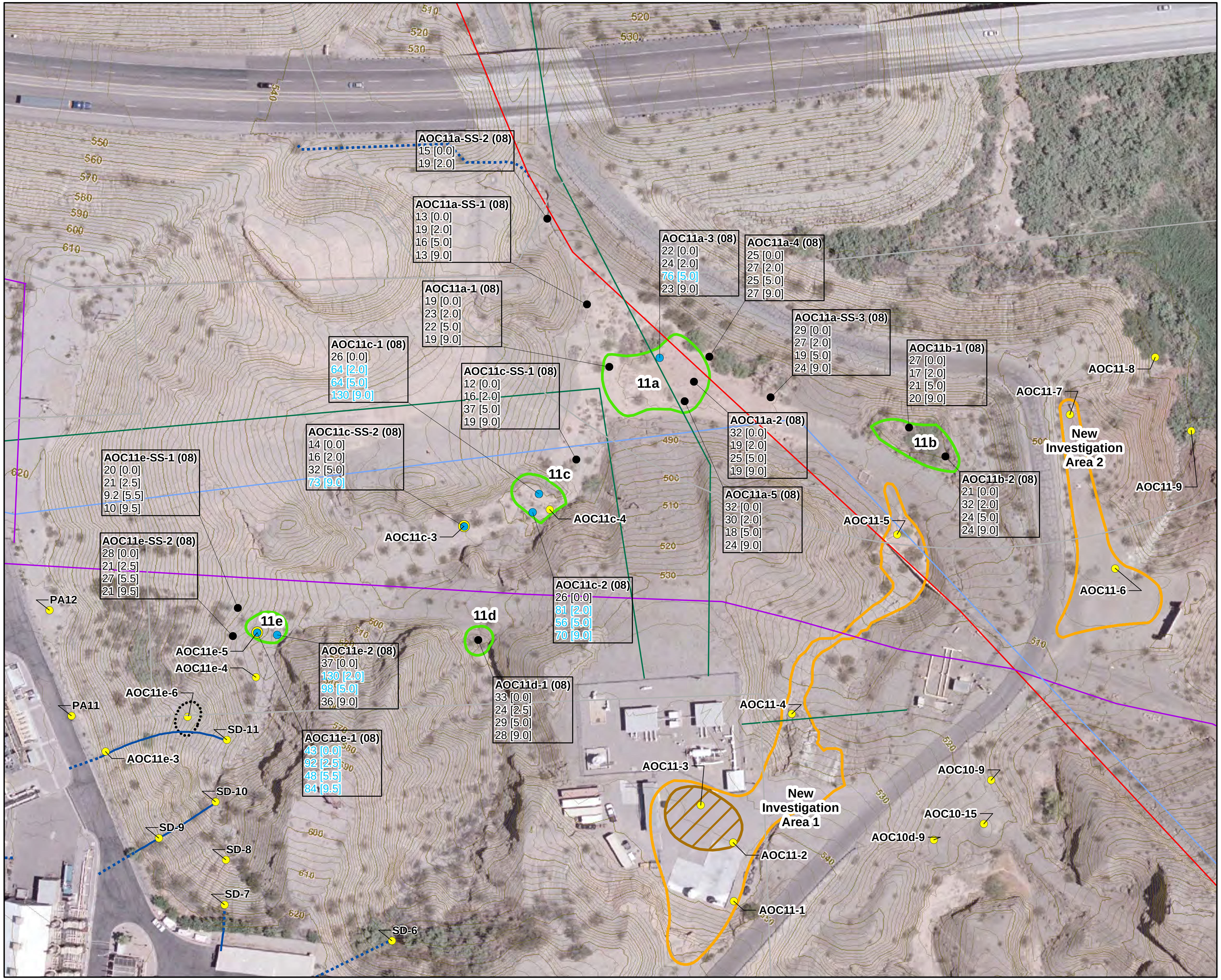
Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (410 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (5,200 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (330 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours are shown at 2 foot intervals.

N

0 100 200
Feet

FIGURE C5-3
Barium
Soil Sample Results
AOC11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



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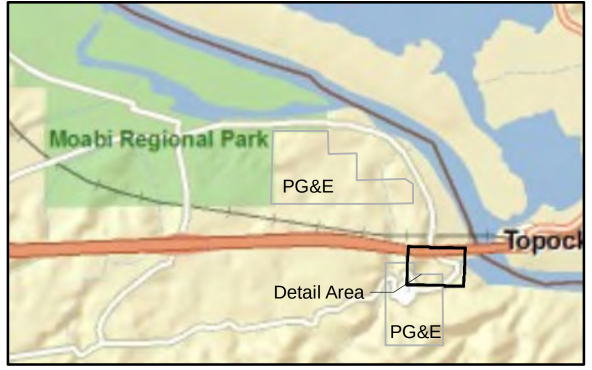


LEGEND

- 🟡 Proposed Phase 2 Sample Location
- ● Soi Boring
- Property Boundary
- Caltrans ROW
- White Powder
- AOC 11 Boundary
- Potential New Investigation Area
- Potential Burning Related Location
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location
Installation Date
20 [1] — Sample Beginning Depth (ft bgs)
Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (39.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the U.S. Environmental Protection Agency Residential Regional Screening Level (280 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (36.3 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours are shown at 2 foot intervals.

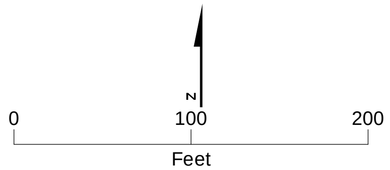
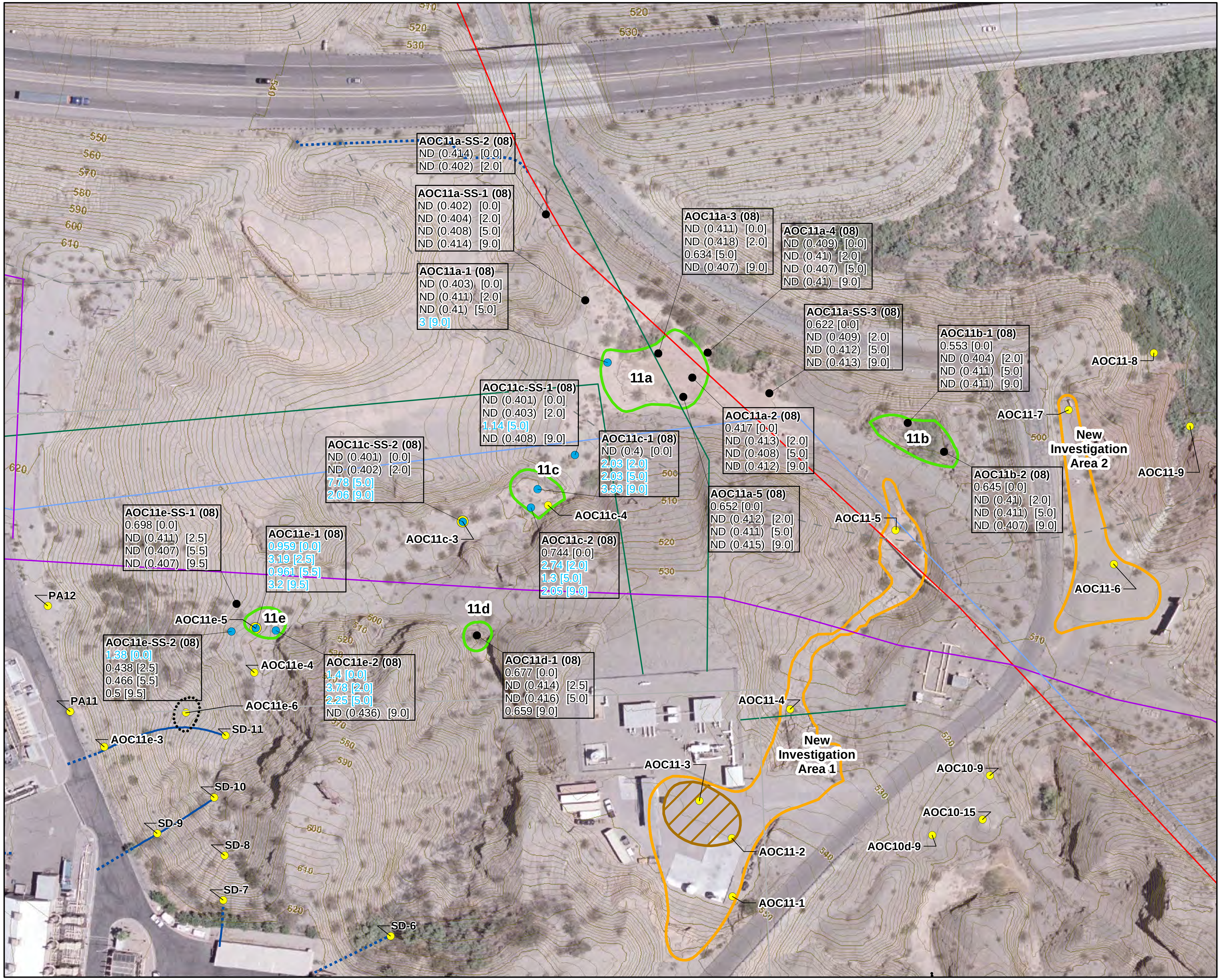


FIGURE C5-4
Total Chromium Soil Sample Results AOC11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



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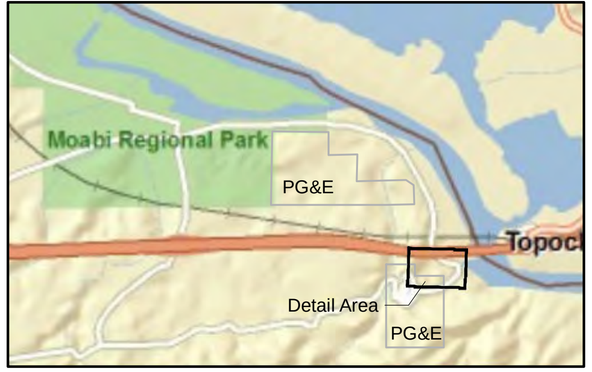

LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- ⁘ White Powder
- ▢ AOC 11 Boundary
- ▢ Potential New Investigation Area
- ▢ Potential Burning Related Location
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ••• Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (0.83 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (139.6) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (17 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. Topographic contours are shown at 2 foot intervals.

N

0 100 200
Feet

FIGURE C5-5
Hexavalent Chromium Soil Sample Results AOC11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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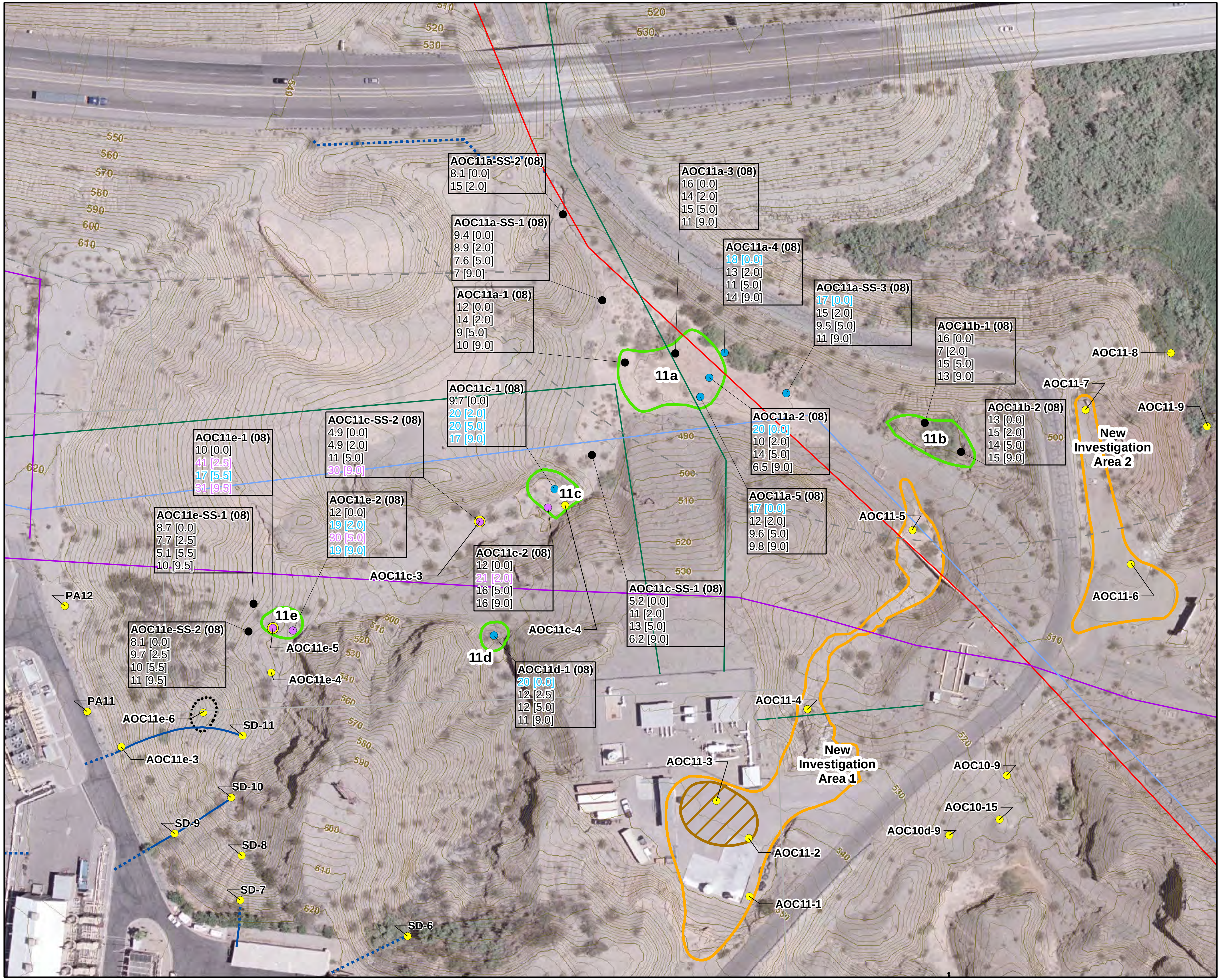

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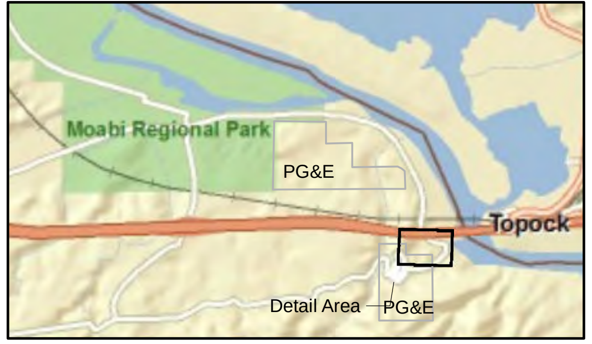

LEGEND

- ● Proposed Phase 2 Sample Location
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- ⁘ White Powder
- ▢ AOC 11 Boundary
- ▢ Potential New Investigation Area
- ▢ Potential Burning Related Location
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (16.8 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3,000 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. Topographic contours are shown at 2 foot intervals.

N

0 100 200
Feet

FIGURE C5-6
Copper
Soil Sample Results
AOC11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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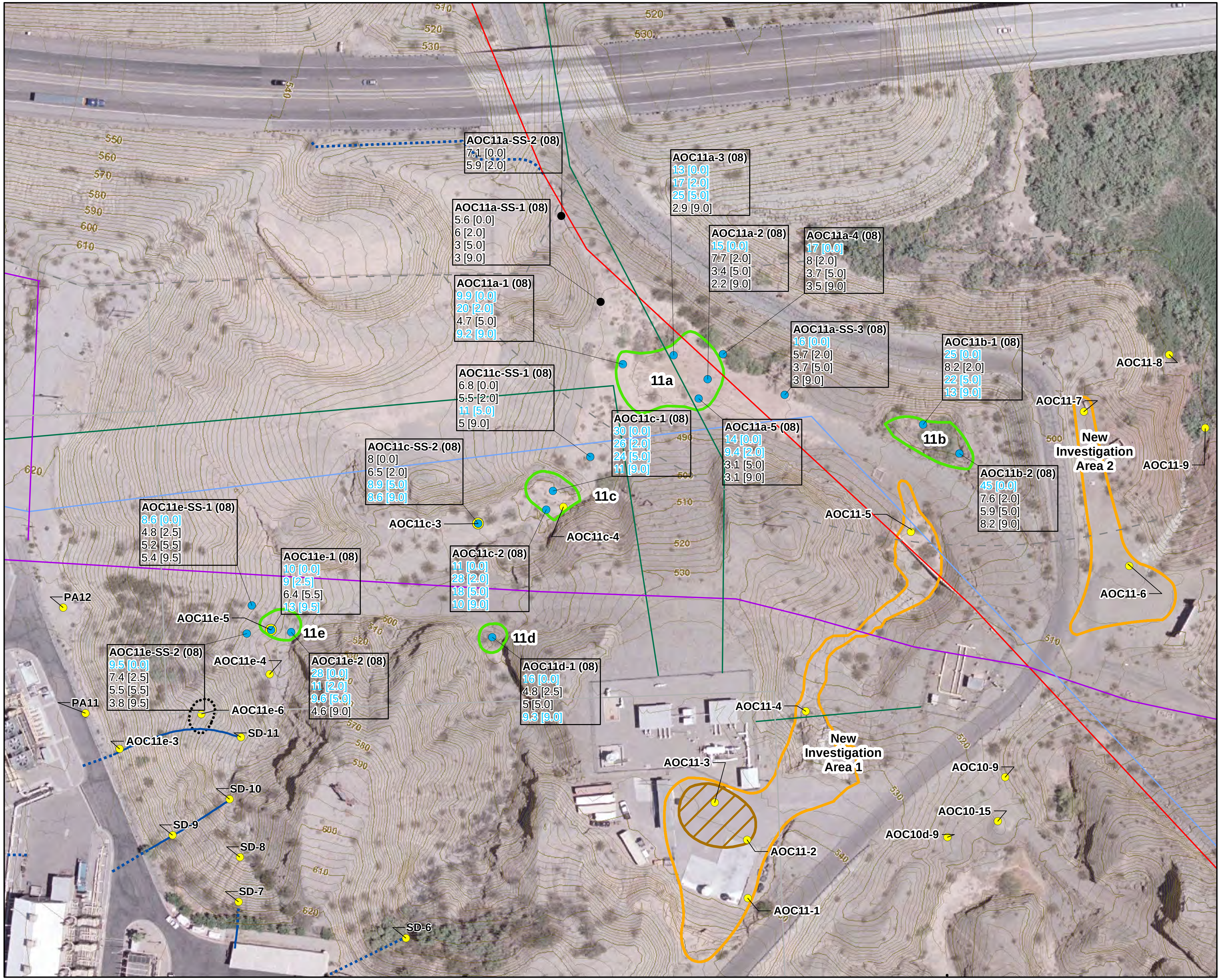
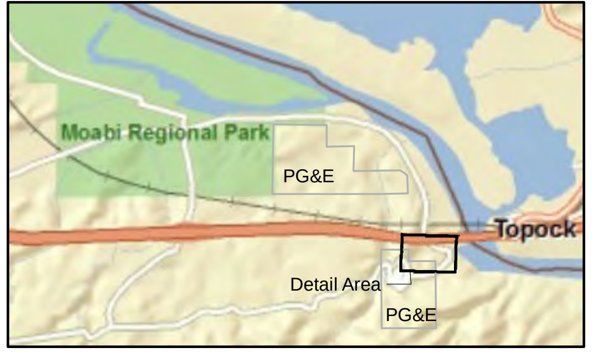
CH2MHILL



VICINITY MAP



LEGEND

- 🟡 Proposed Phase 2 Sample Location
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- ⋯ White Powder
- AOC 11 Boundary
- Potential New Investigation Area
- Potential Burning Related Location
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location Installation Date
20 [1] — Sample Beginning Depth (ft bgs); Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (8.39 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (150 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison (0.0166 mg/kg) is below background value; therefore, the screening level is set at the background value.
9. Topographic contours shown at at 2 foot intervals.

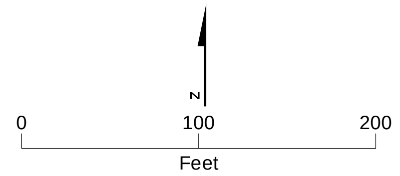


FIGURE C5-7
Lead
Soil Sample Results
AOC11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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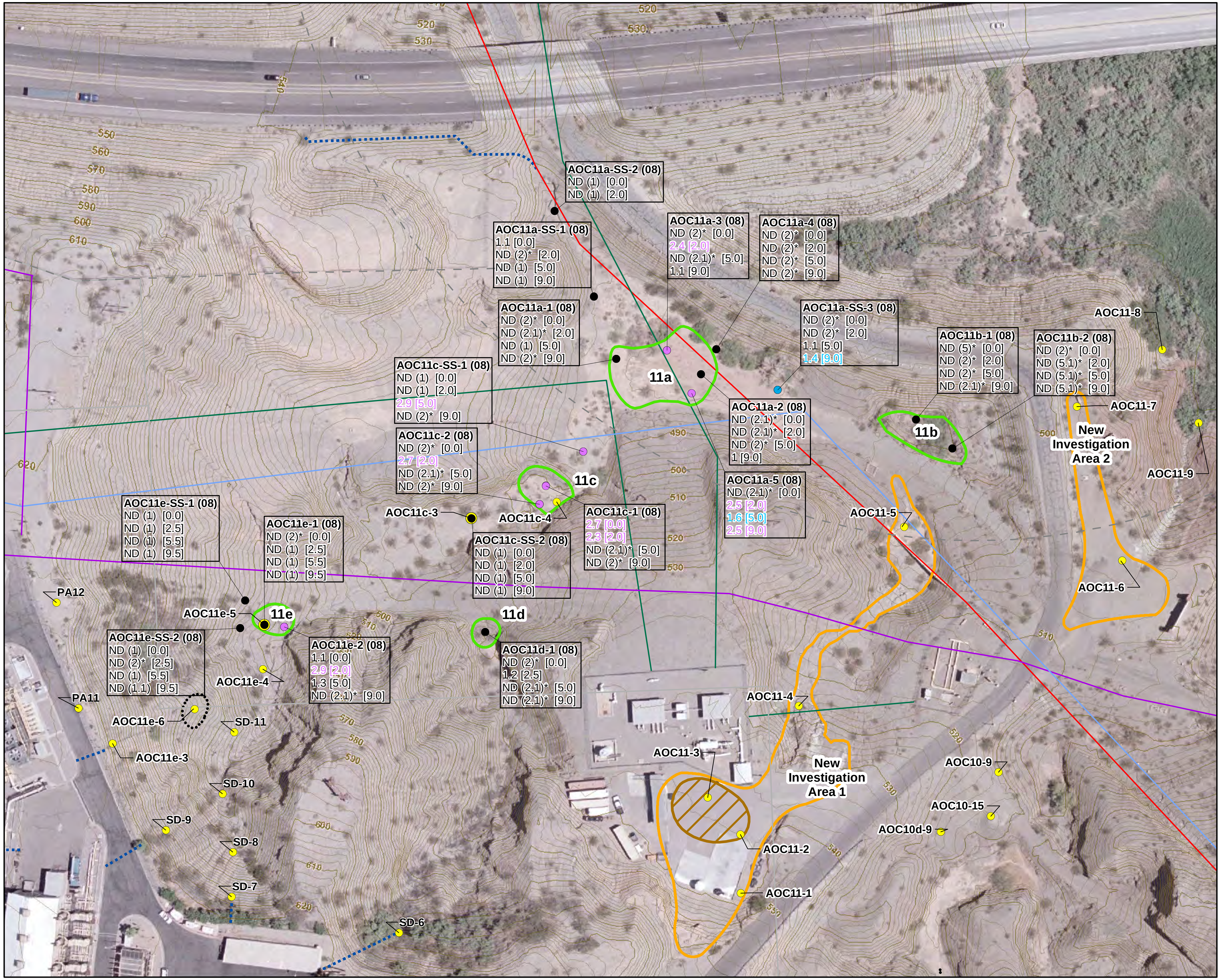
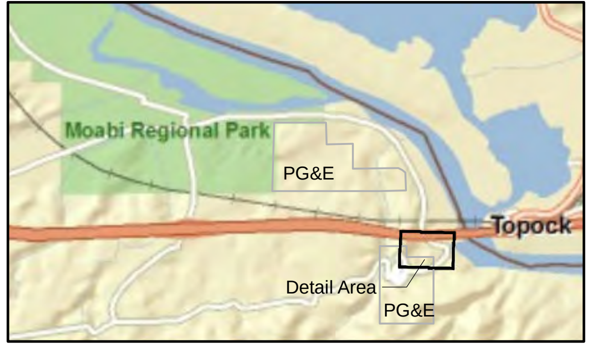
CH2MHILL



VICINITY MAP



LEGEND

- 🟡 Proposed Phase 2 Sample Location
- ● Soil Boring
- — Property Boundary
- – – Caltrans ROW
- ⁙ White Powder
- 🟩 AOC 11 Boundary
- 🟧 Potential New Investigation Area
- ▨ Potential Burning Related Location
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (1.37 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (2.25 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (380 mg/kg) are shown in ORANGE.
7. J = Estimated Result.
8. * = Laboratory reporting limit exceeds screening levels.
9. Topographic contours shown are in 2 foot intervals.

0 100 200
Feet

FIGURE C5-8
Molybdenum
Soil Sample Results
AOC11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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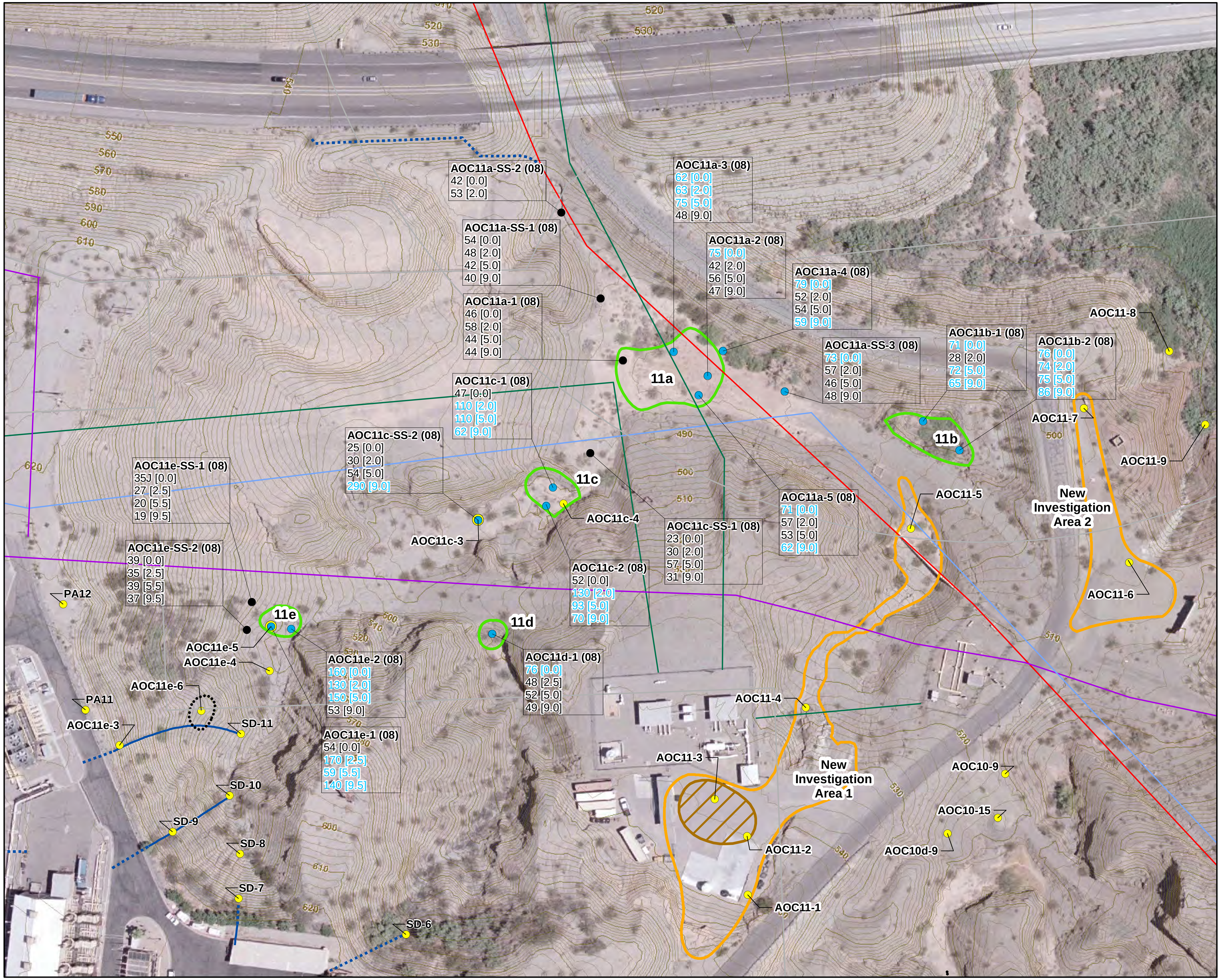
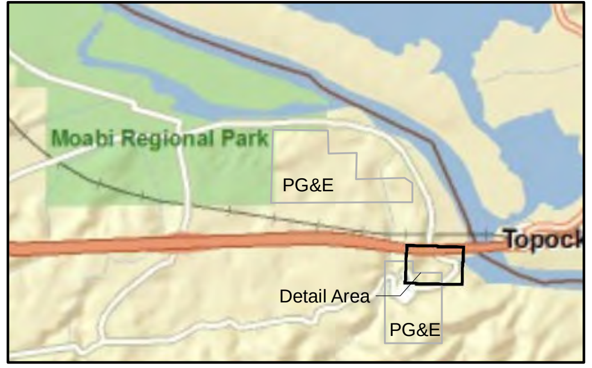
CH2MHILL



VICINITY MAP



LEGEND

- ○ Proposed Phase 2 Sample Location
- ● Soil Boring
- Property Boundary
- Caltrans ROW
- White Powder
- AOC 11 Boundary
- Potential New Investigation Area
- Potential Burning Related Location
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:

1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (58 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (23,000 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.164 mg/kg) is below background value; therefore, the screening level is set at the background value.
8. Topographic contours shown are in 2 foor intervals.

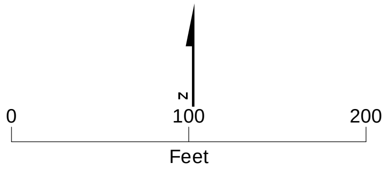
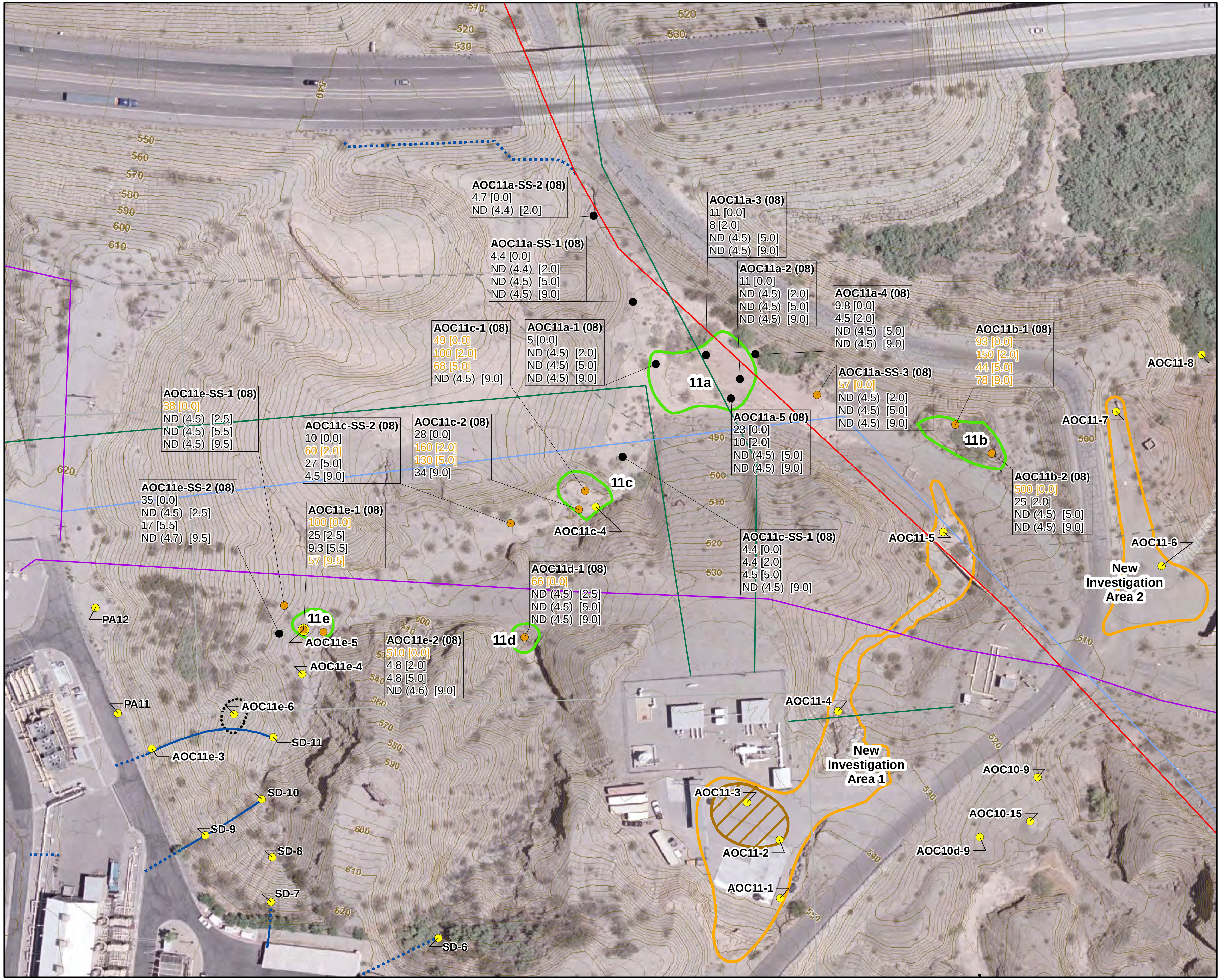


FIGURE C5-9
Zinc
Soil Sample Results
AOC11

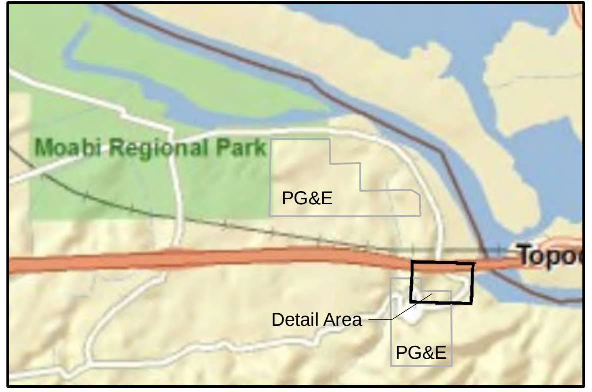
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2009\AOC11\AOC11_DG_ZN.MXD

CH2MHILL



VICINITY MAP



LEGEND

- ● Potential Phase 2 Sample Location
- ● Soil Boring
- —— Property Boundary
- — — Caltrans ROW
- ⁙ White Powder
- ○ Debris Features
- ○ AOC 11 Boundary
- ○ Potential New Investigation Area
- ▨ Potential Burning Related Location
- —— Transwestern Pipeline
- —— Mojave Pipeline
- —— PG&E Pipeline
- —— SoCal Gas Pipeline
- ······ Approximate Location of Stormwater Piping Below Ground
- —— Approximate Location of Stormwater Piping Above Ground

SSB-7 (08) —— Sample Location Installation Date
20 [1] —— Sample Beginning Depth (ft bgs)
—— Soil Concentration (µg/kg)

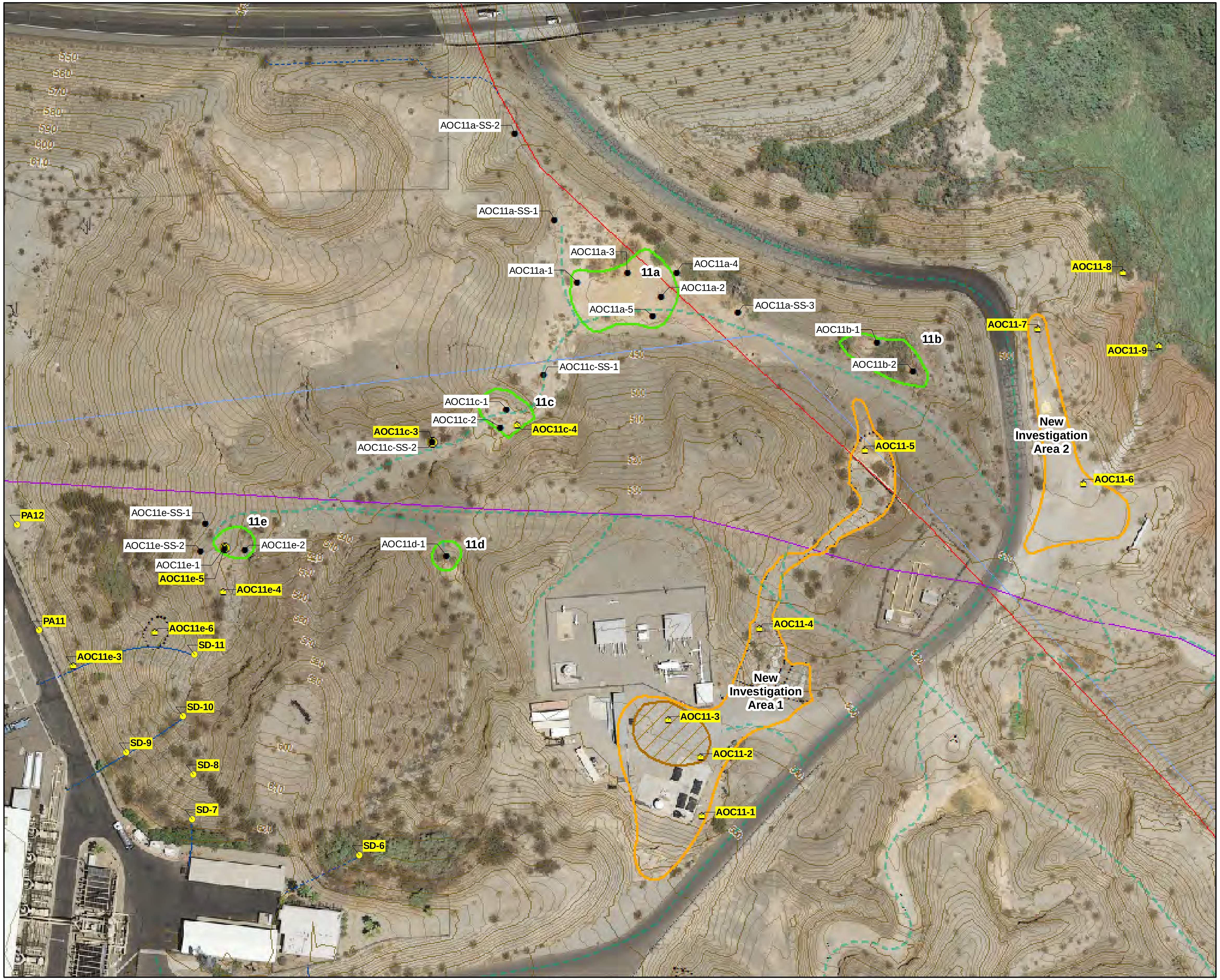
Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. µg/kg = micrograms per kilogram
3. ft bgs = feet below ground surface
4. Results greater than or equal to theCalifornia Department of Toxic Substances Control Residential California Human Health Screening Level (38 µg/kg) are shown in ORANGE.
5. J = Estimated Result.
6. No background level established
7. Topographic contours shown are in 2 foot intervals.

N
0 50 100
Feet

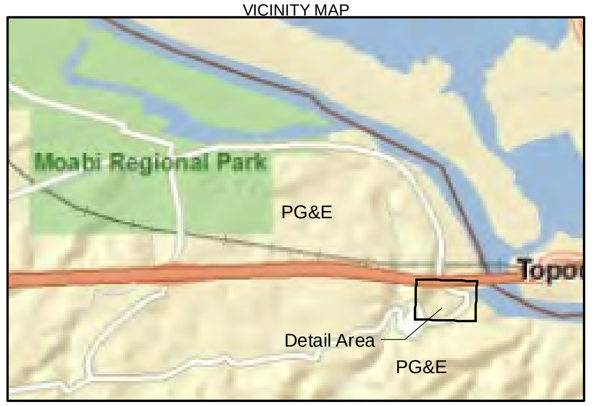
FIGURE C5-10
Benzo(A)pyrene Equivalent Soil Sample Results AOC11

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL



VICINITY MAP



LEGEND

- ● Potential Phase 2 Sample Location
- ● Soil Boring
- - - Access Routes
- ⬭ AOC 11 Boundary
- ⬭ New Investigation Area
- ⬭ White Powder
- ⬭ Potential Burning Related Location
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- — Stormwater Piping Above Ground
- - - Stormwater Piping Above Ground

Note:
1.Topographic contours shown are in 2 foot intervals.

N

0 50 100 200
Feet

FIGURE C5-11
Potential Phase 2 Soil Sample Locations AOC11

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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CH2MHILL

Attachment C6
Area of Concern 12 Data Gaps Evaluation Results

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Figure

C6-1 Sampling and Trench Locations for AOC 12 – Fill Area

Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
CMS/FS	corrective measures study/feasibility study
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SSL	soil screening level
STLC	soluble threshold limit concentration
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
VOC	volatile organic compound

ATTACHMENT C6

Area of Concern 12 Data Gaps Evaluation Results

1.0 Introduction and Background

This attachment presents the results of the Data Gaps Evaluation for Area of Concern (AOC) 12 – Fill Areas at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

AOC 12 consists of three subareas located near the Transwestern gas pipeline meter station (Transwestern Meter Station) east of the compressor station, as shown in Figure C6-1. These three subareas (identified as AOC 12a, AOC 12b, and AOC 12c) were identified through employee interviews as locations that may contain buried debris. AOC 12a was reportedly a disposal area for construction-related debris. A few small pieces of concrete are visible at the surface in the area identified as AOC 12a. The exact nature of the materials placed into this area and the date(s) of placement are unknown. Initially, AOC 12a was the only disposal area identified in AOC 12 (CH2M HILL, 2006).

Two potential disposal locations were subsequently identified from interviews with former employees, as described in the Soil Part A Phase 1 Work Plan (CH2M HILL, 2006). There is no visible debris at these two sites. These two locations are adjacent to the northwestern corner (AOC 12b) and southwestern corner (AOC 12c) of the Transwestern Meter Station. Location 12b reportedly was used to bury asbestos-containing material and two drums of unused unknown chemicals. Location 12c was apparently a small ravine (about 6 feet deep) that was reportedly used to bury asbestos-containing material and possibly other debris. AOC 12a and 12b are located on property owned by Havasu National Wildlife Refuge, and AOC 12c is located on both Havasu National Wildlife Refuge and PG&E property.

1.2 Site Conceptual Model

The depths of buried materials, if any, in AOCs 12a, 12b, and 12c, are not known. Chemicals of potential concern/chemicals of ecological potential concern (COPC/COPECs) may be present in fill material and buried waste and may have affected subsurface soil underneath the debris and laterally in the immediate vicinity of the debris. Subsurface soil would therefore be the primary source medium. Potential migration from subsurface soil to groundwater was identified as a potential secondary pathway, as shown in Table C6-1.

Because debris reportedly was buried at AOC 12a, 12b, and 12c, a geophysical survey was conducted over those areas. Part A Phase 1 trenches were excavated, and soil samples were collected in the areas that former PG&E employees indicated debris had been buried.

1.2.1 AOC 12 Data

Historical sampling has not occurred at AOC 12.

During the 2008 Part A Phase 1 Soil Investigation, five trenches were excavated to assess the AOC12a, AOC12b, and AOC12c, as shown in Figure C6-1. Prior to trenching activities, a geophysical survey was performed at each AOC 12 subarea to attempt to locate buried debris. The results of the surveys found two linear features crossing AOC 12a, a natural gas pipeline approximately 3 to 4 feet in diameter, and an anode flux wire associated with the pipeline, buried between the upper 1 foot below ground surface (bgs) and 3 to 4 feet bgs. In AOC 12a and AOC 12b, results indicated two undifferentiated utilities extending east from aboveground storage tank bunker pipe stub-outs. During the trenching activities, debris was observed in only one trench, AOC12c-T1. Debris consisted of a large piece of concrete (at approximately 1.5 feet bgs), a small piece of wire (at approximately 5 feet bgs), an 18-inch wooden slat, plastic debris, and a bung cover from a polyethylene drum. Additional information about the trenching activities is presented in Appendix B of the Data Gaps Evaluation Report.

Seventeen soil samples[1] (ranging from 0 to 11 feet bgs) were collected from 11 sample locations (AOC12a-T1a, AOC12a-T1c, AOC12a-T2a, AOC12a-T2b, AOC12b-T1a, AOC12b-T1b, AOC12c-T1a through AOC12c-T1c, AOC12c-T2a, and AOC12c-T2b), as shown in Figure C6-1. Part A Phase 1 soil samples collected in AOC 12 were analyzed for Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), semivolatile organic compounds, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), pH, asbestos, pesticides, and polychlorinated biphenyls (PCBs). Ten percent of the Phase 1 soil samples collected in AOC12 were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). Surface soil samples were not analyzed for VOCs. Soil results were validated, and the data quality evaluation is included in Appendix D of the Data Gaps Evaluation Report.

All Part A Phase 1 data are Category 1 and were used as inputs to the four data quality objective decisions.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and COPECs at AOC 12. Laboratory analytical results for Part A Phase 1 soil samples at AOC 12 are presented in Tables C6-2 through C6-8. Table C6-9 presents a statistical summary of soil analytical results for COPCs and COPECs that were either (1) detected above the laboratory reporting limits or (2) not detected but where the reporting limits for one or more samples was greater than the interim screening value.

2.1 Summary of AOC12 Soil Data

Antimony, beryllium, cadmium, hexavalent chromium, mercury, silver, thallium, cyanide, TPH-gasoline, TPH-diesel, pesticides, VOCs, most PCBs, and most semivolatile organic

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[1] Not including quality control samples.

compounds were not detected in soil samples collected in AOC 12. Table C6-9 lists the 36 constituents that were detected at AOC 12, including four calculated quantities (benzo(a)pyrene equivalents, total low molecular weight PAHs, total high molecular weight PAHs, and total PCBs). Ten of these constituents (aluminum, calcium, di-n-butyl phthalate, iron, magnesium, manganese, potassium, sodium, Aroclor-1254, and total PCBs) were detected in the TAL/TCL samples.

Twenty-nine of the constituents detected at AOC 12 (arsenic, barium, total chromium, lead, molybdenum, nickel, vanadium, aluminum, calcium, iron, magnesium, manganese, potassium, sodium, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, total low molecular weight PAHs, total high molecular weight PAHs, Aroclor-1254, total PCBs, and TPH-motor-oil) were detected at concentrations below their respective interim screening levels. Six constituents (cobalt, copper, selenium, zinc, benzo(a)pyrene, and benzo(a)pyrene equivalents) were each detected one time at a concentration exceeding their interim screening levels.

2.2 Nature and Extent Evaluation

The following subsection discusses the nature and extent of detected COPCs and COPECs detected above interim screening levels at AOC 12. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Section 2.5 of this attachment summarizes the constituents that may require further evaluation, and Section 5.0 of this attachment provides the recommended follow-up sampling for the Part A Phase 2 soil investigation.

2.2.1 Cobalt

Cobalt was detected in 17 of 17 soil samples collected from AOC 12. One detected concentration of cobalt (14 milligrams per kilogram [mg/kg] at AOC12b-T1a at 2 to 3 feet bgs) slightly exceeded the interim screening level of 12.7 mg/kg (background threshold value [BTV]) and the ecological comparison value (ECV) (13 mg/kg) once, as shown in Tables C6-2 and C6-9. This detected concentration did not exceed United States Environmental Protection Agency residential and commercial/industrial regional screening levels (RSLs) (23 mg/kg and 300 mg/kg, respectively). The cobalt concentration a sample collected approximately 35 feet to the northeast within this same trench did not exceed the screening levels. No samples were collected to the west, south, or east at this trench location. No deeper samples were collected at this location.

2.2.2 Copper

Copper was detected in 16 of 17 soil samples collected from AOC 12. One detected concentration of copper (18 mg/kg at AOC12b-T1a at 2 to 3 feet bgs) slightly exceeded the interim screening level (16.8 mg/kg) (BTV) once, as shown in Tables C6-2 and C6-9, but did not exceed the ECV (20.6 mg/kg) or residential and commercial/industrial California human health screening level (CHHSLs) (3,000 mg/kg and 38,000 mg/kg, respectively). The copper concentration in a sample collected approximately 35 feet to the northeast within this trench did not exceed the screening levels. No samples were collected to the west, south, or east at this trench location. No deeper samples were collected at this location.

2.2.3 Selenium

Selenium was detected in one of 17 soil samples collected from AOC 12. The detected concentration of selenium (2.5 mg/kg at AOC12b-T1b at 2 to 3 feet bgs) slightly exceeded the interim screening level (1.47 mg/kg) (BTV/ECV), as shown in Tables C62 and C6-9, but did not exceed the residential or commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). Selenium was not detected in a sample collected approximately 35 feet to the southwest within this trench. No samples were collected to the west, north, or east at this trench location. No deeper samples were collected at this location.

2.2.4 Zinc

Zinc was detected in 17 of 17 soil samples collected from AOC 12. One detected concentration of zinc (77 mg/kg at AOC12c-T1a at 0 to 0.5 foot bgs) slightly exceeded the interim screening level (58 mg/kg) (BTV/ECV), as shown in Tables C6-2 and C6-9, but did not exceed the residential and commercial/industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). The zinc concentration in a sample collected approximately 15 feet to the north within this trench and in two other samples in an adjacent trench to the northeast and east did not exceed the interim screening level. No samples were collected to the west or south at this trench location. Concentrations of zinc in deeper samples at this location did not exceed screening levels.

2.2.5 Benzo(a)pyrene, Benzo(a)pyrene Equivalents, and PAHs

Benzo(a)pyrene was detected in three of 17 soil samples collected from AOC 12. One detected concentration of benzo(a)pyrene (39 micrograms per kilogram [µg/kg] at AOC12c-T1b at 3 to 4 feet bgs) slightly exceeded the interim screening level (38 µg/kg) (residential CHHSL). Several other PAHs were detected in soil samples collected from AOC 12 but had concentrations below their respective interim screening levels. To assist with evaluation of PAHs for human health, benzo(a)pyrene equivalents were calculated for each of the soil samples collected at AOC 12, as shown in Table C6-4. One benzo(a)pyrene equivalent value (58 µg/kg at AOC12c-T1b at 3 to 4 feet bgs) exceeded the interim screening level (38 µg/kg) (residential CHHSL), as shown in Table C6-4. The exceedences in this one sample are bounded by other samples collected approximately 20 feet to the north and 15 feet to the south within this trench and two other samples in an adjacent trench to the east and southeast. No samples bound this exceedence to the west. This exceedence is vertically bounded by a sample collected at 10 to 11 feet bgs.

2.2.6 Target Analyte List/Target Compound List Constituents

As described above, aluminum, calcium, iron, magnesium, manganese, potassium, sodium, di-N-butyl phthalate, Aroclor-1254, and total PCBs were detected in the AOC 12 soil samples analyzed for the complete TAL/TCL suite of compounds. These constituents are discussed below.

Aluminum was detected in two of two surface soil samples collected from AOC 12. Both detected concentrations of aluminum (4,500 mg/kg at AOC12a-T1a and12,000 mg/kg at AOC12c-T1a) are below the interim screening level (16,400 mg/kg) (BTV), as shown in Tables C6-3 and C6-9. Neither of the detected concentrations exceeded the residential or commercial/industrial RSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in two of two surface soil samples collected from AOC 12. Both detected concentrations of calcium (10,000J mg/kg at AOC12a-T1a and 31,000 mg/kg at AOC12c-T1a) are below the interim screening level (66,500mg/kg) (BTV), as shown in Tables C6-3 and C6-9. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in was detected in two of two surface soil samples collected from AOC 12. Both detected concentrations of iron (9,900J mg/kg at AOC12a-T1a and 23,000 mg/kg at AOC12c-T1a) are below the interim screening level (55,000 mg/kg) (residential regional screening level [RSL]), as shown in Tables C6-3 and C6-9. A BTV and an ECV have not been established for iron.

Magnesium was detected in two of two surface soil samples collected from AOC 12. Both detected concentrations of magnesium (AOC12a-T1a [3,000 mg/kg] and AOC12c-T1a [8,300 mg/kg]) are below the interim screening level (12,100 mg/kg) (BTV), as shown in Tables C6-3 and C6-9. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in two of two surface soil samples collected from AOC 12. Both detected concentrations of manganese (130 mg/kg at AOC12a-T1a and290 mg/kg at AOC12c-T1a) are below the interim screening level (402 mg/kg) (BTV/ECV), as shown in Tables C6-3 and C6-9. Neither of the detected concentrations exceeded the residential or commercial/industrial RSLs (1,800 mg/kg and 23,000 mg/kg, respectively).

Potassium was detected in two of two surface soil samples collected from AOC 12. Both detected concentrations of potassium (1,300 mg/kg at AOC12a-T1a and 2,700 mg/kg at AOC12c-T1a) are below the interim screening level (4,400 mg/kg) (BTV), as shown in Tables C6-3 and C6-9. Residential and commercial CHHSLs and an ECV have not been established for potassium.

Sodium was detected in two of two surface soil samples collected from AOC 12. Both detected concentrations of sodium (210 mg/kg at AOC12a-T1a and340 mg/kg at AOC12c-T1a) are below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C6-3 and C6-9. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

Di-n-butyl phthalate was detected in one of 17 soil samples collected from AOC 12. One detected concentration (1,100 µg/kg at AOC12c-T1c at 10 to 11 feet bgs) exceeded the interim screening level (46.9 µg/kg) (ECV), as shown in Tables C6-5 and C6-9, but did not exceed the residential and industrial RSLs (6,100,000 µg/kg and 62,000,000 µg/kg, respectively). This exceedence is bounded by another sample collected approximately 20 feet to the south within this trench and two other samples in an adjacent trench to the southeast. No samples bound this exceedence to the west, north, or east. No vertical samples bound this exceedance below 10 to 11 feet bgs.

The PCB Aroclor-1254 was detected in one of three soil samples collected from AOC 12. The maximum detected concentration (31 µg/kg at AOC12a-T1 at 0 to 0.5 foot bgs) did not exceed the interim screening level of 220 µg/kg (residential RSL), as shown in Table C6-6. PCBs were not detected above laboratory reporting limits in the sample collected at 2 to 3 feet bgs at location AOC12a-T1. To assist with evaluation of PCBs for ecological risk, total PCB values were calculated at AOC 12. The sample containing Aroclor-1254 also was below the total PCB screening value (ECV) of 204 µg/kg.

As discussed in Section C.2 of Appendix C, PG&E recommends that aluminum, calcium, iron, magnesium, manganese, potassium, sodium, di-N-butyl phthalate, Aroclor-1254, and total PCBs not be considered a COPC/COPEC for this AOC, and no further sampling for these constituents is recommended. This constituent has been fully discussed in Section C.2 of Appendix C.

2.3 Central Tendency Comparison to Background Threshold Values

Four metals (cobalt, copper, selenium, and zinc) were detected above their respective background values in soil samples collected from AOC 12. A central tendency comparison was performed for three of these four metals (cobalt, copper, and zinc) to compare the AOC 12 soil data set for these metals with the corresponding Topock soil background data set to determine whether a difference exists between the two populations and if additional sampling is required for a given metal, as discussed in Table C6-10 of this attachment and in Figure 3-1 of the Data Gaps Evaluation Report.

Metals in either the AOC 12 data set or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of selenium at AOC 12 to conduct the central tendency comparison.

No statistical difference between the two populations was noted for cobalt and copper, as shown in Table C6-10. However, the results identified a statistically significant difference in the populations for zinc. Zinc was only detected above the BTV of 58 mg/kg once at a concentration of 77 mg/kg in a soil sample collected at 2 to 3 feet bgs. After careful review of AOC 12 site data and background data set for zinc, the statistical difference between the two populations is not considered significant enough to warrant additional sampling for zinc at AOC 12.

2.4 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, a qualitative review indicates that decision error has been held to an acceptable level. Sufficient data of acceptable quality have been attained through collection of Part A soil samples in areas most likely to have been impacted by buried debris. The sample locations were collected in the areas that former PG&E employees indicated debris had been buried.

Based on the review of the data for AOC 12, the nature and extent of all detected COPCs and COPECs have been defined. No additional sampling is recommended in Part A Phase 2 soil investigation.

3.0 Decision 2 – Data Sufficient to Estimate Representative Exposure Point Concentrations

For Decision 2, data were evaluated to determine if the AOC 12 data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Evaluation Report. The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC). Data reviewed were all from Phase 1; no historical sampling was conducted at this AOC.

Table C6-11 summarizes the results of the evaluation to determine whether data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. In general, existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values (three metals and PAHs), as described below.

3.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs using ProUCL for cobalt and zinc in three of four exposure intervals. The 0-to-0.5-foot-bgs interval data are adequate to support the risk assessment for cobalt and zinc because the maximum detected concentrations are less than two times the applicable interim screening value (the ECV for cobalt or BTV for zinc). For selenium, additional data collection is not expected to significantly change the results of the risk assessment because the compound is very infrequently detected (i.e., additional non-detects would be expected) and, consequently, additional data are not expected to strongly influence the EPC.

3.2 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene equivalents using ProUCL.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, are needed to resolve Decision 3. Additional evaluation will be performed as appropriate, as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 – Nature and Extent evaluation will provide the final representative data set that will be used to assess the threat to groundwater.

The analysis of AOC 12 was divided into three separate analyses based on the AOC 12 subareas shown in Figure C-1 in Appendix C.

4.1 AOC 12a

There were no concentrations of metals that exceeded the BTVs at AOC 12a; therefore, comparison to the soil screening levels (SSLs) was not required for AOC 12a, and a current or potential threat to groundwater from this subarea was ruled out.

4.2 AOC 12b

Table C6-12 presents the results of the tiered analysis for AOC 12b. Three metals (cobalt, copper, and selenium) were detected at concentrations above the BTVs. None of these three metals exceeded the calculated SSLs, as shown in Table C6-13. Therefore, numerical modeling was not required for AOC 12b, and a current or potential threat to groundwater from this subarea was ruled out.

4.3 AOC 12c

Table C6-12 presents the results of the tiered analysis for AOC 12c. Only zinc was detected at a concentration above the BTV. However, zinc was not detected at concentrations that exceeded the calculated SSLs, as shown in Table C6-14. Consequently, numerical modeling was not required for AOC 12c, and a current or potential threat to groundwater from this subarea was ruled out.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study (CMS/FS). The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite)
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies)
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for AOC 12 that are currently available to support CMS/FS:

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The lateral and vertical extent of the COPCs and COPECs is discussed in Section 2.2 of this attachment. Data results for selected constituents are shown in Tables C6-2 through C6-8, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0 of this attachment.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed of in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLCs). The maximum concentrations of these metals for each of the units were compared to the TTLCs, and none of the metal concentrations exceeded the TTLCs, as shown in Table C6-15. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLCs), and none of the concentrations in AOC 12 exceeded 10 times the STLC, as shown in Table C6-15. In addition, none of the metals concentrations exceeded 20 times the toxicity characteristic leaching procedure (TCLP), as shown in Table C6-15. Because none of the metals concentrations have the potential to exceed STLC or TCLP thresholds, additional leachability testing is not required if soil excavation and offsite disposal is chosen as a remedy.

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 soil investigation was limited to grain size analysis only. Specific soil physical properties data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 in the Data Gaps Report. Additional soil physical parameter data are needed to support the CMS/FS.

5.4 Surface and Subsurface Features

While there is extensive information regarding surface and subsurface features at AOC 12, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for AOC 12. However, subsurface utilities, including gas transmission pipelines and any culverts or other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives and to prepare construction specifications.

6.0 Summary of Data Gaps and Potential Phase 2 Soil Sample Locations to Fill Identified Gaps

Based on the review of the data for AOC 12, the nature and extent of all detected COPCs and COPECs has been defined, and sufficient data are available to address Decisions 2 and

3. No additional sampling is recommended in Phase 2. Data regarding soil physical properties will be collected at units where additional samples are required to address data gaps for Decisions 1, 2, and/or 3. The remaining data required to address Decision 4 data gaps will be collected following the completion of the risk assessment. No additional sampling is recommended in the Part A Phase 2 soil investigation.

7.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

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United States Environmental Protection Agency. 2009. *Regional Screening Levels for Chemical Contaminants at Superfund Sites.* December. Available online at: http://www.epa.gov/region09/superfund/prg/pdf/composite_sl_table_run_APRIL2009.pdf. September 12.

Tables

TABLE C6-1
Conceptual Site Model – AOC 12
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Disposal of Buried Debris	Subsurface Soil	Percolation and/or infiltration	Subsurface Soil	Potential volatilization and atmospheric dispersion
			Potential Groundwater	Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part A Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C6-2

Sample Results: Metals

AOC 12 - Fill Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1] :				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2] :				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3] :				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4] :				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5] :				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC12a-T1a	09/22/08	0 - 0.5	N	ND (2) J*	3.6	79	ND (1) *	ND (1)	13	ND (0.421)	3.4	5.6	8.3	ND (0.098) *	ND (1)	6.9	ND (1)	ND (1)	ND (2)	19	26
	09/22/08	2 - 3	N	ND (2) *	3.7	14	ND (1) *	ND (1)	4.9	ND (0.402)	1.6	ND (2)	2.4	ND (0.1) *	ND (1)	2.7	ND (1)	ND (1)	ND (2)	13	9
	09/22/08	7 - 8	N	ND (2) *	7	240	ND (2) *	ND (1)	22	ND (0.411)	7.8	12	3.8	ND (0.1) *	ND (2) *	17	ND (1)	ND (2)	ND (4.1) *	32	51
AOC12a-T1c	09/22/08	7 - 8	N	ND (2.1) *	8.4	110	ND (1) *	ND (1)	17	ND (0.409)	6.7	8.6	3.9	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2.1)	36	42
AOC12a-T2a	09/22/08	6 - 7	N	ND (2) *	4.4	58	ND (1) *	ND (1)	13	ND (0.419)	6.6	9	3.1	ND (0.1) *	1	10	ND (1)	ND (1)	ND (2)	28	39
AOC12a-T2b	09/22/08	7 - 8	N	ND (2) *	4.9	25	ND (1) *	ND (1)	15	ND (0.409)	6.9	7.8	3.5	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	32	44
AOC12b-T1a	09/20/08	2 - 3	N	ND (2.1) *	4.9	81	ND (2.1) *	ND (1)	26	ND (0.416)	14	18	4.5	ND (0.1) *	ND (2.1) *	20	ND (1)	ND (2.1)	ND (4.1) *	41	57
AOC12b-T1b	09/20/08	2 - 3	N	ND (2.1) *	5.8	88	ND (2.1) *	ND (1)	26	ND (0.419)	9.6	14	4.9	ND (0.1) *	ND (2.1) *	20	2.5	ND (2.1)	ND (4.2) *	42	58
AOC12c-T1a	09/20/08	0 - 0.5	N	ND (2) J*	5.4	110 J	ND (2) *	ND (1)	28	ND (0.411)	8.4	13	7.1	ND (0.1) *	ND (2) *	18	ND (1)	ND (2)	ND (4) *	38	77
	09/20/08	2 - 3	N	ND (2.1) *	4.9	150	ND (2.1) *	ND (1)	25	ND (0.413)	9.3	11	4	ND (0.1) *	ND (2.1) *	18	ND (1)	ND (2.1)	ND (4.1) *	39	51
	09/20/08	10 - 11	N	ND (2.1) *	6	120	ND (2.1) *	ND (1)	25	ND (0.423)	8.7	9.6	4	ND (0.1) *	ND (2.1) *	18	ND (1)	ND (2.1)	ND (4.2) *	39	50
AOC12c-T1b	09/20/08	2 - 3	N	ND (2.1) *	5.1	140	ND (2.1) *	ND (1)	23	ND (0.431)	8.4	13	5.7	ND (0.1) *	ND (2.1) *	19	ND (1)	ND (2.1)	ND (4.1) *	36	49
	09/22/08	3 - 4	N	ND (2.1) *	6.5	160	ND (2.1) *	ND (1)	27	ND (0.419)	9.4	12	6.4	ND (0.11) *	ND (2.1) *	19	ND (1)	ND (2.1)	ND (4.1) *	40	57
	09/20/08	10 - 11	N	ND (2.1) *	4.7	93	ND (2.1) *	ND (1)	22	ND (0.415)	7.8	9.4	3.9	ND (0.1) *	ND (2.1) *	16	ND (1)	ND (2.1)	ND (4.1) *	35	45
AOC12c-T1c	09/20/08	10 - 11	N	ND (2.1) *	4.7	150	ND (2.1) *	ND (1.1) *	22	ND (0.424)	7.7	12	3.5	ND (0.1) *	ND (2.1) *	17	ND (1.1)	ND (2.1)	ND (4.2) *	35	49
	09/20/08	10 - 11	FD	ND (2.1) *	5	150	ND (2.1) *	ND (1)	23	ND (0.415)	7.7	11	3.8	ND (0.1) *	ND (2.1) *	17	ND (1)	ND (2.1)	ND (4.2) *	36	50
AOC12c-T2a	09/20/08	7 - 8	N	ND (2.1) *	4.2	67	ND (1.1) *	ND (1.1) *	19	ND (0.421)	7.2	10	3.4	ND (0.11) *	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	33	50
AOC12c-T2b	09/20/08	7 - 8	N	ND (2.1) *	4.8	84	ND (2.1) *	ND (1)	21	ND (0.424)	7.5	10	3.9	ND (0.1) *	ND (2.1) *	16	ND (1)	ND (2.1)	ND (4.2) *	34	45

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-3

Sample Results: Contract Laboratory Program Inorganics

AOC 12 - Fill Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
AOC12a-T1a	09/22/08	0 - 0.5	N	4,500	10,000 J	9,900 J	3,000 J	130	1,300	210	ND (1.05) *
AOC12c-T1a	09/20/08	0 - 0.5	N	12,000	31,000	23,000	8,300	290	2,700	340	ND (1.03) *

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-4

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 12 - Fill Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC12a-T1a	09/22/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.3	13	14	12	20 J	20	ND (5)	29	ND (5)	11	ND (5)	9.4	28	9.4	150	19
	09/22/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.1)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/22/08	7 - 8	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.2)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC12a-T1c	09/22/08	7 - 8	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC12a-T2a	09/22/08	6 - 7	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC12a-T2b	09/22/08	7 - 8	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC12b-T1a	09/20/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.1)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC12b-T1b	09/20/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6.5	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	6.5	4.5
AOC12c-T1a	09/20/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.7	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	5.7	4.5
	09/20/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
	09/20/08	10 - 11	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.3)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC12c-T1b	09/20/08	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	8.1	11	9.9	10	14	13	ND (5.2)	16	ND (5.2)	9.3	ND (5)	ND (5.2)	16	ND	110	16
	09/22/08	3 - 4	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	30	39	45	35	45	49	11	61	ND (5.2)	32	ND (5.2)	14	60	14	410	58
	09/20/08	10 - 11	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC12c-T1c	09/20/08	10 - 11	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	09/20/08	10 - 11	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.8)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)
AOC12c-T2a	09/20/08	7 - 8	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	5.4	ND	4.7
AOC12c-T2b	09/20/08	7 - 8	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND	ND	ND (4.5)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-5

Sample Results: VOCs, SVOCs, Total Petroleum Hydrocarbons and pH
AOC 12 - Fill Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)	**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry**
Interim Screening Level[1] :				**46.9**	**540**	**540**	**1,800**	**NE**
Residential Regional Screening Levels[2] :				**6,100,000**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**NE**	**540**	**540**	**1,800**	**NE**
Ecological Comparison Values[5] :				**46.9**	**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Di-N-butyl phthalate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**pH**
AOC12a-T1a	09/22/08	0 - 0.5	N	ND (330) *	---	ND (10)	ND (10)	7.97
	09/22/08	2 - 3	N	ND (330) *	ND (1.1)	ND (10)	ND (10)	9.93
	09/22/08	7 - 8	N	ND (340) *	ND (1.1)	ND (10)	ND (10)	8.31
AOC12a-T1c	09/22/08	7 - 8	N	ND (340) *	ND (0.97)	ND (10)	ND (10)	8.98
AOC12a-T2a	09/22/08	6 - 7	N	ND (340) *	ND (1) J	ND (10)	ND (10)	8.86
AOC12a-T2b	09/22/08	7 - 8	N	ND (340) *	ND (0.84)	ND (10)	ND (10)	9.61
AOC12b-T1a	09/20/08	2 - 3	N	ND (340) *	ND (1.2)	ND (10)	ND (10)	8.34
AOC12b-T1b	09/20/08	2 - 3	N	ND (350) *	ND (160)	ND (10)	ND (10)	9.12
AOC12c-T1a	09/20/08	0 - 0.5	N	ND (330) *	---	ND (10)	ND (10)	8.47
	09/20/08	2 - 3	N	ND (340) *	ND (1)	ND (10)	ND (10)	9.28
	09/20/08	10 - 11	N	ND (350) *	ND (1.2)	ND (10)	ND (10)	7.88
AOC12c-T1b	09/20/08	2 - 3	N	ND (340) *	ND (1)	ND (10)	ND (10)	9.2
	09/22/08	3 - 4	N	ND (340) *	---	ND (10)	22.5	8.52
	09/20/08	10 - 11	N	ND (340) *	ND (0.98)	ND (10)	ND (10)	8.23
AOC12c-T1c	09/20/08	10 - 11	N	530	ND (0.82)	ND (10)	97.5 J	8.1
	09/20/08	10 - 11	FD	1,100	ND (1.1)	ND (10)	120 J	8.25
AOC12c-T2a	09/20/08	7 - 8	N	ND (350) *	ND (0.9)	ND (10)	ND (10)	9.25
AOC12c-T2b	09/20/08	7 - 8	N	ND (340) *	ND (0.86)	ND (10)	ND (10)	7.76

---

[1] For SVOCs, interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used. For TPHs, interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28 and ARCADIS. 2009. Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil". July 1.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

Results greater than the interim screening level are circled.

Only detected VOCs and SVOCs are presented.

SVOCs	semivolatile organic compounds
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-6

Sample Results: Pesticides

AOC 12 - Fill Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Interim Screening Level[1] :				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels[2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL[3] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values[4] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
AOC12a-T1a	09/22/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC12c-T1a	09/20/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-7

Sample Results: Polychlorinated Biphenyls
AOC 12 - Fill Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level[1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Regional Screening Levels[2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Residential DTSC CHHSL[3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC12a-T1a	09/22/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	31	ND (17)	ND (17)	ND (17)	31
	09/22/08	2 - 3	N	ND (17) J	ND (33) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (17) J	ND (8.5)
AOC12c-T1a	09/20/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (8.5)

[1] Interim screening level is the USEPA residential regional screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-8

Sample Results: Asbestos

AOC 12 - Fill Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Asbestos		
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**PLM/BULK**[1]	**CARB435/[2] PLM (%)**	**TEM[3] (%)**
AOC12a-T1a	09/22/08	0 - 0.5	N	Not Present	---	---
	09/22/08	2 - 3	N	---	ND (<0.1)	---
	09/22/08	7 - 8	N	---	ND (<0.1)	---
AOC12a-T1c	09/22/08	7 - 8	N	---	ND (<0.1)	---
AOC12a-T2a	09/22/08	6 - 7	N	---	ND (<0.1)	---
AOC12a-T2b	09/22/08	7 - 8	N	Not Present	---	---
AOC12b-T1a	09/20/08	2 - 3	N	Not Present	---	---
AOC12b-T1b	09/20/08	2 - 3	N	Not Present	---	---
AOC12c-T1a	09/20/08	0 - 0.5	N	Not Present	---	---
	09/20/08	2 - 3	N	Not Present	---	---
	09/20/08	10 - 11	N	Not Present	---	---
AOC12c-T1b	09/20/08	2 - 3	N	Not Present	---	---
	09/20/08	10 - 11	N	Not Present	---	---
AOC12c-T1c	09/20/08	10 - 11	N	Not Present	---	---
	09/20/08	10 - 11	FD	Not Present	---	---
AOC12c-T2a	09/20/08	7 - 8	N	Not Present	---	---
AOC12c-T2b	09/20/08	7 - 8	N	Not Present	---	---

[1] Polarized light microscopy of bulk samples

[2] California Air Resource Board Method 435 / polarized light microscopy of bulk samples

[3] Transmission electron microscopy

ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed

TABLE C6-9

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 12 - Fill Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences [7]**	**(BTV)**	**# of Exceedences [8]**	**(ECV)**	**# of Exceedences [8]**	**(Res SL)**	**# of Exceedences [8]**	**(ESL)**	**# of Exceedences [8]**	**(Com SL)**	**# of Exceedences [8]**	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 17 (0%)	ND (2.1) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	17 / 17 (100%)	8.4	0	(11)	0	(11.4)	0	(0.07) *	NA	(NE)	0	(0.24) *	0	(11)
Barium	mg/kg	17 / 17 (100%)	240	0	(410)	0	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	0	(410)
Beryllium	mg/kg	0 / 17 (0%)	ND (2.1) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	0 / 17 (0%)	ND (1.1) ‡	0	(1.1)	0	(0.0151) *	0	(39)	NA	(NE)	0	(500)	0	(1.1)
Chromium	mg/kg	17 / 17 (100%)	28	0	(39.8)	0	(36.3) *	0	(280)	NA	(NE)	0	(1,400)	0	(39.8)
Cobalt	mg/kg	17 / 17 (100%)	14	1	(12.7)	1	(13)	0	(23)	NA	(NE)	0	(300)	1	(12.7)
Copper	mg/kg	16 / 17 (94%)	18	1	(16.8)	0	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	1	(16.8)
Lead	mg/kg	17 / 17 (100%)	8.3	0	(8.39)	0	(0.0166) *	0	(80)	NA	(NE)	0	(320)	0	(8.39)
Mercury	mg/kg	0 / 17 (0%)	ND (0.11) ‡	NA	(NE)	0	(0.0125)	0	(18)	NA	(NE)	0	(180)	0	(0.0125)
Molybdenum	mg/kg	1 / 17 (5.9%)	1	0	(1.37)	0	(2.25)	0	(380)	NA	(NE)	0	(4,800)	0	(1.37)
Nickel	mg/kg	17 / 17 (100%)	20	0	(27.3)	0	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	0	(27.3)
Selenium	mg/kg	1 / 17 (5.9%)	2.5	1	(1.47)	1	(0.177) *	0	(380)	NA	(NE)	0	(4,800)	1	(1.47)
Thallium	mg/kg	0 / 17 (0%)	ND (4.2) ‡	NA	(NE)	0	(2.32)	0	(5)	NA	(NE)	0	(63)	0	(2.32)
Vanadium	mg/kg	17 / 17 (100%)	42	0	(52.2)	0	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	0	(52.2)
Zinc	mg/kg	17 / 17 (100%)	77	1	(58)	1	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	1	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	2 / 2 (100%)	12,000	0	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	0	(16,400)
Calcium	mg/kg	2 / 2 (100%)	31,000	0	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(66,500)
Iron	mg/kg	2 / 2 (100%)	23,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	2 / 2 (100%)	8,300	0	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(12,100)
Manganese	mg/kg	2 / 2 (100%)	290	0	(402)	0	(220)	0	(1,800)	NA	(NE)	0	(23,000)	0	(402)
Potassium	mg/kg	2 / 2 (100%)	2,700	0	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(4,400)
Sodium	mg/kg	2 / 2 (100%)	340	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 2 (0%)	ND (1.05) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Semivolatile Organic Compounds															
Di-N-butyl phthalate	µg/kg	1 / 17 (5.9%)	1,100	NA	(NE)	1	(46.9)	0	(6,100,000)	NA	(NE)	0	(62,000,000)	1	(46.9)
Polycyclic Aromatic Hydrocarbons															
Benzo (a) anthracene	µg/kg	3 / 17 (18%)	30	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (a) pyrene	µg/kg	3 / 17 (18%)	39	NA	(NE)	NA	(NE)	1	(38)	NA	(NE)	0	(130)	1	(38)
Benzo (b) fluoranthene	µg/kg	3 / 17 (18%)	45	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (ghi) perylene	µg/kg	3 / 17 (18%)	35	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	3 / 17 (18%)	45	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Chrysene	µg/kg	3 / 17 (18%)	49	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Dibenzo (a,h) anthracene	µg/kg	1 / 17 (5.9%)	11	NA	(NE)	NA	(NE)	0	(110)	NA	(NE)	0	(380)	0	(380)
Fluoranthene	µg/kg	5 / 17 (29%)	61	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Indeno (1,2,3-cd) pyrene	µg/kg	3 / 17 (18%)	32	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Phenanthrene	µg/kg	2 / 17 (12%)	14	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Pyrene	µg/kg	3 / 17 (18%)	60	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	3 / 17 (18%)	14	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	5 / 17 (29%)	410	NA	(NE)	0	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,160)

TABLE C6-9

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 12 - Fill Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Units	Frequency of detection	Maximum Detected Value	Background Threshold Value (BTV)[1]		Ecological Comparison Value (ECV)[2]		Residential Screening Level (Res SL)[3]		RWQCB Environmental Screening Levels (ESL)[4]		Commercial Screening Level (Com SL)[5]		Interim Screening Level (Int SL)[6]	
				# of Exceedences[7]	(BTV)	# of Exceedences[8]	(ECV)	# of Exceedences[8]	(Res SL)	# of Exceedences[8]	(ESL)	# of Exceedences[8]	(Com SL)	# of Exceedences[8]	(Int SL)
Polycyclic Aromatic Hydrocarbons															
B(a)P Equivalent	µg/kg	6 / 17 (35%)	58	NA	(NE)	NA	(NE)	1	(38)	NA	(NE)	0	(130)	1	(38)
Polychlorinated biphenyls															
Aroclor 1254	µg/kg	1 / 3 (33%)	31	NA	(NE)	NA	(NE)	0	(220)	NA	(NE)	0	(740)	0	(220)
Total PCBs	µg/kg	1 / 3 (33%)	31	NA	(NE)	0	(204)	NA	(NE)	NA	(NE)	NA	(NE)	0	(204)
Total Petroleum Hydrocarbons															
TPH as motor oil	mg/kg	2 / 17 (12%)	120	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C6-10

Central Tendency Comparisons (Site to Background), AOC 12 - Fill Areas

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Comparison Test Used	Probability that the Observed Differences Would Occur Purely by Chance	Statistical Decision with 0.05 Significance Level	Mean of Site Detects	Mean of Bkgd Detects	Median of Site Detects	Median of Bkgd Detects	Number of Site Detects	Number of Site Samples	Number of Bkgd Detects	Number of Bkgd Samples	Percent Detects Site	Percent Detects Bkgd
Cobalt	Gehan	0.423	nsd	7.71	7.85	7.8	7.61	17	17	58	59	100	98
Copper	Gehan	0.411	nsd	10.9	10.5	10.5	10.1	16	17	70	70	94	100
Zinc	Gehan	0.000	Site > Bkgd	47.1	36.8	50	35.5	17	17	70	70	100	100

Bkgd = background

nsd = no statistical difference
< = less than
> = greater than

TABLE C6-11
Decision 2 Data Gaps Summary AOC 12
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		**Maximum Detected Value**	**> HHCV or Background as Applicable? [1]**	**> ECV or Background as Applicable? [1]**	**Proposed Sample ID**	**Notes**
Compound/Depth	**Y or N**	**Det/# results**		**Y or N**	**Y or N**		
Metals							
Cobalt				**23 mg/kg**	**13 mg/kg**		
0-0.5 ft bgs	N	2 of 2	8.4 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	7 of 7	14 mg/kg	N	Y		
0-6 ft bgs	Y	8 of 8	14 mg/kg	N	Y		
0-10 ft bgs	Y	14 of 14	14 mg/kg	N	NA		
Selenium				**380 mg/kg**	**1.47 mg/kg (bckg)**		
0-0.5 ft bgs	NA	0 of 2	NA mg/kg	N	N	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC as additional sampling would likely result in additional non-detect values.
0-3 ft bgs	N	1 of 7	2.5 mg/kg	N	Y		
0-6 ft bgs	N	1 of 8	2.5 mg/kg	N	Y		
0-10 ft bgs	N	1 of 14	2.5 mg/kg	N	NA		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	N	2 of 2	77 mg/kg	N	Y	None	Compound exceeds ECV and may exceed background. Existing data adequate to calculate 95% UCL for all exposure intervals except 0 - 0.5 ft bgs. While this is insufficient to calculate an EPC using ProUCL for this exposure interval, the maximum concentration is low (i.e., does not exceed two times the lowest comparison value). Therefore, using the maximum result as the EPC is not expected to significantly impact the results of the risk assessment
0-3 ft bgs	Y	7 of 7	77 mg/kg	N	Y		
0-6 ft bgs	Y	8 of 8	77 mg/kg	N	Y		
0-10 ft bgs	Y	14 of 14	77 mg/kg	N	NA		
Polycyclic Aromatic Hydrocarbons							
PAHs (BaP TEQ)				**38 µg/kg**	**NA**		
0-0.5 ft bgs	N	2 of 2	19 µg/kg	N	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	N	4 of 7	19 µg/kg	N	NA		
0-6 ft bgs	Y	5 of 8	58 µg/kg	Y	NA		
0-10 ft bgs	Y	6 of 14	58 µg/kg	Y	NA		

Footnotes:

[1] The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

Acronyms and Abbreviations:

AOC - area of concern
BaP TEQ - benzo(a)pyrene toxic equivalents
ECV - ecological comparison values
EPC - exposure point concentration
ft bgs - feet below ground surface
HHCV - human health comparison values
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
N - no
NA - not applicable
95% UCL - 95 percent upper confidence limit on the mean (calculated by ProUCL Version 4.00.04; USEPA, 2009)
Y - yes

TABLE C6-12
Results of Tiered Analysis at AOC 12b and AOC 12c
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Metal	**Step 1 Do COPCs/COPECs Exceed Background?**	**Step 2 Do COPCs/COPECs Exceed SSL?**	**Step 3 Does the Model Eliminate Potential for Leaching to Groundwater?**
AOC 12b			
Cobalt[a]	√		
Copper	√		
Selenium	√		
AOC 12c			
Zinc	√		

[a] Cobalt has no maximum contaminant level. USEPA tapwater regional screening level (11 micrograms per liter) was used in place of maximum contaminant level.

✓ = Constituents concentration exceeds background and/or SSL.

TABLE C6-13

Sample Results Compared to the Calculated Soil Screening Levels

AOC12b

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)		
			Soil Screening Levels : [1]	**150**	**46,000**	**91**
			Background : [2]	**12.7**	**16.8**	**1.47**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Cobalt**	**Copper**	**Selenium**
AOC12b-T1a	09/20/08	2 - 3	N	14	18	ND (1)
AOC12b-T1b	09/20/08	2 - 3	N	9.6	14	2.5

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-14

Sample Results Compared to the Calculated Soil Screening Levels
AOC12c
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)
			Soil Screening Levels : [1]	**320,000**
			Background : [2]	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Zinc**
AOC12c-T1a	09/20/08	0 - 0.5	N	77
	09/20/08	2 - 3	N	51
	09/20/08	10 - 11	N	50
AOC12c-T1b	09/20/08	2 - 3	N	49
	09/22/08	3 - 4	N	57
	09/20/08	10 - 11	N	45
AOC12c-T1c	09/20/08	10 - 11	N	49
	09/20/08	10 - 11	FD	50

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C6-15

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)
AOC 12 - Fill Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			TTLC in mg/kg[1]		STLC in mg/L[1]			TCLP in mg/L [1]		
Parameter	**Frequency of detection**	**Maximum Detected Value (mg/kg)**	**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	0 / 17 (0%)	ND (2.1)	0	500	0	150	15	0	NE	NE
Arsenic	17 / 17 (100%)	8.4	0	500	0	50	5	0	100	5
Barium	17 / 17 (100%)	240	0	10000	0	1000	100	0	2000	100
Beryllium	0 / 17 (0%)	ND (2.1)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 17 (0%)	ND (1.1)	0	100	0	10	1	0	20	1
Chromium	17 / 17 (100%)	28	0	2500	0	50	5	0	100	5
Chromium, Hexavalent	0 / 17 (0%)	ND (0.431)	0	500	0	50	5	0	NE	NE
Cobalt	17 / 17 (100%)	14	0	8000	0	800	80	0	NE	NE
Copper	16 / 17 (94%)	18	0	2500	0	250	25	0	NE	NE
Lead	17 / 17 (100%)	8.3	0	1000	0	50	5	0	100	5
Mercury	0 / 17 (0%)	ND (0.11)	0	20	0	2	0.2	0	4	0.2
Molybdenum	1 / 17 (5.9%)	1	0	3500	0	3500	350	0	NE	NE
Nickel	17 / 17 (100%)	20	0	2000	0	200	20	0	NE	NE
Selenium	1 / 17 (5.9%)	2.5	0	100	0	10	1	0	20	1
Silver	0 / 17 (0%)	ND (2.1)	0	500	0	50	5	0	100	5
Thallium	0 / 17 (0%)	ND (4.2)	0	700	0	70	7	0	NE	NE
Vanadium	17 / 17 (100%)	42	0	2400	0	240	24	0	NE	NE
Zinc	17 / 17 (100%)	77	0	5000	0	2500	250	0	NE	NE

Notes:

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC.

Figure

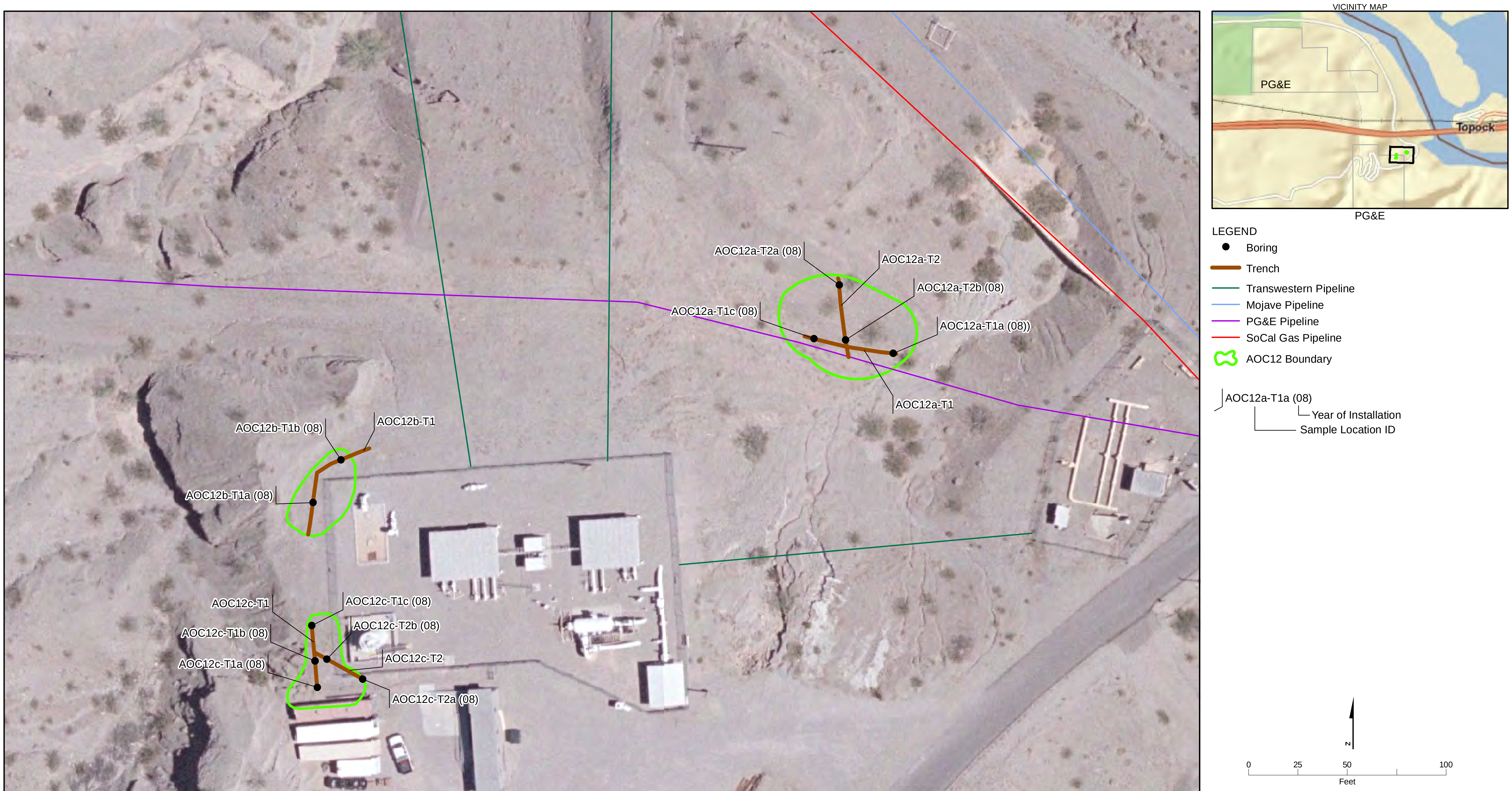

FIGURE C6-1
Sampling and Trench Locations for AOC12 - Fill Area

RCRA Facility Investigation/Remedial Investigation
Soil Investigation Part A,
Phase I Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

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Appendix C7
Area of Concern 14 Data Gaps Evaluation Results

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C7-7 Proposed Phase 2 Soil Sample Locations AOC 14 – Railroad Debris Site

Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CMS/FS	corrective measures study/feasibility study
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyl trichloroethane
DQO	data quality objective
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ECV	ecological comparison value
EPC	exposure point concentration
I-40	Interstate 40
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
SSL	soil screening level
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List

TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
VOC	volatile organic compound

APPENDIX C7

Area of Concern 14 Data Gaps Evaluation Results

1.0 Introduction and Background

This attachment presents the results of the Data Gaps Evaluation and Part A Phase 2 Sampling Program for Area of Concern (AOC) 14 – Railroad Debris Site at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

AOC 14 – Railroad Debris Site is located approximately 1,000 feet north of the compressor station and is currently bounded by the Burlington Northern Santa Fe railroad tracks to the north, Interstate 40 (I-40) to the south, Bat Cave Wash to the west, and a former access road to the east. The primary plateau of AOC 14 is approximately 100 feet above the bottom of Bat Cave Wash.

The Railroad Debris site is approximately 1.5 acres in area and first appears in an aerial photograph dated 1947, prior to the establishment of the compressor station. In that photograph, a mound of soil apparently related to construction of the rail line is present on the site. In subsequent aerial photographs dated 1955, a white patch and other materials are present on this site. A dirt road that runs from the north end of the compressor station to this area is also visible on the 1955 aerial photographs. A white patch can be seen on aerial photographs from the same period (mid 1950s) on the ground adjacent to the sludge-drying beds (Solid Waste Management Unit 5). The white material is probably dehydrated lime sludge from the Permutit water-conditioning system. Former employees report that the lime sludge was trucked to the Railroad Debris Site and sprayed on the ground (CH2M HILL, 2006). AOC 14 currently contains miscellaneous construction debris including chunks of asphalt, railroad ties, and piping. Asbestos-containing material has also been identified at this site.

Employee reports suggest that a removal action for some of the debris and white powdery material was conducted in the mid-1990s; however, no documentation regarding the removal has been found (CH2M HILL, 2006). The contours of the site suggest that some excavation may have occurred in the southern portion of the area. The southern two-thirds of the area are somewhat lower in elevation than the surrounding areas, and a long, low soil mound/berm is present immediately north of this area. Some white powdery material remains in the embankment adjacent to I-40, and it appears that a thin lens of additional material has been uncovered by erosion on the southern side of the soil mound. In addition, a 1998 investigation of the area indicated that a layer of white powdery material is present below the current soil surface to approximately 5 feet below ground surface (bgs) (PG&E,

1999a). This layer has variable thickness and, in some areas, is underlain and overlain by a mix of the white powdery material and gravel.

An asbestos-containing material removal action was completed at this location in 1999 (PG&E, 1999b). In November 1998, during soil sampling at AOC 14, a small amount of friable construction debris and transite were found. The friable material contained over 1 percent asbestos. The transite was non-friable and, after sampling, the transite was left in the trench and was covered with clean fill material. PG&E removed the friable asbestos-containing material on April 14, 1999 and disposed of the material at an appropriate landfill. Two shallow confirmation samples of the underlying soils were collected. At one sample location, asbestos was detected in the underlying soil. Additional sampling was implemented to characterize the extent of the asbestos in the soil underlying the loose construction material near this sample. On June 1, 1999, 14 additional samples were taken, and no asbestos was detected in any of the sample locations.

1.1.1 New Potential Burn Area

Field observations made by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in 2009 identified potential burn material along the I-40 road cut near the southwest corner of AOC 14. During additional employee interviews conducted by PG&E in late 2009 and early 2010, a former PG&E Topock Compressor Station employee reported periodic burning of primarily office garbage on the western edge of the AOC 14 bench area, as shown in Figures C7-1 through C7-7. The employee reported that AOC 14 was used for dumping and garbage burning until the freeway was built in the 1960s (PG&E, 2010). While several soil borings were installed and soil samples were collected during the Phase 1 investigation in 2008 from the general area identified as the area used for burning, no specific attempts were made to delineate or sample any burned material.

1.1.2 Potential Southern Debris Area

As discussed above, an employee identified the current AOC 14 as a location where waste was disposed of and burned; however, the employee also indicated the area north of the compressor station and south of I-40, informally known as the MW-24 bench (named because monitoring well MW-24 is located in this area), was also used as a potential waste disposal area. Miscellaneous construction debris is present in the MW-24 bench area. In January 2008, during trenching activities in the MW-24 bench area associated with installation of a control panel related to the upland *in-situ* pilot test, debris consisting mostly of treated wood, concrete, and scrap steel/tin (including a possible fragment of a storage tank) were encountered. DTSC and the Department of the Interior were notified of this discovery in an e-mail dated January 12, 2008. Three debris samples were collected on January 18, 2008 and were analyzed for Title 22 metals, hexavalent chromium, semivolatile organic compounds (SVOCs), and pH. In addition, two soil samples were collected on January 31, 2008 following sample collection and handling protocols outlined in the PG&E Program Quality Assurance Project Plan. The MW-24 bench area soil samples were analyzed for Title 22 metals, hexavalent chromium, SVOCs, polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), and pH. Analytes detected in soil and debris samples above interim screening levels include metals, and PAHs, as discussed in Tables C7-3 and C7-5. While data from these samples are included in tables presenting results for specific analytical parameters, these data were collected in an area that is geographically separate from AOC 14 and thus are not included on the summary table of sample statistics (Table C7-9).

As this area appears to be related to AOC 14, the new debris area is will be evaluated with AOC 14. The proposed sampling approach for the MW-24 Bench Area is presented in Section 7.0.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 14 based on the above site history and background, as shown in Figure C7-2. Table C7-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 14. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the Soil Part A Data Quality Objective [DQO] Tech Memo, which is included as Appendix A to the Data Summary Report.

The primary sources of contamination at AOC 14 are disposal of debris and asbestos-containing material, lime sludge, and potentially residuals from burning of office garbage. The primary release mechanisms are direct releases of contaminated particulates or leaching of contaminants from the debris, lime sludge, and/or burned material. Contaminants present in these materials could have been deposited on surface soil as particulates, or entered surface soil as dissolved constituents through infiltration of rainfall. In addition, the lime sludge was reportedly sprayed on the ground, and while the majority of the water in the sludge would have evaporated, some of the liquid in the sludge could have infiltrated into underlying soils. Because some material is buried, constituents could also have affected shallow and subsurface soils in the immediate vicinity of the debris, lime sludge, and/or residual burned material. Contaminants released from debris located in the higher (eastern) portion of AOC 14 could also have been transported to the lower portions of the unit through surface runoff. Primary source media therefore consist of surface, shallow, and subsurface soils. Contaminants could have leached from surface soils and shallow soil into underlying deeper soils. Potential migration from subsurface soil to groundwater was identified as a potential secondary pathway. If released, volatile organic compounds (VOCs) in surface soils would be expected to have been degraded by heat and light, and are likely no longer present.

Windblown dust contamination from small particles of debris or contaminated surface soil within AOC 14 is a potential secondary release mechanism. Windblown contamination, if any, is expected to be limited to surface soils. Surface runoff from AOC 14 to Bat Cave Wash could also have transported chemicals of potential concern/chemicals of potential ecological concern (COPCs/COPECs) in surface soil or small pieces of debris from AOC 14 to Bat Cave Wash.

Part A Phase 1 and historical soil and white powder samples were collected throughout AOC 14. Based on the site history, background, and conceptual site models, Part A Phase 1 and historical soil and debris samples were collected in areas with known debris/disposal activity. White powder samples were collected based on observations. Grid-based soil sampling was also conducted across the AOC. Sampling has not been conducted to investigate the potential burning of office garbage west of the AOC 14 boundary and debris disposed to the east of AOC 14 as these areas were only recently discovered (2009/2010).

1.2.1 AOC 14 Data

Twenty historical soil samples (at depths ranging from 0 to 6 feet bgs) were collected from 20 locations (S1-20, S2-6, S2-62, S2-130, S3-15, S3-72, S3-120, S4-4, S4-95, S4-160, S8-30, RR-1 through RR-3, RR-5, RR-6, RR-8, RR-10, and RR-11) in AOC 14, as shown in Figure C7-1. In addition, historical samples also included 11 white powder material samples (at depths ranging from 0 to 4 feet bgs) collected at GS-1, GS-2, S2-6, S2-62, S3-72, S4-4, S4-95, RR-4, RR-7, RR-9, and RR-12); and two black sandy material samples (S2-62 and S8-23 collected at 3 feet bgs).

Historical soil and white powder material samples were analyzed for five constituents: total chromium, hexavalent chromium, copper, nickel, and zinc. The black material samples were analyzed for metals, SVOCs, PAHs, and TPH. The railroad tie sample was analyzed for total chromium, lead, zinc, PAHs, and SVOCs.

During the 2008 Part A Phase 1 Soil Investigation, 79 soil samples (from 0 to 0.5, 2 to 3, 5 to 6, 9 to 10, and 14 to 15 feet bgs) were collected from 17 sample locations (AOC14-1 through AOC14-13 and AOC14-SS-1 through AOC14-SS-4), as shown in Figure C7-1. Phase 1 soil samples collected in AOC 14 were analyzed for Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, TPH, pH, asbestos, pesticides, and polychlorinated biphenyls (PCBs). Surface soil samples were not analyzed for VOCs. Ten percent of the Phase 1 soil samples collected in AOC 14 (eight soil samples) were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). In addition, synthetic precipitation leaching procedure (SPLP) extraction was conducted on a soil sample collected at 5 to 6 feet bgs at sample location AOC14-13 and a soil sample collected at 5 to 6 feet bgs at sample location AOC14-2. The leachate from the SPLP extractions was analyzed for total and hexavalent chromium. The leachate results from the SPLP extractions are presented in Table C7-2. Soil results were validated and the data quality evaluation is included in Appendix D of the Data Gaps Evaluation Report.

In addition, white powder material was observed and sampled at 3.25 feet bgs at sample location AOC14-2, and debris (suspected transite) was observed and sampled at 1.5 feet bgs at sample location AOC14-13. The white powder material and debris samples were analyzed for the same analytical suite as listed above for the Part A Phase 1 soil samples.

All historical and Part A Phase 1 data considered Category 1 were used as inputs to the four DQO decisions.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and COPECs at AOC 14. Laboratory analytical results for historical and Part A Phase 1 soil samples and the white powder sample at AOC 14 are presented in Tables C7-3 through C7-8. Table C7-9 presents a statistical summary of soil analytical results for COPCs and COPECs that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one or more samples was greater than the interim screening value. White powder data are not included in this soil data statistical summary. Soil data are discussed first, followed by a discussion of the white powder sample data.

2.1 Summary of AOC 14 Soil Data

Antimony, beryllium, cadmium, silver, cyanide, TPH-gasoline, and PCBs were not detected in samples collected from AOC 14. Table C7-9 lists the 43 constituents detected in soil at AOC 14, including three calculated quantities (benzo(a)pyrene equivalents, total low molecular weight PAHs, and total high molecular weight PAHs). Nine of these constituents (aluminum, calcium, iron, magnesium, manganese, potassium, sodium 4,4-dichlorodiphenyldichloroethylene [4,4-DDE], and 4,4-dichlorodipheynyltrichloroethane [4,4-DDT]) were detected in the TAL/TCL samples.

Thirty of the constituents detected at AOC 14 (arsenic, barium, cobalt, nickel, thallium, vanadium, aluminum, calcium, iron, magnesium, manganese, potassium, sodium, 4-methylphenol, bis(2-ethylhexyl)phthalate, acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, total low molecular weight PAHs, TPH-diesel, and TPH-motor-oil) were detected at concentrations below their respective interim screening levels. Thirteen constituents were detected one or more times at concentrations exceeding the interim screening levels, including eight metals (total chromium, hexavalent chromium, copper, lead, mercury, molybdenum, selenium, and zinc), two pesticides (4,4-DDE and 4,4-DDT), benzo(a)pyrene, and two calculated quantities (benzo(a)pyrene equivalents and total high molecular weight PAHs).

Five constituents (total chromium, hexavalent chromium, copper, lead, and molybdenum) were detected at concentrations exceeding the interim screening level four or more times; the distribution of these constituents are shown in Figures C7-1 and C7-3 through C7-6.

Four sample locations associated with AOC 1 (AOC1-T6a through AOC1-T6c and SS-6) are located in the area that may potentially receive AOC 14 runoff into Bat Cave Wash. To provide further context for the evaluation of potential data gaps at AOC 14, the data from these sample locations are also shown in Figures C7-1 and C7-3 through C7-6. It should be noted that these samples are located in the bottom of the wash approximately 100 feet below the elevation of AOC 14. Soil samples (24Soil-01 and 24Soil-02) collected in the potential southern debris area located south of I-40 are also shown in Figures C7-1 and C7-3 through C7-6.

2.2 Nature and Extent Evaluation

The following subsection discusses the nature and extent of COPCs and COPECs detected at concentrations exceeding the interim level. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent have been adequately delineated. Section 2.5 of this sub-appendix summarizes the constituents that may require further evaluation, and Section 6.0 of this sub-appendix provides the recommended follow-up sampling for the Part A Phase 2 soil investigation.

2.2.1 Total Chromium

Total chromium was detected in 99 of 99 soil samples collected at AOC 14. Detected concentrations of total chromium exceeded the interim screening level (39.8 milligrams per kilogram [mg/kg]) (background value/ecological comparison value [ECV]) four times (with a maximum detected concentration of 74.9 mg/kg at RR-6), as shown in Tables C7-3 and C7-9 and in Figure C7-1. None of the detected concentrations of total chromium exceeded the United States Environmental Protection Agency 2008 residential or commercial/industrial regional screening levels (RSLs) (280 mg/kg and 1,400 mg/kg, respectively). The four samples with detections exceeding the background threshold value (BTV)/ECV are located near the southwest corner of AOC 14. Samples with concentrations below the screening levels surround these locations laterally and vertically. The maximum detected concentration is only approximately twice the ECV.

2.2.2 Hexavalent Chromium

Hexavalent chromium was detected in 13 of 99 soil samples collected at AOC 14. Detected concentrations of hexavalent chromium exceeded the interim screening level (0.83 mg/kg) (BTV) eight times (with a maximum detected concentration of 5.8 mg/kg at RR-5), as shown in Tables C7-3 and C7-9 and in Figure C7-3. None of the detected concentrations of hexavalent chromium exceeded the ECV (139.6 mg/kg) or DTSC residential and commercial/industrial California human health screening levels (CHHSLs) (17 mg/kg and 37 mg/kg, respectively). Most of the samples with detections above the BTV are located near the southwest corner and southern boundary of AOC 14; two samples (AOC14-3 and S2-6) are located near the western boundary of the AOC. Samples with concentrations below the interim screening level surround the southwest locations laterally and vertically; the lateral extent of hexavalent chromium is not bounded at locations AOC14-2 and S2-6.

2.2.3 Copper

Copper was detected in 97 of 99 soil samples collected at AOC 14. Detected concentrations of copper exceeded the interim screening level (16.8 mg/kg) (BTV) four times (with a maximum detected concentration of 44 mg/kg at AOC14-2), as shown in Tables C7-3 and C7-9 and in Figure C7-4. One of the detected concentrations exceeded the ECV (20.6 mg/kg); none of the detections exceeded the residential or commercial/industrial CHHSLs (3,000 mg/kg and 38,000 mg/kg, respectively). Three of samples with detections above the BTV are located near the southwest corner and southern boundary of AOC 14; one sample is located in the northeastern corner (AOC14-8). Samples with concentrations below the interim screening level surround all of these locations laterally and vertically.

2.2.4 Lead

Lead was detected in 79 of 79 soil samples collected at AOC 14. Detected concentrations of lead exceeded the interim screening level (8.39 mg/kg) (BTV/ECV) 10 times (with a maximum concentration of 21 mg/kg at AOC14-2), as shown in Tables C7-3 and C7-9 and Figure C7-5. None of the detected concentrations exceeded the residential or commercial/industrial CHHSLs (80 mg/kg and 320 mg/kg, respectively). Five of the samples with lead above the BTV are located along the western boundary of AOC 14 and five are located in the southwest area that also had background exceedances for total and hexavalent chromium, and lead. One sample is located in the northwestern corner (AOC14-5). Samples with concentrations below the interim screening level surround most of these locations laterally and vertically. The distribution of lead exceedences is not consistent with the site-specific conceptual site model for AOC 14 (i.e., in or near the disposal areas), suggesting other potential sources. The lead present at AOC 14 is most likely from other anthropogenic sources, which would cause a more widespread distribution of lead, as discussed in Appendix C, Section C.3.

2.2.5 Mercury

Mercury was detected in one of 79 soil samples collected at AOC 14 at a concentration of 0.25 mg/kg in AOC14-SS1 at 2 to 3 feet bgs. The detected concentration of mercury exceeded the interim screening level (0.0125 mg/kg, ECV) as shown in Tables C7-3 and C7-9. The detected concentration did not exceed the residential or commercial/industrial CHHSLs (18 mg/kg and 180 mg/kg). The ECV (0.0125 mg/kg) is below the capability of the instrumentation to detect mercury. The 78 nondetected sample results had reporting limits that exceeded the ECV. These reporting limits ranged from 0.099 to 0.11 mg/kg.

2.2.6 Molybdenum

Molybdenum was detected in 15 of 79 soil samples collected form AOC 14. Detected concentrations of molybdenum exceeded the interim screening level (1.37 mg/kg) (BTV) 10 times (with a maximum concentration of 2.4 mg/kg at AOC14-6. AOC14-7, and AOC14-12), as shown in Tables C7-3 and C7-9 and in Figure C7-6. Three detected concentrations exceeded the ECV (2.25 mg/kg); none of the detected concentrations exceeded residential and commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). The lateral extent of concentrations exceeding the interim screening level/ ECV is limited to the northern and western portions of AOC 14. Samples with concentrations below the screening levels surround most of these locations, with the exception of AOC14-3, AOC14-13, and AOC14-SS-4. At all locations, the deepest samples have concentrations below the screening levels.

2.2.7 Selenium

Selenium was detected in three of 79 soil samples collected from AOC 14. As shown in Tables C7-3 and C7-9, two detected concentrations (AOC14-12 [1.5 mg/kg at 5 to 6 foot bgs] and AOC14-13 [1.6 mg/kg at 9 to 10 feet bgs]) barely exceeded the interim screening level (1.47 mg/kg) (BTV/ECV) but did not exceed the residential and commercial/industrial CHHSLs (380 mg/kg and 4,800 mg/kg, respectively). These locations are located near the southwest corner of AOC 14. Samples with concentrations below the interim screening level surround these locations laterally and vertically.

2.2.8 Zinc

Zinc was detected in 99 of 99 soil samples collected at AOC 14. Detected concentrations of zinc exceeded the interim screening level of 58 mg/kg (BTV/ECV) twice (AOC14-1 [70 mg/kg at 0 to 0.5 foot bgs] and RR-6 [243 mg/kg at 0 feet bgs]), as shown in Tables C7-3 and C7-9. None of the detected concentrations exceeded residential and commercial/ industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). These locations are located near the southwest corner of AOC 14. Samples with concentrations below the interim screening level surround these locations laterally and vertically.

2.2.9 Benzo(a)pyrene, Benzo(a)pyrene Equivalents, and PAHs

Benzo(a)pyrene was detected in seven of 79 soil samples collected from AOC 14. One sample (AOC14-12 at 5 to 6 feet bgs) had a detected concentration of benzo(a)pyrene of 84 micrograms per kilograms (µg/kg) which exceeded the interim screening level of

38 µg/kg (residential CHHSL). Several other PAHs were detected in soil samples collected from AOC 14, but concentrations were below their respective interim screening levels. To assist with evaluation of PAHs for human health, benzo(a)pyrene equivalents were calculated for each of the soil samples collected at AOC 14, as shown in Table C7-5. The benzo(a)pyrene equivalent interim screening level of 38 µg/kg (residential CHHSL) was exceeded in one sample (130 µg/kg at AOC14-12 at 5 to 6 feet bgs), as shown in Tables C7-5 and C7-9. This location is located near the southwest corner of AOC 14. Samples with concentrations below the interim screening level surround this location laterally and vertically. The distribution of PAH exceedences is not consistent with the site-specific CSM for AOC 14 (i.e., in the disposal area), suggesting other potential sources. The PAHs present at AOC 14 are most likely from other anthropogenic and naturally occurring sources (i.e., combustion of fossil fuels, wild fires, volcanic activities, industrial facilities, petroleum oils, asphalt binders, and vehicle exhaust), which would cause a more widespread distribution of PAHs, as discussed in Appendix C, Section C.3.

To assist with evaluation of PAHs for ecological risk, detected concentrations of low molecular weight PAHs and high molecular weight PAHs were summed and compared to the PAH low molecular weight and PAH high molecular weight ECVs (10,000 µg/kg and 1,160 µg/kg, respectively). One of the sums of detected concentrations exceeded the PAH high molecular weight ECV (AOC14-12 at 5 to 6 feet bgs contained 1,400 µg/kg high molecular weight PAHs), and none of the detected sums exceeded the PAH low molecular weight ECV.

2.2.10 Asbestos

Seventy-nine soil samples were analyzed for asbestos. Bulk samples analyzed by polarized light microscopy indicated that asbestos fibers were present in 16 of the 72 soil samples, as shown in Table C7-8. Further analysis of these soil samples by California Air Resources Board Method 435 and transmission electron microscopy indicated that asbestos was present in only two soil samples (AOC13-2 at 14 to 15 feet bgs and AOC14-SS1 at 5 to 6 feet bgs) at trace levels (detected concentration of less than 0.1 percent, where the detection limit was less than 0.1 percent).

2.2.11 Target Analyte List/Target Compound List Constituents

Aluminum, calcium, iron, magnesium, manganese, potassium, sodium, 4-methylphenol, bis (2-ethylhexyl) phthalate, 4,4-DDE, and 4,4-DDT were detected in the AOC 14 soil samples analyzed for the complete TAL/TCL suite of compounds. These constituents are discussed below.

Aluminum was detected in eight of eight surface soil samples collected from AOC 14. The maximum detected concentration of aluminum was 9,000 mg/kg at AOC14-5, which is below the interim screening level (16,400 mg/kg) (BTV), as shown in Tables C7-4 and C7-9. Remaining detected concentrations of aluminum ranged from 3,000 to 8, 800 mg/kg. None of the detected concentrations exceeded residential and commercial CHHSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in nine of nine soil samples collected from AOC 14, both surface and subsurface (3 and 4 feet bgs) were collected. The maximum detected concentration of calcium was 48,000 mg/kg at AOC14-1, which is below the interim screening level

(66,500 mg/kg) (background value), as shown in Tables C7-4 and C7-9. Remaining detected concentrations of calcium ranged from 11,000 to 37,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in nine of nine soil samples collected from AOC 14, both surface and subsurface (3 and 4 feet bgs) were collected. The maximum detected concentration of iron was 23,100 mg/kg at s1-20, which is below the interim screening level of 55,000 mg/kg (residential RSL), as shown in Tables C7-4 and C7-9. Remaining detected concentrations of iron ranged from 6,800 to 20,000 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for iron.

Magnesium was detected in nine of nine soil samples collected from AOC 14, both surface and subsurface (3 and 4 feet bgs) were collected. The maximum detected concentration of magnesium was 8,500 mg/kg at AOC14-1, which is below the interim screening level (12,100 mg/kg) (background value), as shown in Tables C7-4 and C7-9. Remaining detected concentrations of magnesium ranged from 2,600 to 8,330 mg/kg. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in eight of eight surface soil samples collected from AOC 14. The maximum detected concentration of manganese was 290 mg/kg at AOC14-3, which is below the interim screening level (402 mg/kg) (BTV), as shown in Tables C7-4 and C7-9. Remaining detected concentrations of manganese ranged from 120 to 270 mg/kg. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (1,800 mg/kg and 23,000 mg/kg, respectively).

Potassium was detected in nine of nine soil samples collected from AOC 14, both surface and subsurface (3 and 4 feet bgs) were collected. The maximum detected concentration of potassium was 2,800 mg/kg at AOC14-3, which is below the interim screening level of 4,400 mg/kg (BTV), as shown in Tables C7-4 and C7-9. Remaining detected concentrations of potassium ranged from 690 to 2,700 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for potassium.

Sodium was detected in eight of nine soil samples collected from AOC 14, both surface and subsurface (3 and 4 feet bgs) were collected. The maximum detected concentration of sodium was 850 mg/kg at AOC14-1, which is below the interim screening level (2,070 mg/kg) (BTV), as shown in Tables C7-4 and C7-9. Remaining detected concentrations of sodium ranged from 210 to 630 mg/kg. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

4-methylphenol was detected in one of 79 soil samples collected at AOC 14, both surface and subsurface soil samples were collected, as shown in Tables C7-5 and C7-9. The detected concentration was 430 µg/kg at AOC14-2 surface soil sample, which is below the interim screening level of 500 µg/kg (ECV), and well below the residential and commercial/industrial RSLs (310,000 µg/kg and 3,100,000 µg/kg, respectively).

Bis(2-ethylhexyl)phthalate was detected in one of 79 soil samples collected at AOC 14, both surface and subsurface soil samples were collected, as shown in Tables C7-5 and C7-9. The detected concentration was 810 µg/kg AOC4-1 (at 2 to 3 feet bgs), which is below the interim screening level of 2,070 µg/kg, and well below the residential and commercial/industrial RSLs (35,000 µg/kg and 120,000 µg/kg, respectively).

4,4-DDE (2.9 μg/kg at AOC14-2), and 4,4-DDT (3 μg/kg at AOC14-2) were detected above their interim screening levels in one of eight surface soil samples collected from AOC 14. The detected concentrations exceeded the interim screening level of 2.1 μg/kg (ECV), as shown in Tables C7-7 and C7-9. The detected concentrations did not exceed the residential or commercial/industrial CHHSLs (1,600 μg/kg and 6,300 μg/kg, respectively). This location is located in the southwestern corner of the AOC.

As discussed in Section C.2 of Appendix C, PG&E recommends that the metals and organics discussed above not be considered COPCs/COPECs for this SWMU and no further sampling for these constituents is proposed. These constituents have been fully discussed in Section C.2

2.3 Central Tendency Comparison to Background Threshold Values

Seven metals (total chromium, hexavalent chromium, copper, lead, molybdenum, selenium, and zinc) were detected above their background values in soil samples collected from AOC 14. A central tendency comparison was performed for five of these seven metals (total chromium, copper, lead, molybdenum, and zinc) to compare the AOC 14 soil data set for these metals with the corresponding soil background data set to determine whether a difference exists between the two populations and whether additional sampling may be required for a given metal. The comparison results are shown in Table C7-10 of this attachment and in Figure 3-1 of the Data Gaps Evaluation Report.

Metals in either the AOC 14 data set or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of hexavalent chromium and selenium to conduct the test.

No statistical difference between the two populations was noted for any of the five metals evaluated (total chromium, copper, lead, molybdenum, and zinc), as shown in Table C7-10.

2.4 White Powder Material, and Debris Samples and Mapping

This subsection discusses the historical white powder samples, white powder material and debris samples collected during the 2008 Part A Phase 1 soil investigation, and the white powder material and debris mapping.

2.4.1 White Powder Material Samples

As described above, 11 samples of historical white powder material and a sample of white powder material from the Soil Part A Phase 1 (location AOC14-2 at 3 to 3.25 feet bgs) were collected and sent to the laboratory for analysis.

DTSC also collected a sample of the AOC 14 white powder material on January 18, 2008 from the bank of the freeway (DTSC AOC 14 – Roadcut). This sample was collected as a comparison sample to the samples of white powder collected from AOC 10 East Ravine. The results of this sampling were summarized in DTSC's June 18, 2008 memo *Field Report: White Powder Occurrences in the East Ravine - Area of Concern (AOC) 10, Pacific Gas and Electric (PG&E) Company Topock Compressor Station, Needles, California PCA 22120 WP 540015-48/36 WR 640233.* The following compounds were detected in the DTSC-AOC14-Roadcut sample: barium, total chromium, cobalt, vanadium, zinc, sodium, calcium, iron, manganese, and potassium. Of these compounds, only calcium was detected above its interim screening level. These data are not included in the summary tables, since there were not collected, analyzed, or validated under the PG&E Program Quality Assurance Program Plan.

Total chromium, copper, nickel, and zinc were all detected in all 11 historical white powder material samples collected at AOC 14. Hexavalent chromium was detected in six of the 11 samples. Only total chromium, hexavalent chromium, and copper were detected above their respective interim screening levels in these samples, as shown in Table C7-3. The maximum detected concentration of total chromium in the historical white powder samples was 45.5 mg/kg, which only slightly exceeds the background value (39.8 mg/kg) and ECV (36.3 mg/kg) and is well below the residential RSL (280 mg/kg). The maximum detected concentration of hexavalent chromium in the historical white powder samples was 15.4 mg/kg, which exceeds the background value (0.83 mg/kg) but is below the residential CHHSL (17 mg/kg) and the ECV (139.6 mg/kg). The maximum detected concentration of copper in the historical white powder samples was 27.9 mg/kg, which exceeds the background value (16.8 mg/kg) and the ECV (20.6 mg/kg) but is well below the residential CHHSL (3,000 mg/kg).

During the 2008 Part A Phase 1 soil investigation, white powder material was encountered only in one location (AOC14-2) at approximately 3 feet bgs. A sample of the white powder material was collected from the 3- to 3.25-foot-bgs interval. Soil samples were also collected above and beneath the white powder material at (at 2 to 3 feet bgs and at 5 to 6 feet bgs) and were sent to the laboratory for analysis. The following compounds were detected in the white powder material sample: arsenic, barium, total chromium, hexavalent chromium, nickel, and vanadium. Of those compounds detected, arsenic (15 mg/kg) and hexavalent chromium (2.16 mg/kg) were detected above their respective interim screening levels, as shown in Table C7-3.

The following compounds were detected in the two soil samples collected at AOC14-2 above and beneath the white powder material: arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, nickel, vanadium, zinc, and TPH-motor-oil. Several PAHs were detected in the sample beneath the white powder material. Of the compounds detected, total chromium (42 mg/kg both samples) and hexavalent chromium (1.04 and 1.32 mg/kg) were detected above their respective interim screening levels in both samples. Copper (19 mg/kg) and lead (21 mg/kg) were detected above their respective interim screening levels in the deeper sample. Asbestos was also detected in the soil sample collected beneath the white powder material.

2.4.2 Debris Samples

As previously mentioned in Section 1.1, two historical debris samples (black sandy material) and a sample of debris (suspected transite) were collected and sent to the laboratory for analysis. TPH-diesel (15,000 mg/kg) and TPH-motor-oil (17,000 mg/kg) were the only constituents detected above laboratory detection limits in the two black sandy material samples. These concentrations exceed the initial screening levels for TPH-diesel (540 mg/kg) and TPH-motor-oil (1,800 mg/kg); however, the risk assessment will evaluate the constituents contained in these samples, and no further sampling is recommended at this time to address the presence of this material. During the 2008 Part A Phase 1 soil investigation, debris (suspected transite) was encountered in one location (AOC14-13 at 0.5 to 1.5 feet bgs) near the surface, and a sample was collected. A soil sample was also collected beneath the debris at 5 to 6 feet bgs and was sent to the laboratory for analysis. The following compounds were detected in the debris sample: arsenic, barium, total chromium, hexavalent chromium, copper, lead, molybdenum, nickel, zinc, several PAHs, and TPH-motor-oil. Of those compounds detected, arsenic (18 mg/kg), total chromium (63 mg/kg), copper (33 mg/kg), lead (16 mg/kg), molybdenum (98 mg/kg), and nickel (57 mg/kg) were detected above their respective interim screening levels, as shown in Table C7-3. The debris sample contained 25 percent asbestos.

The following compounds were detected in the soil sample collected at 5 to 6 feet bgs, beneath the debris: arsenic, barium, total chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, zinc, and TPH-motor-oil. Of those compounds detected, only molybdenum (2 mg/kg) was detected above its interim screening level. The soil sample identified asbestos fibers present using polarized light microscopy, but further analysis of the soil beneath the debris by California Air Resources Board Method 435 indicated that asbestos was not detected above the detection limit.

2.4.3 White Powder Material and Debris Mapping

As part of the conditional approval of the Soil Part A Work Plan (CH2M HILL, 2006), DTSC requested that the white powder material and debris observed in AOC 14 be mapped. PG&E mapped white powder material during the Part A Phase 1 field investigation in 2008. The extent of the white powder material in AOC 14 was documented by walking the perimeter of the visible white powder material, recording the GPS coordinates, and plotting those areas on a figure. There were six areas of white powder material observed in AOC 14. Sampling locations AOC14-1, AOC14-2, AOC14-11, AOC14-12, and AOC14-13 were collocated within white powder areas.[1] During drilling activities at AOC 14, white powder material and/or debris was encountered in boring AOC14-2 (at 2 to 3.5 foot bgs). More detailed results of the white powder material mapping are presented in Appendix B of the Data Gaps Evaluation Report.

In May 2009, PG&E conducted a site walk at AOC14 in to map the debris areas. Debris was observed on the hill above AOC 14 towards the east. The debris consisted of concrete rubble, transite, cans, and miscellaneous trash; these debris areas are shown in Figures C7-1 to C7-6. No sampling has occurred in these debris areas. Nature and extent of contamination in these debris areas have not been defined. Additional characterization of debris may be needed to assess if asbestos containing materials are present. Section 6.0 of this attachment presents the proposed Phase 2 sample locations within these debris areas.

Additional debris was also identified on the west side of AOC 14 near a small cut in the Bat Cave Wash embankment near the northwestern edges of AOC 14. Some debris was noted on the side of the embankment. The nature and extent of the debris toward Bat Cave Wash have not been defined. Three soil borings (AOC1-T6a, -T6b, and -T6c were installed in a transect across Bat Cave Wash downslope from the western edge of AOC 14. Eleven soil samples (not including quality control samples) were collected. With the exception of two detects of lead (12 and 8.5 mg/kg in the 10-foot samples from AOC1-T6a and AOC1-T6b, respectively), metals were not detected above their respective interim screening levels. PAHs were detected in the surface samples in all three locations but below interim

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[1] White powder material samples were also collected during prior investigation efforts; see Table C7-3.

screening levels. Additional samples are proposed to fully assess impacts from AOC 14. Section 6.0 of this attachment presents the potential Phase 2 sampling to assess potential impacts from this debris area. The potential Phase 2 sample locations are needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

2.5 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates than decision error has been held to an acceptable level. Sufficient data of acceptable quality have been attained by the collection of soil samples in areas most likely to have been impacted by the disposal of debris and asbestos-containing material, and lime sludge. Some of the newly-identified burn area, debris, and white powder areas have not been sampled.

Review of the nature and extent discussions above indicates that the lateral and vertical extent of samples with concentrations exceeding the screening levels is confined primarily to the southwestern corner of the AOC 14 boundary. Within this area, the lateral and/or vertical extents of hexavalent chromium, molybdenum, PAHs, and pesticides have not been defined.

There are two sources of white powder material at Topock Compressor Station: (1) the lime treatment sludge, which is typically low in COPC concentrations, and (2) the concentrated minerals resulting from evaporation of cooling tower blowdown water. The white powder material found at AOC 14 contains a maximum total chromium concentration of 45 mg/kg and relatively low concentrations of other metals. This indicates that the likely source of this white powder material is the lime treatment sludge from the lime-based water conditioning system that was in use at Topock until 1962; thus, chemical data are consistent with anecdotal employee reports.

Because the white powder material found at AOC 14 is likely the lime treatment sludge, and due to the fact that there was extensive sample coverage in the entire area (26 historical and 17 Phase 1 locations), no additional sampling of the white powder material in AOC 14 is recommended.

Based on review of the data and the Part A DQO, three data gaps were identified to resolve Decision 1 – Nature and Extent, and limited additional sampling is recommended in Phase 2 to fill the following data gaps:

1. Data gap #1 – Western extent of PAHs, metals, and pesticides contamination in the southwestern corner of AOC 14.
2. Data gap #2 – Nature and extent of contamination in the newly identified burn area west of AOC 14 and the newly identified debris area east of AOC 14.
3. Data gap #3 – Nature and extent of contamination in the newly identified debris area in the MW-24 bench area.

The potential Phase 2 soil sample locations to fill the data gaps are presented in Section 6.0.

3.0 Decision 2 – Data Sufficient to Estimate Representative Exposure Point Concentrations

For Decision 2, data were evaluated to determine if the AOC 14 data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Evaluation Report. The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC). Data reviewed were all available Category 1 data (including historical data from investigations in 1998 and 2000) at AOC 14. The sample designated as "white powder" (AOC14-2 at 3 to 3.25 feet bgs) was included in the data reviewed as a conservative measure, assuming that exposure to white powder areas would not differ significantly from exposure to surrounding soil areas. Similarly, because the precise physical characteristics (and consequently the potential exposure mechanism) of the samples identified as "black sandy material (i.e., asphalt material)" cannot be determined based on the available data reports, these samples were included in the data reviewed based on the same rationale.

Table C7-11 summarizes the results of the evaluation to determine whether data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. Existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values (10 metals, three Contract Laboratory Program inorganics, PAHs, total DDT [i.e., DDT-R]), TPH-diesel, and TPH-motor-oil, as described below. Phase 2 data will be added to the existing data set to calculate the final EPC (i.e., after Decision 1 is satisfied).

3.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for arsenic, total chromium, copper, lead, nickel, and zinc using ProUCL. For the remaining metals (antimony, mercury, molybdenum, and selenium), additional data collection is not expected to significantly change the results of the risk assessment either because the compound is very infrequently detected (antimony and mercury) (i.e., additional nondetects would be expected) or because the maximum detected concentration is below or only slightly greater than the lowest comparison value (molybdenum and selenium).

3.2 Inorganics

Sufficient data (numbers of samples and detections) are available to calculate EPCs for calcium, magnesium, and sodium using ProUCL.

3.3 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene toxicity equivalents and high molecular weight PAHs using ProUCL.

3.4 Pesticides

4,4-DDE and 4,4-DDT were detected in a single sample at concentrations near the detection limit, as shown in Table C7-7. The data are insufficient to allow calculation of an EPC using ProUCL. The total concentration of DDT and metabolites (DDT-R) is approximately three times the ECV. However, collection of additional data is not expected to yield sufficient detections to strongly influence the EPC; therefore, no additional data collection is recommended to support EPC development.

3.5 Petroleum Hydrocarbons

Sufficient data (number of samples and detections) are available to calculate EPCs for TPH-diesel and TPH-motor-oil using ProUCL.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1 are needed to resolve Decision 3. Additional evaluations will be performed as appropriate as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 – Nature and extent evaluation will provide the final representative data set that will be used to assess the threat to groundwater.

Table C7-12 presents the results of the tiered analysis for AOC 14. Nine metals were detected at concentrations above the BTVs. Of those nine, hexavalent chromium, molybdenum, and thallium exceeded the calculated soil screening levels, as shown in Table C7-13. Numerical modeling was conducted to evaluate the potential of these three metals to leach into groundwater. Based on the initial screening model, the potential for molybdenum to leach to groundwater was ruled out. Based on the screening model, the potential for hexavalent chromium or thallium to leach to groundwater could not be ruled out.

4.1 Thallium

At AOC 14, only one sample had a detectable concentration of thallium (2.2 mg/kg). This single detection prompted the additional analysis. The simulated leaching concentrations of thallium were likely due to the following three factors:

- Nondetects in the initial concentration profile were input as one-half of the detection limit, resulting in a non-zero concentration and mass throughout the simulated vadose zone. Further, the reporting limit for thallium in AOC 14 samples was as high as 22 mg/kg; therefore, the assumed concentration for that interval was elevated.
- Thallium has a very low K_d (dissociation constant)[2] of 3.2 milliliters per gram.
- The background upper tolerance limit for thallium in groundwater is very low at 0.908 micrograms per liter.

Additional data are not needed for thallium; however, further refinement of the vadose leaching zone model and assumptions are proposed.

4.2 Hexavalent Chromium

The simulated leaching concentration of hexavalent chromium at AOC 14 is likely due to the fact that the initial screening approach assigned the maximum concentration found at each

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[2] The distribution coefficient describes how strongly a chemical adsorbs to soil solids.

depth interval across the entire interval, even though many other samples with far lower concentrations were observed at each level.

Additional data are needed to better define the lateral extent of hexavalent chromium. The model will be refined by discretizing the area spatially to more realistically simulate vadose zone contaminant concentrations. Additional proposed soil borings described in Decision 1 will also be used to support the model refinement.

The vertical extent of hexavalent chromium is fully defined at AOC 14, with no exceedances of BTVs at the deepest samples collected; therefore, a current threat to groundwater has been ruled out.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Summary Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study (CMS/FS). The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fenceline include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite).
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil-washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies).
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- Volumes of white powder and debris.

The following is a summary of available data for AOC 14 that is currently available to support CMS/FS:

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The results of COPCs and COPECs are shown in Figure C7-1 and Figures C7-3 to C7-6, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLCs). The maximum concentrations of these metals were compared to the TTLCs, and none of the metals in AOC 14 exceeded the TTLCs, as shown in Table C7-14. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLC), and only one of the metals concentrations in AOC 14 (total chromium at 74.9 mg/kg at RR-6 at 0 feet bgs) exceeded 10 times STLC, as discussed in Table C7-14. Because there was only one exceedance, and the concentration is relatively close to 10 times the STLC, this detection is not considered a data gap. Finally, soil metals concentrations were also compared the TCLP and none of the metals detected exceeded 20 times the TCLP, as shown in Table C4-14. Additional data regarding potential COPC/COPEC leachability include SPLP analysis for total and hexavalent chromium, as shown in Table C7-2. SPLP analysis was conducted only for soil samples (no white powder or debris samples were tested using SPLP).

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 investigation was limited to grain size analysis only. Specific soil physical properties data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 of the Data Gaps Report.

5.4 Surface and Subsurface Features

While there is extensive information regarding surface and subsurface features at AOC 14, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for AOC 14. However, subsurface utilities, including gas transmission pipelines and any culverts or other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives, and prepare construction specifications.

5.5 Volumes of White Powder and Debris

Preliminary mapping has been conducted to identify the extent and type of debris present in AOC 14; findings of this mapping are presented in Section 3.0 and in Appendix B to this Data Summary Report. Additional soil physical parameter data are needed to support the CMS/FS.

6.0 Summary of Data Gaps Evaluation and Potential Phase 2 Soil Sample Locations to Fill the Identified Gaps

Based on the Part A DQO, data gaps were identified for three of the four decisions and are summarized below by decisions:

- **Decision 1 – Nature and Extent** – The following data gaps were identified to resolve this decision:
  - Data gap #1 – Western extent of benzo(a)pyrene, metals, and pesticides contamination in the southwestern corner of AOC 14.

  - Data gap #2 – Nature and extent of contamination in the newly identified burn area west of AOC14 and the newly identified debris area east of AOC 14.
  - Data gap #3 – Nature and extent of contamination in the newly identified debris area in the MW-24 bench area.
- **Decision 2 (Data Sufficient to Estimate Representative Exposure Point Concentrations)**: No data gap was identified for this decision.
- **Decision 3 (Potential Threat to Groundwater from Residual Soil Concentrations)** – No data gap was identified for this decision.
- **Decision 4 (Data Sufficient to Estimate Soil Properties and Contaminant Distribution in Support of the CMS/FS) –** the following data gap was identified to resolve this decision**:**
  - Data gap #4 – Soil physical parameters to support the corrective measures study/ feasibility study.

In an effort to reduce intrusive sampling, a portable X-ray fluorescence (XRF) analyzer will be used to assist with identifying possible sample locations in debris areas on the slope east of AOC 14 (Data Gap #2). Up to 20 XRF samples will be collected in the debris area. Corrected XRF results will be compared to applicable screening levels on Data Gap Evaluation Report Table 3-1 on a point-by-point basis. (For field screening purposes, XRF concentration readings will be adjusted using least squares regression equation calculated from the RCRA facility investigation/remedial investigation samples analyzed in the lab and by the XRF.) If the applicable screening levels are not exceeded, no further sampling will occur at that location. However, if applicable screening levels are exceeded, soil samples will be collected at 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet below ground surface at that location and will be submitted to the laboratory for analysis for hexavalent chromium, PAHs, Title 22 metals, and asbestos.

Table C7-15 summarizes the potential Phase 2 sample locations, depths, rationale for each location, and analytes. Potential Phase 2 sample locations are also shown in Figures C7-1 and C7-3 through Figure C7-7. The potential Phase 2 sample locations are needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

6.1 Access Restrictions

AOC 14 – Railroad Debris Site is currently bounded by the Burlington Northern Santa Fe railroad tracks to the north, I-40 to the south, Bat Cave Wash to the west, and the former access road to the location to the east. The bottom of Bat Cave Wash is located approximately 100 feet below AOC 14 and I-40 is approximately 10 feet below AOC 14. Access to the site is limited to foot traffic only crossing over the railroad tracks, which requires a Burlington Northern Santa Fe permit. Heavy equipment would need to be craned onto the site from I-40.

7.0 MW-24 Bench Evaluation

As discussed above, an employee identified the current AOC 14 as a location where waste was disposed of and burned; however, the employee also indicated the area north of the compressor station and south of I-40, informally known as the MW-24 bench (named because monitoring well MW-24 is located in this area), was also used as a potential waste disposal area. Miscellaneous construction debris is present in that MW-24 bench area. In January 2008, during trenching activities in the MW-24 bench area associated with installation of a control panel related to the upland *in-situ* pilot test, debris consisting mostly of treated wood, concrete, and scrap steel/tin (including a possible fragment of a storage tank) were encountered. The evaluation of MW-24 Bench area will consist of the following:

1. Asbestos Survey of debris
2. Debris mapping of large debris across the area.
3. Geophysical surveying across the bench area to further characterize buried waste.
4. XRF analyzer will be used to assess surface soils in the bench area. Figure C7-7 shows a 50-foot grid over the bench area; one XRF samples will be collected from each grid cell (not shown on figure). Corrected XRF results will be compared to applicable screening levels on Data Gap Report Table 3-1 on a point-by-point basis. (For field screening purposes, XRF concentration readings will be adjusted using least squares regression equation calculated from the RCRA facility investigation/remedial investigation samples analyzed in the lab and by the XRF.)
5. Up to 18 soil borings (AOC14-26 through AOC14-43) will also be advanced in the 50-foot grid in the bench area. Soil borings may be limited to areas of anomalies identified by geophysical and to areas with elevated XRF concentrations. Soil samples will be collected at 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs at each grid point and will be submitted to the laboratory for analysis for pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, and pH.

In addition, DTSC directed PG&E (email date March 24, 2011) to:

- Collect soil samples in an area that DTSC identified as a potential burn waste outcrop along the western ramp up from Bat Cave Wash.
- Define the lateral and vertical extents of waste and any associated contamination at the MW-24 Bench waste pit observed in January 2008 during implementation of the Upland In-situ Pilot Study.

PG&E is proposing to collect three surface soil samples in the potential burn waste outcrop, soil samples will be analyzed for hexavalent chromium, Title 22 metals, TPH, PCBs, and dioxins/furans. Trenching is proposed to define lateral and vertical extent of buried debris discovered during the Upland In-site Pilot study. The trenching may extend up to 20 feet below ground surface and will not extend beyond the boundaries of the MW-24 Bench area shown on FigureC7-7. Five soil samples will be collected from the bottom of the trenches (one centered in the former trench and laterally at the end reaches of debris). The soil samples will be analyzed for, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, and pH.

8.0 References

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Tables

TABLE C7-1
Conceptual Site Model, AOC 14 – Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Results,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Disposal of Debris	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]
Burned Material	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil	Wind erosion and atmospheric dispersion of surface soil

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C7-2

Synthetic Precipitation Leaching Procedure (SPLP) Extraction Results
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			SPLP Results in mg/L	
Location	**Sample Date**	**Depth (ft bgs)**	**Hexavalent Chromium**	**Chromium (total)**
AOC14				
AOC14-13	10/01/08	0.5-1.5	0.0059 J	0.0094
AOC14-2	09/30/08	5-6	0.0436 J	0.0425

Notes:

ft bgs	feet below ground surface
mg/L	milligrams per liter
J	concentration estimated by laboratory or data validation

TABLE C7-3

Sample Results: Metals

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
24debris-01	01/18/08[7]	Unknown	N	1.3	4.1	89	ND (0.1)	0.49	9.6	0.43	2.9	17	66	ND (0.1) *	0.42	7.3	8	ND (0.25)	ND (1)	16	26
24debris-02	01/18/08[7]	Unknown	N	3.8	0.89	43	ND (0.1)	ND (0.1)	190	ND (0.4)	0.7	3.9	830	ND (0.1) *	0.56	1.4	8.9	ND (0.25)	ND (1)	1.9	170
24debris-03	01/18/08[7]	Unknown	N	ND (0.4) *	4.6	45	ND (0.1)	0.74	16	ND (0.4)	2.7	5.1	20	ND (0.1) *	1.5	100	6.6	ND (0.25)	ND (1)	120	41
24soil-01	01/31/08	Unknown	N	ND (0.4) *	3.1	130	ND (0.1)	0.71	15	ND (0.4)	3.5	7.2	6.4	ND (0.1) *	0.63	6.8	6.2	ND (0.25)	ND (1)	17	16
24soil-02	01/31/08	Unknown	N	ND (0.4) *	2.9	89	ND (0.1)	0.3	15	ND (0.4)	3.4	9.1	8.7	ND (0.1) *	0.7	7.2	1.4	ND (0.25)	ND (1)	18	17
AOC14-1	09/30/08	0 - 0.5	N	ND (2) *	4.8	190 J	ND (2) *	ND (1)	25	0.841	7.2	11	18	ND (0.1) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	30	70
	09/30/08	2 - 3	N	ND (2) *	4.8	220	ND (2) *	ND (1)	25	ND (0.412)	8.4	8.5	8.7	ND (0.1) *	ND (2) *	11	ND (1)	ND (2)	ND (4.1) *	36	47
	09/30/08	5 - 6	N	ND (2) *	2.2	180	ND (1) *	ND (1)	27	ND (0.412)	8.5	9.5	2.3	ND (0.1) *	1.6	12	ND (2) *	ND (1)	ND (2)	34	38
	09/30/08	9 - 10	N	ND (2) *	2.3	160	ND (1) *	ND (1)	17	ND (0.403)	7.4	8.2	2.7	ND (0.099) *	ND (1)	11	ND (1)	ND (1)	ND (2)	31	34
	09/30/08	14 - 15	N	ND (2) *	2.7	140	ND (1) *	ND (1)	18	ND (0.412)	8.6	12	2.1	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	29	34
AOC14-2	09/30/08	0 - 0.5	N	ND (2) *	5.8	190	ND (2) *	ND (1)	28	0.768	6.8	44	18	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4.1) *	28	49
	09/30/08	2 - 3	N	ND (2.1) *	11	130	ND (11) *	ND (1.1) *	42	1.04	ND (11)	ND (21) *	7.6	ND (0.11) *	ND (11) *	12	ND (1.1)	ND (11) *	ND (21) *	25	34
	10/01/08[6]	3 - 3.25	N	ND (2.3) *	15	120	ND (11) *	ND (1.1) *	26	2.16	ND (11)	ND (23) *	ND (1.1)	ND (0.11) *	ND (11) *	4.5	ND (1.1)	ND (11) *	ND (23) *	13	ND (11)
	09/30/08	5 - 6	N	ND (2.1) *	8.5	150	ND (5.2) *	ND (1)	42	1.32	6.6	19	21	ND (0.11) *	ND (5.2) *	13	ND (1)	ND (5.2) *	ND (10) *	27	51
	09/30/08	9 - 10	N	ND (2) *	2.6	180	ND (1) *	ND (1)	21	ND (0.405)	8.5	16 J	1.8	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	32	40
	09/30/08	9 - 10	FD	ND (2) *	2.6	180	ND (1) *	ND (1)	21	ND (0.404)	8.4	11 J	1.9	ND (0.1) *	ND (1)	10	ND (2) *	ND (1)	ND (2)	33	41
	09/30/08	14 - 15	N	ND (2) *	3.1	120	ND (1) *	ND (1)	15	ND (0.407)	7.2	9.1	2.1	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	28	35
AOC14-3	10/01/08	0 - 0.5	N	ND (2) J*	3.7	140	ND (1) *	ND (1)	31	ND (0.403)	7.5	12	8.4	ND (0.1) *	1.6	11	ND (1)	ND (1)	ND (2)	30	52
	10/01/08	2 - 3	N	ND (2) *	3.3	90	ND (1) *	ND (1)	26	ND (0.405)	8.1	13	6.4	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	34	46
	10/01/08	5 - 6	N	ND (2) *	3.4	130	ND (1) *	ND (1)	32	0.877	6.6	11	9	ND (0.1) *	2.1	11	ND (1)	ND (1)	ND (2)	26	40
	10/01/08	9 - 10	N	ND (2) *	2.1	140	ND (1) *	ND (1)	19	ND (0.404)	7.5	7.1	2	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	30	33
	10/01/08	14 - 15	N	ND (2) *	2.7	110	ND (1) *	ND (1)	17	ND (0.403)	7.6	12	2.2	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	29	32
AOC14-4	10/01/08	0 - 0.5	N	ND (2) *	4.5	99	ND (1) *	ND (1)	13	ND (0.402)	4.3	7.3	7.2	ND (0.1) *	ND (1)	7.1	ND (1)	ND (1)	ND (2)	20	31
	10/01/08	2 - 3	N	ND (2) *	4.5	130	ND (1) *	ND (1)	16	ND (0.405)	4.4	6.2	3.5	ND (0.1) *	1.5	7.6	ND (1)	ND (1)	ND (2)	21	23
	10/01/08	5 - 6	N	ND (2) *	4.1	110	ND (1) *	ND (1)	16	ND (0.403)	4.4	5.3	3.5	ND (0.1) *	1.5	7.3	ND (1)	ND (1)	ND (2)	21	23
	10/01/08	9 - 10	N	ND (2) *	2.9	86	ND (1) *	ND (1)	8.2	ND (0.403)	3.4	2.9	2.8	ND (0.1) *	1.2	4.8	ND (1)	ND (1)	ND (2)	19	16
	10/01/08	9 - 10	FD	ND (2) *	3.1	96	ND (1) *	ND (1)	8.1	ND (0.404)	3.3	2.7	2.9	ND (0.1) *	1.2	4.8	ND (1)	ND (1)	ND (2)	18	16
	10/01/08	14 - 15	N	ND (2) *	3.4	130	ND (1) *	ND (1)	15	ND (0.406)	6.4	7.9	2.2	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	27	29
AOC14-5	10/02/08	0 - 0.5	N	ND (2) *	6.8	300	ND (2) *	ND (1)	15	ND (0.403)	6.8	9.6	5.3	ND (0.099) *	ND (2) *	10	ND (1)	ND (2)	ND (4) *	29	35
	10/02/08	2 - 3	N	ND (2) *	9	240	ND (2) *	ND (1)	17	ND (0.405)	6.1	16	16	ND (0.1) *	ND (2) *	13	ND (1)	ND (2)	ND (4) *	28	46
	10/02/08	5 - 6	N	ND (2) *	3.2	240	ND (1) *	ND (1)	15	ND (0.404)	7.3	7.9	2.7	ND (0.099) *	ND (1)	10	ND (1)	ND (1)	ND (2)	28	35
	10/02/08	9 - 10	N	ND (2) *	2.8	110	ND (1) *	ND (1)	15	ND (0.403)	7.6	9.5	2.3	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	30	35
	10/02/08	14 - 15	N	ND (2) *	3.2	90	ND (1) *	ND (1)	16	ND (0.406)	6.8	7.3	2.2	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	28	30
AOC14-6	10/02/08	0 - 0.5	N	ND (2) *	5	120	ND (1) *	ND (1)	11	ND (0.402)	4	6.1	7.4	ND (0.1) *	1.2	7	ND (1)	ND (1)	ND (2)	20	35
	10/02/08	2 - 3	N	ND (2) *	6	210	ND (2) *	ND (1)	23	ND (0.403)	7.8	9.5	3.3	ND (0.1) *	2.4	11	ND (1)	ND (2)	ND (4) *	34	37
	10/02/08	5 - 6	N	ND (2) *	3.4	140	ND (1) *	ND (1)	18	ND (0.405)	7.7	9.1	2.3	ND (0.099) *	ND (1)	11	ND (1)	ND (1)	ND (2)	31	35
	10/02/08	9 - 10	N	ND (2) *	2.6	120	ND (1) *	ND (1)	18	ND (0.406)	8.3	9.6	2.4	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	33	39
	10/02/08	9 - 10	FD	ND (2) *	2.8	110	ND (1) *	ND (1)	18	ND (0.406)	8.4	9.7	2.3	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	33	39
	10/02/08	14 - 15	N	ND (2) *	3.3	110	ND (1) *	ND (1)	16	ND (0.402)	5.9	7.2	2.2	ND (0.1) *	ND (1)	9.3	ND (1)	ND (1)	ND (2)	25	28
AOC14-7	10/02/08	0 - 0.5	N	ND (2) *	5	160	ND (1) *	ND (1)	15	ND (0.404)	4.7	7.4	6.1	ND (0.099) *	ND (1)	9.6	ND (1)	ND (1)	ND (2)	25	31
	10/02/08	2 - 3	N	ND (2) *	5	170	ND (1) *	ND (1)	13	ND (0.405)	6.1	10	7.1	ND (0.1) *	ND (1)	9.3	ND (1)	ND (1)	ND (2)	23	30
	10/02/08	5 - 6	N	ND (2) *	5.3	210	ND (2) *	ND (1)	18	ND (0.405)	7.5	10	4.8	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4) *	30	35
	10/02/08	9 - 10	N	ND (2) *	3.9	120	ND (1) *	ND (1)	26	ND (0.404)	10	14	2.9	ND (0.1) *	ND (1)	16	ND (1)	ND (1)	ND (2)	38	46
	10/02/08	14 - 15	N	ND (2) *	3.7	150	ND (1) *	ND (1)	25	ND (0.401)	6.5	9.9	3.5	ND (0.1) *	2.4	11	ND (1)	ND (1)	ND (2)	25	32

TABLE C7-3

Sample Results: Metals

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC14-8	10/02/08	0 - 0.5	N	ND (2) *	6.8	110	ND (2) *	ND (1)	12	ND (0.403)	4.9	7.9	6.4	ND (0.099) *	ND (2) *	9.4	ND (1)	ND (2)	ND (4) *	24	30
	10/02/08	2 - 3	N	ND (2) *	6.9	93	ND (2) *	ND (1)	15	ND (0.406)	5.5	8.8	6.8	ND (0.1) *	ND (2) *	11	ND (1)	ND (2)	ND (4) *	26	31
	10/02/08	5 - 6	N	ND (2) *	2.8	210	ND (1) *	ND (1)	18	ND (0.404)	8.6	6.6	2.4	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	35	39
	10/02/08	9 - 10	N	ND (2) *	3.3	89	ND (1) *	ND (1)	19	ND (0.404)	8.5	12	2.7	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	33	38
	10/02/08	9 - 10	FD	ND (2) *	3.3	92	ND (1) *	ND (1)	19	ND (0.404)	8.5	10	3	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	35	39
	10/02/08	14 - 15	N	ND (2.1) J*	4.7	73 J	ND (1) *	ND (1)	23 J	ND (0.413)	9.7	18	3.7	ND (0.1) *	ND (1)	16	ND (1)	ND (1)	ND (2.1)	36 J	42 J
AOC14-9	10/01/08	0 - 0.5	N	ND (2) *	5.3	140	ND (1) *	ND (1)	13	ND (0.404)	4.8	7.6	5.4	ND (0.1) *	ND (1)	9.5	ND (1)	ND (1)	ND (2)	23	28
	10/01/08	2 - 3	N	ND (2) *	6.3	170	ND (2) *	ND (1)	12	ND (0.407)	4.8	7.2	6	ND (0.1) *	ND (2) *	9.1	ND (1)	ND (2)	ND (4) *	23	29
	10/01/08	5 - 6	N	ND (2) *	3	61	ND (1) *	ND (1)	9	ND (0.4)	2.8	4.1	2.8	ND (0.1) *	ND (1)	5	ND (1)	ND (1)	ND (2)	13	13
	10/01/08	9 - 10	N	ND (2) *	4.4	220	ND (1) *	ND (1)	15	ND (0.405)	5.5	7.6	3.6	ND (0.1) *	ND (1)	9.1	ND (1)	ND (1)	ND (2)	23	29
	10/01/08	14 - 15	N	ND (2) J*	6.2	120 J	ND (2) *	ND (1)	13	ND (0.406)	5.9	8.2	5	ND (0.1) *	ND (2) *	9.4	ND (1)	ND (2)	ND (4.1) *	22	32
AOC14-10	10/01/08	0 - 0.5	N	ND (2) *	3.6	69	ND (1) *	ND (1)	10	ND (0.401)	2.4	3.5	3.5	ND (0.1) *	ND (1)	4.2	ND (1)	ND (1)	ND (2)	13	14
	10/01/08	2 - 3	N	ND (2) *	2.9	65	ND (1) *	ND (1)	11	ND (0.401)	2.4	3.1	2.9	ND (0.1) *	ND (1)	3.9	ND (1)	ND (1)	ND (2)	11	14
	10/01/08	5 - 6	N	ND (2) *	3.3	110	ND (1) *	ND (1)	12	ND (0.403)	2.9	4.6	3.4	ND (0.1) *	ND (1)	5.2	ND (1)	ND (1)	ND (2)	14	17
	10/01/08	5 - 6	FD	ND (2) *	3.1	97	ND (1) *	ND (1)	12	ND (0.402)	2.6	4.1	3.1	ND (0.1) *	ND (1)	4.6	ND (1)	ND (1)	ND (2)	13	15
	10/01/08	9 - 10	N	ND (2) *	5	81	ND (1) *	ND (1)	11	ND (0.409)	4.5	7.1	5.9	ND (0.1) *	ND (1)	8.7	ND (1)	ND (1)	2.2	21	28
	10/01/08	14 - 15	N	ND (2) *	7.1	110	ND (4) *	ND (1)	9.8	ND (0.404)	ND (4)	ND (8.1)	2.6	ND (0.1) *	ND (4) *	4.6	ND (1)	ND (4)	ND (8.1) *	13	13
AOC14-11	10/01/08	5 - 6	N	ND (2) *	5.5	140	ND (1) *	ND (1)	15	ND (0.406)	5.9	7.3	4.2	ND (0.1) *	1	9.9	ND (1)	ND (1)	ND (2)	28	28
	10/01/08	9 - 10	N	ND (2) *	2.4	140	ND (1) *	ND (1)	18	ND (0.405)	8.4	13	2	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	34	37
	10/01/08	14 - 15	N	ND (2) *	4	80	ND (1) *	ND (1)	20	ND (0.41)	8.5	9	3	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	35	39
AOC14-12	09/30/08	5 - 6	N	ND (2) *	3.2	190	ND (1) *	ND (1)	27	ND (0.406)	7.5	8.4	3.2	ND (0.1) *	2.4	9.8	1.5	ND (1)	ND (2)	29	36
	09/30/08	9 - 10	N	ND (2) *	2.3	150	ND (1) *	ND (1)	17	ND (0.405)	7.4	7.7	3	ND (0.1) *	ND (1)	11	1.2	ND (1)	ND (2)	29	37
	09/30/08	14 - 15	N	ND (2) *	3.2	140	ND (1) *	ND (1)	20	ND (0.401)	7.7	9.8	2.8	ND (0.1) *	1.2	13	ND (1)	ND (1)	ND (2)	29	35
AOC14-13	10/01/08[7]	0.5 - 1.5	N	ND (2) *	18	160	ND (10) *	ND (1)	63	0.487	ND (10)	33	16	ND (0.1) *	98	57	ND (1)	ND (10) *	ND (20) *	ND (10)	39
	09/30/08	5 - 6	N	ND (2) *	3.3	130	ND (1) *	ND (1)	22	ND (0.405)	5.8	11	3.6	ND (0.099) *	2	9	ND (1)	ND (1)	ND (2)	21	30
	09/30/08	9 - 10	N	ND (2) *	1.9	140	ND (1) *	ND (1)	16	ND (0.405)	7.7	7.2	2.1	ND (0.1) *	ND (1)	10	1.6	ND (1)	ND (2)	28	34
	09/30/08	14 - 15	N	ND (2) *	3.2	110	ND (1) *	ND (1)	16	ND (0.409)	7	11	2.2	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	29	33
	09/30/08	14 - 15	FD	ND (2) *	2.9	100	ND (1) *	ND (1)	16	ND (0.409)	7.5	13	2.4	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	29	33
AOC14-SS1	10/01/08	0 - 0.5	N	ND (2) *	5	150	ND (1) *	ND (1)	15	ND (0.405)	5.2	9.4	7.2	ND (0.1) *	ND (1)	8.8	ND (1)	ND (1)	ND (2)	23	34
	10/01/08	2 - 3	N	ND (2) *	7.2	150	ND (2) *	ND (1)	22	0.456	5.7	15	11	0.25	ND (2) *	13	ND (1)	ND (2)	ND (4) *	23	32
	10/01/08	5 - 6	N	ND (2) *	6	240	ND (2) *	ND (1)	18	ND (0.406)	6.7	15	4.8	ND (0.1) *	ND (2) *	12	ND (1)	ND (2)	ND (4.1) *	25	35
	10/01/08	9 - 10	N	ND (2) *	2.8	120	ND (1) *	ND (1)	17	ND (0.402)	7	7.4	1.6	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	26	33
	10/01/08	14 - 15	N	ND (2) *	3.1	110	ND (1) *	ND (1)	13	ND (0.406)	6.7	9	2.6	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	27	31
AOC14-SS2	10/01/08	0 - 0.5	N	ND (2) *	4.8	160	ND (1) *	ND (1)	14	ND (0.403)	4.8	8.8	4.8	ND (0.1) *	1.1	10	ND (1)	ND (1)	ND (2)	24	27
	10/01/08	2 - 3	N	ND (2) *	7	160	ND (2) *	ND (1)	14	ND (0.407)	4.9	7.6	5.5	ND (0.1) *	ND (2) *	9.4	ND (1)	ND (2)	ND (4) *	22	29
	10/01/08	5 - 6	N	ND (2) *	7	150	ND (2) *	ND (1)	10	ND (0.405)	4.2	6.5	5.5	ND (0.1) *	ND (2) *	8.2	ND (1)	ND (2)	ND (4.1) *	19	25
	10/01/08	9 - 10	N	ND (2) *	4.6	130	ND (1) *	ND (1)	9.5	ND (0.407)	4.2	6.7	5.3	ND (0.1) *	ND (1)	8.1	ND (1)	ND (1)	ND (2)	18	24
	10/01/08	14 - 15	N	ND (2) *	3.3	120	ND (1) *	ND (1)	17	ND (0.404)	7	9.6	3	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	27	32
	10/01/08	14 - 15	FD	ND (2) *	3	130	ND (1) *	ND (1)	18	ND (0.405)	7.3	9.6	3	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	28	33
AOC14-SS3	10/02/08	0 - 0.5	N	ND (2) *	5.4	190	ND (1) *	ND (1)	17	ND (0.401)	7.1	11	3.8	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	30	35
	10/02/08	2 - 3	N	ND (2) *	4	180	ND (1) *	ND (1)	18	ND (0.402)	8.3	9.5	2.7	ND (0.1) *	ND (1)	12	ND (1)	ND (1)	ND (2)	33	36
	10/02/08	5 - 6	N	ND (2) *	2.9	100	ND (1) *	ND (1)	12	ND (0.403)	5.4	6.7	2	ND (0.1) *	ND (1)	7.2	ND (1)	ND (1)	ND (2)	23	29
	10/02/08	9 - 10	N	ND (2) *	3	160	ND (1) *	ND (1)	16	ND (0.404)	7	8.4	2.2	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	31	32
	10/02/08	14 - 15	N	ND (2) *	3.2	89	ND (1) *	ND (1)	17	ND (0.404)	8.9	9.5	2.4	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	34	35

TABLE C7-3

Sample Results: Metals

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level[1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels[2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL[3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values[4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background[5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC14-SS4	10/02/08	0 - 0.5	N	ND (2) *	5	190	ND (1) *	ND (1)	15	ND (0.402)	6.3	8.1	5.1	ND (0.1) *	ND (1)	9.6	ND (1)	ND (1)	ND (2)	27	31
	10/02/08	2 - 3	N	ND (2) *	5	130	ND (1) *	ND (1)	14	ND (0.401)	4.4	6.9	10	ND (0.1) *	ND (1)	7	ND (1)	ND (1)	ND (2)	20	27
	10/02/08	5 - 6	N	ND (2) *	4.5	120	ND (1) *	ND (1)	16	ND (0.403)	4.1	6.4	11	ND (0.1) *	1.5	6.7	ND (1)	ND (1)	ND (2)	19	27
	10/02/08	9 - 10	N	ND (2) *	3	120	ND (1) *	ND (1)	16	ND (0.404)	8	11	2.3	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	31	32
	10/02/08	14 - 15	N	ND (2) *	2.7	120	ND (1) *	ND (1)	17	ND (0.405)	8.5	11	3	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	32	37
	10/02/08	14 - 15	FD	ND (2) *	2.5	120	ND (1) *	ND (1)	17	ND (0.405)	8.6	8.5	1.6	ND (0.1) *	ND (1)	11	ND (1)	ND (1)	ND (2)	32	34
S1-20	11/01/98	3	N	---	---	---	---	---	31.8	0.7	---	15.7	---	---	---	14	---	---	---	---	49.4
S2-6	11/01/98[6]	3	N	---	---	---	---	---	45.5	12	---	1.8	---	---	---	0.57	---	---	---	---	14.5
	11/01/98	5	N	---	---	---	---	---	39.9	1.8	---	9.7	---	---	---	9.4	---	---	---	---	35.7
S2-62	11/01/98[6]	2	N	---	---	---	---	---	32	1	---	4.1	---	---	---	1.8	---	---	---	---	8.4
	11/01/98[8]	3	N	1.1 J	2.6	72.2	ND (0.89) *	ND (0.89)	72.7	---	5.9	22.2	7.9	0.046 J	0.86 J	47	0.99 J	ND (2.2)	ND (22) *	39.2	ND (29.3)
	11/01/98	4	N	---	---	---	---	---	21.9	ND (0.5)	---	11.5	---	---	---	10.2	---	---	---	---	39.8
S2-130	11/01/98	1	N	---	---	---	---	---	22.1	ND (0.5)	---	10.6	---	---	---	10.8	---	---	---	---	34.5
S3-15	11/01/98	2	N	---	---	---	---	---	13.8	ND (0.5)	---	9.4	---	---	---	7.5	---	---	---	---	24.1
	11/01/98	4	N	---	---	---	---	---	12.1	ND (0.5)	---	11	---	---	---	9.6	---	---	---	---	29.2
S3-72	11/01/98[6]	1	N	---	---	---	---	---	18.7	ND (0.5)	---	6.7	---	---	---	5.9	---	---	---	---	27
	11/01/98	2	N	---	---	---	---	---	11.3	ND (0.5)	---	8	---	---	---	8.6	---	---	---	---	28.9
S3-120	11/01/98	1	N	---	---	---	---	---	12.1	ND (0.5)	---	4.2	---	---	---	4.3	---	---	---	---	18
S4-4	11/01/98[6]	4	N	---	---	---	---	---	23.4	15.4	---	3.2	---	---	---	0.43 J	---	---	---	---	1.9
	11/01/98	6	N	---	---	---	---	---	13.7	1	---	10.3	---	---	---	9.8	---	---	---	---	32.6
S4-95	11/01/98[6]	2	N	---	---	---	---	---	10.3	ND (0.5)	---	2.5	---	---	---	4.3	---	---	---	---	4.3
	11/01/98	3	N	---	---	---	---	---	14.9	ND (0.5)	---	8.3	---	---	---	8.8	---	---	---	---	27
S4-160	11/01/98	2	N	---	---	---	---	---	25	0.5	---	11.8	---	---	---	10.9	---	---	---	---	38.2
S8-23	11/01/98[8]	3	N	0.43 J	4.3	154	0.19 J	ND (0.83)	28.7	---	8.4	14.3	12.5	0.092 J	0.42 J	21	0.59 J	ND (2.1)	ND (21) *	36.4	57
S8-30	11/01/98	3	N	---	---	---	---	---	12.8	0.5	---	10.8	---	---	---	9.4	---	---	---	---	40.9
GS-1	11/01/98[6]	0	N	---	---	---	---	---	33.7	0.59	---	2.2	---	---	---	0.28 J	---	---	---	---	31.3
GS-2	11/01/98[6]	0	N	---	---	---	---	---	21.9	ND (0.5)	---	8.2	---	---	---	6	---	---	---	---	32.7
RR-1	02/02/00	0	N	---	---	---	---	---	23.4	ND (0.5)	---	15.6	---	---	---	15.8	---	---	---	---	44
RR-2	02/02/00	0	N	---	---	---	---	---	16.1	ND (0.5)	---	13.8	---	---	---	12.3	---	---	---	---	37.5
RR-3	02/02/00	0	N	---	---	---	---	---	18.3	ND (0.5)	---	11.6	---	---	---	13	---	---	---	---	35
RR-4	02/02/00[6]	0	N	---	---	---	---	---	19.4	0.6	---	19.2	---	---	---	0.92	---	---	---	---	27.1
RR-5	02/02/00	0	N	---	---	---	---	---	39.5	5.8	---	7.1	---	---	---	0.33	---	---	---	---	34.1
RR-6	02/02/00	0	N	---	---	---	---	---	74.9	4.8	---	7.5	---	---	---	0.39	---	---	---	---	243
RR-7	02/02/00[6]	0	N	---	---	---	---	---	28.6	ND (0.51)	---	9.7	---	---	---	10.4	---	---	---	---	35.1
RR-8	02/02/00	0	N	---	---	---	---	---	28.9	ND (0.51)	---	9.9	---	---	---	7.4	---	---	---	---	29.8
RR-9	02/02/00[6]	0	N	---	---	---	---	---	19.6	2.7	---	27.9	---	---	---	2.2	---	---	---	---	15.4
RR-10	02/02/00	0	N	---	---	---	---	---	18.8	ND (0.51)	---	12.9	---	---	---	11.6	---	---	---	---	36.3
RR-11	02/02/00	0	N	---	---	---	---	---	18.1	ND (0.51)	---	20.2	---	---	---	13.4	---	---	---	---	47.5
RR-12	02/02/00[6]	0	N	---	---	---	---	---	17.5	ND (0.5)	---	3.8	---	---	---	1.5	---	---	---	---	11.3

TABLE C7-3

Sample Results: Metals
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] White powder sample

[7] debris sample

[8] black sandy material

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C7-4

Sample Results: Contract Laboratory Program Inorganics

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
AOC14-1	09/30/08	0 - 0.5	N	8,700	48,000	20,000	8,500	270	2,700	850	ND (1.02) *
AOC14-2	09/30/08	0 - 0.5	N	8,500	37,000	19,000	7,200	270	2,600	630	ND (1.02) *
AOC14-3	10/01/08	0 - 0.5	N	8,800	20,000	20,000	7,200	290	2,800 J	350	ND (1.01) *
AOC14-4	10/01/08	0 - 0.5	N	5,400	12,000	11,000	4,300	170	1,600	340	ND (1.01) *
AOC14-5	10/02/08	0 - 0.5	N	9,000	31,000	17,000	7,000	260	2,500	390	ND (1.01) *
AOC14-7	10/02/08	0 - 0.5	N	6,800	23,000	13,000	6,100	250	1,500	600	ND (1.01) *
AOC14-8	10/02/08	0 - 0.5	N	6,500	32,000	14,000	6,600	260	1,400	340	ND (1.01) *
AOC14-10	10/01/08	0 - 0.5	N	3,000	11,000	6,800	2,600	120	690	210	ND (1) *
S1-20	11/01/98	3	N	---	26,300	23,100	8,330	---	2,250	ND (410)	---
S4-4	11/01/98[6]	4	N	---	379,000	425	23,000	---	89.6 J	6,590	---

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[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] White powder sample

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C7-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
24debris-01	01/18/08[7]	Unknown	N	---	ND (3,300)	ND (3,300)	ND (3,300)	ND (3,300)	ND (3,300) *	ND (3,300) *	ND (3,300) *	ND (3,300)	ND (3,300) *	ND (3,300)	ND (3,300) *	ND (3,300)	ND (3,300)	ND (3,300) *	ND (3,300)	ND (3,300)	ND (3,300)	ND	ND	ND (2,900) *
24debris-02	01/18/08[7]	Unknown	N	---	ND (3,300)	ND (3,300)	ND (3,300)	ND (3,300)	ND (3,300) *	ND (3,300) *	ND (3,300) *	ND (3,300)	ND (3,300) *	ND (3,300)	ND (3,300) *	ND (3,300)	ND (3,300)	ND (3,300) *	ND (3,300)	ND (3,300)	ND (3,300)	ND	ND	ND (2,900) *
24debris-03	01/18/08[7]	Unknown	N	---	ND (160,000)	ND (160,000)	ND (160,000)	ND (160,000)	ND (160,000) *	ND (160,000) *	ND (160,000) *	ND (160,000)	ND (160,000) *	ND (160,000) *	ND (160,000) *	ND (160,000)	ND (160,000)	ND (160,000) *	ND (160,000) *	ND (160,000)	ND (160,000)	ND	ND	ND (140,000) *
24soil-01	01/31/08	Unknown	N	---	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330) *	ND (330)	ND (330)	ND (330)	ND (330)	ND (330) *	ND (330)	ND (330)	ND (330)	ND (330)	450	ND (330)	450	ND	290
24soil-02	01/31/08	Unknown	N	---	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330) *	ND (330)	ND (330)	ND (330)	ND (330)	ND (330) *	370	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND	370	290
AOC14-1	09/30/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.8	6.1	8.2	10	8.1	9.6	ND (5.1)	9.2	ND (5.1)	5.3	ND (5.1)	ND (5.1)	9.4	ND	72	9.8
	09/30/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-2	09/30/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	11	ND (5.1)	ND (5.1)	ND (5.1)	5.9	ND (5.1)	ND (5.1)	ND (5.1)	5.2	5.9	5.2	23	4.5
	09/30/08	2 - 3	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND	ND	ND (4.7)
	10/01/08[6]	3 - 3.25	N	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND (5.7) J	ND	ND	ND (5)
	09/30/08	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	9.5	8.7	12	12	12	12	ND (5.2)	12	ND (5.2)	7.6	ND (5.2)	ND (5.2)	13	ND	99	14
	09/30/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	9 - 10	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-3	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	15	10	15	7.1	12	18	ND (5)	22	ND (5)	6.1	ND (5)	6	20	6	130	16
	10/01/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.2	ND (5)	ND (5)	6.1	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.6	ND	17	4.7
	10/01/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.5	ND (5)	ND (5)	5.4	ND (5)	6.6	ND (5)	ND (5)	ND (5)	ND (5)	7.1	ND	25	4.7
	10/01/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.9)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-4	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.6)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (3.9)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	9 - 10	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-5	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.6	9.5	31	14	22	24	ND (5)	27	ND (5)	12	ND (4.6)	11	21	11	170	18
	10/02/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.9)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.2)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

TABLE C7-5

Sample Results: Polycyclic Aromatic Hydrocarbons
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC14-6	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.9 J	ND (5)	5.9 J	5.2 J	ND (5)	5.9 J	ND (5)	ND (5)	ND (5)	ND (5)	5.3 J	ND	28	5.1
	10/02/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.6)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	9 - 10	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.2)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	14 - 15	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.3)	ND (5)	ND (5)	ND	ND	ND (4.4)
AOC14-7	10/02/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.7	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	7.7	4.5
	10/02/08	2 - 3	N	ND (5)	ND (5)	6.8	ND (5)	17	ND (5)	5.9	16	17	10	10	ND (5)	6.6	ND (5)	10	ND (4.1)	ND (5)	6.6	24	82	11
	10/02/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.6)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	14 - 15	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.6)	ND (5)	ND (5)	ND	ND	ND (4.4)
AOC14-8	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.7)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	13	12	13	12	14	14	13	5.1	ND (5)	12	ND (4.6)	ND (5)	5.7	ND	110	22
	10/02/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	9 - 10	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.9)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.9)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-9	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.9)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-10	10/01/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.7)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	5 - 6	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.6)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-11	10/01/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.6)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-12	09/30/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	22	180	84	110	40	82	210	17	350	ND (5.1)	39	ND (5.1)	120	310	140	1,400	130
	09/30/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	14 - 15	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)

TABLE C7-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (μg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
AOC14-13	10/01/08[7]	0.5 - 1.5	N	ND (5) J	ND (5) J	ND (5) J	ND (5) J	ND (5) J	16 J	12 J	17 J	6.6 J	12 J	17 J	ND (5) J	25 J	ND (5) J	5.8 J	ND (5) J	5.3 J	22 J	5.3	130	18
	09/30/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/30/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	09/30/08	14 - 15	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-SS1	10/01/08	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	11 J	5.3 J	9.8 J	11 J	ND (5.1)	8.1 J	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.1 J	ND	52	6.1
	10/01/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/01/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-SS2	10/01/08	0 - 0.5	N	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	26	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)	ND	26	22
	10/01/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	9 - 10	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/01/08	14 - 15	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.2)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-SS3	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (3.9)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.8)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
AOC14-SS4	10/02/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (3.8)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	9 - 10	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/02/08	14 - 15	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (3.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/02/08	14 - 15	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (3.7)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
S2-62	11/01/98[8]	3	N	---	ND (550)	ND (550)	ND (550)	ND (550)	ND (550) *	ND (550) *	ND (550) *	ND (550)	ND (550) *	ND (550)	ND (550) *	ND (550)	ND (550)	ND (550) *	ND (550)	ND (550)	ND (550)	ND	ND	ND (480) *
S8-23	11/01/98[8]	3	N	---	ND (21,000)	ND (21,000)	ND (21,000)	ND (21,000)	ND (21,000) *	ND (21,000) *	ND (21,000) *	ND (21,000)	ND (21,000) *	ND (21,000) *	ND (21,000) *	ND (21,000)	ND (21,000)	ND (21,000) *	ND (21,000) *	ND (21,000)	ND (21,000)	ND	ND	ND (18,000) *

TABLE C7-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[6] White powder sample

[7] debris sample

[8] black sandy material

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C7-6

Sample Results: Semivolatile Organic Compounds, Total Petroleum Hydrocarbons, and General Chemistry Parameters

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)		Total Petroleum Hydrocarbons (mg/kg)			General Chemistry (mg/kg)							
Interim Screening Level [1]:				500	2,870	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels [2]:				310,000	35,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL [3]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels[4] :				NE	NE	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values [5]:				500	2,870	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background [6]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4-Methylphenol**	**Bis (2-ethylhexyl) phthalate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Phosphate**	**Chloride**	**Nitrate**	**Sulfate**
24debris-01	01/18/08 [8]	Unknown	N	ND (3,300) *	ND (3,300) *	---	---	---	---	---	---	11	---	---	---	---
24debris-02	01/18/08 [8]	Unknown	N	ND (3,300) *	ND (3,300) *	---	---	---	---	---	---	4.6	---	---	---	---
24debris-03	01/18/08 [8]	Unknown	N	ND (160,000) *	ND (160,000) *	---	---	---	---	---	---	8	---	---	---	---
24soil-01	01/31/08	Unknown	N	ND (330)	ND (330)	---	13	---	---	---	---	8.8	---	---	---	---
24soil-02	01/31/08	Unknown	N	ND (330)	ND (330)	---	160	---	---	---	---	9.1	---	---	---	---
AOC14-1	09/30/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	30.8 J	---	---	---	---	---	---	---	---
	09/30/08	2 - 3	N	ND (340)	ND (340)	ND (1)	ND (10)	13.5	---	---	---	---	---	---	---	---
	09/30/08	5 - 6	N	ND (330)	ND (330)	ND (1.2)	ND (10)	28.6	---	---	---	---	---	---	---	---
	09/30/08	9 - 10	N	ND (330)	ND (330)	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	09/30/08	14 - 15	N	ND (340)	ND (340)	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
AOC14-2	09/30/08	0 - 0.5	N	430	ND (340)	---	34.1	252	---	---	---	---	---	---	---	---
	09/30/08	2 - 3	N	ND (350)	ND (350)	ND (1.4)	14.1	64.1	---	---	---	---	---	---	---	---
	10/01/08 [7]	3 - 3.25	N	ND (370) J	ND (370) J	---	ND (10) J	ND (10) J	---	---	---	8.88 J	---	---	---	---
	09/30/08	5 - 6	N	ND (340)	ND (340)	ND (1.5)	ND (10)	164	---	---	---	---	---	---	---	---
	09/30/08	9 - 10	N	ND (330)	ND (330)	ND (0.92)	ND (10)	26.2	---	---	---	---	---	---	---	---
	09/30/08	9 - 10	FD	ND (330)	ND (330)	ND (1)	ND (10)	21.5	---	---	---	---	---	---	---	---
	09/30/08	14 - 15	N	ND (340)	ND (340)	ND (1.6)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
AOC14-3	10/01/08	0 - 0.5	N	ND (330)	640	---	ND (10)	10.9	---	---	---	---	---	---	---	---
	10/01/08	2 - 3	N	ND (330)	ND (330)	ND (1)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	5 - 6	N	ND (330)	ND (330)	ND (0.91)	ND (10)	11.6	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	N	ND (330)	ND (330)	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	N	ND (330)	ND (330)	ND (1.1) J	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
AOC14-4	10/01/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	2 - 3	N	ND (330)	ND (330)	ND (0.94)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	5 - 6	N	ND (330)	ND (330)	ND (0.95)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	N	ND (330)	ND (330)	ND (0.87)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	FD	ND (330)	ND (330)	ND (0.83)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	N	ND (330)	ND (330)	ND (1)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---

TABLE C7-6

Sample Results: Semivolatile Organic Compounds, Total Petroleum Hydrocarbons, and General Chemistry I

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)		**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry (mg/kg)**							
Interim Screening Level [1]:				**500**	**2,870**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2]:				**310,000**	**35,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels[4]:				**NE**	**NE**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5]:				**500**	**2,870**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4-Methylphenol**	**Bis (2-ethylhexyl) phthalate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Phosphate**	**Chloride**	**Nitrate**	**Sulfate**
AOC14-5	10/02/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	2 - 3	N	ND (830) *	ND (830)	ND (0.88)	ND (10)	10.3	---	---	---	---	---	---	---	---
	10/02/08	5 - 6	N	ND (330)	ND (330)	ND (0.98)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	N	ND (330)	ND (330)	ND (0.79)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	14 - 15	N	ND (330)	ND (330)	ND (0.95)	10 J	10 J	---	---	---	---	---	---	---	---
AOC14-6	10/02/08	0 - 0.5	N	ND (330)	ND (330)	---	17	67.4	---	---	---	---	---	---	---	---
	10/02/08	2 - 3	N	ND (330)	ND (330)	ND (1.1)	ND (10)	10.6	---	---	---	---	---	---	---	---
	10/02/08	5 - 6	N	ND (330)	ND (330)	ND (0.92)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	N	ND (330)	ND (330)	ND (0.82)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	FD	ND (330)	ND (330)	ND (0.95)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	14 - 15	N	ND (330)	ND (330)	ND (1)	10 J	10 J	---	---	---	---	---	---	---	---
AOC14-7	10/02/08	0 - 0.5	N	ND (830) *	ND (830)	---	ND (10)	21.1	---	---	---	---	---	---	---	---
	10/02/08	2 - 3	N	ND (830) *	ND (830)	ND (0.84)	ND (10)	14.3	---	---	---	---	---	---	---	---
	10/02/08	5 - 6	N	ND (330)	ND (330)	ND (0.86)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	N	ND (340)	ND (340)	ND (0.96)	ND (10)	14.8	---	---	---	---	---	---	---	---
	10/02/08	14 - 15	N	ND (330)	ND (330)	ND (0.89)	10 J	11.4 J	---	---	---	---	---	---	---	---
AOC14-8	10/02/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	2 - 3	N	ND (330)	ND (330)	ND (0.96)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	5 - 6	N	ND (330)	ND (330)	ND (0.86)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	N	ND (330)	ND (330)	ND (0.8)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	FD	ND (330)	ND (330)	ND (0.89)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/02/08	14 - 15	N	ND (340)	ND (340)	ND (0.9)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
AOC14-9	10/01/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	57.5 J	---	---	---	---	---	---	---	---
	10/01/08	2 - 3	N	ND (330)	ND (330)	ND (0.79)	ND (10)	22.1 J	---	---	---	---	---	---	---	---
	10/01/08	5 - 6	N	ND (330)	ND (330)	ND (0.89) J	ND (10)	57 J	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	N	ND (330)	ND (330)	ND (0.91)	ND (10)	14 J	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	N	ND (340)	ND (340)	ND (0.94) J	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---

TABLE C7-6

Sample Results: Semivolatile Organic Compounds, Total Petroleum Hydrocarbons, and General Chemistry I
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)		**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry (mg/kg)**							
Interim Screening Level [1]:				**500**	**2,870**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2]:				**310,000**	**35,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels[4]:				**NE**	**NE**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5]:				**500**	**2,870**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4-Methylphenol**	**Bis (2-ethylhexyl) phthalate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Phosphate**	**Chloride**	**Nitrate**	**Sulfate**
AOC14-10	10/01/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	2 - 3	N	ND (330)	ND (330)	ND (0.99)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	5 - 6	N	ND (330)	ND (330)	ND (0.86)	ND (10)	21.2	---	---	---	---	---	---	---	---
	10/01/08	5 - 6	FD	ND (330)	ND (330)	ND (0.97)	ND (10)	23.3	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	N	ND (340)	ND (340)	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	N	ND (330)	ND (330)	ND (0.8)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
AOC14-11	10/01/08	5 - 6	N	ND (330)	ND (330)	ND (0.95)	ND (10)	23	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	N	ND (330)	ND (330)	ND (0.83)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	N	ND (340)	ND (340)	ND (1.2)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
AOC14-12	09/30/08	5 - 6	N	ND (330)	ND (330)	ND (1.4)	ND (10)	33	---	---	---	---	---	---	---	---
	09/30/08	9 - 10	N	ND (330)	ND (330)	ND (1.1)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	09/30/08	14 - 15	N	ND (330)	ND (330)	ND (0.87)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
AOC14-13	10/01/08 [8]	0.5 - 1.5	N	ND (330) J	ND (330) J	---	ND (10) J	89.1 J	---	---	---	8.85 J	---	---	---	---
	09/30/08	5 - 6	N	ND (330)	ND (330)	ND (1.4)	ND (10)	28	---	---	---	---	---	---	---	---
	09/30/08	9 - 10	N	ND (330)	ND (330)	ND (1.3)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	09/30/08	14 - 15	N	ND (340)	ND (340)	ND (0.99)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
	09/30/08	14 - 15	FD	ND (340)	ND (340)	ND (0.92)	ND (10)	ND (10)	---	---	---	---	---	---	---	---
AOC14-SS1	10/01/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
	10/01/08	2 - 3	N	ND (340)	ND (340)	ND (0.97)	ND (10) J	56.7 J	---	---	---	---	---	---	---	---
	10/01/08	5 - 6	N	ND (340)	ND (340)	ND (1) J	ND (10) J	38.9 J	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	N	ND (330)	ND (330)	ND (1.1) J	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	N	ND (340)	ND (340)	ND (1) J	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
AOC14-SS2	10/01/08	0 - 0.5	N	ND (3,300) *	ND (3,300) *	---	11 J	134 J	---	---	---	---	---	---	---	---
	10/01/08	2 - 3	N	ND (330)	ND (330)	ND (0.99)	ND (10) J	28.2 J	---	---	---	---	---	---	---	---
	10/01/08	5 - 6	N	ND (340)	ND (340)	ND (0.98)	ND (10) J	10.9 J	---	---	---	---	---	---	---	---
	10/01/08	9 - 10	N	ND (340)	ND (340)	ND (0.92)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	N	ND (330)	ND (330)	ND (0.96)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
	10/01/08	14 - 15	FD	ND (330)	ND (330)	ND (0.92)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---

TABLE C7-6

Sample Results: Semivolatile Organic Compounds, Total Petroleum Hydrocarbons, and General Chemistry

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)		**Total Petroleum Hydrocarbons (mg/kg)**			**General Chemistry (mg/kg)**							
Interim Screening Level [1]:				**500**	**2,870**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential Regional Screening Levels [2]:				**310,000**	**35,000**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4]:				**NE**	**NE**	**540**	**540**	**1,800**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values [5]:				**500**	**2,870**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [6]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4-Methylphenol**	**Bis (2-ethylhexyl) phthalate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Phosphate**	**Chloride**	**Nitrate**	**Sulfate**
AOC14-SS3	10/02/08	0 - 0.5	N	ND (330)	ND (330)	---	30.4 J	172 J	---	---	---	---	---	---	---	---
	10/02/08	2 - 3	N	ND (330)	ND (330)	ND (0.84)	10 J	16.4 J	---	---	---	---	---	---	---	---
	10/02/08	5 - 6	N	ND (330)	ND (330)	ND (0.96)	10 J	24.7 J	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	N	ND (330)	ND (330)	ND (0.85)	10 J	10 J	---	---	---	---	---	---	---	---
	10/02/08	14 - 15	N	ND (330)	ND (330)	ND (0.97)	10 J	10 J	---	---	---	---	---	---	---	---
AOC14-SS4	10/02/08	0 - 0.5	N	ND (330)	ND (330)	---	10 J	14.3 J	---	---	---	---	---	---	---	---
	10/02/08	2 - 3	N	ND (330)	ND (330)	ND (0.96)	10 J	11.2 J	---	---	---	---	---	---	---	---
	10/02/08	5 - 6	N	ND (330)	ND (330)	ND (0.83)	10 J	10.1 J	---	---	---	---	---	---	---	---
	10/02/08	9 - 10	N	ND (330)	ND (330)	ND (0.85)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
	10/02/08	14 - 15	N	ND (330)	ND (330)	ND (0.63)	ND (10) J	ND (10) J	---	---	---	---	---	---	---	---
	10/02/08	14 - 15	FD	ND (330)	ND (330)	ND (0.97) J	10 J	10 J	---	---	---	---	---	---	---	---
S1-20	11/01/98	3	N	---	---	---	---	---	ND (10)	100	100	9.1	64.2	223	17	585
S2-6	11/01/98 [7]	3	N	---	---	---	---	---	---	---	---	9.1	---	---	---	---
	11/01/98	5	N	---	---	---	---	---	---	---	---	9.2	---	---	---	---
S2-62	11/01/98 [7]	2	N	---	---	---	---	---	---	---	---	8.8	---	---	---	---
	11/01/98 [9]	3	N	---	ND (550)	ND (1.1)	ND (11)	2 J	---	---	---	---	---	---	---	---
	11/01/98	4	N	---	---	---	---	---	---	---	---	9.2	---	---	---	---
S2-130	11/01/98	1	N	---	---	---	---	---	---	---	---	9.9	---	---	---	---
S3-15	11/01/98	2	N	---	---	---	---	---	---	---	---	9.7	---	---	---	---
	11/01/98	4	N	---	---	---	---	---	---	---	---	9.5	---	---	---	---
S3-72	11/01/98 [7]	1	N	---	---	---	---	---	---	---	---	9.1	---	---	---	---
	11/01/98	2	N	---	---	---	---	---	---	---	---	9.7	---	---	---	---
S3-120	11/01/98	1	N	---	---	---	---	---	---	---	---	8.8	---	---	---	---
S4-4	11/01/98 [7]	4	N	---	---	---	---	---	344	220	560	9.24	10.7	3,010	29	1,630
	11/01/98	6	N	---	---	---	---	---	---	---	---	10.4	---	---	---	---
S4-95	11/01/98 [7]	2	N	---	---	---	---	---	---	---	---	9.1	---	---	---	---
	11/01/98	3	N	---	---	---	---	---	---	---	---	10.3	---	---	---	---
S4-160	11/01/98	2	N	---	---	---	---	---	---	---	---	9.1	---	---	---	---
S8-23	11/01/98 [9]	3	N	---	ND (21,000) *	ND (1)	15,000	17,000	---	---	---	---	---	---	---	---
S8-30	11/01/98	3	N	---	---	---	---	---	---	---	---	9.2	---	---	---	---

TABLE C7-6

Sample Results: Semivolatile Organic Compounds, Total Petroleum Hydrocarbons, and General Chemistry

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)		Total Petroleum Hydrocarbons (mg/kg)			General Chemistry (mg/kg)							
Interim Screening Level [1]:				500	2,870	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE
Residential Regional Screening Levels [2]:				310,000	35,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Residential DTSC CHHSL [3]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Levels[4] :				NE	NE	540	540	1,800	NE	NE	NE	NE	NE	NE	NE	NE
Ecological Comparison Values [5]:				500	2,870	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background [6]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4-Methylphenol**	**Bis (2-ethylhexyl) phthalate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**	**Alkalinity, as carbonate**	**Alkalinity, bicarb as CaCO3**	**Alkalinity, total as CaCO3**	**pH**	**Phosphate**	**Chloride**	**Nitrate**	**Sulfate**
GS-1	11/01/98 [7]	0	N	---	---	---	---	---	---	---	---	8.81	---	---	---	---
GS-2	11/01/98 [7]	0	N	---	---	---	---	---	---	---	---	8.14	---	---	---	---
RR-1	02/02/00	0	N	---	---	---	---	---	---	---	---	8.7	---	---	---	---
RR-2	02/02/00	0	N	---	---	---	---	---	---	---	---	9.64	---	---	---	---
RR-3	02/02/00	0	N	---	---	---	---	---	---	---	---	8.67	---	---	---	---
RR-4	02/02/00 [7]	0	N	---	---	---	---	---	---	---	---	9.39	---	---	---	---
RR-5	02/02/00	0	N	---	---	---	---	---	---	---	---	9.03	---	---	---	---
RR-6	02/02/00	0	N	---	---	---	---	---	---	---	---	8.9	---	---	---	---
RR-7	02/02/00 [7]	0	N	---	---	---	---	---	---	---	---	8.71	---	---	---	---
RR-8	02/02/00	0	N	---	---	---	---	---	---	---	---	9.06	---	---	---	---
RR-9	02/02/00 [7]	0	N	---	---	---	---	---	---	---	---	9.08	---	---	---	---
RR-10	02/02/00	0	N	---	---	---	---	---	---	---	---	9.01	---	---	---	---
RR-11	02/02/00	0	N	---	---	---	---	---	---	---	---	9.15	---	---	---	---
RR-12	02/02/00 [7]	0	N	---	---	---	---	---	---	---	---	8.94	---	---	---	---

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[1] For SVOCs, interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used. For TPHs, interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28 ARCADIS. 2009. Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil". July 1.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.

[7] White powder sample

[8] Debris sample

[9] Black sandy material

Results greater than the interim screening level are circled.

Only detected SVOCs are presented.

SVOCs	semivolatile organic compounds
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C7-7

Sample Results: Pesticides
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Interim Screening Level [1] :				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels [2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL [3] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values [4] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
AOC14-1	09/30/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC14-2	09/30/08	0 - 0.5	N	ND (2)	2.9	3	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC14-3	10/01/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC14-4	10/01/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC14-5	10/02/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC14-7	10/02/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC14-8	10/02/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
AOC14-10	10/01/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C7-8

Sample Results: Asbestos
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Asbestos		
Location	**Date**	**Depth (ft bgs)**	**SampleType**	**PLM/BULK** [1]	**CARB435/ [2] PLM (%)**	**TEM [3] (%)**
AOC14-1	09/30/08	0 - 0.5	N	Present	ND (<0.1)	ND (0.07)
	09/30/08	2 - 3	N	Not Present	---	---
	09/30/08	5 - 6	N	Not Present	---	---
	09/30/08	9 - 10	N	Not Present	---	---
	09/30/08	14 - 15	N	Not Present	---	---
AOC14-2	09/30/08	0 - 0.5	N	Present	ND (<0.1)	---
	09/30/08	2 - 3	N	Not Present	ND (<0.1)	ND (0.07)
	10/01/08 [4]	3 - 3.25	N	Not Present	---	---
	09/30/08	5 - 6	N	Present	ND (<0.1)	---
	09/30/08	9 - 10	N	Not Present	ND (<0.1)	ND (0.07)
	09/30/08	9 - 10	FD	Not Present	---	---
	09/30/08	14 - 15	N	---	<0.1	---
AOC14-3	10/01/08	0 - 0.5	N	Present	ND (<0.1)	---
	10/01/08	2 - 3	N	Present	ND (<0.1)	---
	10/01/08	5 - 6	N	Present	ND (<0.1)	---
	10/01/08	9 - 10	N	Not Present	---	---
	10/01/08	14 - 15	N	Not Present	---	---
AOC14-4	10/01/08	0 - 0.5	N	Present	ND (<0.1)	---
	10/01/08	2 - 3	N	Not Present	---	---
	10/01/08	5 - 6	N	Not Present	---	---
	10/01/08	9 - 10	N	Not Present	---	---
	10/01/08	9 - 10	FD	Not Present	---	---
	10/01/08	14 - 15	N	Not Present	---	---
AOC14-5	10/02/08	0 - 0.5	N	Not Present	---	---
	10/02/08	2 - 3	N	Present	ND (<0.1)	---
	10/02/08	5 - 6	N	Not Present	---	---
	10/02/08	9 - 10	N	Not Present	---	---
	10/02/08	14 - 15	N	Present	ND (<0.1)	---
AOC14-6	10/02/08	0 - 0.5	N	Not Present	---	---
	10/02/08	2 - 3	N	Not Present	---	---
	10/02/08	5 - 6	N	Not Present	---	---
	10/02/08	9 - 10	N	Not Present	---	---
	10/02/08	9 - 10	FD	Not Present	---	---
	10/02/08	14 - 15	N	Not Present	---	---

TABLE C7-8
Sample Results: Asbestos
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Asbestos		
Location	**Date**	**Depth (ft bgs)**	**SampleType**	**PLM/BULK** [1]	**CARB435/ PLM (%)** [2]	**TEM (%)** [3]
AOC14-7	10/02/08	0 - 0.5	N	Not Present	---	---
	10/02/08	2 - 3	N	Not Present	---	---
	10/02/08	5 - 6	N	Not Present	---	---
	10/02/08	9 - 10	N	Not Present	---	---
	10/02/08	14 - 15	N	Not Present	---	---
AOC14-8	10/02/08	0 - 0.5	N	Not Present	---	---
	10/02/08	2 - 3	N	Not Present	---	---
	10/02/08	5 - 6	N	Not Present	---	---
	10/02/08	9 - 10	N	Not Present	---	---
	10/02/08	9 - 10	FD	Not Present	---	---
	10/02/08	14 - 15	N	Not Present	---	---
AOC14-9	10/01/08	0 - 0.5	N	Not Present	---	---
	10/01/08	2 - 3	N	Present	ND (<0.1)	ND (0.07)
	10/01/08	5 - 6	N	Not Present	---	---
	10/01/08	9 - 10	N	Not Present	---	---
	10/01/08	14 - 15	N	Not Present	---	---
AOC14-10	10/01/08	0 - 0.5	N	Not Present	---	---
	10/01/08	2 - 3	N	Not Present	---	---
	10/01/08	5 - 6	N	Not Present	---	---
	10/01/08	5 - 6	FD	Not Present	---	---
	10/01/08	9 - 10	N	Not Present	---	---
	10/01/08	14 - 15	N	Not Present	---	---
AOC14-11	10/01/08	5 - 6	N	Not Present	---	---
	10/01/08	9 - 10	N	Not Present	---	---
	10/01/08	14 - 15	N	Not Present	---	---
AOC14-12	09/30/08	5 - 6	N	Present	ND (<0.1)	---
	09/30/08	9 - 10	N	Not Present	---	---
	09/30/08	14 - 15	N	Not Present	---	---
AOC14-13	10/01/08 [5]	0.5 - 1.5	N	25	---	---
	09/30/08	5 - 6	N	Present	ND (<0.1)	---
	09/30/08	9 - 10	N	Not Present	---	---
	09/30/08	14 - 15	N	Not Present	---	---
	09/30/08	14 - 15	FD	Not Present	---	---
AOC14-SS1	10/01/08	0 - 0.5	N	Present	ND (<0.1)	---
	10/01/08	2 - 3	N	Present	ND (<0.1)	---
	10/01/08	5 - 6	N	Present	<0.1	---
	10/01/08	9 - 10	N	Not Present	---	---
	10/01/08	14 - 15	N	Not Present	---	---

TABLE C7-8

Sample Results: Asbestos

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Location	**Date**	**Depth (ft bgs)**	**SampleType**	**Asbestos** **PLM/BULK** [1]	**Asbestos** **CARB435/ PLM (%)** [2]	**Asbestos** **TEM (%)** [3]
AOC14-SS2	10/01/08	0 - 0.5	N	Not Present	---	---
	10/01/08	2 - 3	N	Not Present	---	---
	10/01/08	5 - 6	N	Not Present	---	---
	10/01/08	9 - 10	N	Not Present	---	---
	10/01/08	14 - 15	N	---	ND (<0.1)	---
	10/01/08	14 - 15	FD	---	ND (<0.1)	---
AOC14-SS3	10/02/08	0 - 0.5	N	Not Present	---	---
	10/02/08	2 - 3	N	Not Present	---	---
	10/02/08	5 - 6	N	Not Present	---	---
	10/02/08	9 - 10	N	Not Present	---	---
	10/02/08	14 - 15	N	Not Present	---	---
AOC14-SS4	10/02/08	0 - 0.5	N	Not Present	---	---
	10/02/08	2 - 3	N	Not Present	---	---
	10/02/08	5 - 6	N	Present	ND (<0.1)	---
	10/02/08	9 - 10	N	Not Present	---	---
	10/02/08	14 - 15	N	Not Present	---	---
	10/02/08	14 - 15	FD	Not Present	---	---

[1] Polarized light microscopy of bulk samples

[2] California Air Resource Board Method 435 / polarized light microscopy of bulk samples

[3] Transmission electron microscopy

[4] White powder sample

[5] debris sample

ft bgs	feet below ground surface
FD	field duplicate
---	not analyzed

TABLE C7-9

Constitiuent Concentrations in Soil Compared to Screening Values

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV)[1]		Ecological Comparison Value (ECV)[2]		Residential Screening Level (Res SL)[3]		RWQCB Environmental Screening Levels (ESL)[4]		Commercial Screening Level (Com SL)[5]		Interim Screening Level (Int SL)[6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences**[7]	**(BTV)**	**# of Exceedences**[8]	**(ECV)**	**# of Exceedences**[8]	**(Res SL)**	**# of Exceedences**[8]	**(ESL)**	**# of Exceedences**[8]	**(Com SL)**	**# of Exceedences**[8]	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 79 (0%)	ND (2.1) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	79 / 79 (100%)	11	0	(11)	0	(11.4)	0	(0.07) *	NA	(NE)	0	(0.24) *	0	(11)
Barium	mg/kg	79 / 79 (100%)	300	0	(410)	0	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	0	(410)
Beryllium	mg/kg	0 / 79 (0%)	ND (11) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	0 / 79 (0%)	ND (1.1) ‡	0	(1.1)	0	(0.0151) *	0	(39)	NA	(NE)	0	(500)	0	(1.1)
Chromium	mg/kg	99 / 99 (100%)	74.9	4	(39.8)	4	(36.3) *	0	(280)	NA	(NE)	0	(1,400)	4	(39.8)
Chromium, Hexavalent	mg/kg	13 / 99 (13%)	5.8	8	(0.83)	0	(139.6)	0	(17)	NA	(NE)	0	(37)	8	(0.83)
Cobalt	mg/kg	77 / 79 (97%)	10	0	(12.7)	0	(13)	0	(23)	NA	(NE)	0	(300)	0	(12.7)
Copper	mg/kg	97 / 99 (98%)	44	4	(16.8)	1	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	4	(16.8)
Lead	mg/kg	79 / 79 (100%)	21	10	(8.39)	10	(0.0166) *	0	(80)	NA	(NE)	0	(320)	10	(8.39)
Mercury	mg/kg	1 / 79 (1.3%)	0.25	NA	(NE)	1	(0.0125)	0	(18)	NA	(NE)	0	(180)	1	(0.0125)
Molybdenum	mg/kg	15 / 79 (19%)	2.4	10	(1.37)	3	(2.25)	0	(380)	NA	(NE)	0	(4,800)	10	(1.37)
Nickel	mg/kg	99 / 99 (100%)	16	0	(27.3)	0	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	0	(27.3)
Selenium	mg/kg	3 / 79 (3.8%)	1.6	2	(1.47)	2	(0.177) *	0	(380)	NA	(NE)	0	(4,800)	2	(1.47)
Silver	mg/kg	0 / 79 (0%)	ND (11) ‡	NA	(NE)	0	(5.15)	0	(380)	NA	(NE)	0	(4,800)	0	(5.15)
Thallium	mg/kg	1 / 79 (1.3%)	2.2	NA	(NE)	0	(2.32)	0	(5)	NA	(NE)	0	(63)	0	(2.32)
Vanadium	mg/kg	79 / 79 (100%)	38	0	(52.2)	0	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	0	(52.2)
Zinc	mg/kg	99 / 99 (100%)	243	2	(58)	2	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	2	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	8 / 8 (100%)	9,000	0	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	0	(16,400)
Calcium	mg/kg	9 / 9 (100%)	48,000	0	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(66,500)
Iron	mg/kg	9 / 9 (100%)	23,100	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	9 / 9 (100%)	8,500	0	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(12,100)
Manganese	mg/kg	8 / 8 (100%)	290	0	(402)	0	(220)	0	(1,800)	NA	(NE)	0	(23,000)	0	(402)
Potassium	mg/kg	9 / 9 (100%)	2,800	0	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(4,400)
Sodium	mg/kg	8 / 9 (89%)	850	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 8 (0%)	ND (1.02) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Semivolatile Organic Compounds															
4-Methylphenol	µg/kg	1 / 79 (1.3%)	430	NA	(NE)	0	(500)	0	(310,000)	NA	(NE)	0	(3,100,000)	0	(500)
Bis (2-ethylhexyl) phthalate	µg/kg	1 / 79 (1.3%)	640	NA	(NE)	0	(2,870)	0	(35,000)	NA	(NE)	0	(120,000)	0	(2,870)
Polycyclic Aromatic Hydrocarbons															
Acena phthylene	µg/kg	1 / 79 (1.3%)	6.8	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Anthracene	µg/kg	2 / 79 (2.5%)	22	NA	(NE)	NA	(NE)	0	(17,000,000)	NA	(NE)	0	(170,000,000)	0	(17,000,000)
Benzo (a) anthracene	µg/kg	6 / 79 (7.6%)	180	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (a) pyrene	µg/kg	7 / 79 (8.9%)	84	NA	(NE)	NA	(NE)	1	(38)	NA	(NE)	0	(130)	1	(38)
Benzo (b) fluoranthene	µg/kg	11 / 79 (14%)	110	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (ghi) perylene	µg/kg	9 / 79 (11%)	40	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	9 / 79 (11%)	82	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Chrysene	µg/kg	13 / 79 (16%)	210	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Dibenzo (a,h) anthracene	µg/kg	2 / 79 (2.5%)	17	NA	(NE)	NA	(NE)	0	(110)	NA	(NE)	0	(380)	0	(380)
Fluoranthene	µg/kg	11 / 79 (14%)	350	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)

TABLE C7-9

Constitiuent Concentrations in Soil Compared to Screening Values
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences** [7]	**(BTV)**	**# of Exceedences** [8]	**(ECV)**	**# of Exceedences** [8]	**(Res SL)**	**# of Exceedences** [8]	**(ESL)**	**# of Exceedences** [8]	**(Com SL)**	**# of Exceedences** [8]	**(Int SL)**
Polycyclic Aromatic Hydrocarbons															
Indeno (1,2,3-cd) pyrene	µg/kg	7 / 79 (8.9%)	39	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Phenanthrene	µg/kg	4 / 79 (5.1%)	120	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Pyrene	µg/kg	12 / 79 (15%)	310	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	5 / 79 (6.3%)	140	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	14 / 79 (18%)	1,400	NA	(NE)	1	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	1	(1,160)
B(a)P Equivalent	µg/kg	14 / 79 (18%)	130	NA	(NE)	NA	(NE)	1	(38)	NA	(NE)	1	(130)	1	(38)
Pesticides															
4,4-DDE	µg/kg	1 / 8 (13%)	2.9	NA	(NE)	1	(2.1)	0	(1,600)	NA	(NE)	0	(6,300)	1	(2.1)
4,4-DDT	µg/kg	1 / 8 (13%)	3	NA	(NE)	1	(2.1)	0	(1,600)	NA	(NE)	0	(6,300)	1	(2.1)
Total Petroleum Hydrocarbons															
TPH as diesel	mg/kg	16 / 79 (20%)	34.1	NA	(NE)	NA	(NE)	NA	(NE)	0	(540)	NA	(NE)	0	(540)
TPH as motor oil	mg/kg	40 / 79 (51%)	252	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

Notes

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C7-10
Central Tendency Comparisons (Site to Background)
AOC 14 - Railroad Debris Site
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Comparison Test Used	Probability that the Observed Differences Would Occur Purely by Chance	Statistical Decision with 0.05 Significance Level	Mean of Site Detects	Mean of Bkgd Detects	Median of Site Detects	Median of Bkgd Detects	Number of Site Detects	Number of Site Samples	Number of Bkgd Detects	Number of Bkgd Samples	Percent Detects Site	Percent Detects Bkgd
Chromium	Gehan	1.000	nsd	18.8	22.3	17	21.9	99	99	70	70	100	100
Copper	Gehan	0.987	nsd	9.91	10.5	9.4	10.1	97	99	70	70	98	100
Lead	Gehan	0.744	nsd	4.91	4.38	3.5	3.5	79	79	59	60	100	98
Molybdenum	Gehan	0.996	nsd	1.65	1.03	1.5	1	15	79	11	60	19	18
Zinc	Gehan	0.997	nsd	35.6	36.8	34	35.5	99	99	70	70	100	100

Bkgd = background

nsd = no statistical difference

> = greater than

TABLE C7-11

Decision 2 Data Gaps Summary AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
Compound/Depth	Y or N	Det/# results		Y or N	Y or N		
Metals							
Antimony				**30 mg/kg**	**0.285 mg/kg**		
0-0.5 ft bgs	NA	0 of 14	NA mg/kg	N	N	None	Compound exceeds ECV. Detection limit exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC, because additional sampling would likely result in additional non-detect values.
0-3 ft bgs	N	2 of 30	1.1 mg/kg	N	Y		
0-6 ft bgs	N	2 of 48	1.1 mg/kg	N	Y		
0-10 ft bgs	N	2 of 65	1.1 mg/kg	N	NA		
Arsenic				**11 mg/kg (bckg)**	**11.4 mg/kg**		
0-0.5 ft bgs	Y	14 of 14	6.8 mg/kg	N	N	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	30 of 30	11 mg/kg	N	N		
0-6 ft bgs	Y	48 of 48	15 mg/kg	Y	Y		
0-10 ft bgs	Y	65 of 65	15 mg/kg	Y	NA		
Chromium-Total				**280 mg/kg**	**39.8 mg/kg (bckg)**		
0-0.5 ft bgs	Y	31 of 31	74.9 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	56 of 56	74.9 mg/kg	N	Y		
0-6 ft bgs	Y	79 of 79	74.9 mg/kg	N	Y		
0-10 ft bgs	Y	96 of 96	74.9 mg/kg	N	NA		
Copper				**3000 mg/kg**	**20.6 mg/kg**		
0-0.5 ft bgs	Y	31 of 31	44 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	55 of 56	44 mg/kg	N	Y		
0-6 ft bgs	Y	77 of 79	44 mg/kg	N	Y		
0-10 ft bgs	Y	94 of 96	44 mg/kg	N	NA		
Lead				**80 mg/kg**	**8.39 mg/kg (bckg)**		
0-0.5 ft bgs	Y	14 of 14	18 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	30 of 30	18 mg/kg	N	Y		
0-6 ft bgs	Y	47 of 48	21 mg/kg	N	Y		
0-10 ft bgs	Y	64 of 65	21 mg/kg	N	NA		

TABLE C7-11

Decision 2 Data Gaps Summary AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable?[1] Y or N	> ECV or Background as Applicable?[1] Y or N	Proposed Sample ID	Notes
Mercury				**18 mg/kg**	**0.0125 mg/kg**		
0-0.5 ft bgs	NA	0 of 14	NA mg/kg	N	N	None	Compound exceeds ECV and no background value has been established. Detection limits are elevated relative to the ECV. Additional data collection is likely to yield additional non-detected values. The EPC has been defined within the limits of the analytical instrumentation.
0-3 ft bgs	N	3 of 30	0.25 mg/kg	N	Y		
0-6 ft bgs	N	3 of 48	0.25 mg/kg	N	Y		
0-10 ft bgs	N	3 of 65	0.25 mg/kg	N	NA		
Molybdenum				**380 mg/kg**	**2.25 mg/kg**		
0-0.5 ft bgs	N	3 of 14	1.6 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	7 of 30	2.4 mg/kg	N	Y		
0-6 ft bgs	Y	14 of 48	2.4 mg/kg	N	Y		
0-10 ft bgs	Y	15 of 65	2.4 mg/kg	N	NA		
Nickel				**1600 mg/kg**	**27.3 mg/kg (bckg)**		
0-0.5 ft bgs	Y	31 of 31	15.8 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	56 of 56	47 mg/kg	N	Y		
0-6 ft bgs	Y	79 of 79	47 mg/kg	N	Y		
0-10 ft bgs	Y	96 of 96	47 mg/kg	N	NA		
Selenium				**380 mg/kg**	**1.47 mg/kg (bckg)**		
0-0.5 ft bgs	NA	0 of 14	NA mg/kg	N	N	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC because additional sampling would likely result in additional non-detect values and because the maximum detected value is only slightly greater than the lowest comparison value.
0-3 ft bgs	N	2 of 30	0.99 mg/kg	N	N		
0-6 ft bgs	N	3 of 48	1.5 mg/kg	N	Y		
0-10 ft bgs	Y	5 of 65	1.6 mg/kg	N	NA		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	Y	31 of 31	243 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	55 of 56	243 mg/kg	N	Y		
0-6 ft bgs	Y	77 of 79	243 mg/kg	N	Y		
0-10 ft bgs	Y	94 of 96	243 mg/kg	N	NA		

TABLE C7-11
Decision 2 Data Gaps Summary AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
Compound/Depth	Y or N	Det/# results		Y or N	Y or N		
Contract Laboratory Program Inorganics							
Calcium				**66500 mg/kg (bckg)**	**66500 mg/kg (bckg)**		
0-0.5 ft bgs	Y	8 of 8	48000 mg/kg	N	N	None	Compound may exceed background. Existing data adequate for EPC.
0-3 ft bgs	Y	9 of 9	48000 mg/kg	N	N		
0-6 ft bgs	Y	10 of 10	379000 mg/kg	Y	Y		
0-10 ft bgs	Y	10 of 10	379000 mg/kg	Y	NA		
Magnesium				**12100 mg/kg (bckg)**	**12100 mg/kg (bckg)**		
0-0.5 ft bgs	Y	8 of 8	8500 mg/kg	N	N	None	Compound may exceed background. Existing data adequate for EPC.
0-3 ft bgs	Y	9 of 9	8500 mg/kg	N	N		
0-6 ft bgs	Y	10 of 10	23000 mg/kg	Y	Y		
0-10 ft bgs	Y	10 of 10	23000 mg/kg	Y	NA		
Sodium				**2070 mg/kg (bckg)**	**2070 mg/kg (bckg)**		
0-0.5 ft bgs	Y	8 of 8	850 mg/kg	N	N	None	Compound may exceed background. Existing data adequate for EPC.
0-3 ft bgs	Y	8 of 9	850 mg/kg	N	N		
0-6 ft bgs	Y	9 of 10	6590 mg/kg	Y	Y		
0-10 ft bgs	Y	9 of 10	6590 mg/kg	Y	NA		
Polycyclic Aromatic Hydrocarbons							
PAHs (BaP TEQ)				**38 µg/kg**	NA		
0-0.5 ft bgs	Y	7 of 14	22 µg/kg	N	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	10 of 30	22 µg/kg	N	NA		
0-6 ft bgs	Y	14 of 48	130 µg/kg	Y	NA		
0-10 ft bgs	Y	14 of 65	130 µg/kg	Y	NA		
HMW PAHs				NA	**1160 µg/kg**		
0-0.5 ft bgs	Y	7 of 14	130 µg/kg	NA	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	10 of 30	170 µg/kg	NA	N		
0-6 ft bgs	Y	14 of 48	1400 µg/kg	NA	Y		
Pesticides							
DDT-R				**1600 µg/kg**	**2.1 µg/kg**		
0-0.5 ft bgs	N	1 of 8	5.9 µg/kg	N	Y	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC, as additional sampling would likely result in additional non-detect values.
0-3 ft bgs	N	1 of 8	5.9 µg/kg	N	Y		
0-6 ft bgs	N	1 of 8	5.9 µg/kg	N	Y		
0-10 ft bgs	N	1 of 8	5.9 µg/kg	N	NA		

TABLE C7-11
Decision 2 Data Gaps Summary AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
Compound/Depth	Y or N	Det/# results		Y or N	Y or N		
Total Petroleum Hydrocarbons							
TPH as diesel				**545 mg/kg**	**NA**		
0-0.5 ft bgs	Y	5 of 14	34.1 mg/kg	N	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	9 of 30	15000 mg/kg	Y	NA		
0-6 ft bgs	Y	11 of 48	15000 mg/kg	Y	NA		
0-10 ft bgs	Y	12 of 65	15000 mg/kg	Y	NA		
TPH as motor oil				**1833 mg/kg**	**NA**		
0-0.5 ft bgs	Y	9 of 14	252 mg/kg	N	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	21 of 30	17000 mg/kg	Y	NA		
0-6 ft bgs	Y	33 of 48	17000 mg/kg	Y	NA		
0-10 ft bgs	Y	37 of 65	17000 mg/kg	Y	NA		

Footnotes:

[1] The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

Acronyms and Abbreviations:
AOC - area of concern
BaP TEQ - benzo(a)pyrene toxic equivalents
ECV - ecological comparison values
EPC - exposure point concentration
ft bgs - feet below ground surface
HHCV - human health comparison values
HMW PAH - high molecular weight polycyclic aromatic hydrocarbons
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
N - no
NA - not applicable
95% UCL - 95 percent upper confidence limit on the mean (calculated by ProUCL Version 4.00.04; USEPA, 2009)
Y - yes

TABLE C7-12
Results of Tiered Analysis at AOC 14 – Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Results,
PG&E Topock Compressor Station, Needles, California

Metal	**Step 1 Do COPCs/COPECs Exceed Background?**	**Step 2 Do COPCs/COPECs Exceed SSL?**	**Step 3 Does Screening Model Eliminate Potential for Leaching to Groundwater?**
Chromium	✓		
Chromium, Hexavalent	✓	✓	No
Copper	✓		
Lead	✓		
Mercury	✓		
Molybdenum	✓	✓	Yes
Nickel	✓		
Selenium	✓		
Thallium	✓	✓	No
Zinc	✓		

✓ = Constituents concentration exceeds background and/or SSL.
SSL = soil screening level.

TABLE C7-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
		Soil Screening Levels : [1]		**5,500**	**0.36**	**22,000**	**3,500**	**600**	**0.73**	**3,800**	**42**	**0.19**	**130,000**
		Background : [2]		**39.8**	**0.83**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Thallium**	**Zinc**
AOC14-1	09/30/08	0 - 0.5	N	25	0.841	11	18	ND (0.1)	ND (2)	11	ND (1)	ND (4)	70
	09/30/08	2 - 3	N	25	ND (0.412)	8.5	8.7	ND (0.1)	ND (2)	11	ND (1)	ND (4.1)	47
	09/30/08	5 - 6	N	27	ND (0.412)	9.5	2.3	ND (0.1)	1.6	12	ND (2)	ND (2)	38
	09/30/08	9 - 10	N	17	ND (0.403)	8.2	2.7	ND (0.099)	ND (1)	11	ND (1)	ND (2)	34
	09/30/08	14 - 15	N	18	ND (0.412)	12	2.1	ND (0.1)	ND (1)	11	ND (1)	ND (2)	34
AOC14-2	09/30/08	0 - 0.5	N	28	0.768	44	18	ND (0.1)	ND (2)	12	ND (1)	ND (4.1)	49
	09/30/08	2 - 3	N	42	1.04	ND (21)	7.6	ND (0.11)	ND (11)	12	ND (1.1)	ND (21)	34
	10/01/08[6]	3 - 3.25	N	26	2.16	ND (23)	ND (1.1)	ND (0.11)	ND (11)	4.5	ND (1.1)	ND (23)	ND (11)
	09/30/08	5 - 6	N	42	1.32	19	21	ND (0.11)	ND (5.2)	13	ND (1)	ND (10)	51
	09/30/08	9 - 10	N	21	ND (0.405)	16 J	1.8	ND (0.1)	ND (1)	11	ND (1)	ND (2)	40
	09/30/08	9 - 10	FD	21	ND (0.404)	11 J	1.9	ND (0.1)	ND (1)	10	ND (2)	ND (2)	41
	09/30/08	14 - 15	N	15	ND (0.407)	9.1	2.1	ND (0.1)	ND (1)	11	ND (1)	ND (2)	35
AOC14-3	10/01/08	0 - 0.5	N	31	ND (0.403)	12	8.4	ND (0.1)	1.6	11	ND (1)	ND (2)	52
	10/01/08	2 - 3	N	26	ND (0.405)	13	6.4	ND (0.1)	ND (1)	13	ND (1)	ND (2)	46
	10/01/08	5 - 6	N	32	0.877	11	9	ND (0.1)	2.1	11	ND (1)	ND (2)	40
	10/01/08	9 - 10	N	19	ND (0.404)	7.1	2	ND (0.1)	ND (1)	10	ND (1)	ND (2)	33
	10/01/08	14 - 15	N	17	ND (0.403)	12	2.2	ND (0.1)	ND (1)	11	ND (1)	ND (2)	32
AOC14-4	10/01/08	0 - 0.5	N	13	ND (0.402)	7.3	7.2	ND (0.1)	ND (1)	7.1	ND (1)	ND (2)	31
	10/01/08	2 - 3	N	16	ND (0.405)	6.2	3.5	ND (0.1)	1.5	7.6	ND (1)	ND (2)	23
	10/01/08	5 - 6	N	16	ND (0.403)	5.3	3.5	ND (0.1)	1.5	7.3	ND (1)	ND (2)	23
	10/01/08	9 - 10	N	8.2	ND (0.403)	2.9	2.8	ND (0.1)	1.2	4.8	ND (1)	ND (2)	16
	10/01/08	9 - 10	FD	8.1	ND (0.404)	2.7	2.9	ND (0.1)	1.2	4.8	ND (1)	ND (2)	16
	10/01/08	14 - 15	N	15	ND (0.406)	7.9	2.2	ND (0.1)	ND (1)	10	ND (1)	ND (2)	29
AOC14-5	10/02/08	0 - 0.5	N	15	ND (0.403)	9.6	5.3	ND (0.099)	ND (2)	10	ND (1)	ND (4)	35
	10/02/08	2 - 3	N	17	ND (0.405)	16	16	ND (0.1)	ND (2)	13	ND (1)	ND (4)	46
	10/02/08	5 - 6	N	15	ND (0.404)	7.9	2.7	ND (0.099)	ND (1)	10	ND (1)	ND (2)	35
	10/02/08	9 - 10	N	15	ND (0.403)	9.5	2.3	ND (0.1)	ND (1)	10	ND (1)	ND (2)	35
	10/02/08	14 - 15	N	16	ND (0.406)	7.3	2.2	ND (0.1)	ND (1)	12	ND (1)	ND (2)	30

TABLE C7-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
		Soil Screening Levels :[1]		**5,500**	**0.36**	**22,000**	**3,500**	**600**	**0.73**	**3,800**	**42**	**0.19**	**130,000**
		Background :[2]		**39.8**	**0.83**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Thallium**	**Zinc**
AOC14-6	10/02/08	0 - 0.5	N	11	ND (0.402)	6.1	7.4	ND (0.1)	1.2	7	ND (1)	ND (2)	35
	10/02/08	2 - 3	N	23	ND (0.403)	9.5	3.3	ND (0.1)	2.4	11	ND (1)	ND (4)	37
	10/02/08	5 - 6	N	18	ND (0.405)	9.1	2.3	ND (0.099)	ND (1)	11	ND (1)	ND (2)	35
	10/02/08	9 - 10	N	18	ND (0.406)	9.6	2.4	ND (0.1)	ND (1)	12	ND (1)	ND (2)	39
	10/02/08	9 - 10	FD	18	ND (0.406)	9.7	2.3	ND (0.1)	ND (1)	12	ND (1)	ND (2)	39
	10/02/08	14 - 15	N	16	ND (0.402)	7.2	2.2	ND (0.1)	ND (1)	9.3	ND (1)	ND (2)	28
AOC14-7	10/02/08	0 - 0.5	N	15	ND (0.404)	7.4	6.1	ND (0.099)	ND (1)	9.6	ND (1)	ND (2)	31
	10/02/08	2 - 3	N	13	ND (0.405)	10	7.1	ND (0.1)	ND (1)	9.3	ND (1)	ND (2)	30
	10/02/08	5 - 6	N	18	ND (0.405)	10	4.8	ND (0.1)	ND (2)	12	ND (1)	ND (4)	35
	10/02/08	9 - 10	N	26	ND (0.404)	14	2.9	ND (0.1)	ND (1)	16	ND (1)	ND (2)	46
	10/02/08	14 - 15	N	25	ND (0.401)	9.9	3.5	ND (0.1)	2.4	11	ND (1)	ND (2)	32
AOC14-8	10/02/08	0 - 0.5	N	12	ND (0.403)	7.9	6.4	ND (0.099)	ND (2)	9.4	ND (1)	ND (4)	30
	10/02/08	2 - 3	N	15	ND (0.406)	8.8	6.8	ND (0.1)	ND (2)	11	ND (1)	ND (4)	31
	10/02/08	5 - 6	N	18	ND (0.404)	6.6	2.4	ND (0.1)	ND (1)	11	ND (1)	ND (2)	39
	10/02/08	9 - 10	N	19	ND (0.404)	12	2.7	ND (0.1)	ND (1)	13	ND (1)	ND (2)	38
	10/02/08	9 - 10	FD	19	ND (0.404)	10	3	ND (0.1)	ND (1)	13	ND (1)	ND (2)	39
	10/02/08	14 - 15	N	23 J	ND (0.413)	18	3.7	ND (0.1)	ND (1)	16	ND (1)	ND (2.1)	42 J
AOC14-9	10/01/08	0 - 0.5	N	13	ND (0.404)	7.6	5.4	ND (0.1)	ND (1)	9.5	ND (1)	ND (2)	28
	10/01/08	2 - 3	N	12	ND (0.407)	7.2	6	ND (0.1)	ND (2)	9.1	ND (1)	ND (4)	29
	10/01/08	5 - 6	N	9	ND (0.4)	4.1	2.8	ND (0.1)	ND (1)	5	ND (1)	ND (2)	13
	10/01/08	9 - 10	N	15	ND (0.405)	7.6	3.6	ND (0.1)	ND (1)	9.1	ND (1)	ND (2)	29
	10/01/08	14 - 15	N	13	ND (0.406)	8.2	5	ND (0.1)	ND (2)	9.4	ND (1)	ND (4.1)	32
AOC14-10	10/01/08	0 - 0.5	N	10	ND (0.401)	3.5	3.5	ND (0.1)	ND (1)	4.2	ND (1)	ND (2)	14
	10/01/08	2 - 3	N	11	ND (0.401)	3.1	2.9	ND (0.1)	ND (1)	3.9	ND (1)	ND (2)	14
	10/01/08	5 - 6	N	12	ND (0.403)	4.6	3.4	ND (0.1)	ND (1)	5.2	ND (1)	ND (2)	17
	10/01/08	5 - 6	FD	12	ND (0.402)	4.1	3.1	ND (0.1)	ND (1)	4.6	ND (1)	ND (2)	15
	10/01/08	9 - 10	N	11	ND (0.409)	7.1	5.9	ND (0.1)	ND (1)	8.7	ND (1)	2.2	28
	10/01/08	14 - 15	N	9.8	ND (0.404)	ND (8.1)	2.6	ND (0.1)	ND (4)	4.6	ND (1)	ND (8.1)	13

TABLE C7-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
			Soil Screening Levels : [1]	**5,500**	**0.36**	**22,000**	**3,500**	**600**	**0.73**	**3,800**	**42**	**0.19**	**130,000**
			Background : [2]	**39.8**	**0.83**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Thallium**	**Zinc**
AOC14-11	10/01/08	5 - 6	N	15	ND (0.406)	7.3	4.2	ND (0.1)	1	9.9	ND (1)	ND (2)	28
	10/01/08	9 - 10	N	18	ND (0.405)	13	2	ND (0.1)	ND (1)	12	ND (1)	ND (2)	37
	10/01/08	14 - 15	N	20	ND (0.41)	9	3	ND (0.1)	ND (1)	14	ND (1)	ND (2)	39
AOC14-12	09/30/08	5 - 6	N	27	ND (0.406)	8.4	3.2	ND (0.1)	2.4	9.8	1.5	ND (2)	36
	09/30/08	9 - 10	N	17	ND (0.405)	7.7	3	ND (0.1)	ND (1)	11	1.2	ND (2)	37
	09/30/08	14 - 15	N	20	ND (0.401)	9.8	2.8	ND (0.1)	1.2	13	ND (1)	ND (2)	35
AOC14-13	10/01/08[7]	0.5 - 1.5	N	63	0.487	33	16	ND (0.1)	98	57	ND (1)	ND (20)	39
	09/30/08	5 - 6	N	22	ND (0.405)	11	3.6	ND (0.099)	2	9	ND (1)	ND (2)	30
	09/30/08	9 - 10	N	16	ND (0.405)	7.2	2.1	ND (0.1)	ND (1)	10	1.6	ND (2)	34
	09/30/08	14 - 15	N	16	ND (0.409)	11	2.2	ND (0.1)	ND (1)	11	ND (1)	ND (2)	33
	09/30/08	14 - 15	FD	16	ND (0.409)	13	2.4	ND (0.1)	ND (1)	11	ND (1)	ND (2)	33
AOC14-SS1	10/01/08	0 - 0.5	N	15	ND (0.405)	9.4	7.2	ND (0.1)	ND (1)	8.8	ND (1)	ND (2)	34
	10/01/08	2 - 3	N	22	0.456	15	11	0.25	ND (2)	13	ND (1)	ND (4)	32
	10/01/08	5 - 6	N	18	ND (0.406)	15	4.8	ND (0.1)	ND (2)	12	ND (1)	ND (4.1)	35
	10/01/08	9 - 10	N	17	ND (0.402)	7.4	1.6	ND (0.1)	ND (1)	10	ND (1)	ND (2)	33
	10/01/08	14 - 15	N	13	ND (0.406)	9	2.6	ND (0.1)	ND (1)	10	ND (1)	ND (2)	31
AOC14-SS2	10/01/08	0 - 0.5	N	14	ND (0.403)	8.8	4.8	ND (0.1)	1.1	10	ND (1)	ND (2)	27
	10/01/08	2 - 3	N	14	ND (0.407)	7.6	5.5	ND (0.1)	ND (2)	9.4	ND (1)	ND (4)	29
	10/01/08	5 - 6	N	10	ND (0.405)	6.5	5.5	ND (0.1)	ND (2)	8.2	ND (1)	ND (4.1)	25
	10/01/08	9 - 10	N	9.5	ND (0.407)	6.7	5.3	ND (0.1)	ND (1)	8.1	ND (1)	ND (2)	24
	10/01/08	14 - 15	N	17	ND (0.404)	9.6	3	ND (0.1)	ND (1)	13	ND (1)	ND (2)	32
	10/01/08	14 - 15	FD	18	ND (0.405)	9.6	3	ND (0.1)	ND (1)	13	ND (1)	ND (2)	33
AOC14-SS3	10/02/08	0 - 0.5	N	17	ND (0.401)	11	3.8	ND (0.1)	ND (1)	10	ND (1)	ND (2)	35
	10/02/08	2 - 3	N	18	ND (0.402)	9.5	2.7	ND (0.1)	ND (1)	12	ND (1)	ND (2)	36
	10/02/08	5 - 6	N	12	ND (0.403)	6.7	2	ND (0.1)	ND (1)	7.2	ND (1)	ND (2)	29
	10/02/08	9 - 10	N	16	ND (0.404)	8.4	2.2	ND (0.1)	ND (1)	11	ND (1)	ND (2)	32
	10/02/08	14 - 15	N	17	ND (0.404)	9.5	2.4	ND (0.1)	ND (1)	11	ND (1)	ND (2)	35
AOC14-SS4	10/02/08	0 - 0.5	N	15	ND (0.402)	8.1	5.1	ND (0.1)	ND (1)	9.6	ND (1)	ND (2)	31

TABLE C7-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
			Soil Screening Levels : [1]	**5,500**	**0.36**	**22,000**	**3,500**	**600**	**0.73**	**3,800**	**42**	**0.19**	**130,000**
			Background : [2]	**39.8**	**0.83**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Thallium**	**Zinc**
AOC14-SS4	10/02/08	2 - 3	N	14	ND (0.401)	6.9	10	ND (0.1)	ND (1)	7	ND (1)	ND (2)	27
	10/02/08	5 - 6	N	16	ND (0.403)	6.4	11	ND (0.1)	1.5	6.7	ND (1)	ND (2)	27
	10/02/08	9 - 10	N	16	ND (0.404)	11	2.3	ND (0.1)	ND (1)	11	ND (1)	ND (2)	32
	10/02/08	14 - 15	N	17	ND (0.405)	11	3	ND (0.1)	ND (1)	11	ND (1)	ND (2)	37
	10/02/08	14 - 15	FD	17	ND (0.405)	8.5	1.6	ND (0.1)	ND (1)	11	ND (1)	ND (2)	34
S1-20	11/01/98	3	N	31.8	0.7	15.7	---	---	---	14	---	---	49.4
S2-6	11/01/98[6]	3	N	45.5	12	1.8	---	---	---	0.57	---	---	14.5
	11/01/98	5	N	39.9	1.8	9.7	---	---	---	9.4	---	---	35.7
S2-62	11/01/98[6]	2	N	32	1	4.1	---	---	---	1.8	---	---	8.4
	11/01/98[8]	3	N	72.7	---	22.2	7.9	0.046 J	0.86 J	47	0.99 J	ND (22)	ND (29.3)
	11/01/98	4	N	21.9	ND (0.5)	11.5	---	---	---	10.2	---	---	39.8
S2-130	11/01/98	1	N	22.1	ND (0.5)	10.6	---	---	---	10.8	---	---	34.5
S3-15	11/01/98	2	N	13.8	ND (0.5)	9.4	---	---	---	7.5	---	---	24.1
	11/01/98	4	N	12.1	ND (0.5)	11	---	---	---	9.6	---	---	29.2
S3-72	11/01/98[6]	1	N	18.7	ND (0.5)	6.7	---	---	---	5.9	---	---	27
	11/01/98	2	N	11.3	ND (0.5)	8	---	---	---	8.6	---	---	28.9
S3-120	11/01/98	1	N	12.1	ND (0.5)	4.2	---	---	---	4.3	---	---	18
S4-4	11/01/98[6]	4	N	23.4	15.4	3.2	---	---	---	0.43 J	---	---	1.9
	11/01/98	6	N	13.7	1	10.3	---	---	---	9.8	---	---	32.6
S4-95	11/01/98[6]	2	N	10.3	ND (0.5)	2.5	---	---	---	4.3	---	---	4.3
	11/01/98	3	N	14.9	ND (0.5)	8.3	---	---	---	8.8	---	---	27
S4-160	11/01/98	2	N	25	0.5	11.8	---	---	---	10.9	---	---	38.2
S8-30	11/01/98	3	N	12.8	0.5	10.8	---	---	---	9.4	---	---	40.9
GS-1	11/01/98[6]	0	N	33.7	0.59	2.2	---	---	---	0.28 J	---	---	31.3
GS-2	11/01/98[6]	0	N	21.9	ND (0.5)	8.2	---	---	---	6	---	---	32.7
RR-1	02/02/00	0	N	23.4	ND (0.5)	15.6	---	---	---	15.8	---	---	44
RR-2	02/02/00	0	N	16.1	ND (0.5)	13.8	---	---	---	12.3	---	---	37.5

TABLE C7-13

Sample Results Compared to the Calculated Soil Screening Levels
AOC 14 - Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)									
		Soil Screening Levels : [1]		**5,500**	**0.36**	**22,000**	**3,500**	**600**	**0.73**	**3,800**	**42**	**0.19**	**130,000**
		Background : [2]		**39.8**	**0.83**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium**	**Chromium Hexavalent**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Thallium**	**Zinc**
RR-3	02/02/00	0	N	18.3	ND (0.5)	11.6	---	---	---	13	---	---	35
RR-4	02/02/006	0	N	19.4	0.6	19.2	---	---	---	0.92	---	---	27.1
RR-5	02/02/00	0	N	39.5	5.8	7.1	---	---	---	0.33	---	---	34.1
RR-6	02/02/00	0	N	74.9	4.8	7.5	---	---	---	0.39	---	---	243
RR-7	02/02/006	0	N	28.6	ND (0.51)	9.7	---	---	---	10.4	---	---	35.1
RR-8	02/02/00	0	N	28.9	ND (0.51)	9.9	---	---	---	7.4	---	---	29.8
RR-9	02/02/006	0	N	19.6	2.7	27.9	---	---	---	2.2	---	---	15.4
RR-10	02/02/00	0	N	18.8	ND (0.51)	12.9	---	---	---	11.6	---	---	36.3
RR-11	02/02/00	0	N	18.1	ND (0.51)	20.2	---	---	---	13.4	---	---	47.5
RR-12	02/02/006	0	N	17.5	ND (0.5)	3.8	---	---	---	1.5	---	---	11.3

[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C7-14

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)

AOC 14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Topock Compressor Station, Needles, California

			TTLC in mg/kg[1]		**STLC in mg/L[1]**			**TCLP in mg/L[1]**		
Parameter	**Frequency of detection**	**Maximum Detected Value (mg/kg)**	**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	0 / 79 (0%)	ND (2.1)	0	500	0	150	15	0	NE	NE
Arsenic	79 / 79 (100%)	11	0	500	0	50	5	0	100	5
Barium	79 / 79 (100%)	300	0	10000	0	1000	100	0	2000	100
Beryllium	0 / 79 (0%)	ND (11) ‡	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 79 (0%)	ND (1.1)	0	100	0	10	1	0	20	1
Chromium	99 / 99 (100%)	74.9	0	2500	1	50	5	0	100	5
Chromium, Hexavalent	13 / 99 (13%)	5.8	0	500	0	50	5	0	NE	NE
Cobalt	77 / 79 (97%)	10	0	8000	0	800	80	0	NE	NE
Copper	97 / 99 (98%)	44	0	2500	0	250	25	0	NE	NE
Lead	79 / 79 (100%)	21	0	1000	0	50	5	0	100	5
Mercury	1 / 79 (1.3%)	0.25	0	20	0	2	0.2	0	4	0.2
Molybdenum	15 / 79 (19%)	2.4	0	3500	0	3500	350	0	NE	NE
Nickel	99 / 99 (100%)	16	0	2000	0	200	20	0	NE	NE
Selenium	3 / 79 (3.8%)	1.6	0	100	0	10	1	0	20	1
Silver	0 / 79 (0%)	ND (11)	0	500	0	50	5	0	100	5
Thallium	1 / 79 (1.3%)	2.2	0	700	0	70	7	0	NE	NE
Vanadium	79 / 79 (100%)	38	0	2400	0	240	24	0	NE	NE
Zinc	99 / 99 (100%)	243	0	5000	0	2500	250	0	NE	NE

Notes

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC.

24 Bench Samples not included in table summary.

TABLE C7-15
Proposed Phase 2 Soil Sampling Locations at AOC 14 – Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Results,
PG&E Topock Compressor Station, Needles, California

Location ID	**Depths (ft bgs)**	**Description/Rationale**	**Analytes**	**Proposed Collection Methods**[a]
AOC14-14	0, 2, 5, 9, and 14	Evaluate newly identified potential burn area	Dioxin and furans	Rotosonic
AOC14-15	0, 2, 5, 9, and 14	To resolve data gaps #1, #2, and #3 - Define lateral and vertical extent of exceedences in southwestern corner and assess the newly identified potential burn area west of AOC14 and collect additional parameters to support CMS	Dioxin and furans, pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH , soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Rotosonic
AOC14-16	0, 2, 5, 9, and 14	To resolve data gap #2 - Assess the newly identified potential burn area west of AOC14	Dioxin and furans, pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-17	0, 2, 5, 9, and 14	To resolve data gap #2 - Assess the newly identified potential burn area west of AOC14	Dioxin and furans, pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-18	0	To resolve data gap #3 – To assess stained soil	Hexavalent chromium, PAHs, Title 22 metals, TPH, PCBs, dioxin and furans	Hand tools
AOC14-19	0	To resolve data gap #3 – To assess stained soil	Hexavalent chromium, PAHs, Title 22 metals, TPH, PCBs, dioxin and furans	Hand tools
AOC14-20	0	To resolve data gap #3 – To assess stained soil	Hexavalent chromium, PAHs, Title 22 metals, TPH, PCBs, dioxin and furans	Hand tools
AOC14-21	Bottom of trench	To resolve data gaps #3 and #4 – To define lateral and vertical extent of buried debris and collect additional parameters to support CMS	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH , soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Backhoe
AOC14-22	Bottom of trench	To resolve data gap #3 – To define lateral and vertical extent of buried debris near pilot study area	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Backhoe
AOC14-23	Bottom of trench	To resolve data gap #3 – To define lateral and vertical extent of buried debris near pilot study area	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Backhoe

TABLE C7-15
Proposed Phase 2 Soil Sampling Locations at AOC 14 – Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Results,
PG&E Topock Compressor Station, Needles, California

Location ID	**Depths (ft bgs)**	**Description/Rationale**	**Analytes**	**Proposed Collection Methods**[a]
AOC14-24	Bottom of trench	To resolve data gaps #3 and #4– To define lateral and vertical extent of buried debris near pilot study area and collect additional parameters to support CMS	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Backhoe
AOC14-25	Bottom of trench	To resolve data gap #3 – To define lateral and vertical extent of buried debris near pilot study area	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Backhoe
AOC14-26 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-27 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-28 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-29 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-30 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-31 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-32 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-33 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic

TABLE C7-15
Proposed Phase 2 Soil Sampling Locations at AOC 14 – Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Results,
PG&E Topock Compressor Station, Needles, California

Location ID	**Depths (ft bgs)**	**Description/Rationale**	**Analytes**	**Proposed Collection Methods**[a]
		contingent upon geophysical survey and XRF results		
AOC14-34 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-35 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-36 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-37 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-38 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-39 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-40 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-41 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-42 (contingent)	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is contingent upon geophysical survey and XRF results	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pH	Rotosonic
AOC14-43	0, 2, 5, 9, and 14	To resolve data gap #3 – To define lateral and vertical extent of potential buried debris. Sample location is	Pesticides, PAHs, VOCs, SVOCs, Title 22 metals,	Rotosonic

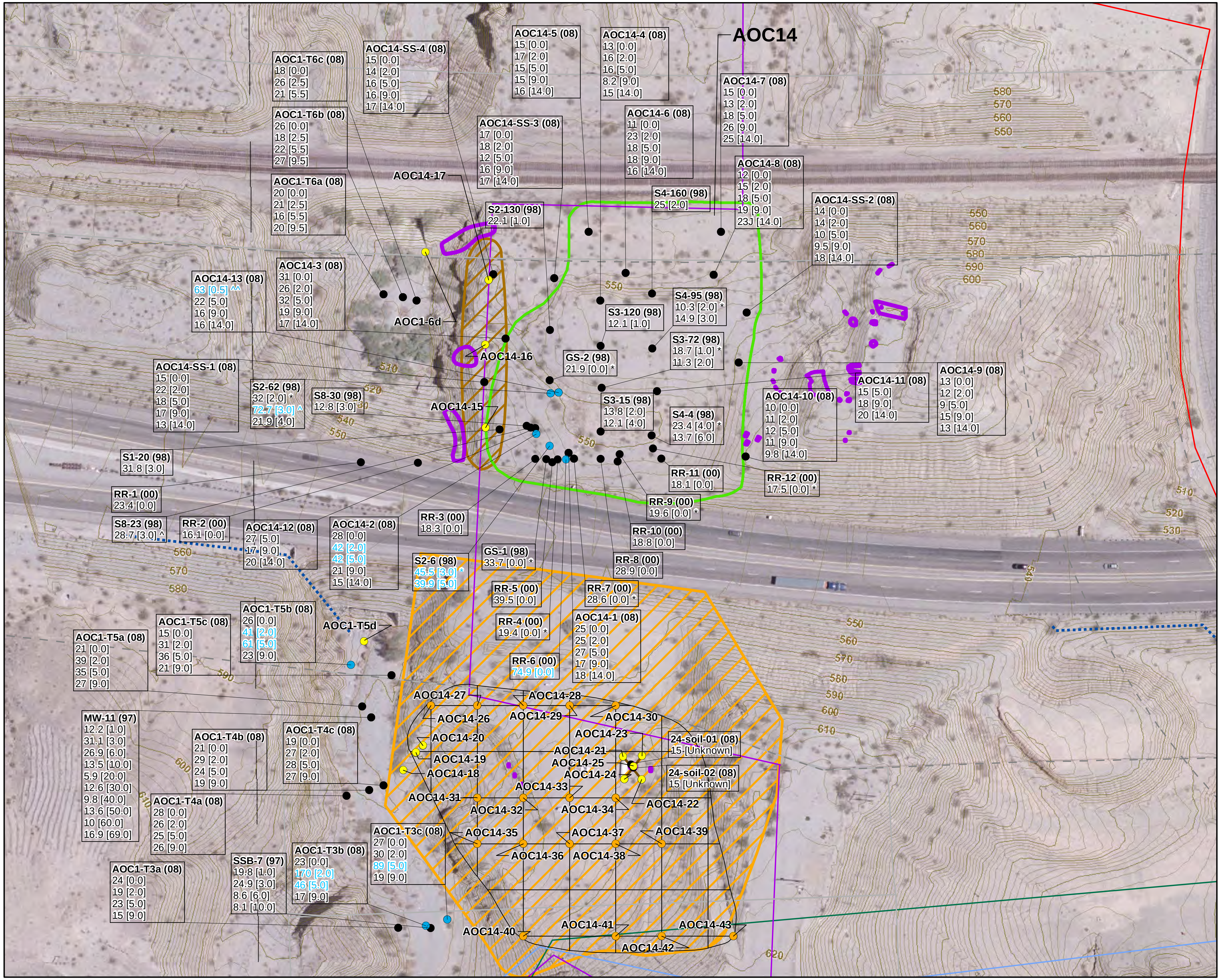
TABLE C7-15
Proposed Phase 2 Soil Sampling Locations at AOC 14 – Railroad Debris Site
Soil Investigation Part A Phase 1 Data Gaps Evaluation Results,
PG&E Topock Compressor Station, Needles, California

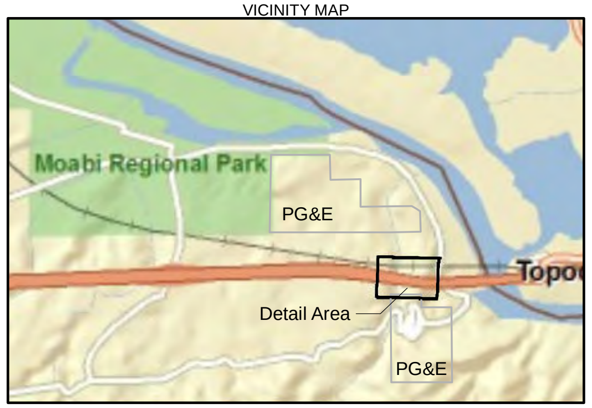
Location ID	**Depths (ft bgs)**	**Description/Rationale**	**Analytes**	**Proposed Collection Methods**[a]
(contingent)		contingent upon geophysical survey and XRF results	hexavalent chromium, PCBs, TPH, pH	

[a] Proposed collection methods listed on this table are based on experience and knowledge of the site; actual collection method will be chosen in the field based on field conditions and site access restrictions.

Contingent samples will be collected if anomalies are identified during the geophysical survey or if corrected XRF results exceed applicable screening levels

Figures





LEGEND

- ● Proposed Phase 2 Sample Location
- ● Contingent sample locations, may be adjusted in field based on X-ray Fluorescence Results
- ● Soil Boring
- Proposed Trench
- Property Boundary
- Caltrans ROW
- AOC14 Boundary
- Debris Features
- Potential Waste Disposal Location
- Potential Burning Related Location
- Approximate Location of Stormwater Piping Below Ground
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- ☐ 50-Foot Sampling Grid

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. * = White Powder Sample
5. ^ = Black Sandy Material
6. ^^= Debris
7. Results greater than Background (39.8 mg/kg) are shown in BLUE.
8. Results greater than or equal to the U.S. Environmental Protection Agency Residential Regional Screening Level (280 mg/kg) are shown in ORANGE.
9. J = Estimated Result.
10. Ecological Comparison Value (36.3 mg/kg) is below background value; therefore, the screening level is set at the background value.
11. Topographic contours are shown at 2 foot intervals.

0 25 50 100
Feet
N

FIGURE C7-1
Total Chromium Soil Sample Results and Proposed Phase 2 Sampling Locations AOC14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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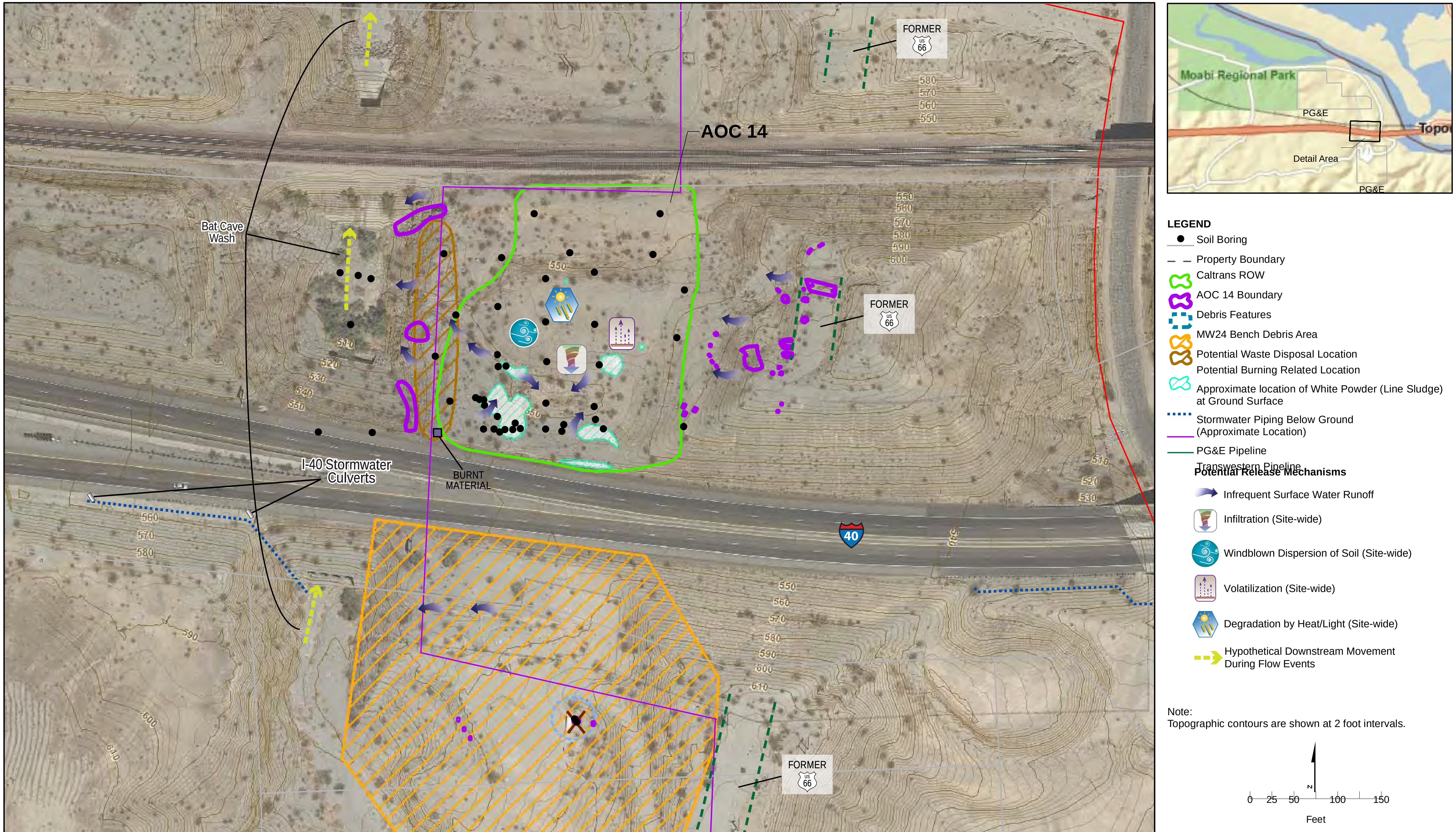
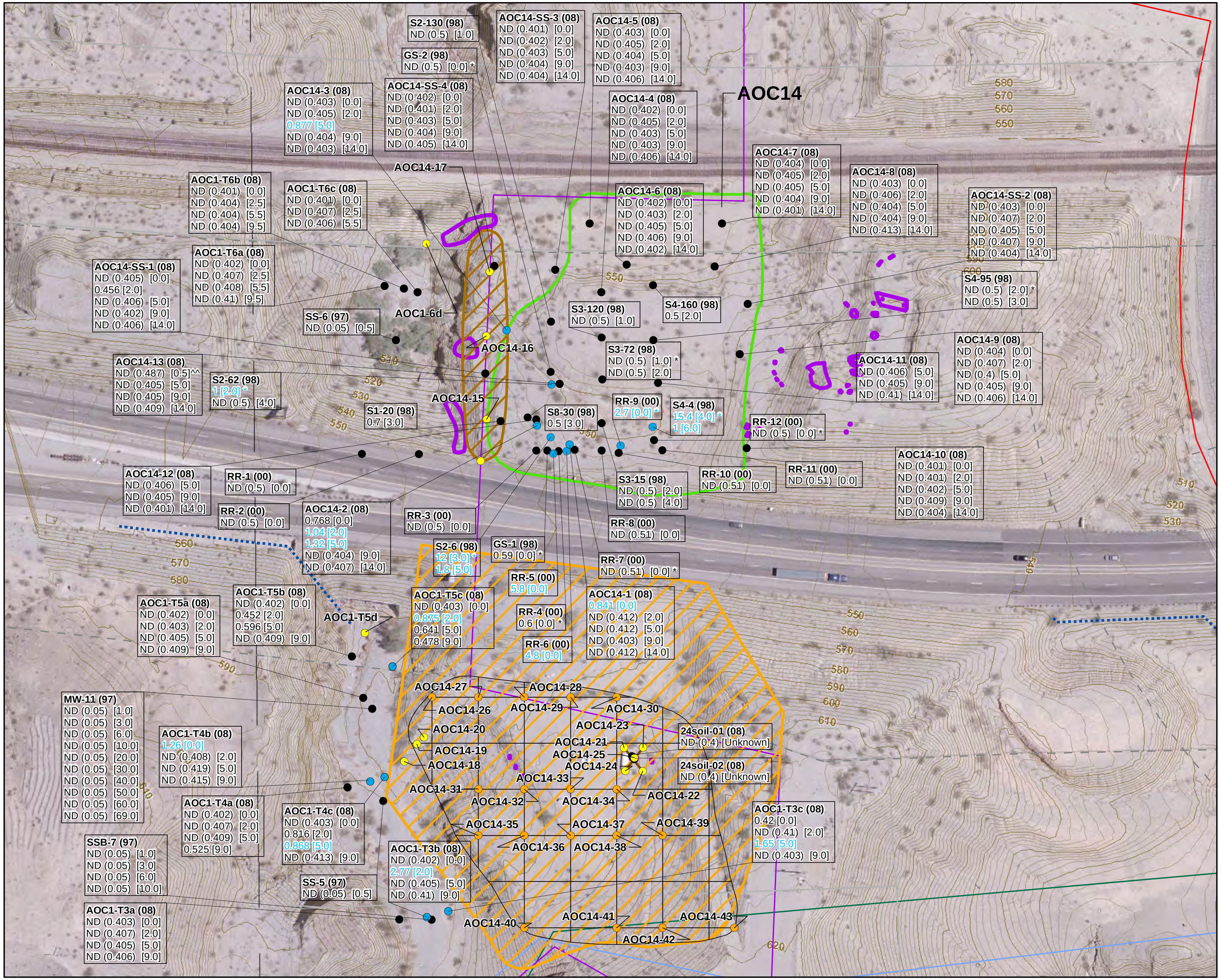


FIGURE C7-2
Conceptual Site Model for AOC-14
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California



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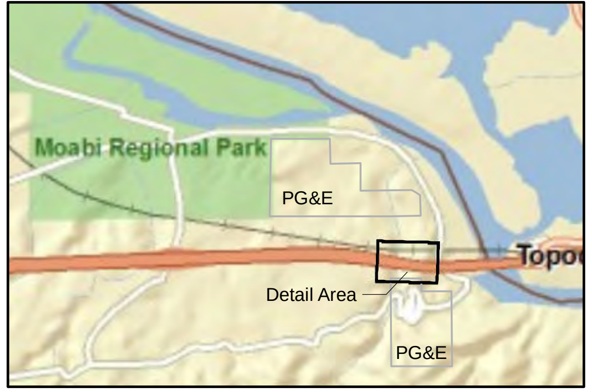

LEGEND

●	Proposed Phase 2 Sample Location
●	Contingent sample locations, may be adjusted in field based on X-ray Fluorescence Results
●	Soil Boring
—	Proposed Trench
—	Property Boundary
– –	Caltrans ROW
▨	AOC14 Boundary
▨	Debris Features
▨	Potential Waste Disposal Location
▨	Potential Burning Related Location
—	Transwestern Pipeline
—	Mojave Pipeline
—	PG&E Pipeline
—	SoCal Gas Pipeline
······	Approximate Location of Stormwater Piping Below Ground
☐	50-Foot Sampling Grid

SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. * = White Powder Sample
5. ^^= Debis
6. Results greater than Background (0.83 mg/kg) are shown in BLUE.
7. Results greater than or equal to the Ecological Comparison Value (139.6 mg/kg) are shown in PURPLE.
8. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (17 mg/kg) are shown in ORANGE.
9. J = Estimated Result.
10. Topographic contours are shown at 2 foot intervals.

0 25 50 100 150
Feet
N

FIGURE C7-3
Hexavalent Chromium Soil Sample Results and Proposed Phase 2 Sample Locations AOC14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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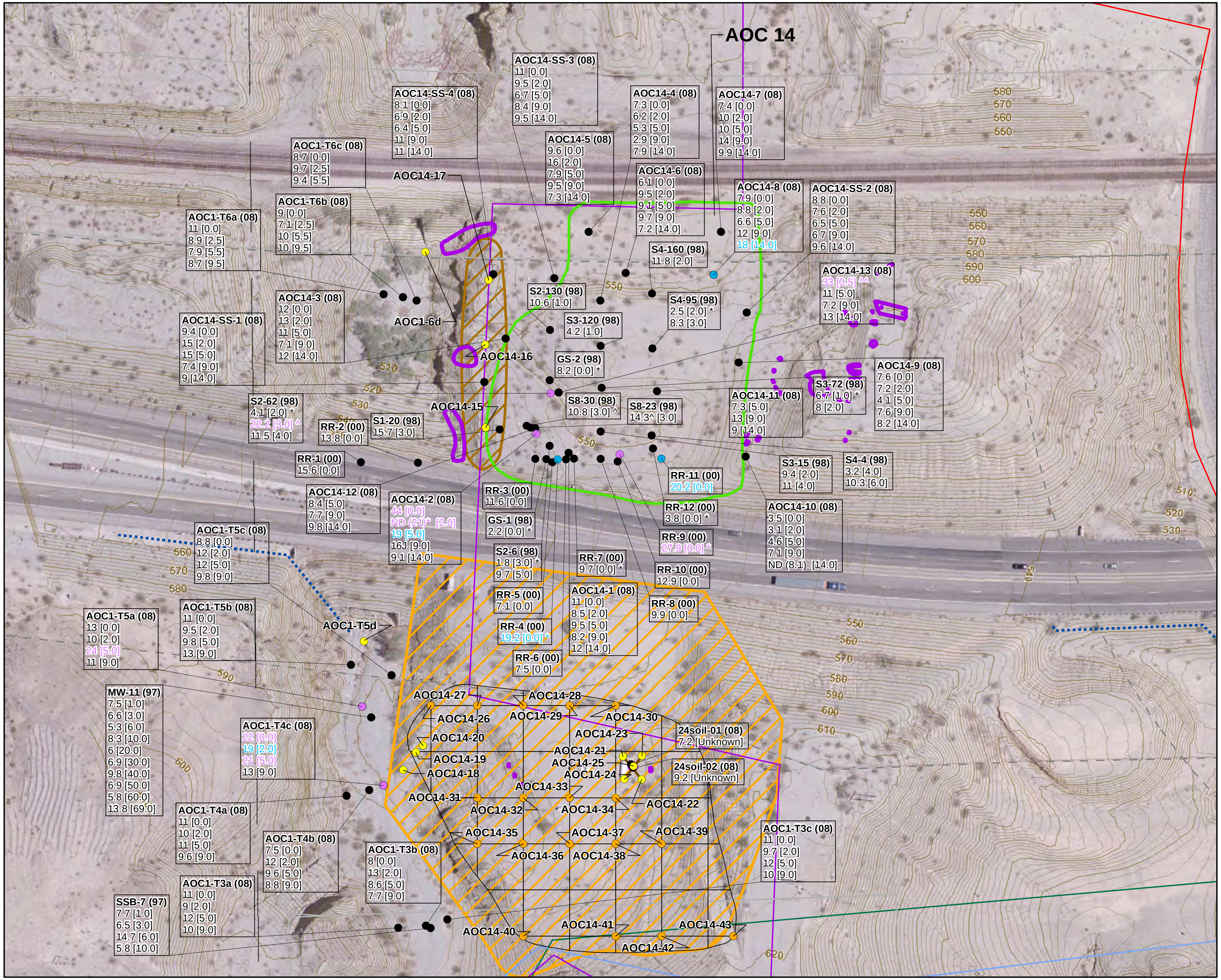

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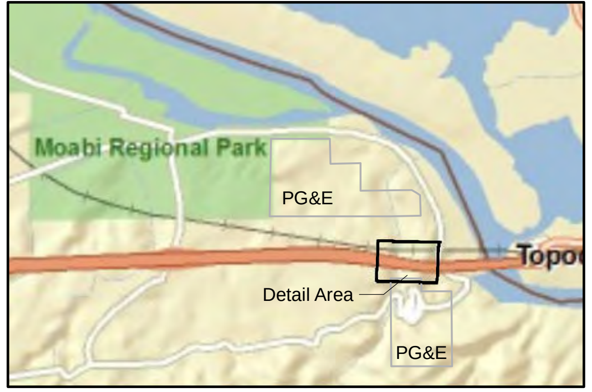


LEGEND

- ● Proposed Phase 2 Sample Location
- ● Contingent sample locations, may be adjusted in field based on X-ray Fluorescence Results
- ● Soil Boring
- Proposed Trench
- Property Boundary
- Caltrans ROW
- AOC14 Boundary
- Debris Features
- Potential Waste Disposal Location
- Potential Burning Related Location
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Approximate Location of Stormwater Piping Below Ground
- ☐ 50-Foot Sampling Grid

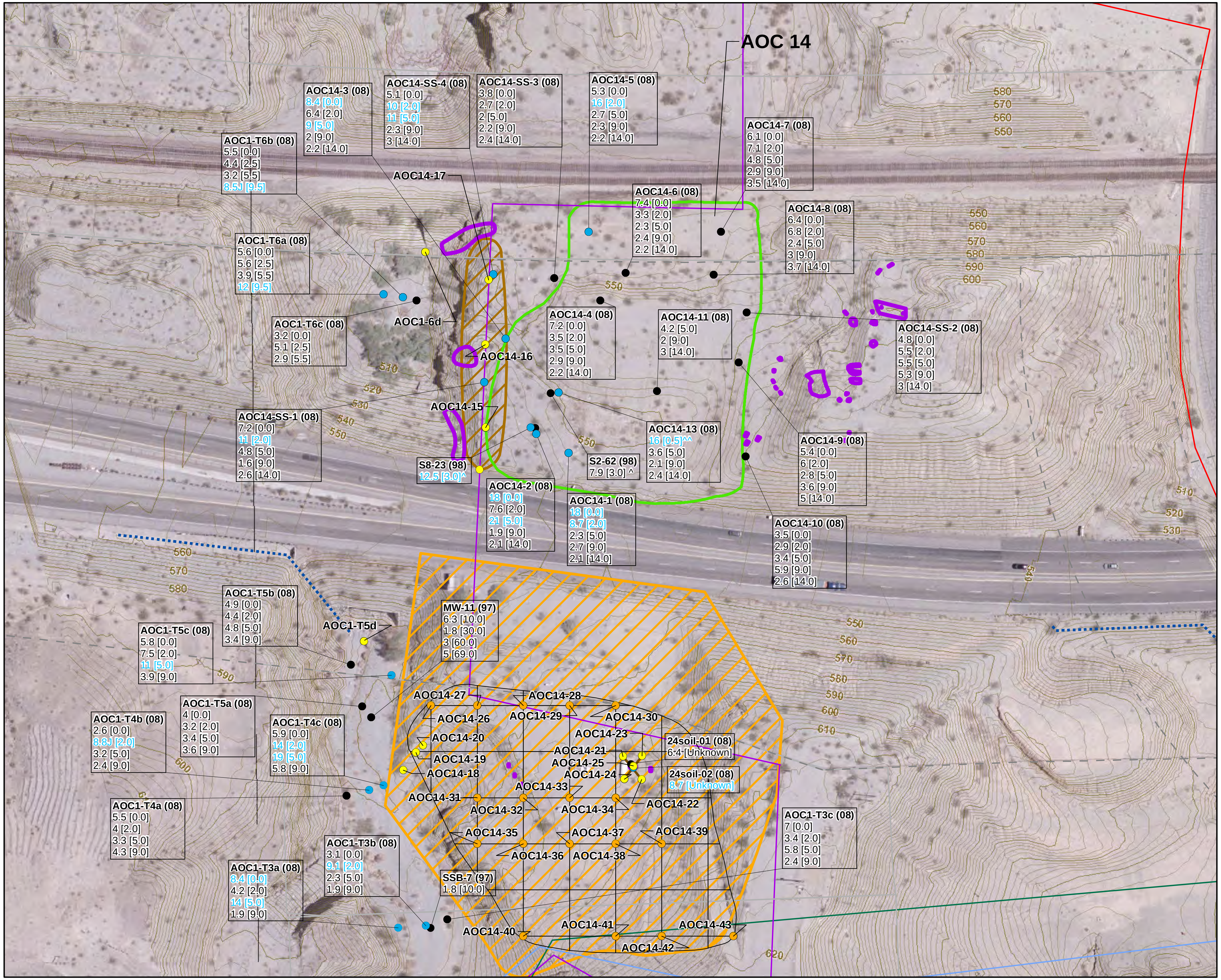
SSB-7 (08) — Sample Location; Installation Date
20 [1] — Sample Beginning Depth (ft bgs); Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. * = White Powder Sample
5. ^ = Black Sandy Material
6. ^^= Debis
7. Results greater than Background (16.8 mg/kg) are shown in BLUE.
8. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are shown in PURPLE.
9. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3,000 mg/kg) are shown in ORANGE.
10. J = Estimated Result.
11. Topographic contours are shown at 2 foot intervals.

0 25 50 100 150
Feet
N

FIGURE C7-4
Copper
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California



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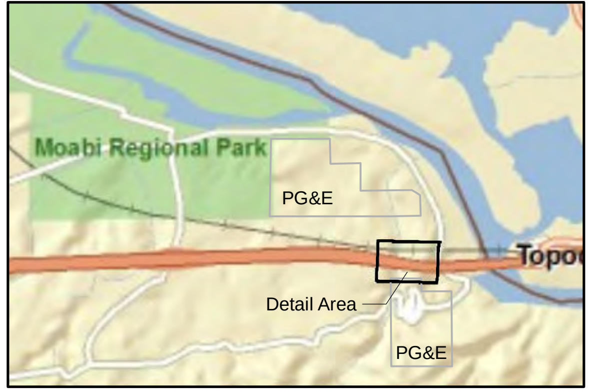

LEGEND

- ● Proposed Phase 2 Sample Location
- ● Contingent sample locations, may be adjusted in field based on X-ray Fluorescence Results
- ● Soil Boring
- Proposed Trench
- Property Boundary
- Caltrans ROW
- AOC14 Boundary
- Debris Features
- Potential Waste Disposal Location
- Potential Burning Related Location
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Approximate Location of Stormwater Piping Below Ground
- ☐ 50-Foot Sampling Grid

SSB-7 (08) — Sample Location — Installation Date
20 [1] — Sample Beginning Depth (ft bgs) — Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. ^ = Black Sandy Material
5. ^^= Debis
6. Results greater than Background (8.39 mg/kg) are shown in BLUE.
7. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (150 mg/kg) are shown in ORANGE.
8. J = Estimated Result.
9. Ecological Comparison Value (0.0166 mg/kg) is below background value; therefore, the screening level is set at the background value.
10. Topographic contours are shown at 2 foot intervals.

0 25 50
Feet

N

FIGURE C7-5
Lead
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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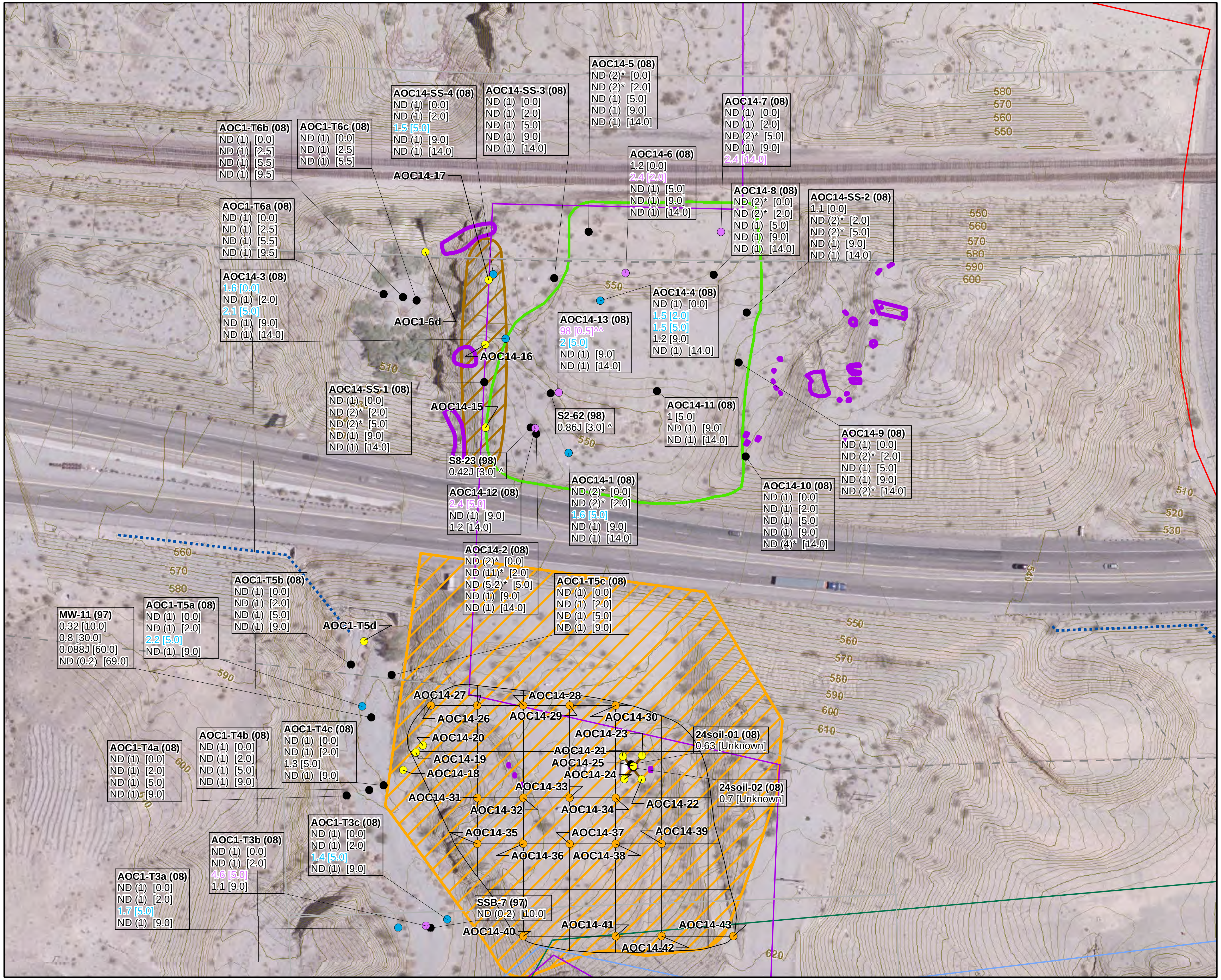

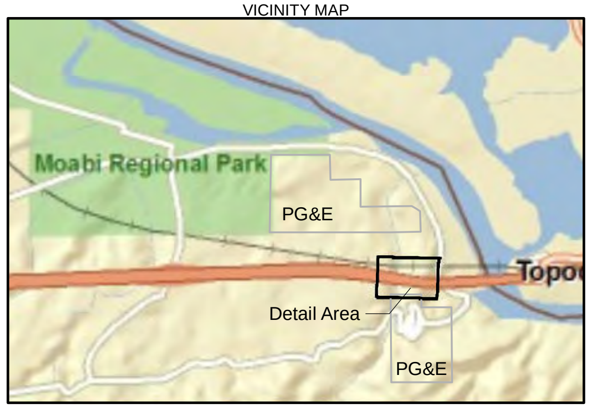

LEGEND

- 🟡 Proposed Phase 2 Sample Location
- 🟠 Contingent sample locations, may be adjusted in field based on X-ray Fluorescence Results
- ● Soil Boring
- Proposed Trench
- Property Boundary
- Caltrans ROW
- AOC14 Boundary
- Debris Features
- New Waste Disposal Location
- Potential Burning Related Location
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Approximate Location of Stormwater Piping Below Ground
- ☐ 50-Foot Sampling Grid

SSB-7 (08) — Sample Location, Installation Date
20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (1.37 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (2.25 mg/kg) are shown in PURPLE.
6. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (380 mg/kg) are in shown in ORANGE.
7. J = Estimated Result.
8. ^ = Black Sandy Material
9. ^^ = Debris
9. * = Laboratory reporting limit exceeds screening levels.
10. Topographic contours are shown at 2 foot intervals.

0 — 200 Feet
N

FIGURE C7-6
Molybdenum
Soil Sample Results and Proposed Phase 2 Sample Locations
AOC14 - Railroad Debris Site

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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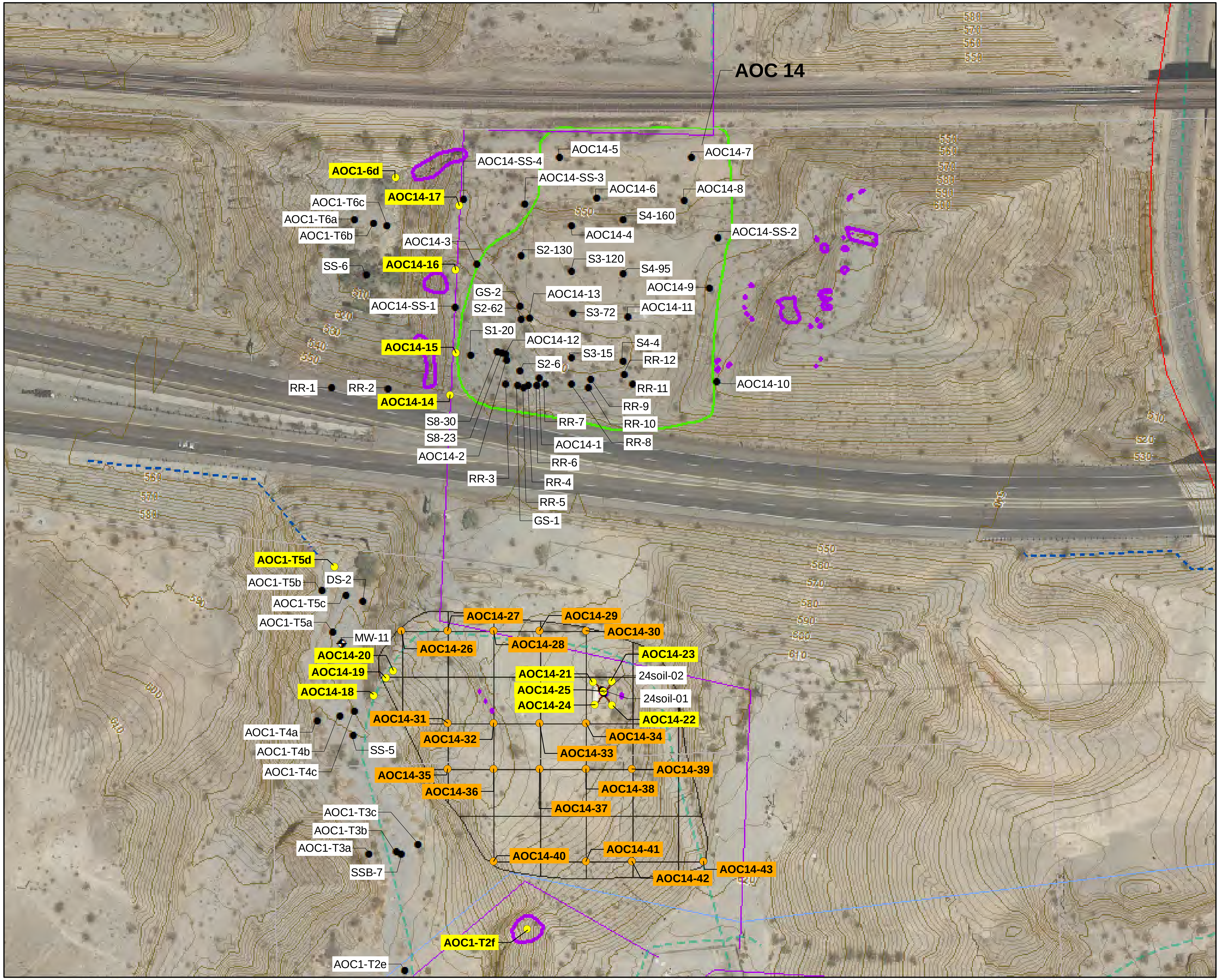

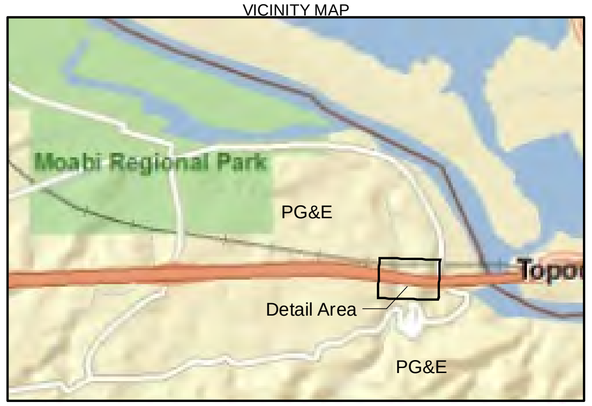

LEGEND

- ● Proposed Phase 2 Sample Location
- ● Contingent sample locations, may be adjusted in field based on X-ray Fluorescence Results
- ● Soil Boring
- ⊕ Monitoring Well
- — Proposed Trench
- - - Access Routes
- — Property Boundary
- ▢ AOC 14 Boundary
- ▢ Debris Features
- ▢ Potential Waste Disposal Location
- ▢ Potential Burning Related Location
- — Transwestern Pipeline
- — Mojave Pipeline
- — PG&E Pipeline
- — SoCal Gas Pipeline
- ☐ 50-Foot Sampling Grid
- - - Stormwater Piping Below Ground

Note:
1. Topographic contours are shown at 2 foot intervals.

FIGURE C7-7
Proposed Phase 2 Soil Sample Locations AOC 14 - Railroad Debris Site

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

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Appendix C8
Undesignated Area 1 Data Gaps
Evaluation Results

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Section **Page**

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1.0 Introduction and Background C8-1

2.0 Background C8-1

3.0 Historical Aerial Photographs Review of Undesignated Area 1 – Potential Pipe Disposal Area C8-2

4.0 Proposed Further Investigation C8-3

Table

C8-1 Summary of Aerial Photographs, 1936 to 2004

Figure

C8-1 Undesignated Area 1 Potential Locations
C8-2 1936 Aerial Photograph
C8-3 1942 Aerial Photograph
C8-4 1944 Aerial Photograph
C8-5 1953 Aerial Photograph
C8-6 1955 Aerial Photograph
C8-7 1956 Aerial Photograph
C8-8 1961 Aerial Photograph
C8-9 1962 Aerial Photograph
C8-10 1964 Aerial Photograph
C8-11 1967 Aerial Photograph
C8-12 1969 Aerial Photograph
C8-13 1975 Aerial Photograph
C8-14 Undated Photograph: Sometime between 1973 and 1989
C8-15 1992 Aerial Photograph
C8-16 1994 Aerial Photograph
C8-17 1997 Aerial Photograph
C8-18 2004 Aerial Photograph

Acronyms and Abbreviations

bgs	below ground surface
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
PG&E	Pacific Gas and Electric Company
ROW	right-of-way
UA	Undesignated Area
UU	undifferentiated utility

APPENDIX C8

Undesignated Area 1 Data Gaps Evaluation Results

1.0 Introduction and Background

This sub-appendix presents the results of the Data Gaps Evaluation for Undesignated Area (UA) 1 – Potential Pipeline Disposal Area at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. Analytical data have not been collected at UA 1; therefore, the process for the data gaps evaluation that is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report is not used to assess this area. This sub-appendix presents the background information regarding this area, including the geophysical survey that was conducted as part of the 2008 field activities, and proposed further investigation at this area.

2.0 Background

During site historical data gathering, a former employee identified an area just north of the gas pipeline road near the former evaporation ponds as a potential historical asbestos-containing material disposal site. The former employee described 20-foot lengths of asbestos-covered metal pipes as having been buried in a trench immediately north of the pipeline road, across from the northern boundary of the former pounds, shown on Figure C8-1 as UA-1.

During the 2008 field investigation, a geophysical survey was performed in UA 1 to evaluate the potential presence of buried asbestos-wrapped metal pipes in this area and to identify the location of underground utility infrastructure. Results of the geophysical survey did not suggest the presence of buried pipes in this area; however, several small metallic anomalies and two undifferentiated utilities (UUs) were observed sporadically across the UA 1 area. One UU was truncated in the north and extended out of the survey area in the south, and the other UU was located in the southern portion of the survey area trending east-west within the alignment of the access road adjacent to UA 1. The UU within the access road was identified as the former wastewater transference pipeline that transferred non-hazardous waste water from the compressor station to the evaporation ponds. This pipeline was abandoned in place in 2007 when it was replaced with a new transfer pipeline. The complete geophysical survey results are presented in Appendix B to the Data Gaps Evaluation Report.

Following the geophysical survey, further visual assessment of the area in the vicinity of UA 1 identified miscellaneous pipe band clamps and small quantities of insulation on the ground surface at a second location approximately 200 to 250 feet to the east of UA 1. A pronounced soil mound approximately 100 feet long by 25 feet wide was also observed in this area and is shown in Figure C8-1 as UA-1A.

During a follow-up interview with the same former employee in early 2011, the employee indicated that he did not remember the burial location with precision. He indicated that the original location, the second location described in the preceding paragraph, and a third location to the west of the originally identified location are all potential locations for the burial. The third locations is shown on Figure C8-1 as UA-1B. The employee indicated that the burial occurred in the 1970s or 1980s and his memory did not allow him to precisely determine which of the three locations are the most likely burial site. Therefore, PG&E intends to investigate all three potential areas identified by the former employee.

3.0 Historical Aerial Photographs Review of Undesignated Area 1 – Potential Pipe Disposal Area

As requested by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in a December 13, 2010 e-mail, PG&E performed a detailed historical aerial photograph analysis near UA-1 and the immediate surrounding area to determine/identify evidence of soil disturbances, including potential pipe disposal (Figure C8-1). All available and applicable historical aerial photographs which span from 1936 to 2004 were reviewed in detail. The date for one of the aerial photographs reviewed is not known with certainty, although it was taken after 1973 and before 1989. Additionally, aerial photographs from the late 1940s, 1947, 1951, 1957, 1960, 1966, 1970, 1973, 1976, 1981, 1983, 1995, 2001, 2005, and 2006 were also viewed but did not show UA-1 or the immediate vicinity; therefore, these aerial photographs are not discussed further in this document.

Table C8-1 presents a summary of the information observed in each of the applicable aerial photographs reviewed. The aerial photographs are presented in Figures C8-2 through C8-18. The approximate location of UA-1 is shown in these figures.

TABLE C8-1
Summary of Aerial Photographs, 1936 to 2004
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

Year	Description
1936, 1942, and 1944 (Figures C8-2, C8-3, and C8-4)	UA-1 and the surrounding area are undeveloped. An undeveloped desert road with a north-south orientation is located in the general area of UA-1 (see arrows in figures). No evidence of other constructed features or other soil disturbance is visible in UA-1 or surrounding area.
1953 (Figure C8-5)	The compressor station (built in 1951) is present in this aerial photograph (see arrow #1 in figure). The pipeline right-of-way (ROW) and road south of UA-1 is now visible (see arrow #2 in figure). There are several smaller roads/paths/turnaround loops stemming off the pipeline ROW (see arrow #3 in figure). What appears to be a small constructed structure is present north of the pipeline ROW (see arrow #4 in figure). Soil disturbance appears to be limited to ROW clearing and road construction.
1955 & 1956 (Figures C8-6 and C8-7)	The small constructed structure north of the pipeline ROW is no longer visible (see arrow in figures). No significant changes in manmade features or soil disturbance in UA-1 and the surrounding area can be seen between the 1953, 1955, and 1956 aerial photographs.

TABLE C8-1
Summary of Aerial Photographs, 1936 to 2004
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station, Needles, California

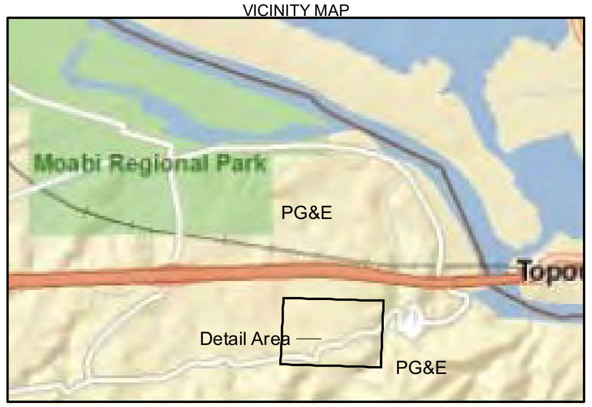
Year	Description
1961 and 1962 (Figures C8-8 and C8-9)	A new pipeline ROW and/or pipeline road is visible to the north and parallel to the existing pipeline ROW (see arrow #1 in figures). Several access roads connecting the new pipeline ROW and the existing pipeline ROW are visible (see arrow #2 in figures). No evidence of other constructed features or other soil disturbance is visible in UA-1 or the surrounding area.
1964 (Figure C8-10)	Several white areas near the pipeline ROWs are visible in this photograph (see arrow #1 in figure). These white areas were not identified in the previous aerial photos, perhaps because those photos were overexposed. A black feature is visible to the south of the pipeline road (see arrow #2 in figure). No other changes can be seen between the 1961 and 1962 photographs and the 1964 photograph.
1967 (Figure C8-11)	No significant changes in manmade features or soil disturbance in UA-1 and the surrounding area can be seen between 1964 and 1967 photographs.
1969 (Figure C8-12)	The white areas near the pipeline ROWs are no longer visible in this photograph. No significant changes in constructed features or soil disturbance in UA-1 and the surrounding area can be seen between 1967 and 1969 photographs.
1975 (Figure C8-13)	The old evaporation ponds are visible south of the pipeline ROW (see arrow #1 in figure). No other changes in constructed features or soil disturbance in UA-1 and the surrounding area can be seen between 1969 and 1975 photographs.
Undated Photo: Sometime Between 1973 and 1989 (Figure C8-14)	What appears to be a constructed structure is visible south of the UA-1 area along the pipeline ROW (see arrow #1). The old evaporation ponds are visible south of the pipeline road (see arrow #2). Dark marks or shadows appear on a portion of the pipeline road to the east of the UA-1 area (see arrow #3).
1992, 1994, 1997, and 2004 (Figures C8-15, C8-16, C8-17, and C8-18)	The northern-most pipeline ROW was widened significantly (see arrow #1 in figures) for the installation of the new Mojave Gas Pipeline in 1992. The old and new evaporation ponds are visible south of the pipeline road (see arrows #2 and #3 in figures).

4.0 Proposed Further Investigation

Per the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) 2007 conditional approval and additional clarification in 2010, PG&E has expanded the potential work area, as shown in Figure C8-1. As directed by DTSC in the December 13, 2010 email, PG&E proposes to perform an additional geophysical survey at the original UA-1 location to further evaluate the two UUs observed in the original UA-1 area. In addition, PG&E proposes to conduct a geophysical survey in both of the new areas (UA-1A and UA-1B) identified during the latest interview with the former employee to attempt to verify the presence of the buried pipelines and their specific placement. If the geophysical surveys provide new information regarding the two UUs in the original UA-1 location or indicate the type of anomalies suggestive of buried metal piping in the UA-1 alternate locations, PG&E will present/discuss the information with agencies and stakeholders.

Figures

VICINITY MAP



LEGEND

- Potential Work Area
- UA1 Boundary
- PG&E Pipeline
- Limits of 2008 Geophysical Survey
- Unidentified Linear Anomaly
- Vertical Magnetic Gradient Contour
  Contour Interval = 10 n Tm
- Evaporation Pond Waste
  Water Pipeline (Abandoned)

Note:
Topographic contours shown are in 2 foot intervals.

N

0 50 100 150 200 250 300 350
Feet

FIGURE C8-1
UA-1 Potential Pipeline Disposal Area

Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:
Fairchild Aerial Photography Collection
Whittier College
Whittier, CA   90608

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-2
1936
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:
Fairchild Aerial Photography Collection
Whittier College
Whittier, CA 90608

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-3
1942
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:
Fairchild Aerial Photography Collection
Whittier College
Whittier, CA 90608

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-4
1944
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:
USDA photo via
County of San Bernardino Flood Control District
825 E. Third Street
San Bernardino, CA 92415-0835

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-5
1953
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:
NOAA National Geodetic Survey, SSMC#3
Information Services Branch, N/NGS12
1315 East West Highway
Silver Spring, MD 20910

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-6
1955
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:

Unknown

- Appropriate location of Undesignated Area 1

FIGURE C8-7
1956
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:
NOAA National Geodetic Survey, SSMC#3
Information Services Branch, N/NGS12
1315 East West Highway
Silver Spring, MD 20910

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-8
1961
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:
NOAA National Geodetic Survey, SSMC#3
Information Services Branch, N/NGS12
1315 East West Highway
Silver Spring, MD 20910

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-9
1962
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

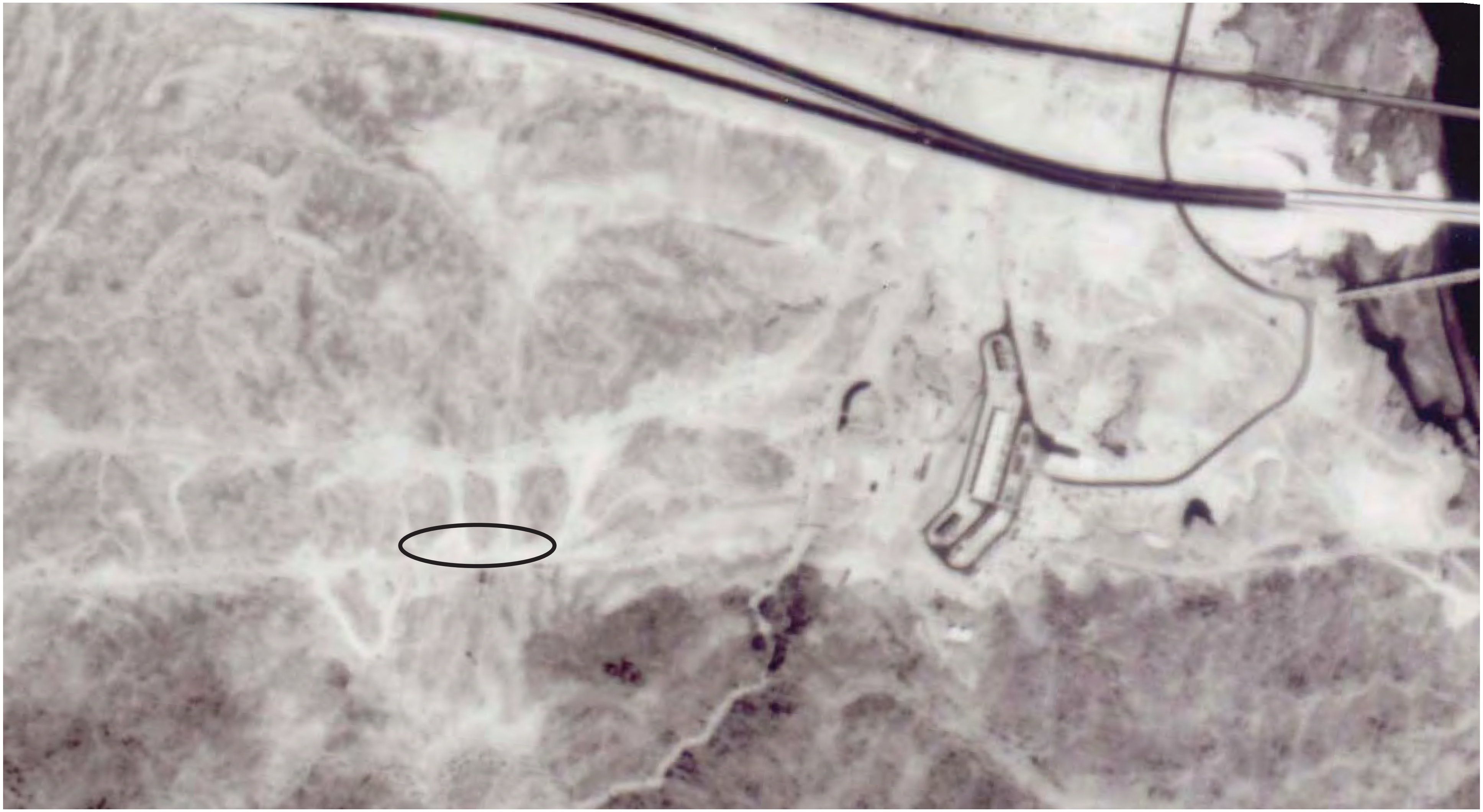
CH2MHILL

Source:
US Bureau of Reclamation
Lower Colorado Region
P.O. Box 61470
Boulder City, NV 89006-1470

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-10
1964
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL



Source:
US Bureau of Reclamation
Lower Colorado Region
P.O. Box 61470
Boulder City, NV 89006-1470

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-11
1967
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

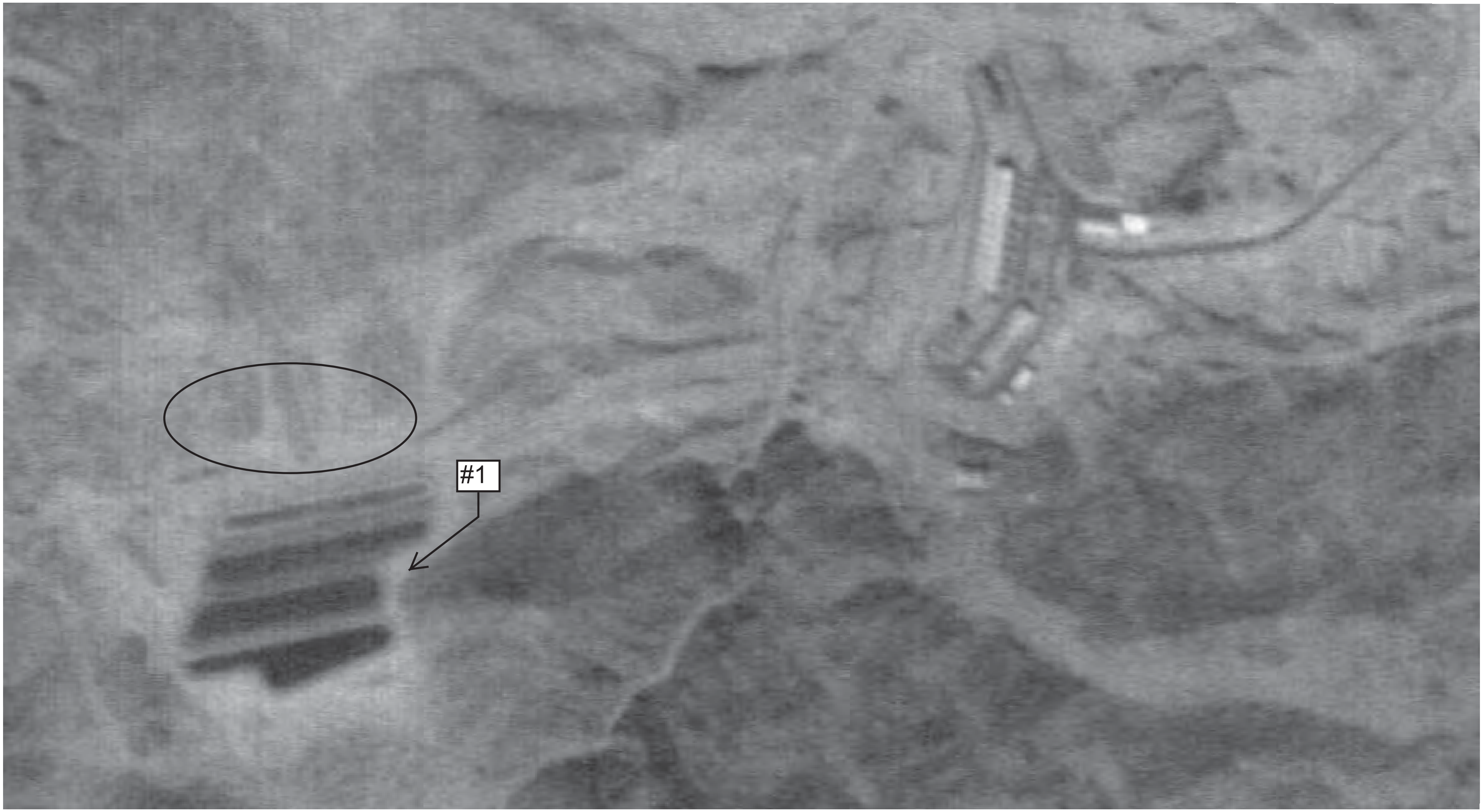
CH2MHILL

Source:
USGS Rocky Mountain Mapping Center
Earth Science Information Center
Box 25046, Stop 504, DFC
Denver, CO 80255

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-12
1969
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL



Source:
USGS Rocky Mountain Mapping Center
Earth Science Information Center
Box 25046, Stop 504, DFC
Denver, CO 80255

⬭ Appropriate Location of Undesignated Area (UA1)

FIGURE C8-13
1975
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:

Unknown

Appropriate Location of Undesignated Area (UA1)

FIGURE C8-14

Undated Photograph: Sometime between 1973 and 1989

Pacific Gas and Electric Company Topock Compressor Station

Needles, California

CH2MHILL

Source:

Unknown

⬭ - Appropriate location of Undesignated Area 1

FIGURE C8-15
1992
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:

Unknown

Appropriate Location of Undesignated Area (UA1)

FIGURE C8-16
1994
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

Source:

Pacific Gas and Electric Company

- Appropriate location of Undesignated Area 1

FIGURE C8-17
1997
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Source:

Unknown

⬭ Appropriate Location of Undesignated Area (UA1)

FIGURE C8-18
2004
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

Appendix C9
Undesignated Area 2 Data Gaps Evaluation Results

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Acronyms and Abbreviations

bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
CMS/FS	corrective measures study/feasibility study
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TTLC	total threshold limit concentration
UA	Undesignated Area
VOC	volatile organic compound

ATTACHMENT C9

Unidentified Area 2 Data Gaps Evaluation Results

1.0 Introduction and Background

This attachment presents the results of the Data Gaps Evaluation for Undesignated Area (UA) 2 – Former 300B Pipeline Liquids Tank Area at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

PG&E's 300B pipeline was formerly equipped with a 900-gallon-capacity aboveground drip tank. The 300B Pipeline Liquids Tank was formerly used to collect pipeline liquids from the 300B natural gas pipeline. The drip tank was located southeast of the plant on a shelf in the hill next to a section of old Route 66, as shown in Figure C9-1. (All tables and figures appear at the end of this attachment.) The tank was 2 feet, 10 inches in diameter and 20 feet long. It was an aboveground tank located on two concrete saddle supports. The tank pad was unpaved (CH2M HILL, 2006). In 1994, oil-stained soil was observed underneath and immediately adjacent to a portion of the tank, and an initial site investigation was performed on December 2, 1994. Samples were analyzed for total petroleum hydrocarbons in the motor-oil range (TPH-motor-oil). Low levels of TPH-motor-oil were detected at 1.2 and 2 feet below ground surface (bgs) (CH2M HILL, 2006). The tank was subsequently removed in 1995. One surface soil sample was collected on April 16, 1996 to characterize the stained soil for future disposal. The soil sample was analyzed for total recoverable petroleum hydrocarbons (TRPH), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and California Assessment Method 17 metals. TRPH was detected at an elevated concentration. Metals, VOCs, SVOCs, and PCBs were sampled at a location coincident with the highest level of TRPH, and analytical results indicated no elevated concentrations of these constituents; therefore, TRPH was considered the only constituent of concern.

A closure plan was submitted in May 1996 to remove the TRPH-impacted soil (Trident, 1996a). The cleanup was implemented and soil excavation was conducted between July 18, 1996 and September 26, 1996. Four rounds of excavation were performed, with a total excavation depth of 5.5 feet bgs. Confirmation samples were collected after each round of excavation. The cleanup target was 1,000 milligrams per kilogram (mg/kg) TRPH. Samples collected during the last two sampling events indicated that the soil remaining in place below and adjacent to the excavation contained TRPH at concentrations ranging from less than analytical detection limits to 150 mg/kg. The soil excavation and sampling results are documented in the Closure Certification Report (Trident, 1996b).

The County of San Bernardino, County Fire Department, Hazardous Materials Management Division issued a closure letter on June 9, 1997 confirming the completion of the site investigation and remedial action for the contaminated soil at this site.

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) requested additional sampling at this site. The area of potential contamination is small (20 feet by 40 feet). Based on DTSC's request, the Soil Part A Work Plan recommended further characterization at UA 2 (CH2M HILL, 2006).

A graphical conceptual site model has been developed for UA 2 based on the above site history and background and is shown in Figure C9-1. Table C9-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for UA 2. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the Soil Part A Data Quality Objective Tech Memo, included as Appendix A to the Data Gaps Evaluation Report.

The primary sources of contamination in UA 2 consisted of potential historic spills while filling or emptying the tank, and potentially historic leaks from the tank. Any constituents released would have been released in liquid form and released to surface soil. Surface soil is therefore the primary source medium. The majority of the affected soil has been removed, as documented by post-remediation confirmation sampling. Because the materials released in this area were pipeline liquids (i.e., primarily low-volatility hydrocarbons), they had limited migration potential; however, some contaminants could have infiltrated from surface soil into underlying shallow soil. Potential migration from subsurface soil to groundwater was identified as a potential secondary pathway. During extreme wet weather events, it is possible that some constituents may have been transported from the unit to the adjacent pipeline road in surface run-off. If released, VOCs in surface soils would be expected to have been degraded by heat and light and are likely no longer present.

Part A Phase 1 and historical soil samples were collected in the area in and around where the former aboveground storage tank had been located.

1.2 C9UA 2 Data

Historical sampling occurred at UA 2; however, the data are considered Category 3, which are not usable for site characterization or risk assessments. Historical sample location HDTP is shown on Figure 9-1. Historical sample location could not be located because previous reports do not provide a figure showing this location.

During the 2008 Part A Phase 1 Soil Investigation, 17 soil samples (from 0 to 0.5, 0.5 to 1, 2 to 3, and a few at 5 to 6 feet bgs) were collected from five sample locations (UA2-300B-1 through UA2-330B-5), as shown in Figure C9-2. Phase 1 soil samples collected in UA 2 were analyzed for Title 22 metals, hexavalent chromium, VOCs, SVOCs, polycyclic aromatic hydrocarbons (PAHs), TPH, pH, pesticides, and PCBs. Ten percent of the Phase 1 soil samples (two samples) were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL). Soil results were validated, and the data quality evaluation is included in Appendix D to the Data Gaps Evaluation Report.

All validated Phase 1 data are Category 1 and were used as inputs to the four data quality objectives decisions.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of chemicals of potential concern (COPCs) and chemicals of potential ecological concern (COPECs) at UA 2. Laboratory analytical results for Phase 1 soil samples at UA 2 are presented in Tables C9-2 through C9-7. Table C9-8 presents a statistical summary of soil analytical results for COPCs and COPECs that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one more samples was greater than the interim screening value.

2.1 Summary of UA 2 Soil Data

Antimony, beryllium, cadmium, hexavalent chromium, mercury, selenium, silver, thallium, cyanide, TPH in the gasoline range (TPH-gasoline), pesticides, and PCBs were not detected in any soil samples collected in UA 2.

Table C9-8 lists the 28 constituents, including three calculated quantities (benzo(a)pyrene equivalents, total low molecular weight PAHs, and total high molecular weight PAHs) detected at UA 2. Seven of the detected constituents (aluminum, calcium, iron, magnesium, manganese, potassium, and sodium) were detected in the TAL/TCL samples.

Twenty-three of the 28 detected constituents (total chromium, cobalt, copper, molybdenum, nickel, vanadium, aluminum, calcium, iron, magnesium, potassium, sodium, 4-methylphenol, bis(2-ethylhexyl)phthalate, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, phenanthrene, total low molecular weight PAHs, total high molecular weight PAHs, benzo(a)pyrene equivalents, TPH in the diesel range [TPH-diesel], and TPH-motor-oil) were detected at concentrations below their respective interim screening levels. Five constituents (arsenic, barium, lead, manganese, and zinc) were detected one or more times at concentrations exceeding interim screening levels.

Arsenic and zinc were detected four or more times above their respective interim screening levels; the distribution of these constituents are shown in Figures C9-2 and C9-3.

2.2 Nature and Extent Evaluation

The following subsection discusses the nature and extent of detected COPCs and COPECs detected above interim screening levels at UA 2. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Section 2.5 of this attachment summarizes the constituents that may require further evaluation, and Section 6.0 of this attachment provides the recommended follow-up sampling for the Part A Phase 2 soil investigation.

2.2.1 Arsenic

Arsenic was detected in 17 of 17 soil samples collected at UA 2. Detected concentrations of arsenic exceeded the interim screening level (11 mg/kg) (background threshold value

[BTV]) seven times (maximum concentration of 24 mg/kg at UA2-300B-1), as shown in Tables C9-2 and C9-8 and Figure C9-2. All seven of these detected concentrations of arsenic also exceeded the ecological comparison value (ECV) (11.4 mg/kg).

Although the site data set for arsenic appears to exceed background, the arsenic concentrations detected at UA 2 may represent a different background population from the sample population used to establish background comparison concentrations. UA 2 is located on bedrock, whereas the majority of the samples comprising the background data set were collected from alluvial material. The potential for the arsenic concentrations detected at this unit to represent background concentrations was evaluated statistically and visually via probability plots, see Section 2.4 of this attachment for more information.

The lateral and vertical extents of arsenic concentrations exceeding the interim screening level have been defined to natural boundaries (i.e., dirt road to the north, bedrock at 5.5 feet bgs, bedrock outcropping to the east and south, and steep slope to the west).

2.2.2 Barium

Barium was detected in 17 of 17 soil samples collected from UA 2. Detected concentrations of barium exceeded the interim screening level (410 mg/kg) (background value/ECV) twice (at UA2-300B-2 [520 mg/kg at 0.5 to 1 feet bgs and UA2-300B-3 [890 mg/kg at 5 to 6 feet bgs]), as shown in Tables C9-2 and C9-8. None of the detected concentrations exceeded residential and commercial/industrial DTSC California human health screening levels (CHHSLs) (5,200 mg/kg and 63,000 mg/kg, respectively). These locations are located along the northwestern boundaries of this area.

The lateral and vertical extents of the barium concentrations exceeding the interim screening level have been defined to natural boundaries (i.e., dirt road to the north, bedrock at 5.5 feet bgs, bedrock outcropping to the east and south, and steep slope to the west).

2.2.3 Lead

Lead was detected in 17 of 17 soil samples collected at UA 2. Detected concentrations of lead exceeded the interim screening level (8.39 mg/kg) (background value/ECV) once (13 mg/kg at UA2-300B-5), as shown in Tables C9-2 and C9-8. The detected concentration did not exceed the residential or commercial/industrial CHHSLs (80 mg/kg and 320 mg/kg, respectively). This location is surrounded by locations that have concentrations below the screening level. At these locations, the deepest samples have concentrations below the screening levels.

The lateral and vertical extents of the lead concentrations exceeding the interim screening level have been defined.

2.2.4 Zinc

Zinc was detected in 17 of 17 soil samples collected at UA 2. Detected concentrations of zinc exceeded the interim screening level (58 mg/kg) (BTV/ECV) 10 times (maximum detected concentration of 65 mg/kg at UA2-300B-3 and UA2-300B-5), as shown in Tables C9-2 and C9-8 and Figure C9-3. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively).

The lateral and vertical extents of zinc concentrations exceeding the interim screening level have been defined to natural boundaries (i.e., dirt road to the north, bedrock at 5.5 feet bgs, bedrock outcropping to the east and south, and steep slope to the west).

2.2.5 Target Analyte List/Target Compound List Constituents

As described above, aluminum, calcium, iron, magnesium, manganese, potassium, and sodium were detected in the two UA 2 soil samples analyzed for the complete TAL/TCL suite of compounds. Manganese is the only TAL/TCL constituent that was detected at concentrations exceeding its interim screening level in soil samples collected from UA 2.

Aluminum was detected in both surface soil samples collected from UA 2. Aluminum was detected at 11,000 mg/kg at both locations UA2-300B-1 and UA2-300B-5; this concentration is below the interim screening level (16,400 mg/kg) (BTV) as shown in Tables C9-3 and C9-8. The detected concentration did not exceed the residential or commercial/industrial CHHSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in both surface soil samples collected from UA 2. Detected concentrations of calcium (UA2-300B-1 [21,000 mg/kg] at 0 to 0.5 foot bgs and UA2-300B-5 [26,000 mg/kg] at 0 to 0.5 foot bgs) are below the interim screening level (66,500 mg/kg) (BTV), as shown in Tables C9-3 and C9-8. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in both surface soil samples collected from UA 2. Detected concentrations of iron (UA2-300B-1 [20,000 mg/kg] at 0 to 0.5 foot bgs and UA2-300B-5 [27,000 mg/kg] at 0 to 0.5 foot bgs) are below the interim screening level (55,000 mg/kg) (residential regional screening level), as shown in Tables C9-3 and C9-8. A BTV and an ECV have not been established for iron.

Magnesium was detected in both surface soil samples collected from UA 2. Detected concentrations of magnesium (UA2-300B-1 [7,400 mg/kg] at 0 to 0.5 foot bgs and UA2-300B-5 [8,900 mg/kg] at 0 to 0.5 foot bgs) are below the interim screening level (12,100 mg/kg) (BTV), as shown in Tables C9-3 and C9-8. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in both surface samples collected from UA 2. Detected concentrations of manganese exceeded the interim screening level (402 mg/kg) (BTV/ECV) twice (UA2-300B-1 [670 mg/kg at 0 to 0.5 foot bgs] and UA2-300B-5 [840 mg/kg at 0 to 0.5 foot bgs), as shown in Tables C9-3 and C9-8. Neither of the detected concentrations exceeded residential and commercial/industrial CHHSLs (1,800 mg/kg and 23,000 mg/kg, respectively).

Potassium was detected in both surface soil samples collected from UA 2. Detected concentrations of potassium (UA2-300B-1 [2,900 mg/kg] at 0 to 0.5 foot bgs and UA2-300B-5 [2,400 mg/kg] at 0 to 0.5 foot bgs) are below the interim screening level (4,400 mg/kg) (BTV), as shown in Tables C9-3 and C9-8. Residential and commercial CHHSLs and an ECV have not been established for potassium.

Sodium was detected in both surface soil samples collected from UA 2. Detected concentrations of sodium (UA2-300B-1 [230 mg/kg] at 0 to 0.5 foot bgs and UA2-300B-5

[210 mg/kg] at 0 to 0.5 foot bgs) are below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C9-3 and C9-8. Residential and commercial/industrial CHHSLs, regional screening levels, and an ECV have not been established for sodium.

As discussed in Section C.2 of the main text of Appendix C, PG&E recommends that none of the inorganic compounds discussed above (aluminum, calcium, iron, magnesium, manganese, potassium, and sodium) be considered a COPC/COPEC for this area, and no further sampling is recommended for these constituents. These constituents have been fully discussed in Section C.2 of Appendix C.

2.3 Central Tendency Comparison to Background Values

Five metals (arsenic, barium, lead, manganese, and zinc) were detected above their respective background values in soil samples collected from UA 2. A central tendency comparison was performed for four of the five metals (arsenic, barium, lead, and zinc) to compare the UA 2 soil data set for these metals with the corresponding Topock soil background data set to determine whether a difference exists between the two populations and whether additional sampling is required for a given metal, as shown in Table C9-9 and Figure 3-1 of the Data Gaps Evaluation Report.

Metals in either the UA 2 data set or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of manganese at UA 2 to conduct the test.

Results from the Gehan test indicated that site concentrations for arsenic, barium, lead, and zinc may exceed background, as shown in Table C9-9. The lateral and vertical extents of arsenic, barium, lead, and zinc have been adequately defined, as discussed above. Physical limitations (i.e., bedrock, bedrock outcroppings, and roads) prevent further samples at UA 2 for arsenic. Barium was detected in two soil samples at concentrations exceeding the BTV (410 mg/kg). Lead was detected in one soil sample at a concentration exceeding the BTV (8.39 mg/kg). Zinc was detected in ten soil samples at concentrations exceeding the BTV (58 mg/kg); however, the maximum detected concentration (65 mg/kg) only exceeds the BTV slightly.

After careful review of UA 2 site data and background data set for arsenic, barium, lead, and zinc, the difference between the two populations and concentrations detected is not considered substantial enough to warrant additional sampling at UA 2, especially in consideration of the physical limitations and characteristics of the site. Further evaluation of the arsenic data is provided in Section 2.4, below.

2.4 Arsenic Concentrations Background Assessment

Although the site data set for arsenic appears to exceed background, the arsenic concentrations detected at UA 2 may represent a different background population from the sample population used to establish background comparison concentrations. UA 2 is located on bedrock, whereas the majority of the samples comprising the background data set were collected from alluvial material. The potential for the arsenic concentrations detected at this unit to represent background concentrations was evaluated statistically and visually via probability plots. The distribution of detected arsenic concentrations at UA 2 is consistent with a single population or background data set.

As discussed in Section 2.2.1, arsenic was detected in all 17 samples collected from UA 2, and seven of the detected concentrations exceed the BTV developed for Topock. A probability plot was constructed for the arsenic data from UA 2 to evaluate the distribution of the data. Probability plots provide a visual tool for identifying possible inflections or breakpoints in the data set. They graph actual concentrations against theoretical quantiles of the potential true distribution of the data. Inflections or breakpoints may serve as evidence that multiple populations appear in the data, which could be consistent with the presence of some site-impacted concentrations along with some un-impacted (potential background) concentrations. The distribution of arsenic concentrations for UA 2 is a relatively smooth curve consistent with a true normal distribution of the data, as shown in Figure C9-4.[1] There are no breakpoints or inflections suggestive of two separate populations of arsenic concentrations (i.e., a background concentrations and an elevated site-related concentration).

One needs to temper expectations of how straight the line for a normal distribution will be with typical sample sizes. Relatively small jumps or steps in the data set are often a part of random variability. One should also be careful not to associate the natural horizontal widening of points in the lower and upper tails of the data distribution with the determination of a breakpoint or the identification of outliers. This can be seen in the 12 randomly-generated example plots using data generated from a true normal 100-point distribution with sample size of 17, as shown in Figure C9-4. As can be seen from comparing the 12 example plots with the UA 2 data presented in Figure C9-5, the randomly-generated true normal distributions are similar in appearance to the plot of the site data. While the above analysis does not conclusively demonstrate that the detected concentrations of arsenic are, in fact, representative of a site-specific background, it does indicate that the interpretation that these concentrations represent site background concentrations is consistent with the distribution of the data.

2.5 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates that decision error has been held to an acceptable level. Sufficient data of acceptable quality have been attained through collection of historical and Part A soil samples in areas most likely to have been impacted by the former aboveground storage tank.

Based on the review of the data for UA 2, the nature and extent of all detected COPCs and COPECs have been defined, and no follow-up sampling is recommended for Phase 2.

3.0 Decision 2 – Data Sufficient to Estimate Representative Exposure Point Concentrations

For Decision 2, data were evaluated to determine if the UA2-300B data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Evaluation Report. The principal consideration for Decision 2

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[1] Often, the chosen distribution is the normal distribution even though it is not a certainty that the true distribution is either normal or any other given distribution. Other distributions can be considered.

was whether there were sufficient data to estimate a representative exposure point concentration (EPC). Data reviewed were validated Phase 1 data.

Table C9-10 summarizes the results of the evaluation to determine whether data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. In general, existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values (arsenic, barium, lead, zinc, and manganese).

In the shallowest exposure interval (0.0 to 0.5 foot bgs), there were five samples and five detected concentrations for metals. While this is insufficient to calculate an EPC using ProUCL, the maximum concentration is low (i.e., does not exceed two times the lowest comparison value). Therefore, using the maximum result as the EPC is not expected to significantly impact the results of the risk assessment. Further, as previously described in Sections 2.2.1 and 2.3, although arsenic was detected above the BTV (11 mg/kg), a separate statistical evaluation was conducted, examining the distribution of arsenic specific to the UA2-300B area, which supports that the arsenic detected in this area is reflective of background conditions. Accordingly, additional samples for arsenic in the 0- to 0.5-foot interval will not affect the results of the risk assessment.

For manganese, there are only two samples, and the maximum value is slightly greater than two times the BTV, which is the applicable comparison value. (The ECV [220 mg/kg] is less than the BTV.) Using the maximum detected concentration of 840 mg/kg as the EPC rather than collecting additional samples to increase the data set is not expected to significantly change the outcome of the ecological risk assessment. This is because the additional sampling is not expected to provide very different results; there is no known source of manganese at UA 2. There is no information to indicate that manganese was associated with the operation of the 300B pipeline or aboveground drip tank.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

The following preliminary analysis was performed with the existing data set to assess the potential threat to groundwater and to assess if additional data, above and beyond that necessary for Decision 1, are needed to resolve Decision 3. Additional evaluation will be performed as appropriate, as data are collected to resolve Decision 1. Data collected to satisfy Decision 1 – Nature and Extent evaluation will provide the final representative data set that will be used to assess the threat to groundwater.

Table C9-11 presents the results of the tiered screening analysis for UA 2. Four metals had concentrations in excess of their respective BTVs. None of these metals exceeded the calculated soil screening level, as shown in Table C9-12; therefore, numerical modeling was not required for UA 2, and a current or potential threat to groundwater has been ruled out.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study (CMS/FS). The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite).
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies).
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for UA 2 that are currently available to support CMS/FS.

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The lateral and vertical extent of the COPCs and COPECs is discussed in Section 2.2 above. Data results for selected constituents are shown in Figures C9-2 and C9-3, and data gaps associated with lateral and vertical delineation are discussed in Section 6.0 of the Data Gaps Evaluation Report.

5.2 Waste Characterization Parameters

Only partial waste characterization data are available to characterize the soil and other materials to be potentially removed for remedial action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLCs). The maximum concentrations of these metals for each of the units were compared to the TTLCs, and none of the metal concentrations exceeded the TTLCs, as shown in Table C9-13. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLCs), and none of the metal concentrations in UA 2 exceeded 10 times STLC, as shown in Table C9-13. In addition, none of the concentrations exceeded 20 times TCLP, as shown in Table C9-13. Because none of the metals concentrations has the potential to exceed STLC or TCLP thresholds, additional leachability testing is not required if soil excavation and offsite disposal is chosen as a remedy.

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 soil investigation were limited to grain size analysis only. Specific soil physical properties data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 in the Data Gaps Evaluation Report. Additional soil physical parameter data are needed to support the CMS/FS.

5.4 Surface and Subsurface Features.

While there is extensive information regarding surface and subsurface features at UA 2, additional information may be required once areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are known for UA 2. However, subsurface utilities, including gas transmission pipelines and any other features, may have to be more precisely defined to evaluate the feasibility and cost of certain remedial alternatives and to prepare construction specifications.

6.0 Summary of Data Gaps and Potential Phase 2 Soil Sample Locations to Fill Identified Gaps

Based on the review of the data for UA 2, the nature and extent of all detected COPCs and COPECs has been defined, and no further sampling is required to address data quality objective Decisions 2 and 3. Data regarding soil physical properties will be collected at units where additional samples are required to address data gaps for Decisions 1, 2, and/or 3. The remaining data required to address Decision 4 data gaps will be collected following the completion of the risk assessment. No additional sampling is recommended in the Part A Phase 2 Soil Investigation.

7.0 References

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Tables

TABLE C9-1
Conceptual Site Model – UA 2
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental leaks or spills from former aboveground storage tank	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Subsurface Soil	Potential volatilization and atmospheric dispersion/enclosed space accumulation
			Potential Groundwater	Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway completed in the groundwater risk assessment (ARCADIS, 2009); Part A Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE C9-2

Sample Results: Metals

UA 2 - Former 300B Pipeline Liquids Tank Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**280**	**39**	**23**	**3,100**	**150**	**23**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**NE**	**17**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
UA2-300B-1	09/23/08	0 - 0.5	N	ND (2) *	14	290	ND (1) *	ND (1)	25	ND (0.42)	7.7	13	7.9	ND (0.1) *	ND (1)	16	ND (1)	ND (1)	ND (2)	28	54
	09/23/08	0.5 - 1	N	ND (2) *	24	280	ND (2) *	ND (1)	28	ND (0.423)	9.1	14	5.8	ND (0.1) *	ND (2) *	19	ND (1)	ND (2)	ND (4) *	31	61
	10/23/08	2.5 - 3	N	ND (2) *	16	300	ND (2) *	ND (1)	25	ND (0.401)	8.8	13	5.6	ND (0.1) *	ND (2) *	18	ND (1)	ND (2)	ND (4) *	29	59
	10/23/08	5.5 - 6	N	ND (2) *	12	150	ND (1) *	ND (1)	17	ND (0.401)	6.7	10	3.2	ND (0.099) *	1.1	13	ND (1)	ND (1)	ND (2)	22	48
UA2-300B-2	10/03/08	0 - 0.5	N	ND (2) *	8	220	ND (1) *	ND (1)	17	ND (0.404)	7	11	6.6	ND (0.1) *	ND (1)	13	ND (1)	ND (1)	ND (2)	27	46
	10/03/08	0.5 - 1	N	ND (2) *	15	520	ND (2) *	ND (1)	33	ND (0.42)	10	15	4.3	ND (0.1) *	ND (2) *	22	ND (1)	ND (2)	ND (4) *	35	62
	10/03/08	2 - 3	N	ND (2) *	11	310	ND (2) *	ND (1)	34	ND (0.408)	11	11	3.4	ND (0.1) *	ND (2) *	23	ND (1)	ND (2)	ND (4) *	36	63
UA2-300B-3	10/03/08	0 - 0.5	N	ND (2) *	9.8	250	ND (2) *	ND (1)	21	ND (0.403)	7.9	11	5.3	ND (0.1) *	ND (2) *	16	ND (1)	ND (2)	ND (4) *	33	52
	10/03/08	0.5 - 1	N	ND (2) *	10	220	ND (2) *	ND (1)	26	ND (0.409)	10	13	6.3	ND (0.099) *	ND (2) *	19	ND (1)	ND (2)	ND (4) *	37	60
	10/03/08	0.5 - 1	FD	ND (2) *	10	220	ND (2) *	ND (1)	26	ND (0.407)	9.5	12	4.5	ND (0.1) *	ND (2) *	19	ND (1)	ND (2)	ND (4.1) *	35	58
	10/03/08	2 - 3	N	ND (2) *	12	180	ND (2) *	ND (1)	25	ND (0.409)	9.9	13	4	ND (0.1) *	ND (2) *	20	ND (1)	ND (2)	ND (4.1) *	34	65
	10/03/08	5 - 6	N	ND (2) *	14	890	ND (2) *	ND (1)	32	ND (0.409)	10	9.4	3.6	ND (0.1) *	ND (2) *	22	ND (1)	ND (2)	ND (4.1) *	37	58
UA2-300B-4	10/03/08	0 - 0.5	N	ND (2) *	9.1	230	ND (2) *	ND (1)	22	ND (0.405)	8.4	11	4.4	ND (0.1) *	ND (2) *	17	ND (1)	ND (2)	ND (4) *	33	53
	10/03/08	0.5 - 1	N	ND (2) *	11	190	ND (1) *	ND (1)	20	ND (0.408)	7.4	11	3.4	ND (0.1) *	ND (1)	14	ND (1)	ND (1)	ND (2)	27	47
	10/03/08	2 - 3	N	ND (2) *	11	220	ND (2) *	ND (1)	28	ND (0.409)	11	15	3.4	ND (0.1) *	ND (2) *	21	ND (1)	ND (2)	ND (4.1) *	38	64
UA2-300B-5	10/03/08	0 - 0.5	N	ND (2) J*	8.4	290 J	ND (1) *	ND (1)	22	ND (0.405)	7	11	13	ND (0.1) *	ND (1)	15	ND (1)	ND (1)	ND (2)	27	62
	10/03/08	0.5 - 1	N	ND (2) *	10	390	ND (2) *	ND (1)	33	ND (0.41)	11	11	3.9	ND (0.1) *	ND (2) *	24	ND (1)	ND (2)	ND (4.1) *	36	65
	10/03/08	2 - 3	N	ND (2) *	9.4	360	ND (2) *	ND (1)	35	ND (0.411)	11	12	3.4	ND (0.1) *	ND (2) *	25	ND (1)	ND (2)	ND (4.1) *	37	62

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C9-3

Sample Results: Contract Laboratory Program Inorganics
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
UA2-300B-1	09/23/08	0 - 0.5	N	11,000	21,000	20,000	7,400	670	2,900	230	ND (1.05) *
UA2-300B-5	10/03/08	0 - 0.5	N	11,000	26,000	27,000	8,900	840	2,400	210	ND (1.01) *

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C9-4

Sample Results: Polycyclic Aromatic Hydrocarbons

UA 2 - Former 300B Pipeline Liquids Tank Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**PAH Low molecular weight**	**PAH High molecular weight**	**B(a)P Equivalent**
UA2-300B-1	09/23/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	09/23/08	0.5 - 1	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/23/08	2.5 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.5	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	11	ND (5)	11	6.5	4.4
	10/23/08	5.5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.3	6.2	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	12	4.7
UA2-300B-2	10/03/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/03/08	0.5 - 1	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
UA2-300B-3	10/03/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/03/08	0.5 - 1	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	0.5 - 1	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
UA2-300B-4	10/03/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/03/08	0.5 - 1	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
UA2-300B-5	10/03/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	10/03/08	0.5 - 1	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	10/03/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C9-5

Sample Results: VOCs, SVOCs and TPHs

UA 2 - Former 300B Pipeline Liquids Tank Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				SVOCs (µg/kg)		**Total Petroleum Hydrocarbons (mg/kg)**		
Interim Screening Level[1] :				**500**	**2,870**	**540**	**540**	**1,800**
Residential Regional Screening Levels[2] :				**310,000**	**35,000**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels[4] :				**NE**	**NE**	**540**	**540**	**1,800**
Ecological Comparison Values[5] :				**500**	**2,870**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4-Methylphenol**	**Bis (2-ethylhexyl) phthalate**	**TPH as gasoline**	**TPH as diesel**	**TPH as motor oil**
UA2-300B-1	09/23/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	32.1
	09/23/08	0.5 - 1	N	ND (330)	ND (330)	---	ND (10)	33.6
	10/23/08	2.5 - 3	N	460	1,300	ND (1.4)	140	902
	10/23/08	5.5 - 6	N	ND (330)	ND (330)	ND (1.1)	ND (10)	60.4
UA2-300B-2	10/03/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	15.1 J
	10/03/08	0.5 - 1	N	ND (330)	ND (330)	---	ND (10)	12.2 J
	10/03/08	2 - 3	N	ND (330)	ND (330)	ND (1.4)	ND (10)	13 J
UA2-300B-3	10/03/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	ND (10)
	10/03/08	0.5 - 1	N	ND (330)	ND (330)	---	ND (10)	ND (10)
	10/03/08	0.5 - 1	FD	ND (330)	ND (330)	---	ND (10)	ND (10)
	10/03/08	2 - 3	N	ND (330)	ND (330)	ND (1.6)	ND (10)	ND (10)
	10/03/08	5 - 6	N	ND (330)	ND (330)	ND (1.6)	ND (10) J	ND (10) J
UA2-300B-4	10/03/08	0 - 0.5	N	ND (330)	ND (330)	---	ND (10)	ND (10)
	10/03/08	0.5 - 1	N	ND (330)	ND (330)	---	ND (10)	ND (10)
	10/03/08	2 - 3	N	ND (330)	ND (330)	ND (0.75)	ND (10)	ND (10)
UA2-300B-5	10/03/08	0 - 0.5	N	ND (330)	ND (330)	---	10.5	59.9 J
	10/03/08	0.5 - 1	N	ND (330)	ND (330)	---	ND (10)	29.7 J
	10/03/08	2 - 3	N	ND (340)	ND (340)	ND (1.7)	ND (10)	11.2 J

---

[1] For SVOCs, interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used. For TPHs, interim screening level is the Regional Water Quality Control Board environmental screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28 and ARCADIS. 2009. Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil". July 1.

[6] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than the interim screening level are circled.

Only detected VOCs and SVOCs are presented.

SVOCs	semivolatile organic compounds
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C9-6

Sample Results: Pesticides
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																				
Residential DTSC CHHSL [1] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Residential Regional Screening Levels [2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Ecological Comparison Values [3] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background [4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
UA2-300B-1	09/23/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
UA2-300B-5	10/03/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)

[1] California EPA, Office of Environmental Health Hazard Assessment. 2005. Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision). January.

[2] US EPA. 2008. Regional Screening Levels for Chemical Contaminants at Superfund Sites. http://epaprgs.ornl.govchemicals/index.shtml. September 12.

[3] ARCADIS. 2008. Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28.

[4] CH2M HILL. 2008. Draft Soil Background Investigation Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California. December.

Results greater than or equal to the Residential DTSC CHHSL or the Residential Regional Screening Level (if Residential DTSC CHHSL were not established) are circled.

EPA	Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California Human Health Screening Levels
NE	not estabilished
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C9-7

Sample Results: Polychlorinated Biphenyls
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level[1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Regional Screening Levels[2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Residential DTSC CHHSL[3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
UA2-300B-1	09/23/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	09/23/08	0.5 - 1	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/23/08	2.5 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/23/08	5.5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
UA2-300B-2	10/03/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	0.5 - 1	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
UA2-300B-3	10/03/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	0.5 - 1	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	0.5 - 1	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
UA2-300B-4	10/03/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	0.5 - 1	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
UA2-300B-5	10/03/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	0.5 - 1	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/03/08	2 - 3	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND

TABLE C9-7

Sample Results: Polychlorinated Biphenyls
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

[1] Interim screening level is the USEPA residential regional screening level.

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C9-8

Constitiuent Concentrations in Soil Compared to Screening Values
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
Parameter	**Units**	**Frequency of detection**	**Maximum Detected Value**	**# of Exceedences** [7]	**(BTV)**	**# of Exceedences** [8]	**(ECV)**	**# of Exceedences** [8]	**(Res SL)**	**# of Exceedences** [8]	**(ESL)**	**# of Exceedences** [8]	**(Com SL)**	**# of Exceedences** [8]	**(Int SL)**
Metals															
Antimony	mg/kg	0 / 17 (0%)	ND (2) ‡	NA	(NE)	0	(0.285)	0	(30)	NA	(NE)	0	(380)	0	(0.285)
Arsenic	mg/kg	17 / 17 (100%)	24	7	(11)	7	(11.4)	7	(0.07) *	NA	(NE)	7	(0.24) *	7	(11)
Barium	mg/kg	17 / 17 (100%)	890	2	(410)	2	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	2	(410)
Beryllium	mg/kg	0 / 17 (0%)	ND (2) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Chromium	mg/kg	17 / 17 (100%)	35	0	(39.8)	0	(36.3) *	0	(280)	NA	(NE)	0	(1,400)	0	(39.8)
Cobalt	mg/kg	17 / 17 (100%)	11	0	(12.7)	0	(13)	0	(23)	NA	(NE)	0	(300)	0	(12.7)
Copper	mg/kg	17 / 17 (100%)	15	0	(16.8)	0	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	0	(16.8)
Lead	mg/kg	17 / 17 (100%)	13	1	(8.39)	1	(0.0166) *	0	(80)	NA	(NE)	0	(320)	1	(8.39)
Mercury	mg/kg	0 / 17 (0%)	ND (0.1) ‡	NA	(NE)	0	(0.0125)	0	(18)	NA	(NE)	0	(180)	0	(0.0125)
Molybdenum	mg/kg	1 / 17 (5.9%)	1.1	0	(1.37)	0	(2.25)	0	(380)	NA	(NE)	0	(4,800)	0	(1.37)
Nickel	mg/kg	17 / 17 (100%)	25	0	(27.3)	0	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	0	(27.3)
Thallium	mg/kg	0 / 17 (0%)	ND (4.1) ‡	NA	(NE)	0	(2.32)	0	(5)	NA	(NE)	0	(63)	0	(2.32)
Vanadium	mg/kg	17 / 17 (100%)	38	0	(52.2)	0	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	0	(52.2)
Zinc	mg/kg	17 / 17 (100%)	65	10	(58)	10	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	10	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	2 / 2 (100%)	11,000	0	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	0	(16,400)
Calcium	mg/kg	2 / 2 (100%)	26,000	0	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(66,500)
Iron	mg/kg	2 / 2 (100%)	27,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	2 / 2 (100%)	8,900	0	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(12,100)
Manganese	mg/kg	2 / 2 (100%)	840	2	(402)	2	(220)	0	(1,800)	NA	(NE)	0	(23,000)	2	(402)
Potassium	mg/kg	2 / 2 (100%)	2,900	0	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(4,400)
Sodium	mg/kg	2 / 2 (100%)	230	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 2 (0%)	ND (1.05) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Semivolatile Organic Compounds															
4-Methylphenol	µg/kg	1 / 17 (5.9%)	460	NA	(NE)	0	(500)	0	(310,000)	NA	(NE)	0	(3,100,000)	0	(500)
Bis (2-ethylhexyl) phthalate	µg/kg	1 / 17 (5.9%)	1,300	NA	(NE)	0	(2,870)	0	(35,000)	NA	(NE)	0	(120,000)	0	(2,870)
Polycyclic Aromatic Hydrocarbons															
Benzo (b) fluoranthene	µg/kg	1 / 17 (5.9%)	5.3	NA	(NE)	NA	(NE)	0	(380)	NA	(NE)	0	(1,300)	0	(380)
Benzo (ghi) perylene	µg/kg	1 / 17 (5.9%)	6.2	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Chrysene	µg/kg	1 / 17 (5.9%)	6.5	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Phenanthrene	µg/kg	1 / 17 (5.9%)	11	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	1 / 17 (5.9%)	11	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	2 / 17 (12%)	12	NA	(NE)	0	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,160)
B(a)P Equivalent	µg/kg	2 / 17 (12%)	4.7	NA	(NE)	NA	(NE)	0	(38)	NA	(NE)	0	(130)	0	(38)
Total Petroleum Hydrocarbons															
TPH as diesel	mg/kg	2 / 17 (12%)	140	NA	(NE)	NA	(NE)	NA	(NE)	0	(540)	NA	(NE)	0	(540)
TPH as motor oil	mg/kg	10 / 17 (59%)	902	NA	(NE)	NA	(NE)	NA	(NE)	0	(1,800)	NA	(NE)	0	(1,800)

TABLE C9-8

Constitiuent Concentrations in Soil Compared to Screening Values
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

TABLE C9-9
Central Tendency Comparisons (Site to Background)
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Comparison Test Used	Probability that the Observed Differences Would Occur Purely by Chance	Statistical Decision with 0.05 Significance Level	Mean of Site Detects	Mean of Bkgd Detects	Median of Site Detects	Median of Bkgd Detects	Number of Site Detects	Number of Site Samples	Number of Bkgd Detects	Number of Bkgd Samples	Percent Detects Site	Percent Detects Bkgd
Arsenic	Gehan	0.000	Site > Bkgd	12	4.01	11	3.5	17	17	58	59	100	98
Barium	Gehan	0.000	Site > Bkgd	311	165	280	135	17	17	60	60	100	100
Lead	Gehan	0.024	Site > Bkgd	5.15	4.38	4.3	3.5	17	17	59	60	100	98
Zinc	Gehan	0.000	Site > Bkgd	57.7	36.8	60	35.5	17	17	70	70	100	100

Bkgd = background

> = greater than
< = less than

TABLE C9-10

Decision 2 Data Gaps Summary - UA 2

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? ^{1}	> ECV or Background as Applicable? ^{1}	Proposed Sample ID	Notes
Compound/Depth	Y or N	Det/# results		Y or N	Y or N		
Metals							
Arsenic				**11 mg/kg (bckg)**	**11.4 mg/kg**		
0-0.5 ft bgs	N	5 of 5	14 mg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC with the exception of the 0-0.5 ft bgs exposure interval. Arsenic is believe to be within local background in bedrock for this area as discussed in Sections 2.3 and 2.4 of the text.
0-3 ft bgs	Y	15 of 15	24 mg/kg	Y	Y		
0-6 ft bgs	Y	17 of 17	24 mg/kg	Y	Y		
0-10 ft bgs	Y	17 of 17	24 mg/kg	Y	NA		
Barium				**5200 mg/kg**	**410 mg/kg (bckg)**		
0-0.5 ft bgs	N	5 of 5	290 mg/kg	N	N	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	15 of 15	520 mg/kg	N	Y		
0-6 ft bgs	Y	17 of 17	890 mg/kg	N	Y		
0-10 ft bgs	Y	17 of 17	890 mg/kg	N	NA		
Lead				**80 mg/kg**	**8.39 mg/kg (bckg)**		
0-0.5 ft bgs	N	5 of 5	13 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC with the exception of the 0-0.5 ft bgs exposure interval. While this is insufficient to calculate an EPC using ProUCL for this exposure interval, the maximum concentration is low (i.e., does not exceed two times the lowest comparison value). Therefore, using the maximum result as the EPC is not expected to significantly impact the results of the risk assessment.
0-3 ft bgs	Y	15 of 15	13 mg/kg	N	Y		
0-6 ft bgs	Y	17 of 17	13 mg/kg	N	Y		
0-10 ft bgs	Y	17 of 17	13 mg/kg	N	NA		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	N	5 of 5	62 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC with the exception of the 0-0.5 ft bgs exposure interval. While this is insufficient to calculate an EPC using ProUCL for this exposure interval, the maximum concentration is low (i.e., does not exceed two times the lowest comparison value). Therefore, using the maximum result as the EPC is not expected to significantly impact the results of the risk assessment.
0-3 ft bgs	Y	15 of 15	65 mg/kg	N	Y		
0-6 ft bgs	Y	17 of 17	65 mg/kg	N	Y		
0-10 ft bgs	Y	17 of 17	65 mg/kg	N	NA		

TABLE C9-10

Decision 2 Data Gaps Summary - UA 2
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Compound/Depth	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [1]	> ECV or Background as Applicable? [1]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N	Y or N		
Contract Laboratory Program Inorganics							
Manganese				**1800 mg/kg**	**402 mg/kg (bckg)**		
0-0.5 ft bgs	N	2 of 2	840 mg/kg	N	Y	None	Compound exceeds ECV. The small dataset of 2 samples would result in using the maximum concentration, which is approximately two times background, as the EPC for the ERA. Additional sampling is not expected to significantly change the EPC or the outcome of the ERA because manganese at UA2-300B is believed to be naturally occurring; there is no information to indicate that manganese was associated with the operation of the 300B pipeline or above-ground drip tank.
0-3 ft bgs	N	2 of 2	840 mg/kg	N	Y		
0-6 ft bgs	N	2 of 2	840 mg/kg	N	Y		
0-10 ft bgs	N	2 of 2	840 mg/kg	N	NA		

Footnotes:

[1] The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

Acronyms and Abbreviations:

ECV - ecological comparison values
EPC - exposure point concentration
ERA - ecological risk assessment
ft bgs - feet below ground surface
HHCV - human health comparison values
mg/kg - milligrams per kilogram
N - no
NA - not applicable
Y - yes

TABLE C9-11
Results of Tiered Analysis at UA 2
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Metal	**Step 1 Do COPCs/COPECs Exceed Background?**	**Step 2 Do COPCs/COPECs Exceed SSL?**	**Step 3 Does Screening Model Eliminate Potential for Impact to Groundwater?**
Arsenic	✓		
Barium	✓		
Lead	✓		
Zinc	✓		

✓ = Constituents concentration exceeds background and/or SSL.

SSL = soil screening level.

TABLE C9-12

Sample Results Compared to the Calculated Soil Screening Levels
UA 2 - Former 300B Pipeline Liquids Tank Area

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California

				Metals (mg/kg)			
			Soil Screening Levels : [1]	**39**	**2,200**	**1,800**	**66,000**
			Background : [2]	**11**	**410**	**8.39**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Arsenic**	**Barium**	**Lead**	**Zinc**
UA2-300B-1	09/23/08	0 - 0.5	N	14	290	7.9	54
	09/23/08	0.5 - 1	N	24	280	5.8	61
	10/23/08	2.5 - 3	N	16	300	5.6	59
	10/23/08	5.5 - 6	N	12	150	3.2	48
UA2-300B-2	10/03/08	0 - 0.5	N	8	220	6.6	46
	10/03/08	0.5 - 1	N	15	520	4.3	62
	10/03/08	2 - 3	N	11	310	3.4	63
UA2-300B-3	10/03/08	0 - 0.5	N	9.8	250	5.3	52
	10/03/08	0.5 - 1	N	10	220	6.3	60
	10/03/08	0.5 - 1	FD	10	220	4.5	58
	10/03/08	2 - 3	N	12	180	4	65
	10/03/08	5 - 6	N	14	890	3.6	58
UA2-300B-4	10/03/08	0 - 0.5	N	9.1	230	4.4	53
	10/03/08	0.5 - 1	N	11	190	3.4	47
	10/03/08	2 - 3	N	11	220	3.4	64
UA2-300B-5	10/03/08	0 - 0.5	N	8.4	290 J	13	62
	10/03/08	0.5 - 1	N	10	390	3.9	65
	10/03/08	2 - 3	N	9.4	360	3.4	62

TABLE C9-12

Sample Results Compared to the Calculated Soil Screening Levels
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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[1] Soil Screening Level (SSL) calculation was provided in the technical memorandum entitled "Calculation of Soil Screening Levels for Protection of Groundwater at the PGE Topock Compressor Station", CH2MHill 2008.

[2] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the SSL and greater than or equal to the background value are circled.

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE C9-13

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)
UA 2 - Former 300B Pipeline Liquids Tank Area
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Topock Compressor Station, Needles, California

			TTLC in mg/kg[1]		**STLC in mg/L[1]**			**TCLP in mg/L[1]**		
Parameter	**Frequency of detection**	**Maximum Detected Value (mg/kg)**	**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	0 / 17 (0%)	ND (2)	0	500	0	150	15	0	NE	NE
Arsenic	17 / 17 (100%)	24	0	500	0	50	5	0	100	5
Barium	17 / 17 (100%)	890	0	10000	0	1000	100	0	2000	100
Beryllium	0 / 17 (0%)	ND (2)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	0 / 17 (0%)	ND (1)	0	100	0	10	1	0	20	1
Chromium	17 / 17 (100%)	35	0	2500	0	50	5	0	100	5
Chromium, Hexavalent	0 / 17 (0%)	ND (0.423)	0	500	0	50	5	0	NE	NE
Cobalt	17 / 17 (100%)	11	0	8000	0	800	80	0	NE	NE
Copper	17 / 17 (100%)	15	0	2500	0	250	25	0	NE	NE
Lead	17 / 17 (100%)	13	0	1000	0	50	5	0	100	5
Mercury	0 / 17 (0%)	ND (0.1)	0	20	0	2	0.2	0	4	0.2
Molybdenum	1 / 17 (5.9%)	1.1	0	3500	0	3500	350	0	NE	NE
Nickel	17 / 17 (100%)	25	0	2000	0	200	20	0	NE	NE
Selenium	0 / 17 (0%)	ND (1)	0	100	0	10	1	0	20	1
Silver	0 / 17 (0%)	ND (2)	0	500	0	50	5	0	100	5
Thallium	0 / 17 (0%)	ND (4.1)	0	700	0	70	7	0	NE	NE
Vanadium	17 / 17 (100%)	38	0	2400	0	240	24	0	NE	NE
Zinc	17 / 17 (100%)	65	0	5000	0	2500	250	0	NE	NE

Notes:

[1] Code of Regulations, Title 22, Chapter 11, Article 3

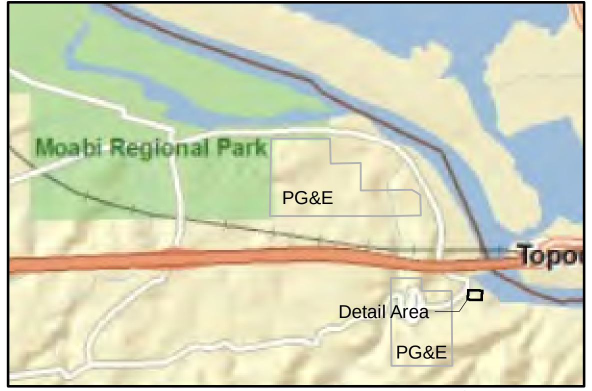
mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC.

Figures

FIGURE C9-1
Conceptual Site Model for UA 2
Soil Investigation Part A
Phase 1 Data Gaps Evaluation Report
PG&E Topock Compressor Station
Needles, California

CH2MHILL

VICINITY MAP



PG&E

LEGEND

● Soil Boring

— Mojave Pipeline

— PG&E Pipeline

— SoCal Gas Pipeline

🟩 UA-2 / 300B Boundary

SSB-7 (08) — Sample Location, Installation Date

20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (11 mg/kg) are shown in BLUE.
5. Results greater than or equal to the Ecological Comparison Value (11.4 mg/kg) are shown in PURPLE.
6. J = Estimated Result.
7. California Department of Toxic Substances Control Residential California Human Health Screening Level (0.07 mg/kg) is below background value; therefore, the screening level is set at the background value.

N

0 25 50

Feet

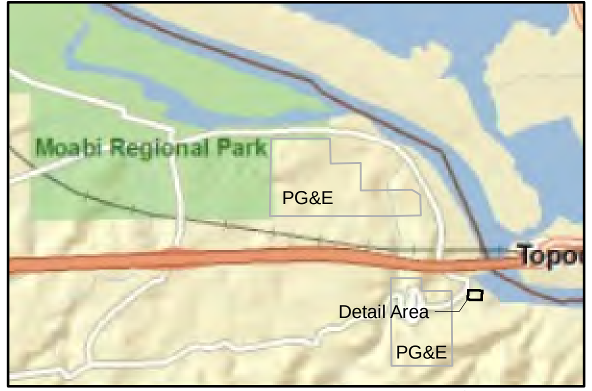
FIGURE C9-2
Arsenic
Soil Sample Results for UA 2

RCRA Facility Investigation/Remedial Investigation
Soil Investigation Part A,
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2009\300B\300B_DG_AS.MXD BKAHLER 1/5/2010 15:16:21

CH2MHILL

VICINITY MAP



LEGEND

● Soil Boring

Mojave Pipeline

PG&E Pipeline

SoCal Gas Pipeline

UA-2 / 300B Boundary

SSB-7 (08) — Sample Location, Installation Date

20 [1] — Sample Beginning Depth (ft bgs), Soil Concentration (mg/kg)

Notes:
1. ND = Not Detected (Reporting Limit in parentheses)
2. mg/kg = milligrams per kilogram
3. ft bgs = feet below ground surface
4. Results greater than Background (58 mg/kg) are shown in BLUE.
5. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (23,000 mg/kg) are shown in ORANGE.
6. J = Estimated Result.
7. Ecological Comparison Value (0.164mg/kg) is below background value; therefore, the screening level is set at the background value.

N

0 25 50
Feet

FIGURE C9-3
Zinc
Soil Sample Results for UA 2

RCRA Facility Investigation/Remedial Investigation
Soil Investigation Part A,
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station
Needles, California

CH2MHILL

\\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2009\300B\300B_DG_ZN.MXD BKAHLER 1/5/2010 15:23:18

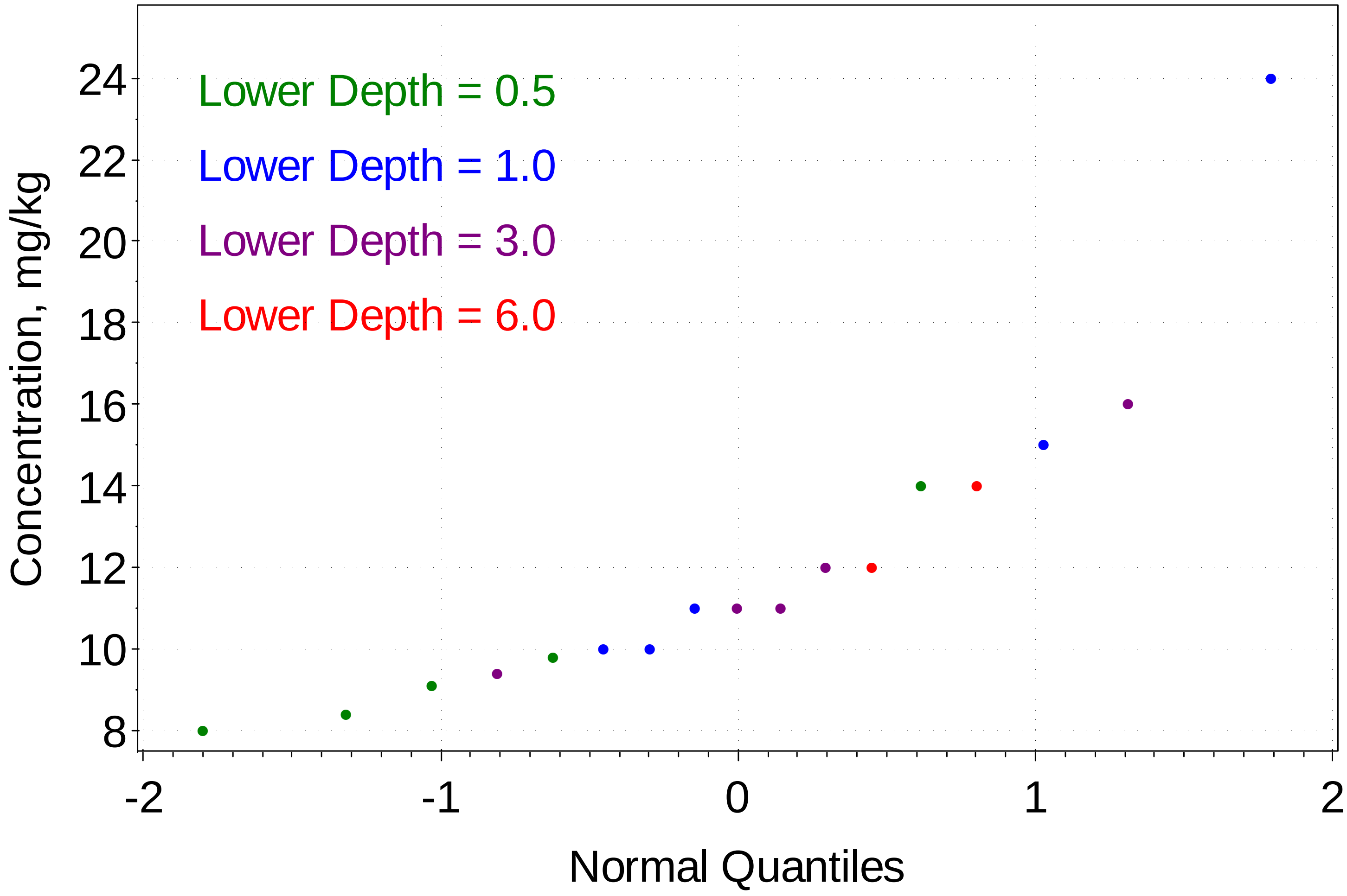


FIGURE C9-4
PROBABILITY PLOTS FOR ARSENIC
UA2 - FORMER 300 B PIPELINE LIQUIDS TANK AREA
SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL

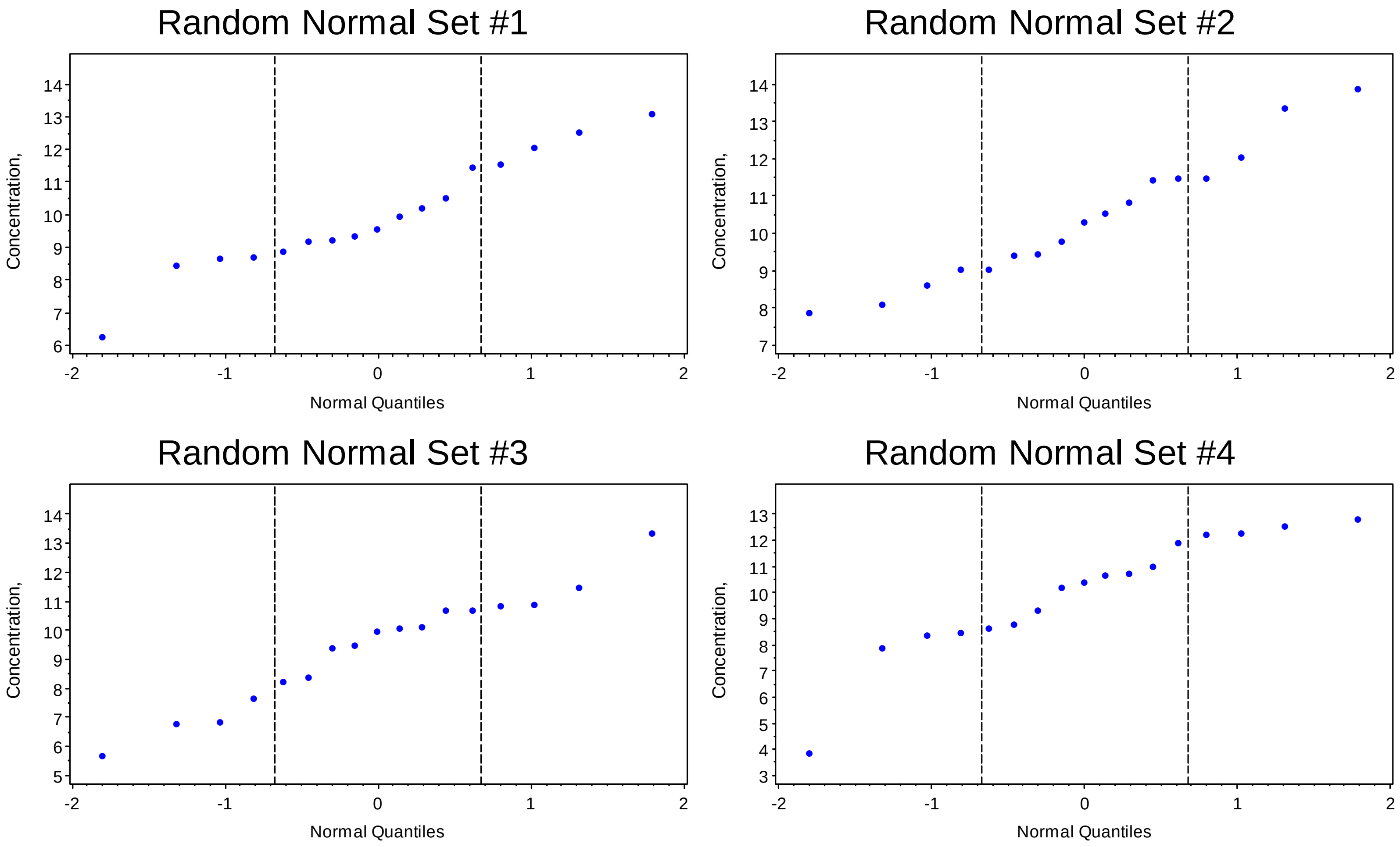
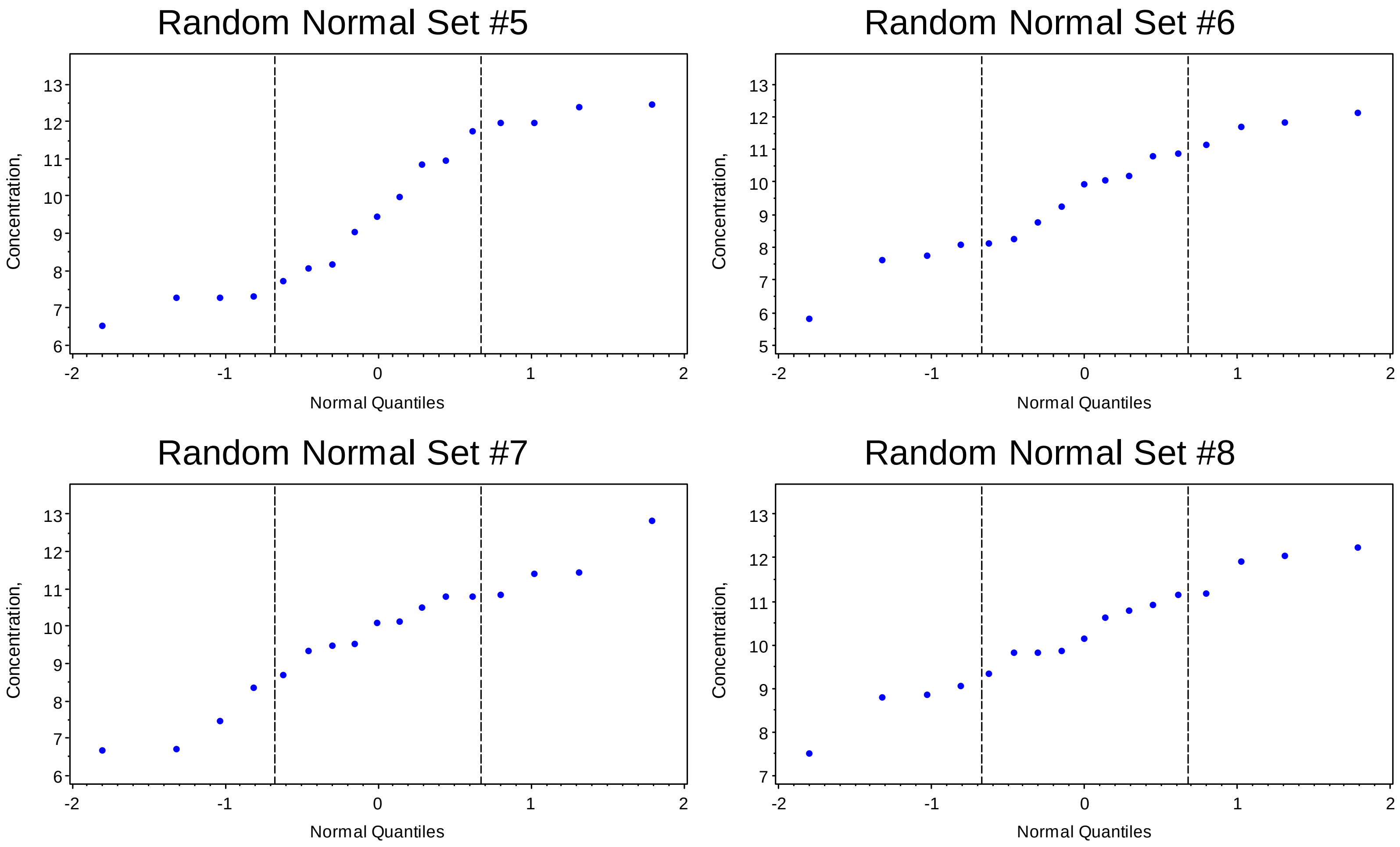


FIGURE C9-5
COMPARATIVE PROBABILITY PLOTS FOR ARSENIC
UA2 - FORMER 300 B PIPELINE LIQUIDS TANK AREA

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL


Random Normal Set #5

Random Normal Set #6

Random Normal Set #7

Random Normal Set #8

FIGURE C9-5
COMPARATIVE PROBABILITY PLOTS FOR ARSENIC
UA2 - FORMER 300 B PIPELINE LIQUIDS TANK AREA
SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

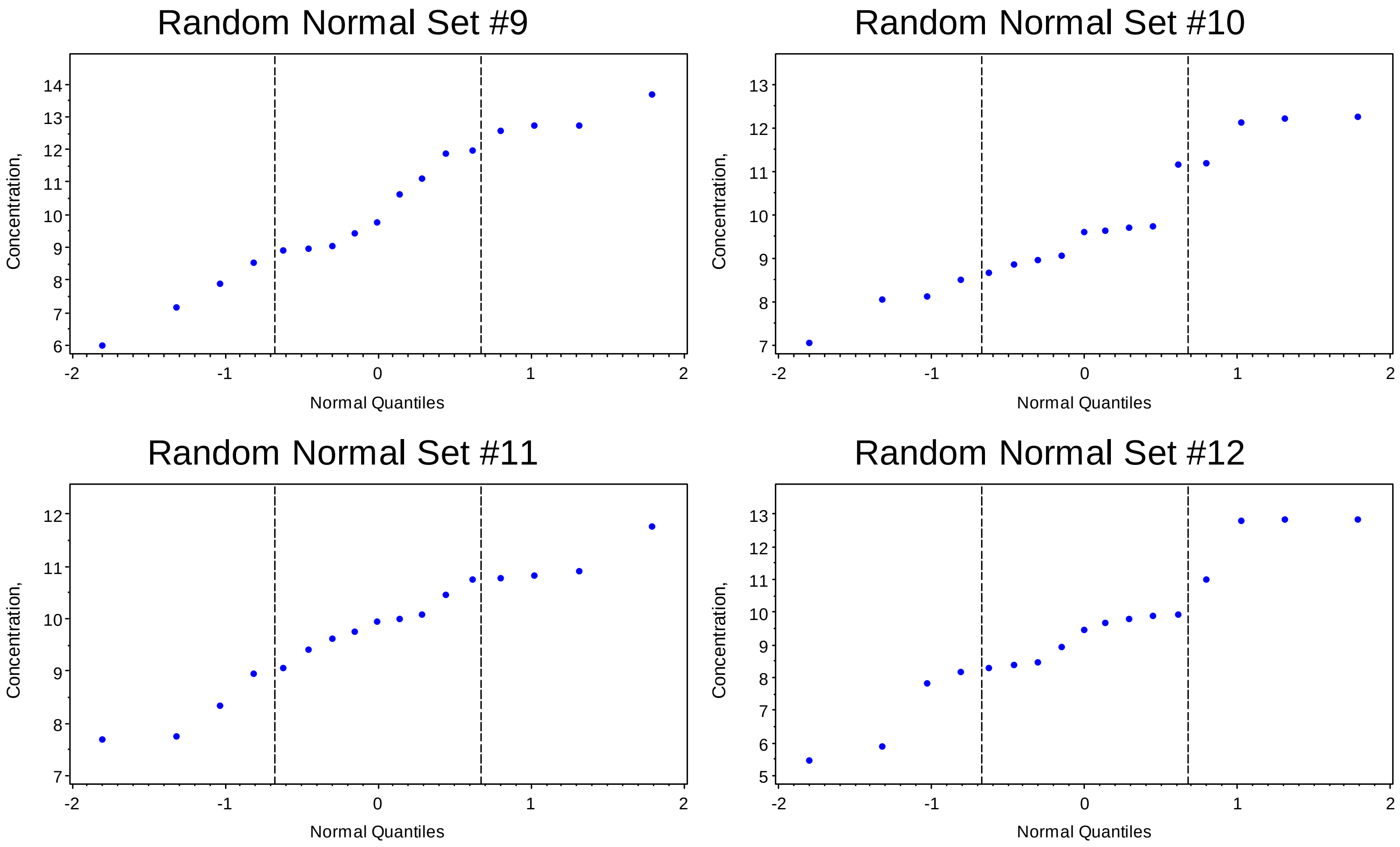


FIGURE C9-5
COMPARATIVE PROBABILITY PLOTS FOR ARSENIC
UA2 - FORMER 300 B PIPELINE LIQUIDS TANK AREA
SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Appendix C10
Area of Concern 4 Data Gaps Evaluation Results

Contents

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHHSL	California human health screening level
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CMS/FS	corrective measures study/feasibility study
DOI	United States Department of the Interior
DQO	data quality objective
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
ng/kg	nanograms per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA facility investigation/remedial investigation
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
STLC	soluble threshold limit concentrations
TEQ	toxicity equivalent quotient
TAL	Target Analyte List
TCL	Target Compound List
TCRA	time-critical removal action
TTLC	total threshold limit concentrations

TCLP	toxicity characteristic leaching procedure
VOC	volatile organic compound

APPENDIX C10

Area of Concern 4 Data Gaps Evaluation Results

1.0 Introduction and Background

This attachment presents the results of the data gaps evaluation for Area of Concern (AOC) 4 – Debris Ravine at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station in Needles, California. The process for the data gaps evaluation is outlined in Sections 2.0 through 6.0 of the Data Gaps Evaluation Report.

1.1 Background

AOC 4 is located in the southern portion of the Topock Compressor Station immediately south of the facility fence line and is shown in Figure C10-1. AOC 4 is a narrow, steep-sided arroyo that drains into the Bat Cave Wash at the southwest corner of the compressor station. It is a ravine which drains into the Bat Cave Wash. AOC 4 is located on PG&E property, except for a small portion of the westernmost end that extends onto Havasu National Wildlife Refuge. The Refuge is managed by the United States Fish and Wildlife Services. Laterally, AOC 4 extends from the point directly south of the water tanks to the junction with Bat Cave Wash and then from the north slope of the ravine to directly south from the end of a small access road and west to the west side of the storage area. The operational history at AOC 4 is not well documented; however, over the years, fill material and debris have been deposited over the northern and eastern slopes, with some debris accumulating in the bottom of the ravine. It appears that burning of trash occurred within AOC 4. Chemicals of potential concern (COPCs) and chemicals of potential ecological concern (COPECs) for AOC 4 identified in the *Revised Final RCRA Facility Investigation and Remedial Investigation Report. Volume 1 – Site Background and History* (CH2M HILL, 2007) (RFI/RI) Volume 1 include Title 22 metals, hexavalent chromium, polycyclic aromatic hydrocarbons (PAHs), and asbestos. Subsequent to the RFI/RI, dioxins and polychlorinated biphenyls (PCBs) were identified in additional debris samples from AOC 4 and have been identified as COPCs and COPECs.

In June 2009, the United States Department of the Interior (DOI) issued an Action Memorandum Time-critical Removal Action (TCRA) at the AOC 4 - Debris Ravine, at the Topock Compressor Station (DOI, 2009) and directed PG&E to initiate activities necessary to implement and perform TCRA actions at AOC 4. The history of previous investigations and Agency direction leading up to the AOC 4 are described in the approved *Final Work Plan for Time-Critical Removal Action at AOC 4 Debris Ravine, PG&E Topock Compressor Station, Needles, California* (Alisto et al., 2009), hereafter referred to as the Final TCRA Work Plan.

The TCRA was conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and, as an interim remedial action, was intended to stabilize and mitigate the threat of release of contaminated material. The TCRA interim action was not intended as a substitute for additional investigative or remedial activities that may be required under the Resource Conservation and Recovery Act (RCRA) or be the final remedy for AOC 4. An implementation report (Alisto et al., 2011) for the TCRA at AOC 4 has been prepared to document the field work and present the results of the field activities for the project. The conclusions of the TCRA at AOC 4 are summarized below.

The TCRA objectives were met by the removal action. Removal was conducted in safely accessible areas of AOC 4. The excavation, screening, and confirmation approach followed the Final TCRA Work Plan, including the quality criteria established in the data quality objectives (DQO) and quality assurance program addendum. For areas on PG&E property, the TCRA target end point concentrations (TECs) were based on commercial/industrial CHHSL and/or RSLs. In order to comply with the stated intent and objectives of the AOC 4 TCRA, the TECs for native alluvial material were based on ten times the commercial/industrial CHHSL and/or RSLs. This reduced the amount of native alluvium to be removed, but also removed material that may have presented an imminent and substantial endangerment to public health, or welfare or the environment. Table C10-1 presents the TCRA TECs for native and non-native material, as well as the Part A RFI/RI interim screening levels. For areas of AOC 4 on Havasu National Wildlife Refuge property, the target endpoints for the removal are background levels for metals and ecological comparison values (ECVs) for organics, which align with the Part A RFI/RI interim screening levels.

Based on the confirmation data set and installation of erosion control measures, the potential threat of release of contaminated material from AOC 4 has been stabilized and mitigated. AOC 4 confirmation soil data has been carried forward to the RFI process and will be used in this data gaps evaluation to identify potential data gaps.

Additional post-construction activities are ongoing at this AOC and include inspection and maintenance of SoilTac soil stabilization and the gabion at the downstream end of the Debris Ravine. SoilTac soil stabilizer will be reapplied as necessary, based on inspections. Slopes in the former debris ravine are generally stable and resistant to erosion. Inspection will also include examining steep slopes in native alluvium for indications of slope movement or instability. Run-on controls were left in place above the upper slope. Also above the upper slope, concrete barriers were installed to keep Topock Compressor Station personnel activities at a safe distance from steeper areas of the slope.

The check dam and the gabion below the slot canyon will be maintained under a periodic inspection program, with special attention to pre- and post-rainfall inspections. Soil that accumulates above the dam or the gabion after rainfall events may be removed.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 4 based on the above site history and background, as shown in Figure C10-2. Table C10-2 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 4. The conceptual site model represents conditions prior to the TCRA at AOC 4. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the *Data Quality Objectives – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor*

Station, Needles, California (CH2M HILL, 2010), which is included as Appendix A to the Data Gaps Evaluation Report.

The primary sources of contamination at AOC 4 are disposal of debris (including asbestos-containing material) and residuals from burning of compressor station waste. The primary release mechanisms are direct releases of contaminated particulates or leaching of contaminants from the debris and/or burned material. Contaminants present in these materials could have been deposited on surface soil as particulates or entered surface soil as dissolved constituents through infiltration of rainfall. Because some material is buried, constituents could also have affected shallow and subsurface soils in the immediate vicinity of the debris and/or residual burned material. Contaminants released from debris located on the slopes of AOC 4 could also have been transported to the lower portions of the unit and eventually into Bat Cave Wash through surface runoff. Primary source media therefore consist of surface, and subsurface soils. Contaminants could have leached from surface soils and shallow soil into underlying deeper soils. Potential migration from subsurface soil to groundwater was identified as a potential secondary pathway. If released, volatile organic compounds (VOCs) in surface soils would be expected to have been degraded by heat and light and are likely no longer present.

Windblown dust contamination from small particles of debris or contaminated surface soil within AOC 4 is a potential secondary release mechanism. Windblown contamination, if any, is expected to be limited to surface soils. Surface runoff from AOC 4 to Bat Cave Wash could also have transported COPCs/COPECs in surface soil or small pieces of debris from AOC 4 to Bat Cave Wash.

1.3 AOC 4 Data

One-hundred and sixteen confirmation surface soil samples and three gabion surface soil samples (AOC4-GB10, AOC4-GB11, and AOC4-GB12) were collected to represent soil conditions upon completion of the TCRA, as shown in Figure C10-3. The confirmation and gabion surface soil samples were analyzed for Title 22 metals, mercury, hexavalent chromium, semivolatile organic compounds, PCBs, and dioxins/furans analyses.

In addition, three soil samples collected from one location (AOC4-1) were collected during the 2008 Soil Part A Phase 1 investigation are still representative of existing site conditions. The samples were collected at sample depth 0 to 0.5, 0.5 to 1, and 2 to 3 feet below ground surface (bgs). Samples at this location were analyzed for the full inorganic and organic suites per the CERCLA Target Analyte List and Target Compound List (TAL/TCL), including Title 22 metals, hexavalent chromium, VOCs, semivolatile organic compounds, PAHs, total petroleum hydrocarbons, pH, pesticides, and PCBs. The soil samples collected between 0 and 1 foot bgs were not analyzed for VOCs.

All TCRA and Part A Phase 1 data are considered Category 1 and can be used as inputs to the four DQO decisions for Solid Waste Management Unit 1.

2.0 Decision 1 – Nature and Extent

This section describes the nature and extent of residual soil concentrations of COPCs and COPECs at AOC 4. Laboratory analytical results for AOC 4 are presented in Tables C10-3 through C10-9. Table C10-10 presents a statistical summary of soil analytical results for

COPCs and COPECs that were either detected above laboratory reporting limits or not detected and reporting limits for one or more samples were greater than the interim screening value. The soil data are discussed first, followed by the data for the white powder sample.

Beryllium, selenium, silver, molybdenum, cyanide, and thallium were not detected in soil samples collected in AOC 4. Table C10-10 lists the 58 detected constituents.

Twenty-five constituents were detected one or more times at concentrations exceeding their respective interim screening levels: antimony, barium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, mercury, nickel, vanadium, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, total high molecular weight PAHs, benzo(a)pyrene equivalents, Aroclor 1254, Aroclor 1260, total PCBs, dioxins TEQ (toxicity equivalent quotient), dioxin TEQ Avian, and dioxin TEQ Mammals.

Twenty constituents (barium, total chromium, hexavalent chromium, cobalt, copper, lead, mercury, nickel, vanadium, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, PAH high molecular weight, benzo(a)pyrene equivalents, Aroclor 1254, total PCBs, dioxin TEQ, dioxin TEQ Avian, and dioxin TEQ Mammals) were detected at concentrations exceeding the interim screening level four or more times; the distribution of these constituents are shown in Figures C10-3 through C10-17, with the exception of benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene, which are being evaluated by benzo(a)pyrene equivalents and PAH high molecular weight figures.

2.1 Nature and Extent Evaluation for Soil

The following subsection discusses the nature and extent of detected COPCs and COPECs detected above interim screening levels at AOC 4. As discussed in Section 3.2 of the Data Gaps Evaluation Report, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Section 2.3 of this sub-appendix summarizes the constituents that may require further evaluation, and Section 6.0 of this sub-appendix provides the recommended follow-up sampling for the Part A Phase 2 soil investigation. The potential Phase 2 sample locations are PG&E's initial assessment of candidate locations for additional characterization. These locations represent sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation. PG&E anticipates that all candidate locations identified may not be necessary for such purposes.

During the TCRA at AOC 4, bedrock was exposed in much of the southeast portion of AOC 4; no further vertical delineation is possible in this area. Vertical delineation is also limited by bedrock in many of the areas at AOC-4.

2.1.1 Antimony

Antimony was detected in three of 122 soil samples collected at AOC 4. Detected concentrations of antimony exceeded the interim screening level (0.285 milligrams per kilogram [mg/kg]) ECV) three times (maximum detected concentration of 2.7 mg/kg at AOC4-K05), as shown in Table C10-3. No samples of the detected concentrations of antimony exceeded the California human health screening level (CHHSL) for residential use

(30 mg/kg) or the commercial/industrial regional screening level (380 mg/kg). The lateral and vertical extents of antimony exceeding the interim screening level have been defined.

2.1.2 Arsenic

Arsenic was detected in 30 of 122 soil samples collected at AOC 4. Detected concentrations of arsenic did not exceed the interim screening level (11 mg/kg; background threshold value [BTV]/CHHSL for residential and commercial use), as shown in Table C10-3. No samples of the detected concentrations of arsenic exceeded the ECV of 11.4 mg/kg. The lateral and vertical extents of arsenic have been defined.

2.1.3 Barium

Barium was detected in 122 of 122 soil samples collected at AOC 4. Detected concentrations of barium exceeded the interim screening level (410 mg/kg; BTV)/ECV) 13 times (maximum detected concentration of 1,300 mg/kg at AOC4-B03), as shown in Tables C10-3 and C10-10 and Figure C10-3. No samples of the detected concentrations of barium exceeded the CHHSL for residential use (5,200 mg/kg) or the commercial/industrial regional screening level (63,000 mg/kg). The lateral and vertical extents of barium exceeding the interim screening level have been defined.

2.1.4 Cadmium

Cadmium was detected in three of 122 soil samples collected at AOC 4. Detected concentrations of barium exceeded the interim screening level (1.1 mg/kg; BTV/ECV) twice (with a maximum detected concentration of 1.7 mg/kg at AOC4-B03), as shown in Tables C10-3 and C10-10. No samples of the detected concentrations of cadmium exceeded the CHHSL for residential use (39 mg/kg) or the commercial/industrial regional screening level (500 mg/kg). The lateral and vertical extents of cadmium exceeding the interim screening level have been defined.

2.1.5 Total Chromium

Total chromium was detected in 123 of 123 soil samples collected at AOC 4. Detected concentrations of total chromium exceeded the interim screening level (39.8 mg/kg (BTV/ECV) 59 times (maximum detected concentration of 160 mg/kg at AOC4-D04), as shown in Tables C10-3 and C10-10 and Figure C10-4. No samples of the detected concentrations of total chromium exceeded the residential screening level (RSL) for residential use (280 mg/kg) or the commercial/industrial regional screening level (1,400 mg/kg). The lateral extent of concentrations exceeding the interim screening level show are scattered throughout the AOC. The lateral extent of chromium concentrations exceeding the interim screening level has not been defined in most of the AOC; however, topographic conditions (steep slopes) prevent additional sampling to the west and south. With the exception of a few detections slightly above the BTV, the lateral extent of total chromium in the flat area adjacent to the compressor station, in the northern part of the AOC, has been defined. The vertical extent of total chromium concentrations has not been defined across much of the AOC. Based on the shallow depth to bedrock across most of AOC 4, additional sampling for delineating vertical extent is limited to the northern portion of AOC, where bedrock is not near the surface.

2.1.6 Hexavalent Chromium

Hexavalent chromium was detected in 25 of 122 soil samples collected at AOC 4. Detected concentrations of hexavalent chromium exceeded the interim screening level (0.83 mg/kg BTV) 15 times (maximum detected concentration of 16 mg/kg at AOC4-K05), as shown in Tables C10-3 and C10-10 and Figure C10-5. None of the detected concentrations of hexavalent chromium exceeded the residential screening level (CHHSL) of 17 mg/kg, the commercial/industrial CHHSL of 37 mg/kg, or the ECV (139.6 mg/kg). Lateral extent of hexavalent chromium concentrations above interim screening levels has largely been defined, although two samples (AOC4-P04 and AOC4_Q04) in the northwest area of the AOC have not been bound to the north, and two samples (AOC4-J06_J07 and AOC4-M10) in the bottom of the ravine are bounded by topography. Vertical delineation is also incomplete in several locations, especially near the west center and at the eastern boundary; however, given the shallow depth to bedrock in these areas, additional sampling is not recommended to delineate vertical extent.

2.1.7 Cobalt

Cobalt was detected in 123 of 123 soil samples collected at AOC 4. Detected concentrations of cobalt exceeded the interim screening level (12.7 mg/kg) (BTV) 19 times (maximum detected concentration of 20 mg/kg at AOC4-D03), as shown in Tables C10-3 and C10-10 and Figure C10-6. Ten samples exceeded the ECV (13 mg/kg). None of the detected concentrations exceeded residential or commercial/industrial CHHSLs (23 mg/kg and 300 mg/kg, respectively). Remaining detected concentrations exceeding the interim screening level ranged from 13 to 20 mg/kg. Lateral extent of cobalt concentrations above interim screening levels have largely been defined, although four samples (AOC4-B-06_07, AOC4-C06_07, AOC4-J06_J07, and AOC4-L07_L08) in the bottom of the ravine have not been bounded to the south, and three locations (AOC4-K02, AOC4-L01, and AOC4-L02) near the top center of the AOC have not been bounded to the east. However, these values are very close to the BTV and adjacent to the access road to the water tanks. Vertical delineation is also incomplete in several locations; however, given the shallow depth to bedrock in the area of exceedances, additional sampling is not recommended to delineate vertical extent.

2.1.8 Copper

Copper was detected in 123 of 123 soil samples collected at AOC 4. Detected concentrations of copper exceeded the interim screening level (16.8 mg/kg) (BTV) 54 times (maximum detected concentration of 790 mg/kg at AOC4-B03), as shown in Tables C10-3 and C10-10 and Figure C10-7. Forty-two samples exceeded the ECV (20.6 mg/kg). None of the detected concentrations exceeded residential or commercial/industrial CHHSLs (3,000 mg/kg and 38,000 mg/kg, respectively). Remaining detected concentrations exceeding the interim screening level ranged from 17 to 210 mg/kg. The lateral extent of copper concentrations exceeding the interim screening level has been defined in the northern portion of the AOC. The lateral extent of copper is undefined to the south, east, and west; however, topographic conditions (steep slopes) prevent additional sampling to the west and south. Additional sampling is recommended in the southeastern corner of the AOC and along the upper access road. The vertical extent of copper concentrations has also not been defined; however, given the shallow depth to bedrock in areas of exceedances, additional sampling is not recommended to delineate vertical extent.

2.1.9 Lead

Lead was detected in 122 of 123 soil samples collected at AOC 4. Detected concentrations of lead exceeded the interim screening level (8.39 mg/kg) (BTV/ECV) 24 times (maximum detected concentration of 220 mg/kg at AOC4-B03), as shown in Tables C10-3 and C10-10 and Figure C10-8. Two of the detected concentrations exceeded the residential CHHSL and no detected concentrations exceeded the commercial/industrial CHHSL (80 mg/kg and 320 mg/kg, respectively). The lateral extent of lead concentrations above interim screening levels has largely been defined. The vertical extent of lead concentrations has also not been defined; however, based on the shallow depth to bedrock across most of AOC 4, additional sampling for delineating vertical extent is limited to the northern portion of AOC, where bedrock is not near the surface.

2.1.10 Mercury

Mercury was detected in five of 122 samples collected at AOC 4. Detected concentrations of mercury exceeded the interim screening level (0.0125 mg/kg; ECV) five times (maximum detected concentration of 0.52 mg/kg at AOC4-B03), as shown in Tables C10-3 and C10-10 and Figure C10-9. None of the detected concentrations exceeded the residential and commercial/industrial CHHSLs (18 mg/kg and 180 mg/kg, respectively). The ECV of 0.0125 mg/kg is below the capability of the instrumentation to detect mercury. As a result, the non-detected sample results had reporting limits that exceeded the ECV. These reporting limits ranged from 0.098 to 0.11 mg/kg. The five sample locations with detectable concentrations of mercury are surrounded by samples with non-detect concentrations. While the precise extent of mercury concentrations above the ECV cannot be determined with the available data, further investigation is unlikely to yield more usable data. The detected mercury concentrations are also collocated with other locations with metals concentrations above background. The uncertainties with regard to mercury will be addressed in the risk assessment and corrective measures study/feasibility study (CMS/FS).

2.1.11 Nickel

Nickel was detected in 122 of 122 soil samples collected from AOC 4. As shown in Tables C10-3 and C10-10 and Figure C10-10, detected concentrations exceeded the interim screening level (27.3 mg/kg) (BTV/ECV) 52 times (maximum detected concentration of 75 mg/kg at AOC4-D02). There were no exceedances of the residential and commercial/industrial CHHSLs (1,600 mg/kg and 16,000 mg/kg, respectively). The lateral extent of nickel concentrations exceeding the interim screening level has been defined in the south and southeastern corner of the AOC. Topographic conditions (steep slopes) prevent additional sampling to the west and south, and the compressor station is immediately to the north of the AOC. The vertical extent of nickel concentrations has not been defined. Based on the shallow depth to bedrock across most of AOC 4, additional sampling for delineating vertical extent is limited to the northern portion of AOC, where bedrock is not near the surface.

2.1.12 Vanadium

Vanadium was detected in 122 of 122 soil samples collected at AOC 4. Detected concentrations of vanadium exceeded the interim screening level (52.2 mg/kg) (BTV) 38 times (maximum detected concentration of 100 mg/kg at AOC4-D02), as shown in

Tables C10-3 and C10-10 and Figure C10-11. Thirty-eight samples exceeded the ECV (13.9 mg/kg). None of the detected concentrations exceeded residential or commercial/industrial CHHSLs (390 mg/kg and 5,200 mg/kg, respectively). Remaining detected concentrations exceeding the interim screening level ranged from 53 to 95 mg/kg. The lateral extent of vanadium concentrations exceeding the interim screening level has not been defined in most of the AOC; however, topographic conditions (steep slopes) prevent additional sampling to the west and south. With the exception of a few detections slightly above the BTV, the lateral extent of vanadium in the flat area adjacent to the compressor station, in the north part of the AOC has been defined. The vertical extent of vanadium concentrations has also not been defined; however, given the shallow depth to bedrock in areas of exceedances, additional sampling is not recommended to delineate vertical extent.

2.1.13 Zinc

Zinc was detected in 122 of 122 soil samples collected at AOC 4. Detected concentrations of zinc exceeded the interim screening level (58 mg/kg) (BTV/ECV) 13 times (maximum detected concentration of 410 mg/kg at AOC4-B03), as shown in Tables C10-3 and C10-10 and Figure C10-12. None of the detected concentrations exceeded residential and commercial/industrial CHHSLs (23,000 mg/kg and 100,000 mg/kg, respectively). The lateral extent of zinc concentrations exceeding the interim screening level has been defined in most of the AOC. The vertical extent of zinc concentrations has not been defined; however, based on the shallow depth to bedrock across most of AOC 4, additional sampling for delineating vertical extent is limited to the northern portion of AOC, where bedrock is not near the surface.

2.1.14 Benzo(a)pyrene, Benzo(a)pyrene Equivalents, and PAHs

Benzo(a)pyrene was detected in 48 of 122 soil samples collected from AOC 4. Detected concentrations of benzo(a)pyrene exceeded the interim screening level (38 micrograms per kilograms [µg/kg]) (residential CHHSL) 16 times. Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene and indeno(1,2,3-cd)pyrene were also detected at concentrations exceeding the interim screening levels. Benzo(a)anthracene was detected in 52 of 122 soil samples and exceeded the interim screening level (380 µg/kg) (residential CHHSL) six times. Benzo(b)fluoranthene was detected in 60 of 122 soil samples and exceeded the interim screening level (380 µg/kg) (residential CHHSL) six times. Benzo(k)fluoranthene was detected in 40 of 122 soil samples and exceeded the interim screening level (380 µg/kg) (residential CHHSL) two times. Ideno(1,2,3-cd)pyrene was detected in 45 of 122 soil samples and exceeded the interim screening level (380 µg/kg) (residential CHHSL) one time. To assist with evaluation of PAHs for human health, benzo(a)pyrene equivalents were calculated for each of the soil samples collected at AOC 4, as shown in Table C10-5. Benzo(a)pyrene equivalents values exceeded the interim screening level of 38 µg/kg (residential CHHSL) 26 times (maximum calculated concentration of 1,110 µg/kg at AOC4-C01), as shown in Tables C10-5 and C10-10 and Figure C10-13. The lateral extent of benzo(a)pyrene equivalent concentrations exceeding the interim screening level has not been defined in the east, south, and southeastern corner of the AOC. The vertical extent of benzo(a)pyrene equivalent concentrations has also not been defined; however, given the shallow depth to bedrock, additional sampling is not recommended to delineate vertical extent.

To assist with evaluation of PAHs for ecological risk, detected concentrations of low molecular weight PAHs and high molecular weight PAHs were summed and compared to the PAH low molecular weight and PAH high molecular weight ECVs (10,000 µg/kg and 1,160 µg/kg, respectively). None of the sums of detected concentrations exceeded the PAH low molecular weight. Twelve of the sums of detected concentrations exceeded the PAH high molecular weight ECVs, as shown on Figure C10-14. PAH high molecular weight sums exceeding the interim screening level have not been defined in the south-southeastern corner of the AOC. The vertical extent has also not been defined; however, given the shallow depth to bedrock, additional sampling is not recommended to delineate vertical extent.

2.1.14 Polychlorinated Biphenyls

Three PCB isomers were detected in soil samples from AOC 4: Aroclor 1016, Aroclor 1254, and Aroclor 1260, as shown on Tables C10-8 and C10-10. These constituents are discussed below.

Aroclor 1016 was detected in eight of the 120 in the surface soil samples collected from AOC 4. None of the samples was above the interim screening level of 3,900 µg/kg (residential RSL) (maximum detected concentration of 60 µg/kg).

Aroclor 1254 was detected in 70 of the 120 in the surface soil samples collected from AOC 4 (Figure C10-15). Twenty-six samples were above the interim screening level of 220 µg/kg (residential RSL) (maximum detected concentration of 5,900 µg/kg). The remaining detected concentration of Aroclor 1254 ranged from 19 µg/kg to 2,900 µg/kg. The lateral extent of Aroclor 1254 concentrations exceeding the interim screening level has not been defined in the eastern part of the AOC. The vertical extent of Aroclor 1254 concentrations has also not been defined; however, given the shallow depth to bedrock, additional sampling is not recommended to delineate vertical extent.

Aroclor 1260 was detected in 11 of the 120 in the surface soil samples collected from AOC 4. One sample was above the interim screening level of 220 µg/kg (residential RSL); the detected concentration was 640 µg/kg. The remaining detected concentration of Aroclor 1260 ranged from 19 µg/kg to 120 µg/kg.

To assist with evaluation of PCBs for ecological risk, detected concentrations of Aroclors were summed and the total PCB values were compared to the ECV. Twenty-six samples were above the interim screening level of 204 µg/kg (ECV). The maximum calculated value for total PCBs was 6,000 µg/kg, as shown in Tables C10-8 and C10-10 and Figure C10-16. The lateral extent of total PCB values exceeding the interim screening level has not been defined in the eastern part of the AOC. The vertical extent of total PCBs has also not been defined; however, given the shallow depth to bedrock, additional sampling is not recommended to delineate vertical extent.

2.1.15 Dioxins and Furans

Dioxins and furans are compared to TEQ, TEQ Avian, and TEQ Mammals. Pentadioxin (1,2,3,7,8-PeCDD) and 2,3,7,8 tetracholordibenzo (2,3,7,8-TCCD) are the only two dioxins with individual interim screening levels. Dioxins and furans were detected in 118 of the 119 surface soil samples collected from AOC 4, as shown in Tables C10-9 and C10-10 and Figure C10-17. Thirty-four samples were above the TEQ Avian interim screening level of 16 nanograms per kilogram (ng/kg) (ECV) (maximum detected concentration of 280 ng/kg). Thirteen samples were above the TEQ human interim screening level of 50 ng/kg (residential RSL) (maximum detected concentration of 250 ng/kg). One hundred and two samples were above the TEQ Mammals interim screening level of 1.6 ng/kg (ECV) (maximum detected concentration of 250 ng/kg). The lateral extent of TEQ exceeding the interim screening level (ECV) has not been defined; however, the lateral extent of TEQ values exceeding residential and commercial RSLs has been defined except at the mouth of the ravine near Bat Cave Wash. The vertical extent of TEQ has not been defined; however, given the shallow depth to bedrock in most of the AOC, additional sampling for vertical extent is not recommended except near the mouth of the ravine in Bat Cave Wash.

2.1.16 Target Analyte List/Target Compound List Constituents

TAL/TCL compounds were analyzed in one sample during the Soil Part A investigation. Aluminum, calcium, iron, magnesium, manganese, potassium, sodium, bis(2ethylhexyl)phthalate, methyl acetate, cyanide, Aroclor 1016, Aroclor 1254, and Aroclor 1260 were detected in the AOC 4 surface soil sample (AOC4-1) the complete TAL/TCL suite of compounds. Aroclor 1016, Aroclor 1254, and Aroclor 1260 are discussed in Section 2.1.14. The remaining constituents are discussed below.

Aluminum was detected in one of one surface soil samples collected. The maximum detected concentration of aluminum was 8,400 mg/kg, which is below the interim screening level (16,400 mg/kg) (BTV), as shown in Tables C10-4 and C10-10. The detected concentration did not exceed the residential and commercial CHHSLs (77,000 mg/kg and 990,000 mg/kg, respectively). An ECV has not been established for aluminum.

Calcium was detected in one of one surface soil samples collected. The maximum detected concentration of calcium was 21,000 mg/kg, which is below the interim screening level (66,500 mg/kg) (background value), as shown in Tables C10-4 and C10-10. Residential and commercial/industrial CHHSLs and an ECV have not been established for calcium.

Iron was detected in one of one surface soil samples collected. The maximum detected concentration of iron was 20,000 mg/kg, which is below the interim screening level of 55,000 mg/kg (residential RSL), as shown in Tables C10-4 and C10-10. Residential and commercial/industrial CHHSLs and an ECV have not been established for iron.

Magnesium was detected in one of one surface soil samples collected. The maximum detected concentration of magnesium was 7,900 mg/kg, which is below the interim screening level (12,100 mg/kg) (background value), as shown in Tables C10-4 and C10-10. Residential and commercial/industrial CHHSLs and an ECV have not been established for magnesium.

Manganese was detected in one of one surface soil samples collected. The maximum detected concentration of manganese was 310 mg/kg, which is below the interim screening level (402 mg/kg) (BTV/ECV), as shown in Tables C10-4 and C10-10. The detected concentrations did not exceed residential and commercial/industrial CHHSLs (1,800 mg/kg and 23,000 mg/kg, respectively).

Potassium was detected in one of one surface soil samples collected. The maximum detected concentration of potassium was 2,500 mg/kg, which is below the interim screening level of

4,400 mg/kg (BTV), as shown in Tables C10-4 and C10-10. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for potassium.

Sodium was detected in one of one surface soil samples collected. The maximum detected concentration of sodium was 270 mg/kg, which is below the interim screening level of 2,070 mg/kg (BTV), as shown in Tables C10-4 and C10-10. Residential and commercial/industrial CHHSLs, RSLs, and an ECV have not been established for sodium.

Bis(2-ethylhexyl)phthalate and methyl acetate were detected in one of one soil sample collected at AOC 4 at 2 to 3 feet bgs at location AOC4-1, as shown in Tables C10-6 and C10-10. The detected concentrations were 810 µg/kg and 12 µg/kg, respectively. Both are below respective interim screening levels of 2,870 µg/kg and 22,000,000 µg/kg.

As discussed in Section C.2 of Appendix C, PG&E recommends that the TAL/TCL metals and organics discussed above not be considered COPCs/COPECs for this AOC, and no further sampling for these constituents is proposed except for the detected Aroclor 1016, Aroclor 1254, and Aroclor 1260. These constituents have been fully discussed in Section C.2

2.2 Central Tendency Comparison to Background Threshold Values

Seventeen metals (antimony, barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc) were detected above their respective Topock site-specific BTVs in soil samples collected from AOC 4. A central tendency comparison was performed for eight of these 17 metals (barium, total chromium, cobalt, lead, nickel, vanadium, and zinc) to compare the AOC 4 soil data set for these metals with the corresponding Topock soil background data set to determine whether a difference exists between the two populations and if additional sampling is required for a given metal, as shown in Table C10-11.

Metals in either the AOC 4 data set or background data set that were detected infrequently (less than five detects) or had a limited number of results (less than eight) were not tested. There were insufficient detections of antimony, beryllium, cadmium, molybdenum, selenium, silver and thallium at AOC 4 to conduct the test, and there were insufficient detections of hexavalent chromium and mercury in the background data set to allow for a central tendency comparison.

As shown in Table C10-11 and in plots on Figure 3-1 in Data Gaps Report, results from the Gehan test indicated that site concentrations for barium, total chromium, cobalt, copper, lead, nickel, vanadium, and zinc may exceed background. Additional sampling is being proposed to define lateral extent of copper and vertical extent for total chromium, lead, nickel, and zinc. The lateral and vertical extents of barium, cobalt, and vanadium have been adequately defined.

2.3 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review indicates that the decision error has been held to an acceptable level. Post-remediation sampling indicates sufficient data of acceptable quality have been attained in areas likely to have been impacted by incidental disposal of debris.

Based on the DQOs, the following data gaps were identified to resolve Decision 1:

- Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans to the east and near the south-southeastern corner of the AOC.
- Data Gaps #2 – Vertical extent of various metals, PCBs, and dioxins/furans across the AOC; however, given the shallow depth to bedrock, additional sampling is limited to the northern portion of AOC, where bedrock is not near the surface.
- Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.

The potential Phase 2 soil sample locations to fill the identified data gaps are presented in Section 6.0.

3.0 Decision 2 – Data Sufficient to Estimate Representative Exposure Point Concentrations

For Decision 2, data were evaluated to determine if the AOC 4 data are sufficient to conduct human health and ecological risk assessments based on the criteria described in Section 4.0 of the Data Gaps Report. The principal consideration for Decision 2 was whether there were sufficient data to estimate a representative exposure point concentration (EPC). Data reviewed were all available data at AOC 4, including data collected after the TCRA conducted in 2010, data collected during the gabion installations at the confluence of Bat Cave Wash and Area F of AOC 4 in 2010, and historical data remaining in place.

Table C10-12 summarizes the results of the evaluation to determine if data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. In general, existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values (11 metals, dioxins/furans, PAHs, and PCBs) as described below.

3.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for barium, total chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc using ProUCL. For the remaining metals (antimony and cadmium), although sufficient data are not available to calculate EPCs (based on the 95 percent upper confidence limit on the mean), additional data collection is not expected to significantly change the results of the risk assessment because the compounds are very infrequently detected (i.e., additional non-detects would be expected).

3.2 Dioxins/Furans

Sufficient data (numbers of samples and detections) are available to calculate EPCs for dioxins/furans (human, bird, and mammal TEQs) using ProUCL.

3.3 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene toxic equivalents and high molecular weight PAHs using ProUCL.

3.4 Polychlorinated Biphenyls

Sufficient data (numbers of samples and detections) are available to calculate EPCs for total PCBs using ProUCL.

4.0 Decision 3 – Potential Threat to Groundwater from Residual Soil Concentrations

Table C3-13 presents the results of the tiered screening analysis for AOC 4 following debris and sediment removal. Ten metals had concentrations in excess of their respective background threshold value. Of those 10, cobalt, hexavalent chromium, and vanadium had one or more concentrations exceeding the calculated soil screening levels.

The hydrogeologic setting at AOC 4 is distinct from other AOCs at Topock because of the presence of shallow bedrock and deep groundwater. Bedrock is present at or near the surface across much of the AOC area, and is present at depths of 40 to 50 feet below ground surface in the northern part. The depth to groundwater is between 150 and 200 feet bgs. Numerical simulation of unsaturated flow and transport through fractured bedrock is a very complex undertaking, and requires a dual domain formulation of the unsaturated flow equations, which requires a large number of parameters that are highly site-specific. Because most of the parameters cannot be measured, parameter estimates would be highly uncertain, resulting in an inherently non-unique solution, that is, solutions to the equations would be highly variable and uncertain. Thus, simulation of a fractured rock domain was not performed. However, vadose zone modeling was performed, assuming the vadose zone at AOC 4 was comprised of soil. Assuming the fractured rock is a porous medium is a conservative approach in this extremely arid environment. At AOC 4, the bedrock is a minimally fractured, competent crystalline metadiorite. Fractures, particularly at depth, are not common, and the apertures relative to the pore scale, are large. Thus, except for extremely rare events, the fractures likely act as a capillary barrier to water flow.

The screening level model was able to rule out the threat to groundwater from hexavalent chromium and cobalt. The potential for vanadium to leach to groundwater could not be ruled out based on the screening level model.

4.1 Vanadium

Because there is no MCL for vanadium, the calculated background threshold value (BTV) of 59.9 µg/L was initially used in the SSL calculation. Although the potential for vanadium to leach to groundwater could not be ruled out, it is highly unlikely that the metal is a threat to groundwater at AOC 4 for the following reasons:

- The depth to water at AOC 4 is at least 150 feet below ground surface. For vanadium to reach the water table, the presence of interconnected fractures in the competent crystalline bedrock would be required through the 150 feet to the water table.
- The modeling assumed that the results of the deepest sample (42 mg/kg) at a depth of 5 feet below ground surface extended to the water table.
- The modeling was conducted using a porous media approach, and therefore neglects the capillary barrier effect that the fractures likely provide in this arid environment.

- Vanadium has not been identified as a groundwater COPC at the Topock. Vanadium has been detected in Topock monitoring wells at concentrations above the UTL very infrequently. Monitoring wells MW-10 and MW-11 have one sample each (out of 22 and 13 total samples, respectively) that had vanadium detections above the UTL, which is within the statistical limits of the UTL.

5.0 Decision 4 – Data Sufficiency to Support the Corrective Measures Study/Feasibility Study

As discussed in Section 6.0 of the Data Gaps Evaluation Report, various types of data will be needed to support the evaluation of technologies/remedial actions for the CMS/FS. The types of data needed vary somewhat depending on the specific technology to be evaluated. The categories of data required for technologies that may be applicable to the areas outside the fence line include:

- Extent of COPCs and COPECs above action levels (required for all technologies).
- Waste characterization parameters (required if soil may be disposed of offsite), as discussed in Table 6-1 in the Data Gaps Evaluation Report.
- Constituent leachability (required to assess the need for fixation of leachable compounds and/or the feasibility of certain soil washing technologies).
- Soil physical properties (required for all technologies; however, the properties required vary among the different technologies), as discussed in Table 6-1 in the Data Gaps Evaluation Report.
- Surface and subsurface features (required to determine whether there are physical impediments to implementing specific technologies and/or remediating specific areas).
- If present, volumes of white powder and debris.

The following is a summary of data for AOC 4 that are currently available to support CMS/FS.

5.1 Extent of COPCs and COPECs

A summary of the nature and extent of detected COPCs/COPECs is presented in Section 2.0 Decision 1 – Nature and Extent. The lateral and vertical extents of the COPCs and COPECs are discussed in Section 2.2, data results for selected constituents are shown in Figures C10-3 through C10-17, and data gaps associated with lateral delineation are discussed in Section 6.0.

5.2 Waste Characterization Parameters

Partial waste characterization data are available to characterize the soil and other materials for a potential removal action and disposed in an offsite permitted facility. While none of the soils or other materials is considered ignitable, corrosive, or reactive, data are lacking to complete the evaluation of the toxicity characteristic. Total chemical concentrations are available to characterize the soil, certain debris, and white powder material relative to California Title 22 total threshold limit concentrations (TTLC). The maximum concentrations of these metals for each of the units were compared to the TTLCs, and no metals exceeded the TTLCs, as shown in Table C10-14. The maximum detected concentrations were also compared to the soluble threshold limit concentrations (STLCs). Concentrations of barium and copper exceeded 10 times the STLC once, total chromium exceeded 10 times the STLC 37 times, and lead exceeded 10 times the STLC four times, as shown in Table C10-14. In addition, total chromium also exceeded 20 times the toxicity characteristic leaching procedure (TCLP) in four samples and lead also exceeded 20 times the TCLP once, as indicated in Table C10-14. Because these two metals have the potential to exceed STLC or TCLP thresholds, additional leachability testing for waste characterization purposes may be required if soil excavation and offsite disposal is chosen as a remedy. For the purposes of supporting the CMS/FS, the lack of STLC or TCLP analysis is not considered a data gap, for the existing total concentrations are sufficient for the purposes of evaluating various remedial alternatives.

5.3 Soil Physical Properties

Soil physical property data collected during the Part A Phase 1 investigation was limited to grain size analysis only. Specific soil physical property data (i.e., porosity, grain size, density, organic carbon content) are required to support the CMS/FS, as described in Table 6-1 of the Data Gaps Evaluation Report.

5.4 Surface and Subsurface Features

There is extensive information regarding surface and subsurface features at AOC 4, but additional information may be required once remaining areas requiring remediation have been defined. Nearby roads and road structures, vegetation, and the location of bedrock are considered part of AOC 4. Similarly, subsurface utilities, including gas transmission pipelines and any culverts or other features, have been defined as part of the TCRA. All areas to be remediated will require a utility clearance prior to intrusive activities; however, no other data gaps pertaining to surface and subsurface features have been identified at this AOC.

Additional soil physical parameter data are needed to support the CMS/FS.

6.0 Summary of Data Gaps and Potential Phase 2 Soil Sample Locations to Fill Identified Gaps

Based on the Part A DQO, data gaps were identified for three of the four decisions and are summarized below by decision:

- **Decision 1 (Nature and Extent)** – the following data gaps were identified to resolve this decision:
  - Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans to the east and near the south-southeastern corner of the AOC.
  - Data Gaps #2 – Vertical extent of various metals, PCBs, and dioxins/furans across the AOC; however, given the shallow depth to bedrock, additional sampling is limited to the northern portion of AOC, where bedrock is not near the surface.

  - Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.

- **Decision 2 (Data Sufficient to Estimate Representative Exposure Point Concentrations).** No data gap was identified for this decision.

- **Decision 3 (Potential Threat to Groundwater from Residual Soil Concentrations).** No data gap was identified for this decision.

- **Decision 4 (Data Sufficient to Support the CMS/FS) – the following data gap was identified to resolve this decision:**

  - Data gap #4 – Soil physical property parameters to support the CMS/FS.

Table C10-15 summarizes the potential Phase 2 sample locations, depths, description/ rationale for each location (i.e., which data gaps they would address), and analytes. Potential Phase 2 sample locations are also shown in Figure C10-18. The potential Phase 2 sample locations are PG&E's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation. PG&E anticipates that all candidate locations identified may not be necessary for such purposes.

7.0 References

Alisto, Arcadis, CH2M HILL, NES, and Turnkey. 2009. *Work Plan for Time-Critical Removal Action at AOC 4, Pacific Gas and Electric Company Topock Compressor Station, Needles, California.* December.

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CH2M HILL. 2007. *Revised Final RCRA Facility Investigation and Remedial Investigation Report. Volume 1 – Site Background and History.* August.

__________. 2010. *Data Quality Objectives – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California.* March 12.

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Tables

TABLE C10-1

Time-Critical Removal Action Target Endpoint Concentrations and RI/RFI Soil Interim Screening Levels

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter Name	Units	Target Endpoint Concentrations: Native Alluvium[a]	Target Endpoint Concentrations: Disturbed Alluvium[b]	RI/RFI Soil Interim Screening Level[c]
PG&E Property				
Metals				
Antimony	mg/kg	3,800	380	0.285
Arsenic	mg/kg	110	11	11
Barium	mg/kg	63,000	6,300	410
Beryllium	mg/kg	---	---	0.672
Cadmium	mg/kg	8,100	810	1.1
Chromium, Hexavalent	mg/kg	370	37	0.83
Chromium, total	mg/kg	14,000	1,400	39.8
Cobalt	mg/kg	3,000	300	12.7
Copper	mg/kg	380,000	38,000	16.8
Lead	mg/kg	8,000	800	8.39
Mercury	mg/kg	1,800	180	0.0125
Molybdenum	mg/kg	480,000	4,800	1.37
Nickel	mg/kg	160,000	16,000	27.3
Selenium	mg/kg	480,000	4,800	1.47
Silver	mg/kg	---	---	5.15
Thallium	mg/kg	---	---	2.32
Vanadium	mg/kg	520,000	5,200	52.2
Zinc	mg/kg	1,000,000	100,000	58
Semivolatile Organic Compounds				
Pentachloro phenol	ug/kg	90,000	9,000	2,490
Polyaromatic Hydrocarbons				
B(a)P Equivalent	ug/kg	1,300	130	38
Dioxins and Furans				
TEQ Avian	ng/kg	---	---	16
TEQ Human	ng/kg	500	50	50
TEQ Mammals	ng/kg	---	---	1.6
Polychlorinated Biphenyls				
Total PCBs	ug/kg	7,400	740	204
HNWR Property				
Metals				
Antimony	mg/kg	---	---	0.285
Arsenic	mg/kg	---	11	11
Barium	mg/kg	---	410	410
Beryllium	mg/kg	---	---	0.672
Cadmium	mg/kg	---	1.1	1.1
Chromium, Hexavalent	mg/kg	---	0.83	0.83
Chromium, total	mg/kg	---	39.8	39.8
Cobalt	mg/kg	---	12.7	12.7
Copper	mg/kg	---	16.8	16.8
Lead	mg/kg	---	8.39	8.39
Mercury	mg/kg	---	---	0.0125
Molybdenum	mg/kg	---	1.37	1.37

TABLE C10-1

Time-Critical Removal Action Target Endpoint Concentrations and RI/RFI Soil Interim Screening Levels

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter Name	Units	Target Endpoint Concentrations: Native Alluvium[a]	Target Endpoint Concentrations: Disturbed Alluvium[b]	RI/RFI Soil Interim Screening Level[c]
HNWR Property				
Metals				
Nickel	mg/kg	---	27.3	27.3
Selenium	mg/kg	---	1.47	1.47
Silver	mg/kg	---	---	5.15
Thallium	mg/kg	---	---	2.32
Vanadium	mg/kg	---	52.2	52.2
Zinc	mg/kg	---	58	58
Semivolatile Organic Compounds				
Pentachloro phenol	ug/kg	---	2,490	2,490
Polyaromatic Hydrocarbons				
B(a)P Equivalent	ug/kg	---	---	38
Dioxins and Furans				
TEQ Avian	ng/kg	---	16	16
TEQ Human	ng/kg	---	50	50
TEQ Mammals	ng/kg	---	1.6	1.6
Polychlorinated Biphenyls				
Total PCBs	ug/kg	---	204	204

Notes:

[a] Native alluvium concentrations are 10 times the target endpoints

[b] Disturbed Alluvium Target Endpoint Concentrations include: commercial/industrial California human health screening levels and USEPA industrial regional screening levels

[c] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional 6 screening level is used. The interim screening level is applicable to areas outside the fence line of the compressor station.

mg/kg	milligrams per kilogram
ng/kg	nanograms per killogram
ug/kg	micrograms per kilogram
---	target not identified

TABLE C10-2
Conceptual Site Model – AOC 4 – Debris Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Disposal of Debris (including asbestos containing material)	Surface and subsurface soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]
Burned Material	Surface and subsurface soil	Percolation and/or infiltration Potential entrainment in stormwater/surface water runoff	Subsurface Soil	Wind erosion and atmospheric dispersion of surface soil

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

C10-3
Sample Results: Metals
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Metals (mg/kg)																	
Interim Screening Level [1]:				0.285	11	410	0.672	1.1	39.8	0.83	12.7	16.8	8.39	0.0125	1.37	27.3	1.47	5.15	2.32	52.2	58
Residential Screening Level [2]:				30	0.07	5,200	16	39	280	17	23	3,000	80	18	380	1,600	380	380	5	390	23,000
Commercial Screening Level [3]:				380	0.24	63,000	190	500	1,400	37	300	38,000	320	180	4,800	16,000	4,800	4,800	63	5,200	100,000
Ecological Comparison Values [4]:				0.285	11.4	330	23.3	0.0151	36.3	139.6	13	20.6	0.0166	0.0125	2.25	0.607	0.177	5.15	2.32	13.9	0.164
Background [5]:				NE	11	410	0.672	1.1	39.8	0.83	12.7	16.8	8.39	NE	1.37	27.3	1.47	NE	NE	52.2	58
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC4-1	10/14/08	0 - 0.5	N	ND (2J)	3.7	440 J	ND (1)	ND (1)	47	0.49	6.7	16	8.5	ND (0.1)	ND (1)	19	ND (1)	ND (1)	ND (2)	23	48
	10/14/08	0.5 - 1	N	ND (2)	4	120	ND (1)	ND (1)	32	ND (0.404)	9.6	13	10	ND (0.1)	ND (1)	17	ND (1)	ND (1)	ND (2)	32	47
	10/14/08	2 - 3	N	ND (2)	3.6	120	ND (1)	ND (1)	20	ND (0.405)	7.4	12	17	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2)	30	39
AOC4-A01	03/02/10	0	N	ND (2.3J)	ND (1.1)	230 J	ND (1.1)	ND (1.1)	73 J	0.49	17	33	5.3	ND (0.11)	ND (1.1J)	55 J	ND (1.1J)	ND (1.1)	ND (2.3)	95 J	52 J
AOC4-A01minus	03/02/10	0	N	ND (2.2)	2.5	330	ND (1.1)	ND (1.1)	24	0.5	5.3	14	11	ND (0.11)	ND (1.1)	14	ND (1.1)	ND (1.1)	ND (2.2)	26	46
AOC4-A01S	04/21/10	0	N	ND (2.1)	4.3	360	ND (1.1)	ND (1.1)	49	ND (0.43)	12	56	2.7	ND (0.11)	ND (1.1)	30	ND (1.1)	ND (1.1)	ND (2.1)	56	49
AOC4-A02	02/24/10	0	N	ND (2.3)	3.6	350	ND (1.1)	ND (1.1)	21	ND (0.45)	5.8	36	8.4	ND (0.11)	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.3)	32	38
AOC4-A03	03/01/10	0	N	ND (2.4)	5	270 J	ND (1.2)	ND (1.2)	41	ND (0.47)	9.3	24	6.3 J	ND (0.11)	ND (1.2)	34	ND (1.2)	ND (1.2)	ND (2.4)	50	53
	03/01/10	0	FD	ND (2.4)	4.2	220 J	ND (1.2)	ND (1.2)	40	ND (0.47)	9	24	8.2 J	ND (0.11)	ND (1.2)	34	ND (1.2)	ND (1.2)	ND (2.4)	46	52
AOC4-A04	07/27/10	0	N	ND (2)	1.2	140	ND (1)	ND (1)	13	ND (0.4)	5.1	7.4	7.6	ND (0.099)	ND (1)	12	ND (1)	ND (1)	ND (2)	25	35
AOC4-A05	07/26/10	0	N	ND (2)	1.4	130	ND (1)	ND (1)	11	ND (0.4)	4.4	7.8	7.4	ND (0.1)	ND (1)	9.8	ND (1)	ND (1)	ND (2)	19	32
AOC4-A06	07/26/10	0	N	ND (2)	ND (1)	150	ND (1)	ND (1)	22	ND (0.4)	6.2	7.8	6.8	ND (0.1)	ND (1)	16	ND (1)	ND (1)	ND (2)	29	33
AOC4-A06_A07	08/10/10	0	N	ND (2J)	ND (1)	180 J	ND (1)	ND (1)	31 J	ND (0.4)	8.8	10	8.3	ND (0.098)	ND (1J)	26 J	ND (1)	ND (1)	ND (2J)	35 J	40 J
AOC4-B01	03/03/10	0	N	ND (2.4)	5.5	450	ND (1.2)	ND (1.2)	26	ND (0.47)	9.3	17	2.4	ND (0.11)	ND (1.2)	22	ND (1.2)	ND (1.2)	ND (2.4)	60	47
AOC4-B01S	04/21/10	0	N	ND (2.2)	4.7	250	ND (1.1)	ND (1.1)	24	ND (0.44)	8	24	8.4	ND (0.11)	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.2)	35	45
	04/21/10	0	FD	ND (2.2)	4.9	240	ND (1.1)	ND (1.1)	24	ND (0.44)	8.3	25	8.6	ND (0.11)	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.2)	34	46
AOC4-B02	03/17/10	0	N	ND (11J)	ND (5.4J)	770 J	ND (5.4J)	ND (5.4J)	58 J	1.9	12 J	81 J	44 J	0.29	ND (5.4J)	36 J	ND (5.4J)	ND (5.4J)	ND (11J)	65 J	160 J
AOC4-B03	03/03/10	0	N	2.5	4.2	1,300	ND (1.1)	1.7	100	9.7	5.4	790	220	0.52	ND (1.1)	24	ND (1.1)	ND (1.1)	ND (2.2)	26	410
AOC4-B04	03/12/10	0	N	ND (2.2J)	ND (1.1)	390 J	ND (1.1)	ND (1.1)	35 J	0.67	9.4	7.8	4	ND (0.11)	ND (1.1J)	33 J	ND (1.1)	ND (1.1)	ND (2.2)	38 J	46 J
AOC4-B05	07/26/10	0	N	ND (2)	ND (1)	180	ND (1)	ND (1)	22	ND (0.4)	6.4	8.4	7.9	ND (0.1)	ND (1)	17	ND (1)	ND (1)	ND (2)	30	36
AOC4-B06	07/26/10	0	N	ND (2)	ND (1)	190	ND (1)	ND (1)	24	ND (0.4)	6.4	9	9.7	ND (0.099)	ND (1)	17	ND (1)	ND (1)	ND (2)	31	40
AOC4-B06_B07	08/10/10	0	N	ND (2)	ND (1)	220	ND (1)	ND (1)	53	ND (0.4)	13	17	6.9	ND (0.1)	ND (1)	40	ND (1)	ND (1)	ND (2)	53	45
AOC4-C01	03/02/10	0	N	ND (2.3)	3.6	340	ND (1.2)	ND (1.2)	84	0.73	7.3	45	5.7	ND (0.11)	ND (1.2)	23	ND (1.2)	ND (1.2)	ND (2.3)	39	55
AOC4-C01S	04/22/10	0	N	ND (2.1)	3	200	ND (1)	ND (1)	15	ND (0.41)	6.1	11	7	ND (0.1)	ND (1)	12	ND (1)	ND (1)	ND (2.1)	26	32
AOC4-C02	03/29/10	0	N	ND (4.2)	7.6	520	ND (2.1)	ND (2.1)	64	ND (0.42)	6	26	5.1	ND (0.1)	ND (2.1)	25	ND (2.1)	ND (2.1)	ND (4.2)	56	50
AOC4-C03	03/18/10	0	N	2.1	1.4	700	ND (1)	1.1	73	5.3	5.9	90	76	0.25	ND (1)	20	ND (1)	ND (1)	ND (2)	28	260
AOC4-C04	03/18/10	0	N	ND (2.2)	5.5	500	ND (1.1)	ND (1.1)	17	ND (0.44)	4.4	13	5.4	ND (0.11)	ND (1.1)	15	ND (1.1)	ND (1.1)	ND (2.2)	31	33
AOC4-C05	07/26/10	0	N	ND (2)	2	140	ND (1)	ND (1)	18	ND (0.4)	6.2	18	12	ND (0.099)	ND (1)	14	ND (1)	ND (1)	ND (2)	28	45
AOC4-C06	07/26/10	0	N	ND (2)	ND (1)	170	ND (1)	ND (1)	29	ND (0.4)	7.4	9.1	6.8	ND (0.1)	ND (1)	22	ND (1)	ND (1)	ND (2)	38	36
AOC4-C06_C07	08/10/10	0	N	ND (2)	ND (1)	190	ND (1)	ND (1)	47	ND (0.4)	12	14	8.2	ND (0.099)	ND (1)	36	ND (1)	ND (1)	ND (2)	48	47
	08/10/10	0	FD	ND (2)	ND (1)	210	ND (1)	ND (1)	51	ND (0.4)	13	16	7.3	ND (0.1)	ND (1)	41	ND (1)	ND (1)	ND (2)	52	47
AOC4-D01	03/24/10	0	N	ND (2.2)	ND (1.1)	570	ND (1.1)	ND (1.1)	140	ND (0.44)	13	16	3.1	ND (0.11)	ND (1.1)	60	ND (1.1)	ND (1.1)	ND (2.2)	72	49
AOC4-D01S	04/12/10	0	N	ND (2.1J)	ND (1)	160 J	ND (1)	ND (1J)	42 J	ND (0.41)	11 J	26	4.9 J	ND (0.1)	ND (1J)	33 J	ND (1J)	ND (1)	ND (2.1J)	51 J	45 J
AOC4-D02	03/19/10	0	N	ND (11)	ND (5.5)	430	ND (5.5)	ND (5.5)	150	ND (0.44)	19	34	ND (5.5)	ND (0.11)	ND (5.5)	75	ND (5.5)	ND (5.5)	ND (11)	100	86
AOC4-D03	03/19/10	0	N	ND (2.3)	ND (1.2)	400	ND (1.2)	ND (1.2)	72	1.1	20	15	3.4	ND (0.12)	ND (1.2)	35	ND (1.2)	ND (1.2)	ND (2.3)	74	50
AOC4-D04	03/19/10	0	N	ND (2.2)	ND (1.1)	280	ND (1.1)	ND (1.1)	160	ND (0.44J)	15	5.9	2.4	ND (0.11)	ND (1.1)	65	ND (1.1)	ND (1.1)	ND (2.2)	78	48
AOC4-D05	07/26/10	0	N	ND (2)	ND (1)	160	ND (1)	ND (1)	18	ND (0.4)	4.4	9.8	10	ND (0.1)	ND (1)	11	ND (1)	ND (1)	ND (2)	23	45
AOC4-D06	07/27/10	0	N	ND (2)	ND (1)	190	ND (1)	ND (1)	33	ND (0.4)	8.7	12	6.2	ND (0.099)	ND (1)	26	ND (1)	ND (1)	ND (2)	43	38
AOC4-D06_D07	08/10/10	0	N	ND (2)	ND (1)	190	ND (1)	ND (1)	32	ND (0.4)	8.5	13	6.2	ND (0.098)	ND (1)	24	ND (1)	ND (1)	ND (2)	36	40
AOC4-E01S	04/22/10	0	N	ND (2.2)	3.1	460	ND (1.1)	ND (1.1)	43	0.92	8.2	22	4.8	ND (0.11)	ND (1.1)	20	ND (1.1)	ND (1.1)	ND (2.2)	40	44
AOC4-E02	04/16/10	0	N	ND (4.3)	3.8	360	ND (2.2)	ND (2.2)	55	0.94	13	13	2.9	ND (0.11)	ND (2.2)	38	ND (2.2)	ND (2.2)	ND (4.3)	73	55
AOC4-E03	03/25/10	0	N	ND (2.1)	1.8	190	ND (1.1)	ND (1.1)	67	1.4	12	5.7	3.3	ND (0.11)	ND (1.1)	33	ND (1.1)	ND (1.1)	ND (2.1)	66	50
AOC4-E04	03/25/10	0	N	ND (2.1)	ND (1.1)	210	ND (1.1)	ND (1.1)	21	ND (0.42)	5.8	8.7	5.3	ND (0.11)	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	28	31

C10-3
Sample Results: Metals
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Screening Level [2]:				**30**	**0.07**	**5,200**	**16**	**39**	**280**	**17**	**23**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**390**	**23,000**
Commercial Screening Level [3]:				**380**	**0.24**	**63,000**	**190**	**500**	**1,400**	**37**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC4-E05	07/27/10	0	N	ND (2J)	ND (1)	130 J	ND (1)	ND (1J)	23	ND (0.4)	6.5 J	11	7.5 J	ND (0.099)	ND (1J)	17 J	ND (1J)	ND (1)	ND (2J)	29	35 J
	07/27/10	0	FD	ND (2J)	ND (1)	130 J	ND (1)	ND (1J)	24	ND (0.4)	6.7 J	11	7.1 J	ND (0.1)	ND (1J)	18 J	ND (1J)	ND (1)	ND (2J)	29 J	35 J
AOC4-E06	07/27/10	0	N	ND (2)	ND (1)	170	ND (1)	ND (1)	28	ND (0.4)	9.2	11	6	ND (0.1)	ND (1)	21	ND (1)	ND (1)	ND (2)	34	34
AOC4-E06_E07	08/10/10	0	N	ND (2)	ND (1)	190	ND (1)	ND (1)	45	ND (0.41)	11	18	6.1	ND (0.1)	ND (1)	31	ND (1)	ND (1)	ND (2)	42	40
AOC4-F01S	04/22/10	0	N	ND (2.2)	2.2	360	ND (1.1)	ND (1.1)	51	ND (0.43)	13	19	3.7	ND (0.11)	ND (1.1)	34	ND (1.1)	ND (1.1)	ND (2.2)	58	37
AOC4-F02	03/31/10	0	N	ND (2.1J)	2.9 J	310 J	ND (1.1J)	ND (1.1J)	28 J	ND (0.42)	6.7 J	14 J	4.5 J	ND (0.1)	ND (1.1J)	19 J	ND (1.1J)	ND (1.1J)	ND (2.1J)	32 J	41 J
AOC4-F03	03/31/10	0	N	ND (11)	ND (5.3)	300	ND (5.3)	ND (5.3)	51	ND (0.42)	10	33	6.4	ND (0.11)	ND (5.3)	20	ND (5.3)	ND (5.3)	ND (11)	74	74
AOC4-F04	03/31/10	0	N	ND (2.1)	ND (1.1)	250	ND (1.1)	ND (1.1)	83	ND (0.43)	9.4	18	4.5	ND (0.11)	ND (1.1)	23	ND (1.1)	ND (1.1)	ND (2.1)	64	48
AOC4-F05	08/09/10	0	N	ND (2)	ND (1)	190	ND (1)	ND (1)	29	ND (0.41)	7.5	14	4	ND (0.1)	ND (1)	19	ND (1)	ND (1)	ND (2)	35	29
AOC4-G01S	04/22/10	0	N	ND (2.1)	1.7	260	ND (1)	ND (1)	36	ND (0.42)	8.3	12	4.3	ND (0.1)	ND (1)	22	ND (1)	ND (1)	ND (2.1)	40	34
AOC4-G04	08/04/10	0	N	ND (2J)	ND (1)	170 J	ND (1)	ND (1J)	26 J	ND (0.41)	5.9	11	11 J	ND (0.1)	ND (1J)	14 J	ND (1J)	ND (1)	ND (2J)	28 J	50 J
AOC4-G05	08/05/10	0	N	ND (2.1)	ND (1)	400	ND (1)	ND (1)	61	ND (0.41)	14	19	4.4	ND (0.1)	ND (1)	46	ND (1)	ND (1)	ND (2.1)	62	46
AOC4-G06	08/09/10	0	N	ND (2)	ND (1)	210	ND (1)	ND (1)	33	ND (0.4)	9	16	6	ND (0.1)	ND (1)	22	ND (1)	ND (1)	ND (2)	40	39
AOC4-GB10	02/10/10	0 - 0.5	N	ND (2.2)	ND (1.1)	160 J	ND (1.1)	ND (1.1)	35 J	ND (0.44)	8.5	16	14	ND (0.11)	ND (1.1)	20	ND (1.1)	ND (1.1)	ND (2.2)	40 J	71 J
AOC4-GB11	02/10/10	0 - 0.5	N	ND (2.2)	ND (1.1)	170	ND (1.1)	ND (1.1)	31	ND (0.43)	9.1	13	7.2 J	ND (0.11)	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.2)	38	46
	02/10/10	0 - 0.5	FD	ND (2.2)	ND (1.1)	160	ND (1.1)	ND (1.1)	29	0.57	8.1	14	16 J	ND (0.11)	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.2)	38	47
AOC4-GB12	02/10/10	0 - 0.5	N	ND (2.2)	ND (1.1)	160	ND (1.1)	ND (1.1)	35	ND (0.44)	9.1	15	5.5	ND (0.11)	ND (1.1)	24	ND (1.1)	ND (1.1)	ND (2.2)	42	43
AOC4-H04	07/27/10	0	N	ND (2)	ND (1)	210	ND (1)	ND (1)	38	ND (0.4)	9	11	5.2	ND (0.1)	ND (1)	27	ND (1)	ND (1)	ND (2)	41	34
AOC4-H05	08/05/10	0	N	ND (2.1)	ND (1.1)	300	ND (1.1)	ND (1.1)	58	ND (0.42)	13	26	4.2	ND (0.1)	ND (1.1)	37	ND (1.1)	ND (1.1)	ND (2.1)	57	42
AOC4-I04	05/19/10	0	N	ND (2.2)	ND (1.1)	300	ND (1.1)	ND (1.1)	33	ND (0.45)	8.8	12	6.5	ND (0.11)	ND (1.1)	25	ND (1.1)	ND (1.1)	ND (2.2)	46	35
AOC4-I05	05/24/10	0	N	ND (2.2)	ND (1.1)	310	ND (1.1)	ND (1.1)	60	ND (0.44)	15	33	9.3	ND (0.11)	ND (1.1)	43	ND (1.1)	ND (1.1)	ND (2.2)	73	52
AOC4-I06	08/11/10	0	N	ND (2.1)	ND (1.1)	290	ND (1.1)	ND (1.1)	44	ND (0.43)	11	33	5.9	ND (0.11)	ND (1.1)	32	ND (1.1)	ND (1.1)	ND (2.1)	58	47
AOC4-I06_I07	08/13/10	0	N	ND (2.1)	ND (1.1)	360	ND (1.1)	ND (1.1)	41	ND (0.43)	10	34	5.5	ND (0.11)	ND (1.1)	31	ND (1.1)	ND (1.1)	ND (2.1)	55	52
AOC4-J02	05/10/10	0	N	ND (2.2)	1.2	230	ND (1.1)	ND (1.1)	25	ND (0.44)	7.2	15	5.7	ND (0.11)	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.2)	34	34
AOC4-J03	05/17/10	0	N	ND (2.3J)	5	780 J	ND (1.1)	ND (1.1J)	42 J	ND (0.45)	7.1 J	26	5.5 J	ND (0.11)	ND (1.1J)	22 J	ND (1.1)	ND (1.1)	ND (2.3J)	46 J	41 J
AOC4-J04	06/15/10	0	N	ND (2J)	1.2	160 J	ND (1)	ND (1J)	20	ND (0.4)	4.3 J	26	9.7 J	ND (0.1)	ND (1J)	10 J	ND (1J)	ND (1)	ND (2J)	23	38 J
AOC4-J05	06/07/10	0	N	ND (2.3)	ND (1.1)	230	ND (1.1)	ND (1.1)	60	ND (0.45)	15	29	4.6	ND (0.11)	ND (1.1)	42	ND (1.1)	ND (1.1)	ND (2.3)	66	47
AOC4-J06	06/07/10	0	N	ND (2.2)	ND (1.1)	360	ND (1.1)	ND (1.1)	74	3.1	12	39	24	ND (0.11)	ND (1.1)	34	ND (1.1)	ND (1.1)	ND (2.2)	54	92
AOC4-J06_J07	08/13/10	0	N	ND (2.1)	ND (1.1)	390	ND (1.1)	ND (1.1)	59	0.9	13	37	5.7	ND (0.11)	ND (1.1)	40	ND (1.1)	ND (1.1)	ND (2.1)	59	58
AOC4-K02	05/17/10	0	N	ND (2J)	ND (1)	230 J	ND (1J)	ND (1J)	59 J	ND (0.41)	14 J	24	3.9 J	ND (0.1)	ND (1J)	42 J	ND (1J)	ND (1)	ND (2J)	62 J	46 J
	05/17/10	0	FD	ND (2.1)	ND (1)	270	ND (1)	ND (1)	60	ND (0.41)	15	26	4.2	ND (0.1)	ND (1)	41	ND (1)	ND (1)	ND (2.1)	62	45
AOC4-K03	05/17/10	0	N	ND (2.1)	ND (1.1)	210	ND (1.1)	ND (1.1)	41	ND (0.42)	9.7	17	7	ND (0.1)	ND (1.1)	27	ND (1.1)	ND (1.1)	ND (2.1)	43	41
AOC4-K04	06/16/10	0	N	ND (2)	ND (1)	230	ND (1)	ND (1)	52	2.7	8.5	39	71	0.22	ND (1)	26	ND (1)	ND (1)	ND (2)	39	130
AOC4-K05	06/15/10	0	N	2.7	ND (1)	720	ND (1)	1.5	140	16	11	210	96	0.51	ND (1)	43	ND (1)	ND (1)	ND (2.1)	57	290
AOC4-K06	06/15/10	0	N	ND (2.2)	ND (1.1)	140	ND (1.1)	ND (1.1)	52	ND (0.45)	12	20	4.8	ND (0.11)	ND (1.1)	35	ND (1.1)	ND (1.1)	ND (2.2)	59	41
AOC4-K07	06/15/10	0	N	ND (2.2)	ND (1.1)	170	ND (1.1)	ND (1.1)	49	ND (0.44)	11	18	5.7	ND (0.11)	ND (1.1)	33	ND (1.1)	ND (1.1)	ND (2.2)	50	41
AOC4-L01	05/14/10	0	N	ND (2.1)	ND (1.1)	230	ND (1.1)	ND (1.1)	54	ND (0.43)	14	24	4.2	ND (0.1)	ND (1.1)	37	ND (1.1)	ND (1.1)	ND (2.1)	63	42
AOC4-L02	05/14/10	0	N	ND (2.1)	ND (1.1)	340	ND (1.1)	ND (1.1)	53	ND (0.42)	13	25	4.4	ND (0.11)	ND (1.1)	37	ND (1.1)	ND (1.1)	ND (2.1)	61	44
AOC4-L03	05/13/10	0	N	ND (2.1)	ND (1.1)	160	ND (1.1)	ND (1.1)	53	ND (0.43)	12	28	4.5	ND (0.1)	ND (1.1)	36	ND (1.1)	ND (1.1)	ND (2.1)	60	43
AOC4-L04	05/18/10	0	N	ND (2.2)	ND (1.1)	210	ND (1.1)	ND (1.1)	46	ND (0.43)	12	18	5.2	ND (0.11)	ND (1.1)	33	ND (1.1)	ND (1.1)	ND (2.2)	49	41
AOC4-L05	06/28/10	0	N	ND (2.1J)	ND (1.1)	63 J	ND (1.1)	ND (1.1J)	54 J	ND (0.43)	12 J	25	7 J	ND (0.11)	ND (1.1J)	34 J	ND (1.1J)	ND (1.1)	ND (2.1J)	54 J	43 J
AOC4-L06	06/28/10	0	N	ND (2.1)	ND (1)	160	ND (1)	ND (1)	47	ND (0.41)	11	32	5.6	ND (0.1)	ND (1)	34	ND (1)	ND (1)	ND (2.1)	55	46
	06/28/10	0	FD	ND (2.1)	ND (1)	150	ND (1)	ND (1)	50	ND (0.42)	12	32	5.8	ND (0.1)	ND (1)	37	ND (1)	ND (1)	ND (2.1)	57	48

				Metals (mg/kg)																	
Interim Screening Level [1]:				0.285	11	410	0.672	1.1	39.8	0.83	12.7	16.8	8.39	0.0125	1.37	27.3	1.47	5.15	2.32	52.2	58
Residential Screening Level [2]:				30	0.07	5,200	16	39	280	17	23	3,000	80	18	380	1,600	380	380	5	390	23,000
Commercial Screening Level [3]:				380	0.24	63,000	190	500	1,400	37	300	38,000	320	180	4,800	16,000	4,800	4,800	63	5,200	100,000
Ecological Comparison Values [4]:				0.285	11.4	330	23.3	0.0151	36.3	139.6	13	20.6	0.0166	0.0125	2.25	0.607	0.177	5.15	2.32	13.9	0.164
Background [5]:				NE	11	410	0.672	1.1	39.8	0.83	12.7	16.8	8.39	NE	1.37	27.3	1.47	NE	NE	52.2	58
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC4-L07	09/16/10	0	N	ND (2.2J)	ND (1.1J)	270 J	ND (1.1J)	ND (1.1J)	58	ND (0.44)	15	36	8.1	ND (0.11)	ND (1.1J)	45 J	ND (1.1J)	ND (1.1)	ND (2.2J)	67 J	61 J
	09/16/10	0	FD	ND (2.2J)	ND (1.1J)	230 J	ND (1.1J)	ND (1.1J)	48	ND (0.44)	11	32	6.1	ND (0.11)	ND (1.1J)	36 J	ND (1.1J)	ND (1.1)	ND (2.2J)	53 J	49 J
AOC4-L07_L08	09/20/10	0	N	ND (2.1)	ND (1.1)	160	ND (1.1)	ND (1.1)	61	ND (0.42)	13	30	5.2	ND (0.11)	ND (1.1)	43	ND (1.1)	ND (1.1)	ND (2.1)	59	51
AOC4-M01	09/30/10	0	N	ND (2.2)	ND (1.1)	180	ND (1.1)	ND (1.1)	51	ND (0.43)	12	23	4.6	ND (0.11)	ND (1.1)	37	ND (1.1)	ND (1.1)	ND (2.2)	53	43
AOC4-M02	09/30/10	0	N	ND (2.1)	ND (1)	230	ND (1)	ND (1)	47	ND (0.42)	11	22	4.1	ND (0.1)	ND (1)	32	ND (1)	ND (1)	ND (2.1)	51	38
AOC4-M03	10/04/10	0	N	ND (2.1)	ND (1.1)	650	ND (1.1)	ND (1.1)	51	ND (0.43)	12	24	3.2	ND (0.1)	ND (1.1)	38	ND (1.1)	ND (1.1)	ND (2.1)	54	39
AOC4-M04	10/05/10	0	N	ND (2.1J)	ND (1.1)	240 J	ND (1.1J)	ND (1.1J)	30	ND (0.42)	7.9 J	11	3.6 J	ND (0.1)	ND (1.1J)	25	ND (1.1J)	ND (1.1)	ND (2.1J)	38	33
AOC4-M05	09/20/10	0	N	ND (2.1)	ND (1)	140	ND (1)	ND (1)	34	ND (0.41)	8.9	14	4.6	ND (0.1)	ND (1)	27	ND (1)	ND (1)	ND (2.1)	42	34
AOC4-M06	07/08/10	0	N	ND (2)	ND (1)	170	ND (1)	ND (1)	31	ND (0.41)	8.3	10	5.1	ND (0.1)	ND (1)	23	ND (1)	ND (1)	ND (2)	38	34
AOC4-M07	09/22/10	0	N	ND (2.1)	ND (1)	160	ND (1)	ND (1)	45	ND (0.41)	11	21	5	ND (0.1)	ND (1)	34	ND (1)	ND (1)	ND (2.1)	48	43
AOC4-M07_M08	09/22/10	0	N	ND (2.1)	ND (1)	120	ND (1)	ND (1)	48	1.6	11	26	5.8	ND (0.1)	ND (1)	36	ND (1)	ND (1)	ND (2.1)	52	49
AOC4-M08	09/22/10	0	N	ND (2.1)	ND (1)	280	ND (1)	ND (1)	47	ND (0.41)	12	29	5.5	ND (0.1)	ND (1)	35	ND (1)	ND (1)	ND (2.1)	52	46
AOC4-M08_M09	09/23/10	0	N	ND (2)	ND (1)	140	ND (1)	ND (1)	39	0.75	9	24	7.3	ND (0.1)	ND (1)	26	ND (1)	ND (1)	ND (2)	42	49
AOC4-M10	10/01/10	0	N	ND (2)	ND (1)	160	ND (1)	ND (1)	69	1.8	11	200	6.2	ND (0.1)	ND (1)	32	ND (1)	ND (1)	ND (2)	44	50
AOC4-N01	09/30/10	0	N	ND (2)	ND (1)	130	ND (1)	ND (1)	22	ND (0.4)	5.2	9.5	5.4	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2)	26	32
AOC4-N02	09/30/10	0	N	ND (2.1)	ND (1)	200	ND (1)	ND (1)	31	ND (0.41)	8.5	13	3.3	ND (0.1)	ND (1)	24	ND (1)	ND (1)	ND (2.1)	39	30
AOC4-N03	10/04/10	0	N	ND (2.1)	ND (1.1)	170	ND (1.1)	ND (1.1)	23	ND (0.43)	6.4	11	5	ND (0.11)	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.1)	28	30
AOC4-N04	10/05/10	0	N	ND (2.1)	ND (1.1)	150	ND (1.1)	ND (1.1)	36	ND (0.42)	9	15	3.9	ND (0.11)	ND (1.1)	27	ND (1.1)	ND (1.1)	ND (2.1)	42	32
AOC4-N05	10/05/10	0	N	ND (2.1)	ND (1)	240	ND (1)	ND (1)	34	ND (0.41)	8.9	14	4.1	ND (0.1)	ND (1)	27	ND (1)	ND (1)	ND (2.1)	41	32
AOC4-N05A	07/08/10	0	N	ND (2)	ND (1)	170	ND (1)	ND (1)	38	ND (0.4)	8.6	12	4.9	ND (0.1)	ND (1)	27	ND (1)	ND (1)	ND (2)	41	33
AOC4-N06	09/23/10	0	N	ND (2.1)	ND (1.1)	190	ND (1.1)	ND (1.1)	33	ND (0.42)	8.8	13	5.3	ND (0.11)	ND (1.1)	27	ND (1.1)	ND (1.1)	ND (2.1)	40	34
AOC4-N07	09/23/10	0	N	ND (2.1)	ND (1)	140	ND (1)	ND (1)	31	ND (0.42)	8.1	9.8	5.2	ND (0.1)	ND (1)	25	ND (1)	ND (1)	ND (2.1)	36	33
AOC4-N08	09/23/10	0	N	ND (2.1)	ND (1.1)	120	ND (1.1)	ND (1.1)	26	0.5	7.4	9.5	5.4	ND (0.11)	ND (1.1)	23	ND (1.1)	ND (1.1)	ND (2.1)	35	33
AOC4-O02	10/04/10	0	N	ND (2.1)	ND (1)	150	ND (1)	ND (1)	20	ND (0.42)	5.6	8.7	4.4	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2.1)	28	43
AOC4-O03	10/26/10	0	N	ND (2)	ND (1)	220	ND (1)	ND (1)	33	ND (0.41)	9.2	9	7	ND (0.1)	ND (1)	28	ND (1)	ND (1)	ND (2)	44	38
	10/26/10	0	FD	ND (2)	ND (1)	220	ND (1)	ND (1)	32	ND (0.41)	9	9.7	7.1	ND (0.1)	ND (1)	28	ND (1)	ND (1)	ND (2)	44	38
AOC4-O04	10/26/10	0	N	ND (2.1)	ND (1.1)	190	ND (1.1)	ND (1.1)	48	0.66	12	12	6	ND (0.11)	ND (1.1)	36	ND (1.1)	ND (1.1)	ND (2.1)	52	45
AOC4-O05	10/27/10	0	N	ND (2.1)	2.4	230	ND (1)	ND (1)	31	ND (0.41)	9	12	6.5	ND (0.1)	ND (1)	26	ND (1)	ND (1)	ND (2.1)	46	38
	10/27/10	0	FD	ND (2.1)	2.3	200	ND (1)	ND (1)	32	ND (0.41)	9.2	13	6.6	ND (0.1)	ND (1)	27	ND (1)	ND (1)	ND (2.1)	45	37
AOC4-O06	10/07/10	0	N	ND (2)	ND (1)	230	ND (1)	ND (1)	34	ND (0.41)	8.1	15	34	ND (0.1)	ND (1)	24	ND (1)	ND (1)	ND (2)	35	59
AOC4-O07	10/01/10	0	N	ND (2)	ND (1)	130	ND (1)	ND (1)	34	ND (0.4)	8.8	15	4.1	ND (0.1)	ND (1)	29	ND (1)	ND (1)	ND (2)	39	33
AOC4-O08	10/01/10	0	N	ND (2)	ND (1)	140	ND (1)	ND (1)	25	ND (0.41)	6.9	15	5.3	ND (0.1)	ND (1)	21	ND (1)	ND (1)	ND (2)	35	43
AOC4-P03	10/04/10	0	N	ND (2.1)	ND (1)	160	ND (1)	ND (1)	27	ND (0.41)	6.8	11	4.6	ND (0.1)	ND (1)	18	ND (1)	ND (1)	ND (2.1)	34	30
AOC4-P04	11/19/10	0	N	ND (2.1J)	ND (1)	140	ND (1)	ND (1J)	43	11	8.3	10	5.3	ND (0.1)	ND (1J)	25	ND (1J)	ND (1)	ND (2.1J)	37	33
AOC4-P05	10/27/10	0	N	ND (2.1)	1.8	190	ND (1)	ND (1)	25	ND (0.41)	8.1	13	6.9	ND (0.1)	ND (1)	23	ND (1)	ND (1)	ND (2.1)	39	35
	10/27/10	0	FD	ND (2.1)	ND (1)	200	ND (1)	ND (1)	24	ND (0.41)	8.1	12	6.9	ND (0.1)	ND (1)	23	ND (1)	ND (1)	ND (2.1)	39	36
AOC4-P06	10/25/10	0	N	ND (2)	ND (2)	220	ND (1)	ND (1)	35	ND (0.41)	9.5	13	7.5	ND (0.1)	ND (1)	29	ND (1)	ND (1)	ND (2)	49	41
AOC4-P07	10/22/10	0	N	ND (2.1J)	ND (1.1)	240 J	ND (1.1J)	ND (1.1J)	40	ND (0.43)	11	13	7.2	ND (0.11)	ND (1.1J)	32	ND (1.1J)	ND (1.1)	ND (2.1J)	52	43
AOC4-P08	10/22/10	0	N	ND (2.1)	ND (1)	200	ND (1)	ND (1)	26	ND (0.41)	8.4	10	7.3	ND (0.1)	ND (1)	24	ND (1)	ND (1)	ND (2.1)	43	39
AOC4-Q04	10/07/10	0	N	ND (2)	ND (1)	140	ND (1)	ND (1)	65	2.7	6.9	16	13	ND (0.1)	ND (1)	18	ND (1)	ND (1)	ND (2)	28	77
AOC4-Q05	10/07/10	0	N	ND (2)	ND (1)	130	ND (1)	ND (1)	22	0.42	7.2	19	11	ND (0.099)	ND (1)	14	ND (1)	ND (1)	ND (2)	26	61 J
	10/07/10	0	FD	ND (2)	ND (1)	130	ND (1)	ND (1)	23	0.56	5.8	19	8.6	ND (0.099)	ND (1)	13	ND (1)	ND (1)	ND (2)	25	48 J
AOC4-Q06	10/25/10	0	N	ND (2)	ND (1)	280	ND (1)	ND (1)	37	ND (0.41)	11	11	6.6	ND (0.1)	ND (1)	30	ND (1)	ND (1)	ND (2)	50	39

C10-3
Sample Results: Metals
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Screening Level [2]:				**30**	**0.07**	**5,200**	**16**	**39**	**280**	**17**	**23**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**390**	**23,000**
Commercial Screening Level [3]:				**380**	**0.24**	**63,000**	**190**	**500**	**1,400**	**37**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**36.3**	**139.6**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**39.8**	**0.83**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**	**Barium**	**Beryllium**	**Cadmium**	**Chromium**	**Chromium, Hexavalent**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
AOC4-Q07	10/25/10	0	N	ND (2.1)	ND (1)	310	ND (1)	ND (1)	46	ND (0.41)	12	14	8.2	ND (0.1)	ND (1)	35	ND (1)	ND (1)	ND (2.1)	54	45
AOC4-Q08	10/22/10	0	N	ND (2.1)	ND (1.1)	260	ND (1.1)	ND (1.1)	37	ND (0.43)	11	15	6.6	ND (0.11)	ND (1.1)	32	ND (1.1)	ND (1.1)	ND (2.1)	54	40
AOC4-R05	10/29/10	0	N	ND (2)	3.6	300	ND (1)	ND (1)	35	ND (0.41)	11	13	6	ND (0.1)	ND (1)	30	ND (1)	ND (1)	ND (2)	53	42
	10/29/10	0	FD	ND (2.1)	3.4	290	ND (1)	ND (1)	38	ND (0.41)	11	14	5.9	ND (0.1)	ND (1)	30	ND (1)	ND (1)	ND (2.1)	52	40
AOC4-R06	10/07/10	0	N	ND (2)	ND (1)	93	ND (1)	ND (1)	13	ND (0.4)	3.9	11	8.8	ND (0.1)	ND (1)	9	ND (1)	ND (1)	ND (2)	20	37
AOC4-R07	10/08/10	0	N	ND (2J)	ND (1)	140 J	ND (1)	ND (1J)	31	ND (0.4)	8.5	11	4.5	ND (0.099)	ND (1J)	27	ND (1)	ND (1)	ND (2J)	36	33

Notes:

1 Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

2 Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used.

3 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
CHHSL = California human health screening levels
-- = not analyzed
FD = Field Dupliicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
mg/kg = milligrams per kilogram
N = Primary Sample
ND = not detected at the listed reporting limit

C10-4

Sample Results: Contract Laboratory Program Inorganics
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level [1]:				**16,400**	**66,500**	**0.9**	**55,000**	**12,100**	**402**	**4,400**	**2,070**
Residential Screening Levels [2]:				**77,000**	**NE**	**1,600**	**55,000**	**NE**	**1,800**	**NE**	**NE**
Commercial Screening Level [3]:				**990,000**	**NE**	**20,000**	**720,000**	**NE**	**23,000**	**NE**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**0.9**	**NE**	**NE**	**220**	**NE**	**NE**
Background [5]:				**16,400**	**66,500**	**NE**	**NE**	**12,100**	**402**	**4,400**	**2,070**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Cyanide**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**
AOC4-1	10/14/08	0 - 0.5	N	8,400	21,000	ND (1.01)	20,000	7,900	310	2,500 J	270

Notes:

1 Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

2 Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used.

3 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Dupliicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

C10-5
Sample Results: Polycyclic Aromatic Hydrocarbons
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level [1]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**1,160**	**10,000**
Residential Screening Levels [2]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**NE**	**NE**
Commercial Screening Level [3]:				**99,000**	**4,100,000**	**17,000,000**	**33,000,000**	**170,000,000**	**1,300**	**130**	**1,300**	**17,000,000**	**1,300**	**13,000**	**380**	**22,000,000**	**22,000,000**	**1,300**	**18,000**	**17,000,000**	**17,000,000**	**130**	**NE**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1,160**	**10,000**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**B(a)P Equivalent**	**PAH High molecular weight**	**PAH Low molecular weight**
AOC4-1	10/14/08	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	14	11	37	12	18	28	ND (5)	37	ND (5)	12	ND (5)	10	24	20	190	10
	10/14/08	0.5 - 1	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND	ND
	10/14/08	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.2)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-A01	03/02/10	0	N	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	190 J	110 J	220 J	82 J	82 J	160 J	21 J	480 J	ND (5.6J)	78 J	ND (5.6J)	30 J	470 J	180	1,900	30
AOC4-A01minus	03/02/10	0	N	ND (5.4J)	ND (5.4J)	ND (5.4J)	ND (5.4J)	ND (5.4J)	130 J	82 J	170 J	66 J	39 J	110 J	17 J	310 J	ND (5.4J)	62 J	ND (5.4J)	39 J	260 J	130	1,200	39
AOC4-A01S	04/21/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	5.7	130 J	70	190	49	44	97	11	290	ND (5.3)	40	ND (5.3)	31	240	120	1,200	37
AOC4-A02	02/24/10	0	N	ND (5.7J)	ND (5.7J)	ND (5.7J)	ND (5.7J)	ND (5.7J)	110 J	71 J	160 J	59 J	39 J	110 J	18 J	190 J	ND (5.7J)	57 J	ND (5.7J)	20 J	190 J	110	1,000	20
AOC4-A03	03/01/10	0	N	ND (5.9J)	ND (5.9J)	ND (5.9J)	ND (5.9J)	12 J	420 J	190 J	520 J	140 J	100 J	260 J	37 J	760 J	ND (5.9J)	130 J	ND (5.9J)	70 J	700 J	320	3,300	82
	03/01/10	0	FD	ND (5.9J)	ND (5.9J)	ND (5.9J)	ND (5.9J)	10 J	290 J	170 J	490 J	120 J	90 J	240 J	33 J	720 J	ND (5.9J)	120 J	ND (5.9J)	55 J	650 J	280	2,900	65
AOC4-A04	07/27/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.7	ND (5)	ND (5)	ND (5)	ND (5)	7	ND (5)	ND (5)	ND (5)	ND (5)	6.3	4.8	20	ND
AOC4-A05	07/26/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND	ND
AOC4-A06	07/26/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND	ND
AOC4-A06_A07	08/10/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND	ND
AOC4-B01	03/03/10	0	N	ND (5.9J)	ND (5.9J)	ND (5.9J)	ND (5.9J)	13 J	410 J	170 J	510 J	110 J	97 J	250 J	30 J	770 J	ND (5.9J)	110 J	ND (5.9J)	110 J	640 J	300	3,100	120
AOC4-B01S	04/21/10	0	N	ND (5.6)	ND (5.6)	ND (5.6)	5.9	33 J	160 J	64 J	160 J	40 J	36 J	120 J	8.5	490 J	ND (5.6)	32 J	ND (5.6)	240 J	360 J	110	1,500	280
	04/21/10	0	FD	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5J)	5.5 J	ND (5.5J)	ND (5.5J)	ND (5.5J)	ND (5.5J)	5.9 J	ND (5.5)	18 J	ND (5.5)	ND (5.5J)	ND (5.5)	20 J	13 J	5.1	42	20
AOC4-B02	03/17/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	24	810	620	1,200	550	1,400	750	93	2,100	ND (5.4)	440	ND (5.4)	140	2,200	1,000	10,000	160
AOC4-B03	03/03/10	0	N	ND (5.5J)	ND (5.5J)	ND (5.5J)	ND (5.5J)	10 J	250 J	140 J	430 J	97 J	73 J	220 J	31 J	600 J	ND (5.5J)	97 J	ND (5.5J)	54 J	550 J	240	2,500	64
AOC4-B04	03/12/10	0	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	14	12	24	10	9	17	ND (5.6)	35	ND (5.6)	7.5	ND (5.6)	ND (5.6)	34	19	160	ND
AOC4-B05	07/26/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7	8	19	8.7	6.7	10	ND (5)	21	ND (5)	7	ND (5)	ND (5)	19	13	110	ND
AOC4-B06	07/26/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	21	18	41	18	16	24	5	54	ND (5)	15	ND (5)	12	45	29	260	12
AOC4-B06_B07	08/10/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND	ND
AOC4-C01	03/02/10	0	N	ND (5.6J)	ND (5.6J)	6 J	22 J	95 J	1,000 J	750 J	1,400 J	190 J	380 J	1,200 J	63 J	2,400 J	14 J	200 J	ND (5.6J)	1,200 J	2,100 J	1,100	9,700	1,300
AOC4-C01S	04/22/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	25	14	31	12	8.9	20	ND (5.1)	46	ND (5.1)	8.9	ND (5.1)	6.5	39	22	200	6.5
AOC4-C02	03/29/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	44	380	180	280	87	80	360	24	800	ND (5.5)	79	ND (5.5)	210	740	270	3,000	250
AOC4-C03	03/18/10	0	N	8.8	12	ND (5.1)	ND (5.1)	5.8	170	140	240	94	80	160	22	530	ND (5.1)	76	6.5	37	480	210	2,000	70
AOC4-C04	03/18/10	0	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	6.3	6.3	11	ND (5.6)	ND (5.6)	6.7	ND (5.6)	16	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	16	9.6	62	ND
AOC4-C05	07/26/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	12	11	27	10	10	15	ND (5)	32	ND (5)	8.7	ND (5)	ND (5)	31	18	160	ND
AOC4-C06	07/26/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.7	ND (5)	ND (5)	ND (5)	ND (5)	6.3	4.4	13	ND
AOC4-C06_C07	08/10/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5	ND (5)	10	ND (5)	ND (5)	7	ND (5)	15	ND (5)	ND (5)	ND (5)	ND (5)	12	5.4	49	ND
	08/10/10	0	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.7	ND (5)	ND (5)	6.7	ND (5)	16	ND (5)	ND (5)	ND (5)	ND (5)	13	4.9	43	ND
AOC4-D01	03/24/10	0	N	ND (5.5J)	ND (5.5J)	ND (5.5J)	ND (5.5J)	36 J	870 J	550 J	860 J	390 J	190 J	630 J	90 J	1,200 J	ND (5.5J)	330 J	ND (5.5J)	130 J	1,100 J	810	6,200	170
AOC4-D01S	04/12/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	11 J	6.2	11	5.2	ND (5.2)	9.6	ND (5.2)	17	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	16	9.9	76	ND
AOC4-D02	03/19/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.8)	ND	ND
AOC4-D03	03/19/10	0	N	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	25	21	31	14	14	19	ND (5.8)	25	ND (5.8)	10	ND (5.8)	ND (5.8)	27	30	190	ND
AOC4-D04	03/19/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.8)	ND	ND

C10-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level [1]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**1,160**	**10,000**
Residential Screening Levels [2]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**NE**	**NE**
Commercial Screening Level [3]:				**99,000**	**4,100,000**	**17,000,000**	**33,000,000**	**170,000,000**	**1,300**	**130**	**1,300**	**17,000,000**	**1,300**	**13,000**	**380**	**22,000,000**	**22,000,000**	**1,300**	**18,000**	**17,000,000**	**17,000,000**	**130**	**NE**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1,160**	**10,000**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**B(a)P Equivalent**	**PAH High molecular weight**	**PAH Low molecular weight**
AOC4-D05	07/26/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	12	11	28	12	10	15	ND (5)	33	ND (5)	9.7	ND (5)	5.3	30	18	160	5.3
AOC4-D06	07/27/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.7	ND (5)	ND (5)	ND (5)	ND (5)	7	ND (5)	ND (5)	ND (5)	ND (5)	6	4.7	19	ND
AOC4-D06_D07	08/10/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8	5.7	15	5.3	ND (5)	9.3	ND (5)	19	ND (5)	ND (5)	ND (5)	ND (5)	20	9.4	82	ND
AOC4-E01S	04/22/10	0	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	66	41	90	36	25	57	7.1	130	ND (5.6)	27	ND (5.6)	23	110	65	590	23
AOC4-E02	04/16/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)	ND	ND
AOC4-E03	03/25/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	9.5	8.8	12	7.7	6.6	9.5	ND (5.5)	16	ND (5.5)	6.2	ND (5.5)	ND (5.5)	15	13	91	ND
AOC4-E04	03/25/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	17	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	13	4.8	30	ND
AOC4-E05	07/27/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND	ND
	07/27/10	0	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8.3	ND (5)	ND (5)	ND (5)	ND (5)	8.7	ND (5)	ND (5)	ND (5)	ND (5)	8	5	25	ND
AOC4-E06	07/27/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)	ND	ND
AOC4-E06_E07	08/10/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-F01S	04/22/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)	ND	ND
AOC4-F02	03/31/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	36	30	65	21	16	36	5.2	77	ND (5.2)	19	ND (5.2)	9.8	62	46	370	9.8
AOC4-F03	03/31/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	19	120	59	110	28	26	100	8.5	200	ND (5.3)	26	ND (5.3)	65	190	91	870	84
AOC4-F04	03/31/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	8.9	5.7	14	ND (5.3)	ND (5.3)	7.5	ND (5.3)	17	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	15	9.5	68	ND
AOC4-F05	08/09/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-G01S	04/22/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	88	49	98	40	31	78	8.3	140	ND (5.2)	30	ND (5.2)	23	120	77	680	23
AOC4-G04	08/04/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	34	27	63	31	23	46	6.8	100	ND (5.1)	25	ND (5.1)	15	92	44	450	15
AOC4-G05	08/05/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
AOC4-G06	08/09/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	39	23	45	18	18	37	ND (5)	82	ND (5)	16	ND (5)	13	71	36	350	13
AOC4-GB10	02/10/10	0 - 0.5	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	28 J	15 J	33 J	9.6 J	ND (5.6)	25 J	ND (5.6)	45 J	ND (5.6)	10 J	ND (5.6)	13 J	36 J	24	200	13
AOC4-GB11	02/10/10	0 - 0.5	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	13	7.9	16	5.4	ND (5.4)	ND (5.4)	ND (5.4)	21	ND (5.4)	5.4	ND (5.4)	9	19	13	88	9
	02/10/10	0 - 0.5	FD	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	13	11	20	8	ND (5.5)	13	ND (5.5)	28	ND (5.5)	7.6	ND (5.5)	13	23	16	120	13
AOC4-GB12	02/10/10	0 - 0.5	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	12	12	19	9	ND (5.6)	ND (5.6)	ND (5.6)	7.8	ND (5.6)	8.6	ND (5.6)	ND (5.6)	7.8	17	76	ND
AOC4-H04	07/27/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	11	6	ND (5)	6.7	ND (5)	16	ND (5)	ND (5)	ND (5)	ND (5)	13	5.3	53	ND
AOC4-H05	08/05/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-I04	05/19/10	0	N	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (4.9)	ND	ND
AOC4-I05	05/24/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	8	ND (5.5)	ND (5.5)	7.7	ND (5.5)	ND (5.5)	7.3	ND (5.5)	ND (5.5)	ND (5.5)	7	23	ND
AOC4-I06	08/11/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)	ND	ND
AOC4-I06_I07	08/13/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	5.4	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	5.4	4.7	11	ND
AOC4-J02	05/10/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.8)	ND	ND
AOC4-J03	05/17/10	0	N	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	5.6 J	ND (5.6J)	9 J	12 J	ND (5.6J)	7.9 J	8.2 J	16 J	ND (5.6J)	9.7 J	ND (5.6J)	6 J	13 J	8.4	81	6
AOC4-J04	06/15/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	17	15	32	13	11	18	ND (5)	42	ND (5)	11	ND (5)	8.3	36	23	200	8.3
AOC4-J05	06/07/10	0	N	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5)	ND	ND
AOC4-J06	06/07/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	9.3	7.9	23	9	5.7	13	ND (5.4)	23	ND (5.4)	7.2	ND (5.4)	7.5	20	13	120	7.5
AOC4-J06_J07	08/13/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	6.4	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	6.8	4.7	13	ND

C10-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level [1]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**1,160**	**10,000**
Residential Screening Levels [2]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**NE**	**NE**
Commercial Screening Level [3]:				**99,000**	**4,100,000**	**17,000,000**	**33,000,000**	**170,000,000**	**1,300**	**130**	**1,300**	**17,000,000**	**1,300**	**13,000**	**380**	**22,000,000**	**22,000,000**	**1,300**	**18,000**	**17,000,000**	**17,000,000**	**130**	**NE**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1,160**	**10,000**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**B(a)P Equivalent**	**PAH High molecular weight**	**PAH Low molecular weight**
AOC4-K02	05/17/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
	05/17/10	0	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
AOC4-K03	05/17/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	6.3	6	13	6.3	5.6	9.5	ND (5.3)	18	ND (5.3)	5.3	ND (5.3)	ND (5.3)	17	10	87	ND
AOC4-K04	06/16/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	34	36	86	34	28	50	7.4	96	ND (5)	28	ND (5)	32	82	57	480	32
AOC4-K05	06/15/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	18	17	34	18	9.9	21	ND (5.1)	32	ND (5.1)	14	ND (5.1)	13	28	26	190	13
AOC4-K06	06/15/10	0	N	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)	ND (4.9)	ND	ND
AOC4-K07	06/15/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.8)	ND	ND
AOC4-L01	05/14/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-L02	05/14/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-L03	05/13/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-L04	05/18/10	0	N	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (5.6J)	ND (4.9)	ND	ND
AOC4-L05	06/28/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-L06	06/28/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
	06/28/10	0	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
AOC4-L07	09/16/10	0	N	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.8)	ND	ND
	09/16/10	0	FD	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (4.8)	ND	ND
AOC4-L07_L08	09/20/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-M01	09/30/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)	ND	ND
AOC4-M02	09/30/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	5.2	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	4.5	5.2	ND
AOC4-M03	10/04/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-M04	10/05/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-M05	09/20/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
AOC4-M06	07/08/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-M07	09/22/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
AOC4-M07_M08	09/22/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.8	ND (5.1)	ND (5.1)	5.5	ND (5.1)	12	ND (5.1)	ND (5.1)	ND (5.1)	5.8	9.2	4.8	33	5.8
AOC4-M08	09/22/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	16	13	22	7.2	6.5	15	ND (5.2)	35	ND (5.2)	6.2	ND (5.2)	15	30	19	150	15
AOC4-M08_M09	09/23/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.1	ND (5.1)	8.8	ND (5.1)	ND (5.1)	6.1	ND (5.1)	13	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	11	5.4	44	ND
AOC4-M10	10/01/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	11	7.8	15	5.8	5.1	10	ND (5.1)	23	ND (5.1)	5.1	ND (5.1)	5.4	21	12	100	5.4
AOC4-N01	09/30/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.7	9	19	10	ND (5)	14	ND (5)	29	ND (5)	8.4	ND (5)	7	24	14	120	7
AOC4-N02	09/30/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
AOC4-N03	10/04/10	0	N	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)	ND	ND
AOC4-N04	10/05/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	5.6	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	10	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	7.8	4.9	23	ND
AOC4-N05	10/05/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-N05A	07/08/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-N06	09/23/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	6.3	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	5.6	4.6	12	ND
AOC4-N07	09/23/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND

C10-5

Sample Results: Polycyclic Aromatic Hydrocarbons

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level [1]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**1,160**	**10,000**
Residential Screening Levels [2]:				**22,000**	**310,000**	**1,700,000**	**3,400,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**38**	**NE**	**NE**
Commercial Screening Level [3]:				**99,000**	**4,100,000**	**17,000,000**	**33,000,000**	**170,000,000**	**1,300**	**130**	**1,300**	**17,000,000**	**1,300**	**13,000**	**380**	**22,000,000**	**22,000,000**	**1,300**	**18,000**	**17,000,000**	**17,000,000**	**130**	**NE**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**1,160**	**10,000**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acenaphthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluoranthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phenanthrene**	**Pyrene**	**B(a)P Equivalent**	**PAH High molecular weight**	**PAH Low molecular weight**
AOC4-N08	09/23/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-O02	10/04/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	7	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	5.9	4.5	13	ND
AOC4-O03	10/26/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
	10/26/10	0	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-O04	10/26/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-O05	10/27/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
	10/27/10	0	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-O06	10/07/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-O07	10/01/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	8.1	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.7	4.5	14	ND
AOC4-O08	10/01/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.4	ND (5.1)	7.1	ND (5.1)	ND (5.1)	6.8	ND (5.1)	13	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	12	5.2	44	ND
AOC4-P03	10/04/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	6.9	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	9.3	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	7.9	5	24	ND
AOC4-P04	11/19/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
AOC4-P05	10/27/10	0	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)	ND	ND
	10/27/10	0	FD	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	8.6	ND (5.2)	ND (5.2)	ND (5.2)	5.2	5.8	4.5	14	5.2
AOC4-P06	10/25/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.8	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	4.5	5.8	ND
AOC4-P07	10/22/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	9.2	7.5	16	8.2	5.3	12	ND (5.3)	24	ND (5.3)	6.8	ND (5.3)	12	18	12	110	12
AOC4-P08	10/22/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-Q04	10/07/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	22	27	61	29	21	40	ND (5.1)	46	ND (5.1)	24	ND (5.1)	14	40	41	310	14
AOC4-Q05	10/07/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	10	9	20	8	6	15	ND (5)	22	ND (5)	6.7	ND (5)	6.4	18	14	110	6.4
	10/07/10	0	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	11	10	21	8.1	6.4	16	ND (5)	28	ND (5)	6.7	ND (5)	13	23	16	130	13
AOC4-Q06	10/25/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-Q07	10/25/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.5	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	5.1	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	4.8	11	ND
AOC4-Q08	10/22/10	0	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)	ND	ND
AOC4-R05	10/29/10	0	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
	10/29/10	0	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)	ND	ND
AOC4-R06	10/07/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.7	5.7	19	5.4	5	17	ND (5)	27	ND (5)	ND (5)	ND (5)	8.7	18	10	100	8.7
AOC4-R07	10/08/10	0	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	14	9	21	6	6	18	ND (5)	42	ND (5)	5.7	ND (5)	23	30	15	150	23

Notes:

1 Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

2 Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used.

3 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.
NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
CHHSL = California human health screening levels

Calculations:
BaP equivalent = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all PAHs are nondetect, the final qualifier code is U.
PAHLow = Sum of Result of low molecular weight PAHs, zero is used for nondetect values.
PAHHigh= Sum of Result of high molecular weight PAHs, zero is used for nondetect values.
-- = not analyzed
µg/kg = micrograms per kilogram
FD = Field Dupliicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
N = Primary Sample
ND = not detected at the listed reporting limit

C10-6

Sample Results: Total Petroleum Hydrocarbons, Semivolatile Organic Compounds, and Volatile Organic Compounds

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Total Petroleum Hydrocarbons (mg/kg)			Semi-Volatile Organic Compounds (µg/kg)	Volatile Organic Compounds (µg/kg)
			Interim Screening Level[1] :	**540**	**540**	**1,800**	**2,870**	**22,000,000**
			Residential Screening Levels[2] :	**NE**	**NE**	**NE**	**35,000**	**22,000,000**
			Commercial Screening Level [3] :	**NE**	**NE**	**NE**	**120,000**	**92,000,000**
			RWQCB Environmental Screening Levels [4] :	**540**	**540**	**1,800**	**NE**	**NE**
			Ecological Comparison Values[5] :	**NE**	**NE**	**NE**	**2,870**	**NE**
			Background[6] :	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as diesel**	**TPH as gasoline**	**TPH as motor oil**	**Bis (2-ethylhexyl) phthalate**	**Methyl acetate**
AOC4-1	10/14/08	0 - 0.5	N	ND (10)	---	ND (10)	ND (330)	---
	10/14/08	0.5 - 1	N	ND (10)	---	ND (10)	ND (330)	---
	10/14/08	2 - 3	N	ND (10)	ND (0.98)	ND (10)	810	12

Notes:

1 Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.
2 Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used.
3 Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.
4 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.
5 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.
6 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.
Results greater than or equal to the interim screening level are circled.
Only detected SVOCs and VOCs are presented.
NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
RWQCB = Regional Water Quality Control Board
CHHSL = California human health screening levels
SVOCs = Semi-Volatile Organic Compounds
TPH = Total Petroleum Hydrocarbon
VOCs = Volatile Organic Compounds
-- = not analyzed
µg/kg = micrograms per kilogram
FD = Field Dupliicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
mg/kg = milligrams per kilogram
N = Primary Sample
ND = not detected at the listed reporting limit

C10-7
Sample Results: Pesticides
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Pesticides (µg/kg)																				
Interim Screening Level [1]:				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Screening Levels [2]:				**2,300**	**1,600**	**1,600**	**33**	**77**	**430**	**270**	**77**	**35**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Commercial Screening Level [3]:				**9,000**	**6,300**	**6,300**	**130**	**270**	**1,700**	**960**	**270**	**130**	**3,700,000**	**3,700,000**	**3,700,000**	**230,000**	**230,000**	**230,000**	**2,000**	**1,700**	**520**	**190**	**3,800,000**	**1,800**
Ecological Comparison Values [4]:				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
AOC4-1	10/14/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2J)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)

Notes:

1 Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

2 Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used.

3 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.
NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
CHHSL = California human health screening levels
-- = not analyzed
µg/kg = micrograms per kilogram
FD = Field Dupliicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
N = Primary Sample
ND = not detected at the listed reporting limit

C10-8

Sample Results: Polychlorinated Biphenyls
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Screening Level [2]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Commercial Screening Level [3]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC4-1	10/14/08	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	24	ND (17)	ND (17)	ND (17)	41
AOC4-A01	03/02/10	0	N	ND (19J)	ND (37J)	ND (19J)	ND (19J)	ND (19J)	120 J	ND (19J)	---	---	140
AOC4-A01minus	03/02/10	0	N	ND (18J)	ND (36J)	ND (18J)	ND (18J)	ND (18J)	150 J	ND (18J)	---	---	170
AOC4-A01S	04/21/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	170	ND (18)	---	---	190
AOC4-A02	02/24/10	0	N	ND (19J)	ND (37J)	ND (19J)	ND (19J)	ND (19J)	23 J	ND (19J)	---	---	42
AOC4-A03	03/01/10	0	N	ND (20J)	ND (39J)	ND (20J)	ND (20J)	ND (20J)	90 J	ND (20J)	---	---	110
	03/01/10	0	FD	ND (19J)	ND (39J)	ND (19J)	ND (19J)	ND (19J)	75 J	ND (19J)	---	---	94
AOC4-A04	07/27/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	19	ND (17)	ND (17)	ND (17)	36
AOC4-A05	07/26/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-A06	07/26/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND
AOC4-A06_A07	08/10/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND
AOC4-B01	03/03/10	0	N	ND (19J)	ND (39J)	ND (19J)	ND (19J)	ND (19J)	310 J	ND (19J)	---	---	330
AOC4-B01S	04/21/10	0	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---	ND
	04/21/10	0	FD	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---	ND
AOC4-B02	03/17/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	220	ND (18)	---	---	240
AOC4-B03	03/03/10	0	N	ND (18J)	ND (36J)	ND (18J)	ND (18J)	ND (18J)	100 J	ND (18J)	---	---	120
AOC4-B04	03/12/10	0	N	ND (19)	ND (37)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	---	---	ND
AOC4-B05	07/26/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	22	ND (16)	ND (16)	ND (16)	38
AOC4-B06	07/26/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	53	ND (16)	ND (16)	ND (16)	69
AOC4-B06_B07	08/10/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-C01	03/02/10	0	N	ND (19J)	ND (38J)	ND (19J)	ND (19J)	ND (19J)	410 J	ND (19J)	---	---	430
AOC4-C01S	04/22/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---	ND
AOC4-C02	03/29/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	170	ND (17)	---	---	190
AOC4-C03	03/18/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	400	ND (17)	---	---	420
AOC4-C04	03/18/10	0	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	37	ND (18)	---	---	55
AOC4-C05	07/26/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	120 J	ND (17)	ND (17)	ND (17)	140

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Sample Results: Polychlorinated Biphenyls

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Screening Level [2]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Commercial Screening Level [3]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC4-C06	07/26/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	18	ND (16)	ND (16)	ND (16)	34
AOC4-C06_C07	08/10/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND
	08/10/10	0	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-D01	03/24/10	0	N	ND (18J)	ND (36J)	ND (18J)	ND (18J)	ND (18J)	340 J	ND (18J)	---	---	360
AOC4-D01S	04/12/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	21	ND (17)	---	---	38
AOC4-D02	03/19/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---	ND
AOC4-D03	03/19/10	0	N	ND (19)	ND (38)	ND (19)	ND (19)	ND (19)	160	ND (19)	---	---	180
AOC4-D04	03/19/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	25	ND (18)	---	---	43
AOC4-D05	07/26/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	140	ND (17)	ND (17)	ND (17)	160
AOC4-D06	07/27/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND
AOC4-D06_D07	08/10/10	0	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND
AOC4-E01S	04/22/10	0	N	48	ND (37)	ND (18)	ND (18)	ND (18)	2,500	ND (18)	---	---	2,600
AOC4-E02	04/16/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	510	ND (18)	---	---	530
AOC4-E03	03/25/10	0	N	31	ND (35)	ND (18)	ND (18)	ND (18)	1,800	ND (18)	---	---	1,800
AOC4-E04	03/25/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	500	ND (17)	---	---	520
AOC4-E05	07/27/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	07/27/10	0	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	66	ND (17)	ND (17)	ND (17)	83
AOC4-E06	07/27/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	17	ND (17)	ND (17)	ND (17)	34
AOC4-E06_E07	08/10/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-F01S	04/22/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	34	ND (18)	---	---	52
AOC4-F02	03/31/10	0	N	42	ND (35)	ND (17)	ND (17)	ND (17)	1,600	ND (17)	---	---	1,700
AOC4-F03	03/31/10	0	N	38	ND (35)	ND (18)	ND (18)	ND (18)	1,900	ND (18)	---	---	1,900
AOC4-F04	03/31/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	710	ND (18)	---	---	730
AOC4-F05	08/09/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-G01S	04/22/10	0	N	42	ND (34)	ND (17)	ND (17)	ND (17)	2,900	ND (17)	---	---	3,000
AOC4-G04	08/04/10	0	N	25	ND (34)	ND (17)	ND (17)	ND (17)	2,500	ND (17)	ND (17)	ND (17)	2,500

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Sample Results: Polychlorinated Biphenyls

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Screening Level [2]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Commercial Screening Level [3]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC4-G05	08/05/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-G06	08/09/10	0	N	30	ND (33)	ND (17)	ND (17)	ND (17)	2,100	640	ND (17)	ND (17)	2,800
AOC4-GB10	02/10/10	0 - 0.5	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	350	ND (18)	---	---	370
AOC4-GB11	02/10/10	0 - 0.5	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	350 J	ND (18)	---	---	370
	02/10/10	0 - 0.5	FD	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	900 J	ND (18)	---	---	920
AOC4-GB12	02/10/10	0 - 0.5	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	420	ND (18)	---	---	440
AOC4-H04	07/27/10	0	N	60	ND (33)	ND (16)	ND (16)	ND (16)	5,900	ND (16)	ND (16)	ND (16)	6,000
AOC4-H05	08/05/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	280	ND (17)	ND (17)	ND (17)	300
AOC4-I04	05/19/10	0	N	ND (19J)	ND (37J)	ND (19J)	ND (19J)	ND (19J)	1,200 J	ND (19J)	ND (19J)	ND (19J)	1,200
AOC4-I05	05/24/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-I06	08/11/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-I06_I07	08/13/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	77	53	ND (18)	ND (18)	140
AOC4-J02	05/10/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	78	ND (18)	---	---	96
AOC4-J03	05/17/10	0	N	ND (19J)	ND (37J)	ND (19J)	ND (19J)	ND (19J)	320 J	ND (19J)	ND (19J)	ND (19J)	340
AOC4-J04	06/15/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	300	ND (17)	ND (17)	ND (17)	320
AOC4-J05	06/07/10	0	N	ND (19)	ND (38)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND
AOC4-J06	06/07/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	66	ND (18)	ND (18)	ND (18)	84
AOC4-J06_J07	08/13/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	75	49	ND (18)	ND (18)	130
AOC4-K02	05/17/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---	ND
	05/17/10	0	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---	ND
AOC4-K03	05/17/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---	ND
AOC4-K04	06/16/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	250	ND (17)	ND (17)	ND (17)	270
AOC4-K05	06/15/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	160	ND (17)	ND (17)	ND (17)	180
AOC4-K06	06/15/10	0	N	ND (19)	ND (37)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND
AOC4-K07	06/15/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-L01	05/14/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---	ND

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Sample Results: Polychlorinated Biphenyls

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Screening Level [2]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Commercial Screening Level [3]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC4-L02	05/14/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---	ND
AOC4-L03	05/13/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	33	ND (18)	---	---	51
AOC4-L04	05/18/10	0	N	ND (18J)	ND (36J)	ND (18J)	ND (18J)	ND (18J)	ND (18J)	ND (18J)	ND (18J)	ND (18J)	ND
AOC4-L05	06/28/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-L06	06/28/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	06/28/10	0	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-L07	09/16/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
	09/16/10	0	FD	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	19	ND (18)	ND (18)	ND (18)	37
AOC4-L07_L08	09/20/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-M01	09/30/10	0	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-M02	09/30/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-M03	10/04/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-M04	10/05/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	19	ND (17)	ND (17)	ND (17)	36
AOC4-M05	09/20/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-M06	07/08/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-M07	09/22/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-M07_M08	09/22/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	28	ND (17)	ND (17)	ND (17)	45
AOC4-M08	09/22/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	36	ND (17)	ND (17)	ND (17)	53
AOC4-M08_M09	09/23/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	43	ND (17)	ND (17)	ND (17)	60
AOC4-M10	10/01/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	140	29	ND (17)	ND (17)	180
AOC4-N01	09/30/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	160	34	ND (17)	ND (17)	200
AOC4-N02	09/30/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-N03	10/04/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	20	ND (18)	ND (18)	ND (18)	38
AOC4-N04	10/05/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-N05	10/05/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	33	ND (17)	ND (17)	ND (17)	50
AOC4-N05A	07/08/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND

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Sample Results: Polychlorinated Biphenyls
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Screening Level [2]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Commercial Screening Level [3]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC4-N06	09/23/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	58	ND (17)	ND (17)	ND (17)	75
AOC4-N07	09/23/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-N08	09/23/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-O02	10/04/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-O03	10/26/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/26/10	0	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-O04	10/26/10	0	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	110	22	ND (17)	ND (17)	140
AOC4-O05	10/27/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/27/10	0	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-O06	10/07/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-O07	10/01/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	28	ND (17)	ND (17)	ND (17)	45
AOC4-O08	10/01/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	100	25	ND (17)	ND (17)	130
AOC4-P03	10/04/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	24	ND (17)	ND (17)	ND (17)	41
AOC4-P04	11/19/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-P05	10/27/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/27/10	0	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-P06	10/25/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-P07	10/22/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND
AOC4-P08	10/22/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-Q04	10/07/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	400	120	ND (17)	ND (17)	530
AOC4-Q05	10/07/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	290	88	ND (17)	ND (17)	390
	10/07/10	0	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	380	100	ND (17)	ND (17)	490
AOC4-Q06	10/25/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-Q07	10/25/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
AOC4-Q08	10/22/10	0	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND

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Sample Results: Polychlorinated Biphenyls
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Polychlorinated biphenyls (µg/kg)									
Interim Screening Level [1]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**204**
Residential Screening Level [2]:				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**	**NE**
Commercial Screening Level [3]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**204**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**	**Total PCBs**
AOC4-R05	10/29/10	0	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND
	10/29/10	0	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	19	ND (17)	ND (17)	ND (17)	36
AOC4-R06	10/07/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	110	34	ND (17)	ND (17)	150
AOC4-R07	10/08/10	0	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	51	17	ND (17)	ND (17)	77

Notes:

1 Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

2 Residential screening level - residential USEPA regional screening levels

3 Commercial screening level - commercial USEPA regional screening levels

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

CHHSL = California human health screening levels

Calculations:

Total PCBs by Area = Sum of Result of PCBs. Detected values are summed plus ½ the RL for nondetect Aroclors if the Aroclor is detected somewhere in the area. If all aroclors in a particular sa

-- = not analyzed

µg/kg = micrograms per kilogram

FD = Field Dupliicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

N = Primary Sample

ND = not detected at the listed reporting limit

C10-9

Sample Results: Dioxin and Furans

AOC 4 – Debris Ravine

Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Dioxin/Furans (ng/kg)																		
Interim Screening Level [1]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**4.6**	**NE**	**NE**	**4.6**	**NE**	**50**	**16**	**1.6**
Residential Regional Screening Levels [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**50**	**NE**	**NE**
Commercial Screening Level [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**200**	**NE**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**16**	**1.6**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NA**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1,2,3,4,6,7,8-HpCDD**	**1,2,3,4,6,7,8-HpCDF**	**1,2,3,4,7,8,9-HpCDF**	**1,2,3,4,7,8-HxCDD**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDD**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDD**	**1,2,3,7,8,9-HxCDF**	**2,3,4,6,7,8-HxCDF**	**OCDD**	**OCDF**	**1,2,3,7,8-PeCDD**	**1,2,3,7,8-PeCDF**	**2,3,4,7,8-PeCDF**	**2,3,7,8-TCDD**	**2,3,7,8-TCDF**	**TEQ Human**	**TEQ Avian**	**TEQ Mammals**
AOC4-A01	03/02/10	0	N	270	19	ND (2.1)	ND (3.2)	ND (3.4)	8.4 J	2.6 J	6.2 J	ND (1.4)	ND (3.1)	3,700	38	ND (2.1)	ND (1.7)	ND (2.2)	ND (0.39)	ND (1.5)	8	5.5	8
AOC4-A01minus	03/02/10	0	N	470	41	ND (2.2)	7 J	ND (6.2)	17	ND (2.7)	14	ND (1.8)	ND (5.4)	5,300	39	ND (3.9)	ND (1.5)	ND (4)	ND (0.96)	ND (2.9)	15	10	15
AOC4-A01S	04/21/10	0	N	ND (27)	ND (2.5)	ND (0.38)	ND (1.1)	ND (0.6)	ND (1.1)	ND (0.34)	ND (1.1)	ND (0.41)	ND (0.39)	180	ND (3.6)	ND (1.4)	ND (0.38)	ND (0.37)	ND (0.21)	ND (1.1)	1.4	1.8	1.4
AOC4-A02	02/24/10	0	N	520	58	ND (1.3)	ND (1.7)	8.4 J	ND (7.4)	ND (2)	ND (2.5)	ND (2.3)	ND (4.1)	10,000	46	ND (1.2)	ND (1.8)	ND (1.5)	ND (0.21)	ND (1)	12	5.6	12
AOC4-A03	03/01/10	0	N	200	23	2.5 J	4.3 J	ND (4.4)	9.1 J	2.7 J	7.7 J	ND (1.3)	4.8 J	1,800	29	ND (2.3)	2.5 J	ND (3.1)	0.59 J	ND (1.8)	8.3	7.2	8.3
	03/01/10	0	FD	150	ND (11)	1.8 J	3.2 J	ND (3.4)	6.6 J	3.1 J	5.5 J	ND (0.36)	3.2 J	1,300	22 J	ND (1.9)	1.9 J	2.4 J	0.47 J	ND (1.5)	6.6	6.7	6.6
AOC4-A04	07/27/10	0	N	68	5.4 J	0.99 J	ND (1)	ND (0.83)	3.2 J	0.87 J	2.2 J	0.62 J	ND (3.1)	430	7.6 J	ND (0.21)	0.47 J	ND (0.26)	ND (0.33)	ND (0.9)	2.2	1.7	2.2
AOC4-A05	07/26/10	0	N	55	3.6 J	ND (0.29)	ND (0.78)	0.62 J	2.1 J	0.47 J	1.5 J	0.2 J	ND (2.5)	450	5.4 J	ND (0.13)	ND (0.3)	ND (0.29)	0.11 J	0.63 J	1.7	1.5	1.7
AOC4-A06	07/26/10	0	N	530	28	1.7 J	ND (2)	ND (1.6)	9.2 J	ND (0.79)	4.3 J	0.6 J	ND (5.3)	10,000 J	83	ND (0.21)	0.46 J	0.42 J	ND (0.078)	0.65 J	11	4.1	11
AOC4-A06_A07	08/10/10	0	N	33	ND (2.5)	ND (0.17)	ND (0.25)	ND (0.17)	1.5 J	ND (0.33)	1.3 J	ND (0.19)	ND (2.6)	280	4 J	ND (0.3)	ND (0.14)	ND (0.14)	ND (0.12)	ND (0.32)	1.1	0.84	1.1
AOC4-B01	03/03/10	0	N	110	9.6 J	0.84 J	ND (1.8)	2.5 J	4.4 J	ND (1.9)	3.1 J	ND (0.99)	1.8 J	1,000	10 J	ND (1)	2.1 J	ND (4.8)	ND (0.16)	2.1 J	4.5	6.6	4.5
AOC4-B01S	04/21/10	0	N	ND (0.98)	ND (0.16)	ND (0.19)	ND (0.29)	ND (0.19)	ND (0.29)	ND (0.17)	ND (0.29)	ND (0.35)	ND (0.2)	ND (7.5)	ND (0.35)	ND (0.42)	ND (0.3)	ND (0.3)	ND (0.18)	ND (0.55)	ND (0.47)	ND (0.81)	ND (0.47)
	04/21/10	0	FD	ND (1.2)	ND (0.29)	ND (0.35)	ND (0.53)	ND (0.25)	ND (0.36)	ND (0.23)	ND (0.36)	ND (0.45)	ND (0.33)	ND (11)	ND (0.34)	ND (0.44)	ND (0.33)	ND (0.32)	ND (0.17)	ND (0.25)	ND (0.51)	ND (0.71)	ND (0.51)
AOC4-B02	03/17/10	0	N	1,400	160	13	22	ND (43)	59	33	43	11 J	48	11,000	120	ND (16)	21	36	3 J	16	67	87	67
AOC4-B03	03/03/10	0	N	5,000	ND (490)	48	87	ND (130)	220	100	170	39	140	35,000	330	56	67	100	14	34	250	280	250
AOC4-B04	03/12/10	0	N	48	ND (3.7)	ND (0.31)	ND (0.93)	ND (1.1)	2.5 J	0.83 J	ND (1.1J)	ND (0.58)	ND (0.88)	330	3.1 J	ND (0.76)	ND (0.91)	1.3 J	ND (0.19)	0.89 J	2.1	3.1	2.1
AOC4-B05	07/26/10	0	N	140	8.7 J	0.9 J	ND (2.2)	1.1 J	6 J	0.87 J	4.3 J	ND (0.47)	ND (7)	1,100	17 J	ND (0.15)	0.59 J	0.56 J	ND (0.37)	0.94 J	4.1	3.3	4.1
AOC4-B06	07/26/10	0	N	350	33	4.1 J	ND (0.14)	4.7 J	ND (10)	2.8 J	ND (7.1)	1.3 J	ND (18)	2,700	55	ND (0.32)	1.3 J	1.8 J	ND (0.087)	ND (1.7)	8.2	6.2	8.2
AOC4-B06_B07	08/10/10	0	N	27	2.1 J	ND (0.21)	ND (0.35)	ND (0.33)	ND (1.2)	ND (0.14)	0.91 J	ND (0.19)	0.22 J	190	ND (2.7)	ND (0.32)	ND (0.14)	ND (0.14)	ND (0.13)	ND (0.3)	0.84	0.68	0.84
AOC4-C01	03/02/10	0	N	1,100	45	6.2 J	17	ND (12)	40	6.5 J	29	3.5 J	7.3 J	7,500	65	ND (7.1)	4.5 J	ND (10)	1.2 J	4.1 J	32	23	32
AOC4-C01S	04/22/10	0	N	12 J	ND (1.4)	ND (0.15)	ND (0.21)	ND (0.3)	ND (0.6)	ND (0.15)	0.53 J	ND (0.22)	ND (0.96)	160	2.5 J	ND (0.34)	ND (0.18)	ND (0.24)	ND (0.23)	0.58 J	0.73	1.2	0.73
AOC4-C02	03/29/10	0	N	690	37	2.2 J	ND (3.9)	ND (5.7)	20	ND (2.9)	9 J	ND (1.2)	3 J	6,700	54	2.7 J	2.4 J	ND (0.86)	ND (0.72)	ND (1.8)	17	8.4	17
AOC4-C03	03/18/10	0	N	8,000	340	28	120	ND (69)	310	36	240	17	51	46,000	310	ND (71)	22	34	15	10	240	160	240
AOC4-C04	03/18/10	0	N	120	7.8 J	ND (0.58)	3.1 J	1.9 J	6 J	1.3 J	5.3 J	0.88 J	1.3 J	810	7.1 J	ND (1.6)	ND (0.78)	1.1 J	ND (0.33)	0.93 J	4.9	4.6	4.9
AOC4-C05	07/26/10	0	N	370	20	2 J	3.9 J	2.5 J	12 J	2.1 J	6.7 J	2 J	ND (17)	2,900	29	ND (0.15)	1.1 J	ND (1.1)	ND (0.052)	ND (1.2)	8.9	4.7	8.9
AOC4-C06	07/26/10	0	N	91	5 J	0.64 J	1.4 J	0.82 J	3.7 J	0.66 J	ND (2.4)	1.5 J	ND (3.8)	530	7.5 J	ND (0.16)	ND (0.51)	ND (0.41)	ND (0.21)	0.85 J	2.6	2.2	2.6
AOC4-C06_C07	08/10/10	0	N	67	3.5 J	ND (0.22)	ND (0.61)	ND (0.4)	2.5 J	ND (0.43)	ND (1.3)	ND (0.21)	ND (4.4)	570	5.6 J	ND (0.34)	ND (0.18)	ND (0.18)	ND (0.14)	ND (0.19)	1.8	0.97	1.8
	08/10/10	0	FD	57	4.5 J	ND (0.29)	ND (0.51)	ND (0.67)	ND (0.52)	ND (0.3)	ND (0.49)	ND (0.38)	ND (5.1)	440	6.6 J	ND (0.54)	ND (0.26)	ND (0.26)	ND (0.14)	ND (0.45)	1.6	1.2	1.6
AOC4-D01	03/24/10	0	N	330 J	32 J	3.1 J	5.5 J	4.5 J	14 J	ND (2J)	ND (5.6J)	ND (1.1J)	ND (78J)	2,900 J	76 J	ND (2.9J)	ND (1.3J)	2.8 J	ND (0.66J)	ND (2.5J)	14	12	14
AOC4-D01S	04/12/10	0	N	ND (6.6)	ND (0.35)	ND (0.42)	ND (0.6)	ND (0.4)	ND (0.4)	ND (0.35)	ND (0.4)	ND (0.43)	ND (1.5)	51	ND (0.98)	ND (0.89)	ND (0.57)	ND (0.55)	ND (0.18)	ND (0.33)	0.9	1.2	0.9
AOC4-D02	03/19/10	0	N	74	ND (6.2)	0.59 J	0.81 J	ND (0.62)	2.8 J	ND (0.2)	ND (0.68)	ND (0.29)	ND (0.25)	870	18 J	ND (0.31)	ND (0.21)	ND (0.2)	ND (0.13)	ND (0.46)	1.8	0.93	1.8
AOC4-D03	03/19/10	0	N	470	39	3.7 J	3.1 J	4.5 J	15 J	1.5 J	6.8 J	ND (0.34)	ND (2.1)	5,800	110	ND (1.5)	ND (0.81)	1.2 J	ND (0.3)	1.6 J	12	6.9	12
AOC4-D04	03/19/10	0	N	150	13	1.2 J	1.4 J	1.6 J	ND (5)	0.68 J	ND (2)	ND (0.24)	ND (1.5)	1,300	26	ND (0.7)	ND (0.56)	ND (0.66)	ND (0.11)	1.4 J	3.5	3.1	3.5

C10-9
Sample Results: Dioxin and Furans
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Dioxin/Furans (ng/kg)																			
Interim Screening Level [1]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	4.6	NE	NE	4.6	NE	50	16	1.6
Residential Regional Screening Levels [2]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	50	NE	NE
Commercial Screening Level [3]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	200	NE	NE
Ecological Comparison Values [4]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	16	1.6
Background [5]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NA	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1,2,3,4,6,7,8 -HpCDD**	**1,2,3,4,6,7,8 -HpCDF**	**1,2,3,4,7,8,9 -HpCDF**	**1,2,3,4,7,8-HxCDD**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDD**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDD**	**1,2,3,7,8,9-HxCDF**	**2,3,4,6,7,8-HxCDF**	**OCDD**	**OCDF**	**1,2,3,7,8-PeCDD**	**1,2,3,7,8-PeCDF**	**2,3,4,7,8-PeCDF**	**2,3,7,8-TCDD**	**2,3,7,8-TCDF**	**TEQ Human**	**TEQ Avian**	**TEQ Mammals**
AOC4-D05	07/26/10	0	N	7,100	490	22	39	37	210	11 J	85	18	25	66,000	240	ND (0.3)	3.1 J	4 J	0.89 J	1.9 J	140	48	140
AOC4-D06	07/27/10	0	N	140	9 J	0.69 J	1.9 J	1.2 J	5.2 J	0.91 J	2.9 J	ND (0.45)	ND (5.5)	1,700	10 J	ND (0.8)	0.7 J	ND (0.62)	0.21 J	0.74 J	4.3	3.1	4.3
AOC4-D06_D07	08/10/10	0	N	180	11 J	ND (0.62)	2.9 J	ND (1.8)	7.4 J	ND (1.3)	4.6 J	ND (0.42)	ND (8.3)	1,500	17 J	ND (0.47)	ND (0.28)	ND (0.69)	ND (0.19)	ND (0.61)	4.9	2.7	4.9
AOC4-E01S	04/22/10	0	N	1,400 J	160 J	ND (13J)	ND (9.1)	ND (20J)	ND (48J)	ND (7.1J)	ND (12J)	ND (0.56J)	ND (310J)	13,000 J	520 J	ND (1.2J)	ND (12)	ND (19)	ND (1.1J)	13 J	46	47	46
AOC4-E02	04/16/10	0	N	1,100	58	7.6 J	3.2 J	3.2 J	14	ND (2.2)	ND (4.4)	ND (0.18)	ND (64)	74,000 J	240	ND (0.22)	ND (1.3)	3 J	ND (0.12)	3.2 J	41	20	41
AOC4-E03	03/25/10	0	N	4,800	360	32	ND (20)	32	110	13	34	ND (0.41)	29	42,000 J	630	ND (8)	8 J	14	ND (1.1)	15	98	60	98
AOC4-E04	03/25/10	0	N	82 J	15	ND (1.2)	ND (1.3)	ND (3.8)	ND (2.4)	ND (1.9)	---	ND (0.43)	1.6 J	520	19 J	ND (0.51)	6.9 J	4.2 J	ND (0.11)	3.8 J	3.9	9.8	3.9
AOC4-E05	07/27/10	0	N	250 J	23	1.5 J	1.7 J	2.9 J	5.8 J	1.3 J	3.1 J	1.1 J	ND (3.3)	4,700 J	26	ND (0.25)	ND (0.67)	ND (0.55)	ND (0.13)	0.76 J	6.3	3.4	6.3
	07/27/10	0	FD	99 J	7.4 J	0.56 J	1.5 J	1.3 J	4 J	1.1 J	2.9 J	ND (0.53)	ND (5.1)	780 J	8.5 J	ND (0.2)	ND (0.57)	ND (0.62)	0.17 J	2.9 J	3.3	4.7	3.3
AOC4-E06	07/27/10	0	N	120	8.2 J	0.88 J	2.1 J	1.3 J	5.1 J	1 J	3.1 J	2.6 J	ND (2.9)	1,000	9.1 J	ND (0.2)	0.96 J	ND (0.57)	ND (0.21)	ND (0.81)	3.6	2.4	3.6
AOC4-E06_E07	08/10/10	0	N	76	5.7 J	ND (0.21)	1.2 J	1 J	2.8 J	0.64 J	ND (1.6)	ND (0.15)	ND (5.6)	580	7.2 J	ND (0.31)	ND (0.15)	ND (0.3)	ND (0.081)	0.54 J	2.2	1.7	2.2
AOC4-F01S	04/22/10	0	N	ND (11)	2.6 J	0.34 J	ND (0.34)	ND (0.68)	0.83 J	ND (0.63)	ND (0.36)	ND (0.17)	ND (2.2)	120	5.1 J	ND (0.17)	ND (0.14)	ND (0.81)	0.41 J	ND (1.2)	1.1	1.8	1.1
AOC4-F02	03/31/10	0	N	810	81	10 J	ND (3.5)	ND (13)	ND (5.7)	ND (4.4)	ND (6.7)	ND (0.6)	ND (5.7)	11,000	230	ND (1.6)	8.1 J	12 J	ND (0.28)	8.8	20	27	20
AOC4-F03	03/31/10	0	N	710	90	ND (10)	ND (5.4)	ND (19)	ND (18)	10 J	---	ND (3.3)	9.5 J	6,700	240	ND (2.7)	15	26	ND (0.58)	17	26	52	26
AOC4-F04	03/31/10	0	N	250 J	38	ND (4.5)	ND (1.7)	5.9 J	ND (8.9)	4.2 J	---	ND (0.91)	ND (2.5)	1,500	82	ND (0.96)	ND (3.3)	ND (13)	ND (0.25)	11	8.8	20	8.8
AOC4-F05	08/09/10	0	N	4.7 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	30	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.072	0.031	0.072
AOC4-G01S	04/22/10	0	N	800	120	9.3 J	ND (0.73)	ND (24)	ND (0.77)	19	ND (0.72)	ND (0.43)	7.7 J	8,100	280	ND (2)	12 J	48	ND (0.51)	27	35	84	35
AOC4-G04	08/04/10	0	N	1,300	170	13	23	35	48	ND (0.01)	ND (0.01)	5.2 J	ND (0.01)	9,300	210	ND (0.01)	ND (0.01)	48	ND (0.01)	35	47	93	47
AOC4-G05	08/05/10	0	N	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	18 J	0.53 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	0.021	0.025	0.021
AOC4-G06	08/09/10	0	N	430	67	7.3 J	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	ND (0.01)	3,300	190	ND (0.01)	6.6 J	ND (0.01)	ND (0.01)	ND (0.01)	6.3	2.2	6.3
AOC4-GB10	02/10/10	0 - 0.5	N	4,200	140	14	16	ND (21)	88	ND (13)	29	ND (12.5)	ND (12.5)	52,000	260	ND (12.5)	ND (12.5)	6.5 J	ND (5)	ND (5)	87	37	87
AOC4-GB11	02/10/10	0 - 0.5	N	4,700	180	ND (12.5)	ND (13)	ND (28)	110	ND (17)	34	ND (12.5)	ND (14)	33,000	610	ND (12.5)	3.7 J	6.7 J	1.2 J	ND (5)	87	35	87
	02/10/10	0 - 0.5	FD	5,300	230	ND (12.5)	21	ND (43)	160	ND (23)	39	ND (12.5)	22	30,000	440	ND (12.5)	ND (12.5)	14	1.7 J	ND (5)	110	48	110
AOC4-GB12	02/10/10	0 - 0.5	N	490	26	ND (12.5)	5.5 J	ND (12.5)	14	ND (12.5)	ND (12.5)	ND (12.5)	ND (12.5)	4,400	66	ND (12.5)	ND (12.5)	1.4 J	ND (5)	ND (5)	21	18	21
AOC4-H04	07/27/10	0	N	190	110	11 J	ND (0.27)	38	ND (0.29)	35	ND (0.26)	ND (0.22)	18	1,600	110	ND (0.83)	22	67	ND (0.075)	49	39	130	39
AOC4-H05	08/05/10	0	N	12 J	6.8 J	0.89 J	ND (0.01)	2 J	ND (0.01)	1.6 J	ND (0.01)	ND (0.01)	0.93 J	90	8.1 J	ND (0.01)	1.1 J	2.7 J	ND (0.01)	2.4 J	1.8	5.8	1.8
AOC4-I04	05/19/10	0	N	110	25	ND (3)	ND (0.47)	8.6 J	ND (0.52)	9.4 J	ND (0.51)	ND (0.42)	3.7 J	920	43	ND (0.74)	5.9 J	22	ND (1)	11	13	37	13
AOC4-I05	05/24/10	0	N	27	ND (5.6)	ND (3.9)	1.8 J	1.7 J	ND (2.9)	ND (1.4)	2.9 J	ND (4.2)	2 J	250	ND (12)	ND (1)	ND (0.76)	ND (1)	1.9 J	ND (2.5)	4.3	5.3	4.3
AOC4-I06	08/11/10	0	N	29	3.1 J	0.43 J	ND (0.01)	ND (0.01)	ND (0.01)	0.51 J	ND (0.01)	ND (0.01)	ND (0.01)	330	6.1 J	ND (0.01)	ND (0.01)	0.63 J	ND (0.01)	0.98 J	0.78	1.8	0.78
AOC4-I06_I07	08/13/10	0	N	160	14	ND (1.2)	1.9 J	ND (0.27)	6.2 J	ND (1.2)	2.9 J	ND (0.31)	ND (28)	1,500	34	ND (0.55)	ND (1.4)	1.8 J	0.25 J	1.5 J	6	6.3	6
AOC4-J02	05/10/10	0	N	210	21	2.6 J	1.4 J	ND (1.4)	6 J	ND (3.2)	3.1 J	ND (0.96)	ND (0.78)	2,500	120	ND (0.48)	ND (0.4)	0.59 J	0.33 J	ND (0.47)	5.3	2.9	5.3
AOC4-J03	05/17/10	0	N	4,400	390	34	26	ND (26)	110	ND (63)	42	ND (0.4)	ND (770)	50,000	1,900	ND (0.7)	ND (0.35)	ND (8.2)	1.9 J	ND (3.9)	130	72	130
AOC4-J04	06/15/10	0	N	1,400	140	ND (7.7)	17	ND (10)	47	ND (4.5)	29	ND (0.48)	ND (140)	12,000	370	ND (14)	ND (0.78)	ND (0.65)	ND (0.64)	3 J	44	27	44

C10-9
Sample Results: Dioxin and Furans
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

				Dioxin/Furans (ng/kg)																			
Interim Screening Level [1]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**4.6**	**NE**	**NE**	**4.6**	**NE**	**50**	**16**	**1.6**
Residential Regional Screening Levels [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**50**	**NE**	**NE**
Commercial Screening Level [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**200**	**NE**	**NE**
Ecological Comparison Values [4]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**16**	**1.6**
Background [5]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NA**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1,2,3,4,6,7,8-HpCDD**	**1,2,3,4,6,7,8-HpCDF**	**1,2,3,4,7,8,9-HpCDF**	**1,2,3,4,7,8-HxCDD**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDD**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDD**	**1,2,3,7,8,9-HxCDF**	**2,3,4,6,7,8-HxCDF**	**OCDD**	**OCDF**	**1,2,3,7,8-PeCDD**	**1,2,3,7,8-PeCDF**	**2,3,4,7,8-PeCDF**	**2,3,7,8-TCDD**	**2,3,7,8-TCDF**	**TEQ Human**	**TEQ Avian**	**TEQ Mammals**
AOC4-J05	06/07/10	0	N	55	ND (6.5)	ND (0.81)	ND (0.43)	ND (0.91)	1.8 J	ND (0.95)	1.3 J	ND (0.4)	0.62 J	580	20 J	ND (0.28)	ND (0.25)	ND (0.25)	ND (0.32)	ND (0.63)	1.6	1.2	1.6
AOC4-J06	06/07/10	0	N	1,600	150	13	12 J	ND (19)	57	ND (8.5)	27	ND (0.53)	14	14,000	450	ND (0.4)	ND (0.39)	ND (0.38)	ND (0.48)	ND (5.3)	35	15	35
AOC4-J06_J07	08/13/10	0	N	340	23	ND (1.8)	3.6 J	ND (0.27)	12 J	1.6 J	7.4 J	ND (0.31)	ND (49)	2,900	57	ND (0.63)	ND (0.28)	ND (1.4)	ND (0.17)	ND (1.4)	10	6.4	10
AOC4-K02	05/17/10	0	N	120 J	26	2.7 J	ND (0.93)	2.1 J	5.8 J	ND (1.3)	ND (2.1)	ND (0.28)	ND (1.6)	960 J	54	ND (0.92)	ND (0.37)	ND (0.21)	ND (0.29)	0.54 J	3.6	2.3	3.6
	05/17/10	0	FD	440 J	43	5.3 J	6 J	4.5 J	17	3 J	11 J	ND (2.6)	3 J	5,100 J	110	ND (0.4)	3 J	4.3 J	1 J	3.8 J	14	14	14
AOC4-K03	05/17/10	0	N	110	26	2.9 J	ND (1.1)	1.8 J	ND (4.8)	ND (1.7)	ND (2)	ND (1.2)	ND (44)	910	55	ND (0.91)	ND (0.28)	0.82 J	ND (0.14)	ND (0.5)	5.4	4.8	5.4
AOC4-K04	06/16/10	0	N	1,300	81	7.8 J	11 J	9.8 J	42	7.2 J	24	ND (1.2)	6.7 J	8,600	200	ND (0.82)	5.5 J	ND (0.84)	0.94 J	4.7 J	29	16	29
AOC4-K05	06/15/10	0	N	1,700	350	32	19	ND (46)	68	32	34	12 J	50	14,000	770	ND (0.54)	24	ND (0.57)	ND (1.7)	ND (19)	52	37	52
AOC4-K06	06/15/10	0	N	53	ND (2.8)	ND (0.47)	ND (0.63)	ND (0.49)	1.8 J	ND (0.34)	ND (0.98)	ND (0.33)	ND (10)	450	15 J	ND (0.36)	ND (0.21)	ND (0.31)	ND (0.37)	ND (0.32)	1.9	1.4	1.9
AOC4-K07	06/15/10	0	N	210	18	ND (1.2)	ND (1.6)	ND (1.7)	7.9 J	1 J	ND (3.9)	ND (0.4)	ND (29)	1,900	48	ND (0.93)	ND (0.42)	ND (0.42)	ND (0.25)	ND (0.88)	6.3	3.8	6.3
AOC4-L01	05/14/10	0	N	44	ND (5.6)	ND (2.7)	1.3 J	ND (1.1)	ND (2.1)	ND (1.3)	ND (1.9)	ND (2.6)	1 J	430	15 J	ND (0.16)	1 J	1.2 J	1.3 J	1.7 J	3.2	5	3.2
AOC4-L02	05/14/10	0	N	25	4.4 J	2.9 J	1.3 J	1.2 J	ND (2)	ND (0.87)	2.1 J	ND (3.2)	1.4 J	210	10 J	ND (0.17)	1.2 J	1.3 J	1.4 J	ND (1.6)	3.3	4.6	3.3
AOC4-L03	05/13/10	0	N	81	8 J	ND (1.4)	1.6 J	1.4 J	3.6 J	ND (0.99)	3.5 J	ND (1.1)	ND (0.6)	780	17 J	ND (0.44)	1 J	ND (0.79)	ND (0.18)	ND (1)	2.8	2.3	2.8
AOC4-L04	05/18/10	0	N	67	ND (6.3)	ND (2)	ND (1.1)	ND (0.87)	ND (3.1)	0.71 J	ND (1.8)	ND (2)	ND (1)	630	24 J	ND (0.48)	ND (0.75)	ND (0.8)	ND (0.67)	ND (1)	2.2	2.1	2.2
AOC4-L05	06/28/10	0	N	58	ND (5.4)	ND (0.62)	0.7 J	0.82 J	ND (2.2)	ND (0.3)	ND (1.2)	ND (0.42)	ND (7.2)	990	ND (11)	ND (0.26)	ND (0.3)	ND (0.3)	ND (0.097)	ND (0.067)	1.9	1.1	1.9
AOC4-L06	06/28/10	0	N	760 J	61	ND (0.43)	ND (1.2)	ND (5.7)	24	ND (2.8)	3.9 J	2.8 J	ND (100)	17,000 J	160	ND (0.21)	ND (0.61)	ND (1.6)	ND (0.24)	ND (0.71)	22	11	22
	06/28/10	0	FD	340 J	32	ND (0.3)	ND (0.53)	ND (1.5)	7.7 J	ND (0.89)	ND (1.5)	ND (0.28)	ND (41)	7,000 J	180	ND (0.15)	ND (0.41)	0.7 J	ND (0.13)	ND (0.92)	9.3	5	9.3
AOC4-L07	09/16/10	0	N	290	20	ND (0.74)	0.82 J	ND (0.26)	9.3 J	ND (1.9)	ND (1.4)	ND (0.32)	ND (57)	4,900	60	ND (0.18)	ND (0.21)	ND (0.61)	ND (0.16)	ND (0.24)	8.9	4.8	8.9
	09/16/10	0	FD	410	25	ND (0.38)	ND (0.61)	ND (0.29)	11 J	ND (1.9)	1.8 J	ND (0.35)	ND (65)	7,100	74	ND (0.23)	ND (0.26)	ND (0.26)	ND (0.12)	ND (0.33)	11	5.5	11
AOC4-L07_L08	09/20/10	0	N	1,400	100	8.2 J	2 J	9.2 J	35	ND (4.9)	5.4 J	5.1 J	ND (210)	25,000	310	ND (0.35)	ND (0.3)	ND (2)	ND (0.13)	ND (0.25)	40	20	40
AOC4-M01	09/30/10	0	N	15	2.7 J	ND (0.15)	ND (0.18)	ND (0.32)	ND (0.73)	ND (0.38)	ND (0.17)	ND (0.19)	ND (3.5)	140	9.8 J	ND (0.17)	ND (0.22)	ND (0.085)	ND (0.11)	ND (0.38)	0.67	0.68	0.67
AOC4-M02	09/30/10	0	N	95	ND (1.2)	ND (1.8)	ND (0.58)	ND (0.57)	ND (0.6)	ND (0.51)	ND (0.57)	ND (0.68)	ND (0.6)	960	ND (1.9)	ND (0.39)	ND (0.4)	ND (0.38)	ND (0.26)	ND (0.39)	1.9	1.1	1.9
AOC4-M03	10/04/10	0	N	12 J	ND (1)	ND (0.32)	ND (0.37)	ND (0.18)	ND (0.38)	ND (0.16)	ND (0.36)	ND (0.21)	ND (1.3)	120	ND (2.8)	ND (0.31)	ND (0.17)	ND (0.17)	ND (0.095)	ND (0.26)	0.55	0.58	0.55
AOC4-M04	10/05/10	0	N	45	4.1 J	0.6 J	ND (0.47)	0.82 J	2.8 J	ND (0.29)	1.6 J	ND (0.39)	ND (4.3)	450	ND (6.4)	ND (0.49)	ND (0.38)	ND (0.36)	ND (0.17)	ND (0.38)	1.8	1.4	1.8
AOC4-M05	09/20/10	0	N	41	2.5 J	ND (0.26)	0.33 J	ND (0.24)	1.2 J	ND (0.15)	ND (0.21)	ND (0.2)	ND (4.5)	680	5.9 J	ND (0.14)	ND (0.059)	ND (0.057)	ND (0.091)	ND (0.2)	1.2	0.68	1.2
AOC4-M06	07/08/10	0	N	1,600	110	6 J	2.3 J	9.6 J	39	ND (0.12)	5.9 J	5 J	ND (160)	38,000	270	0.5 J	1.1 J	2.6 J	ND (0.19)	0.59 J	44	21	44
AOC4-M07	09/22/10	0	N	140	8.4 J	ND (0.35)	ND (0.33)	ND (0.24)	3.3 J	ND (0.76)	ND (0.38)	ND (0.29)	ND (22)	2,900	26	ND (0.24)	ND (0.11)	ND (0.11)	ND (0.16)	ND (0.27)	4.1	2.1	4.1
AOC4-M07_M08	09/22/10	0	N	1,900	100	ND (0.73)	3.8 J	ND (8.9)	46	ND (5.5)	ND (9.2)	ND (0.43)	ND (170)	33,000	230	ND (0.34)	ND (1.5)	ND (2.3)	ND (0.3)	0.61 J	45	19	45
AOC4-M08	09/22/10	0	N	2,600	160	13	3.5 J	ND (16)	62	ND (9.7)	ND (8.7)	7.8 J	ND (310)	41,000	400	ND (0.45)	1.4 J	3.4 J	ND (0.31)	ND (0.45)	66	31	66
AOC4-M08_M09	09/23/10	0	N	1,600	74	6.7 J	7 J	ND (6.9)	38	2.4 J	13	ND (0.5)	ND (140)	27,000	210	ND (0.48)	ND (1.5)	2.1 J	ND (0.22)	ND (0.88)	39	18	39
AOC4-M10	10/01/10	0	N	2,200	97	14	18	ND (14)	77	ND (13)	ND (21)	ND (1.1)	ND (0.94)	22,000	230	ND (1.2)	ND (0.77)	5.1 J	ND (0.85)	ND (1.4)	44	17	44
AOC4-N01	09/30/10	0	N	510	37	3.1 J	5.1 J	ND (3.3)	17	2.6 J	10 J	ND (0.73)	ND (37)	4,500	65	ND (0.72)	ND (0.56)	1.5 J	ND (0.23)	ND (1.3)	13	7.8	13
AOC4-N02	09/30/10	0	N	5.3 J	ND (0.14)	ND (0.23)	ND (0.23)	ND (0.15)	ND (0.23)	ND (0.14)	ND (0.22)	ND (0.18)	ND (1.3)	50	ND (1.3)	ND (0.24)	ND (0.089)	ND (0.086)	ND (0.18)	ND (0.12)	0.42	0.44	0.42

				Dioxin/Furans (ng/kg)																			
Interim Screening Level [1]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	4.6	NE	NE	4.6	NE	50	16	1.6
Residential Regional Screening Levels [2]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	50	NE	NE
Commercial Screening Level [3]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	200	NE	NE
Ecological Comparison Values [4]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	16	1.6
Background [5]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NA	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1,2,3,4,6,7,8 -HpCDD**	**1,2,3,4,6,7,8 -HpCDF**	**1,2,3,4,7,8,9 -HpCDF**	**1,2,3,4,7,8-HxCDD**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDD**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDD**	**1,2,3,7,8,9-HxCDF**	**2,3,4,6,7,8-HxCDF**	**OCDD**	**OCDF**	**1,2,3,7,8-PeCDD**	**1,2,3,7,8-PeCDF**	**2,3,4,7,8-PeCDF**	**2,3,7,8-TCDD**	**2,3,7,8-TCDF**	**TEQ Human**	**TEQ Avian**	**TEQ Mammals**
AOC4-N03	10/04/10	0	N	140	ND (9.1)	ND (1.3)	ND (0.78)	ND (1.2)	5.1 J	ND (0.58)	ND (1.7)	ND (0.34)	ND (23)	1,400	31	ND (0.43)	ND (0.35)	ND (0.58)	ND (0.2)	ND (0.55)	4.2	2.6	4.2
AOC4-N04	10/05/10	0	N	230	15	ND (0.58)	ND (0.64)	ND (1.8)	8.3 J	ND (0.89)	ND (0.62)	ND (0.59)	ND (0.52)	2,700	43	ND (0.48)	ND (0.28)	ND (0.78)	ND (0.39)	ND (0.44)	4.9	2	4.9
AOC4-N05	10/05/10	0	N	140	15	ND (0.32)	ND (1)	ND (1.4)	4.6 J	ND (0.47)	2.1 J	ND (0.48)	ND (0.37)	1,700	40	ND (0.5)	ND (0.32)	ND (0.31)	ND (0.42)	0.54 J	3.5	2.1	3.5
AOC4-N05A	07/08/10	0	N	1,100	87	ND (0.27)	2.3 J	6.9 J	30	ND (0.087)	4.8 J	3.3 J	ND (120)	34,000	290	ND (0.16)	ND (0.89)	2.2 J	ND (0.14)	ND (0.49)	34	16	34
AOC4-N06	09/23/10	0	N	2,300	170	ND (0.86)	5.8 J	ND (13)	62	ND (6.8)	13	6.8 J	ND (270)	50,000	410	ND (0.36)	1.6 J	3.2 J	ND (0.36)	ND (0.77)	64	31	64
AOC4-N07	09/23/10	0	N	200	12 J	ND (0.53)	ND (0.46)	ND (0.51)	4.7 J	ND (0.99)	ND (1.1)	ND (0.61)	ND (29)	3,500	57	ND (0.27)	ND (0.18)	ND (0.27)	ND (0.16)	0.49 J	5.6	3.2	5.6
AOC4-N08	09/23/10	0	N	20	ND (0.97)	ND (0.34)	ND (0.25)	ND (0.43)	ND (0.38)	ND (0.12)	ND (0.25)	ND (0.17)	ND (3.4)	240	3.4 J	ND (0.19)	ND (0.085)	ND (0.082)	ND (0.1)	ND (0.36)	0.71	0.65	0.71
AOC4-O02	10/04/10	0	N	67	7.1 J	ND (0.95)	ND (1)	ND (0.68)	ND (2.4)	ND (0.6)	ND (1.1)	ND (0.81)	ND (6.6)	630	11 J	ND (0.39)	ND (0.46)	ND (0.45)	ND (0.33)	ND (0.34)	2	1.5	2
AOC4-O03	10/26/10	0	N	38	5.3 J	ND (1.2)	ND (2.4)	ND (1.7)	ND (2.8)	ND (1.6)	ND (2.8)	ND (2)	ND (1.2)	370	ND (11)	ND (1.1)	ND (0.58)	ND (1.1)	ND (0.82)	ND (0.72)	2.4	2.6	2.4
	10/26/10	0	FD	33	ND (3.5)	2 J	ND (1.6)	ND (1.7)	ND (2.2)	ND (1.3)	ND (1.6)	ND (1.3)	ND (0.66)	330	ND (9.9)	ND (0.67)	ND (0.63)	ND (0.94)	ND (0.59)	ND (0.36)	1.8	1.8	1.8
AOC4-O04	10/26/10	0	N	480	49	ND (4.2)	ND (5.1)	4.2 J	16	ND (2.9)	9.7 J	ND (0.99)	ND (2.1)	4,200	100	ND (0.62)	ND (0.63)	ND (2.1)	0.77 J	1.4 J	12	7	12
AOC4-O05	10/27/10	0	N	5 J	2.1 J	ND (1.1)	ND (0.34)	ND (0.63)	ND (0.58)	ND (0.34)	ND (0.61)	1.2 J	ND (0.28)	35	2.5 J	ND (0.29)	ND (0.41)	ND (0.12)	ND (0.23)	ND (0.65)	0.66	0.93	0.66
	10/27/10	0	FD	4.3 J	1.9 J	ND (1.1)	ND (0.43)	ND (0.36)	0.63 J	ND (0.32)	ND (0.95)	ND (0.61)	ND (0.1)	35	2.5 J	ND (0.36)	ND (0.41)	ND (0.31)	ND (0.14)	ND (0.51)	0.61	0.85	0.61
AOC4-O06	10/07/10	0	N	680	21	2.6 J	6.4 J	2.7 J	17	1.8 J	11 J	2.2 J	ND (37)	5,900	41	ND (0.23)	ND (0.35)	ND (0.34)	0.17 J	0.41 J	15	6.5	15
AOC4-O07	10/01/10	0	N	570	36	ND (1.1)	1.1 J	4.4 J	17	ND (4.7)	ND (2.3)	ND (0.41)	ND (0.36)	9,300	120	ND (0.38)	ND (0.43)	ND (0.42)	ND (0.19)	ND (0.29)	12	3.6	12
AOC4-O08	10/01/10	0	N	390	23	2.3 J	ND (0.68)	ND (0.27)	11 J	ND (2)	ND (2.4)	ND (0.32)	ND (67)	6,900	84	ND (0.25)	ND (0.53)	ND (0.68)	ND (0.17)	ND (0.34)	11	5.8	11
AOC4-P03	10/04/10	0	N	170	11 J	ND (0.73)	ND (1)	ND (1.4)	5 J	1.6 J	2.8 J	ND (0.37)	ND (14)	1,900	27	ND (0.44)	ND (0.46)	ND (0.44)	ND (0.22)	ND (0.48)	4.6	2.6	4.6
AOC4-P04	11/19/10	0	N	4.4 J	ND (2.5)	1.5 J	0.82 J	ND (0.87)	ND (1.1)	ND (1.1)	ND (1.4)	1.3 J	ND (0.75)	ND (23)	3.2 J	0.91 J	1.2 J	ND (0.5)	ND (0.36)	ND (0.95)	1.8	2.4	1.8
AOC4-P05	10/27/10	0	N	32	ND (0.092)	0.93 J	0.93 J	ND (0.87)	1.5 J	0.74 J	ND (1.4)	0.92 J	ND (0.42)	270	6.5 J	ND (0.24)	ND (0.52)	ND (0.26)	ND (0.16)	ND (0.56)	1.2	1.1	1.2
	10/27/10	0	FD	43	ND (0.21)	ND (2.2)	ND (1)	ND (1.4)	ND (1.7)	1.1 J	ND (1.4)	1.7 J	0.69 J	320	9.2 J	ND (0.41)	ND (0.81)	ND (0.43)	ND (0.091)	ND (0.91)	1.5	1.6	1.5
AOC4-P06	10/25/10	0	N	25	3 J	ND (0.55)	ND (1.9)	ND (1.1)	ND (1.4)	ND (1.2)	ND (1.2)	ND (1.4)	ND (0.65)	190	5.8 J	1.7 J	1.6 J	ND (1)	ND (0.45)	0.53 J	3	3.5	3
AOC4-P07	10/22/10	0	N	390	ND (19)	4.7 J	62	ND (0.98)	17	ND (5.2)	ND (6.9)	ND (1.5)	ND (93)	3,900	57	5.6 J	ND (0.97)	ND (1.7)	ND (3.9)	ND (1.1)	26	19	26
AOC4-P08	10/22/10	0	N	37	3.6 J	ND (1.3)	ND (1.5)	ND (0.66)	ND (0.98)	ND (0.58)	ND (1.1)	ND (1)	ND (0.71)	560	ND (2.5)	ND (1.3)	ND (1.1)	1.3 J	ND (0.53)	0.7 J	2.3	3.4	2.3
AOC4-Q04	10/07/10	0	N	2,000	140	12 J	25	14	64	9.3 J	42	ND (0.35)	ND (140)	15,000	280	ND (0.48)	4.5 J	11 J	ND (0.6)	8.9	53	41	53
AOC4-Q05	10/07/10	0	N	2,400	150	14	24	15	66	8.1 J	36	ND (0.43)	ND (210)	12,000	380	ND (0.56)	3.4 J	7.8 J	ND (0.59)	3.9 J	58	36	58
	10/07/10	0	FD	2,300	150	ND (12)	21	15	66	ND (6.8)	36	ND (0.27)	ND (200)	14,000	370	ND (0.53)	3.9 J	ND (6.3)	ND (0.82)	4 J	55	31	55
AOC4-Q06	10/25/10	0	N	15	2.6 J	ND (2.1)	ND (1.1)	1.5 J	ND (2)	ND (2)	ND (2.2)	ND (0.73)	2 J	89	ND (0.77)	ND (1)	0.94 J	1.3 J	0.71 J	0.67 J	2.7	4	2.7
AOC4-Q07	10/25/10	0	N	970	36	ND (3.5)	12 J	5.1 J	34	ND (3.6)	19	ND (0.94)	ND (53)	5,700	ND (53)	ND (3.4)	ND (2)	ND (1.7)	ND (0.96)	1.7 J	24	13	24
AOC4-Q08	10/22/10	0	N	69	6.5 J	ND (1.8)	ND (1.7)	ND (1.8)	ND (4.1)	ND (1.3)	ND (1.8)	ND (1.5)	ND (1.6)	760	ND (13)	ND (0.3)	ND (1.8)	ND (1.2)	ND (1.1)	0.95 J	2.7	3	2.7
AOC4-R05	10/29/10	0	N	20	ND (2.6)	ND (1.8)	1.5 J	ND (3.6)	ND (2.5)	ND (1.9)	2.9 J	ND (3)	1.3 J	160	9.8 J	ND (2.8)	ND (6.5)	ND (3.3)	ND (1.6)	ND (2)	4.3	6.2	4.3
	10/29/10	0	FD	31	13	ND (7.2)	3.1 J	ND (0.26)	4.8 J	3.6 J	ND (6.8)	7.2 J	2.3 J	180	27	2.5 J	3.3 J	ND (1.1)	ND (0.25)	ND (0.68)	5.9	5.9	5.9
AOC4-R06	10/07/10	0	N	710 J	41	4.2 J	13	5.3 J	24	4 J	19 J	1.1 J	ND (29)	5,200	80	ND (0.43)	1.5 J	2.3 J	ND (0.79)	2.1 J	19	12	19
AOC4-R07	10/08/10	0	N	1,600	67	5.2 J	24	6.8 J	55	ND (6.9)	39	2.3 J	ND (44)	11,000	90	ND (0.46)	3 J	ND (2.7)	1.2 J	2 J	37	18	37

Notes:

1 Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological
comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.
2 Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used.
3 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.
4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil."
May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.
5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.
Results greater than or equal to the interim screening level are circled.
NE = not established
NA = not applicable
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
CHHSL = California human health screening levels
Calculations:
Teq = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is U.
TeqBird = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is U.
TeqMammals = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is U.
-- = not analyzed
FD = Field Dupliicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
N = Primary Sample
ND = not detected at the listed reporting limit
ng/kg = nanograms per kilogram
R = rejected by laboratory or data validation

TABLE C10-10

Constituent Concentrations in Soil Compared to Screening Values
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

Parameter	Units	Frequency of detection	Maximum Detected Value	Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
				# of Exceedences [7]	(BTV)	# of Exceedences [8]	(ECV)	# of Exceedences [8]	(Res SL)	# of Exceedences [8]	(ESL)	# of Exceedences [8]	(Com SL)	# of Exceedences [8]	(Int SL)
Dioxins and Furans															
TEQ Avian	ng/kg	118 / 119 (99%)	280	NA	(NE)	34	(16)	NA	(NE)	NA	(NE)	NA	(NE)	34	(16)
TEQ Human	ng/kg	118 / 119 (99%)	250	NA	(NE)	NA	(NE)	13	(50)	NA	(NE)	2	(200)	13	(50)
TEQ Mammals	ng/kg	118 / 119 (99%)	250	NA	(NE)	102	(1.6)	NA	(NE)	NA	(NE)	NA	(NE)	102	(1.6)
Metals															
Antimony	mg/kg	3 / 122 (2.5%)	2.7	NA	(NE)	3	(0.285)	0	(30)	NA	(NE)	0	(380)	3	(0.285)
Arsenic	mg/kg	30 / 122 (25%)	7.6	0	(11)	0	(11.4)	0	(0.07) *	NA	(NE)	0	(0.24) *	0	(11)
Barium	mg/kg	122 / 122 (100%)	1,300	13	(410)	13	(330) *	0	(5,200)	NA	(NE)	0	(63,000)	13	(410)
Beryllium	mg/kg	0 / 122 (0%)	ND (5.5) ‡	0	(0.672)	0	(23.3)	0	(16)	NA	(NE)	0	(190)	0	(0.672)
Cadmium	mg/kg	3 / 122 (2.5%)	1.7	2	(1.1)	2	(0.0151) *	0	(39)	NA	(NE)	0	(500)	2	(1.1)
Chromium	mg/kg	123 / 123 (100%)	160	59	(39.8)	59	(36.3) *	0	(280)	NA	(NE)	0	(1,400)	59	(39.8)
Chromium, Hexavalent	mg/kg	25 / 122 (20%)	16	15	(0.83)	0	(139.6)	0	(17)	NA	(NE)	0	(37)	15	(0.83)
Cobalt	mg/kg	123 / 123 (100%)	20	19	(12.7)	10	(13)	0	(23)	NA	(NE)	0	(300)	19	(12.7)
Copper	mg/kg	123 / 123 (100%)	790	54	(16.8)	42	(20.6)	0	(3,000)	NA	(NE)	0	(38,000)	54	(16.8)
Lead	mg/kg	122 / 123 (99%)	220	24	(8.39)	24	(0.0166) *	2	(80)	NA	(NE)	0	(320)	24	(8.39)
Mercury	mg/kg	5 / 122 (4.1%)	0.52	NA	(NE)	5	(0.0125)	0	(18)	NA	(NE)	0	(180)	5	(0.0125)
Molybdenum	mg/kg	0 / 122 (0%)	ND (5.5) ‡	0	(1.37)	0	(2.25)	0	(380)	NA	(NE)	0	(4,800)	0	(1.37)
Nickel	mg/kg	122 / 122 (100%)	75	52	(27.3)	52	(0.607) *	0	(1,600)	NA	(NE)	0	(16,000)	52	(27.3)
Selenium	mg/kg	0 / 122 (0%)	ND (5.5) ‡	0	(1.47)	0	(0.177) *	0	(380)	NA	(NE)	0	(4,800)	0	(1.47)
Silver	mg/kg	0 / 122 (0%)	ND (5.5) ‡	NA	(NE)	0	(5.15)	0	(380)	NA	(NE)	0	(4,800)	0	(5.15)
Thallium	mg/kg	0 / 122 (0%)	ND (11) ‡	NA	(NE)	0	(2.32)	0	(5)	NA	(NE)	0	(63)	0	(2.32)
Vanadium	mg/kg	122 / 122 (100%)	100	38	(52.2)	38	(13.9) *	0	(390)	NA	(NE)	0	(5,200)	38	(52.2)
Zinc	mg/kg	122 / 122 (100%)	410	13	(58)	13	(0.164) *	0	(23,000)	NA	(NE)	0	(100,000)	13	(58)
Contract Laboratory Program Inorganics															
Aluminum	mg/kg	1 / 1 (100%)	8,400	0	(16,400)	NA	(NE)	0	(77,000)	NA	(NE)	0	(990,000)	0	(16,400)
Calcium	mg/kg	1 / 1 (100%)	21,000	0	(66,500)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(66,500)
Iron	mg/kg	1 / 1 (100%)	20,000	NA	(NE)	NA	(NE)	0	(55,000)	NA	(NE)	0	(720,000)	0	(55,000)
Magnesium	mg/kg	1 / 1 (100%)	7,900	0	(12,100)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(12,100)
Manganese	mg/kg	1 / 1 (100%)	310	0	(402)	0	(220)	0	(1,800)	NA	(NE)	0	(23,000)	0	(402)
Potassium	mg/kg	1 / 1 (100%)	2,500	0	(4,400)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(4,400)
Sodium	mg/kg	1 / 1 (100%)	270	0	(2,070)	NA	(NE)	NA	(NE)	NA	(NE)	NA	(NE)	0	(2,070)
Cyanide	mg/kg	0 / 1 (0%)	ND (1.01) ‡	NA	(NE)	0	(0.9)	0	(1,600)	NA	(NE)	0	(20,000)	0	(0.9)
Organics															
Bis (2-ethylhexyl) phthalate	µg/kg	1 / 3 (33%)	810	NA	(NE)	0	(2,870)	0	(35,000)	NA	(NE)	0	(120,000)	0	(2,870)
Methyl acetate	µg/kg	1 / 1 (100%)	12	NA	(NE)	NA	(NE)	0	(22,000,000)	NA	(NE)	0	(92,000,000)	0	(22,000,000)
Polycyclic Aromatic Hydrocarbons															
1-Methyl naphthalene	µg/kg	1 / 122 (0.82%)	8.8	NA	(NE)	NA	(NE)	0	(22,000)	NA	(NE)	0	(99,000)	0	(22,000)
2-Methyl naphthalene	µg/kg	1 / 122 (0.82%)	12	NA	(NE)	NA	(NE)	0	(310,000)	NA	(NE)	0	(4,100,000)	0	(310,000)
Acena phthylene	µg/kg	1 / 122 (0.82%)	6	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Acenaphthene	µg/kg	2 / 122 (1.6%)	22	NA	(NE)	NA	(NE)	0	(3,400,000)	NA	(NE)	0	(33,000,000)	0	(3,400,000)
Anthracene	µg/kg	11 / 122 (9.0%)	95	NA	(NE)	NA	(NE)	0	(17,000,000)	NA	(NE)	0	(170,000,000)	0	(17,000,000)
Benzo (a) anthracene	µg/kg	52 / 122 (43%)	1,000	NA	(NE)	NA	(NE)	6	(380)	NA	(NE)	0	(1,300)	6	(380)

TABLE C10-10

Constituent Concentrations in Soil Compared to Screening Values
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

Parameter	Units	Frequency of detection	Maximum Detected Value	Background Threshold Value (BTV) [1]		Ecological Comparison Value (ECV) [2]		Residential Screening Level (Res SL) [3]		RWQCB Environmental Screening Levels (ESL) [4]		Commercial Screening Level (Com SL) [5]		Interim Screening Level (Int SL) [6]	
				# of Exceedences [7]	(BTV)	# of Exceedences [8]	(ECV)	# of Exceedences [8]	(Res SL)	# of Exceedences [8]	(ESL)	# of Exceedences [8]	(Com SL)	# of Exceedences [8]	(Int SL)
Polycyclic Aromatic Hydrocarbons															
Benzo (a) pyrene	µg/kg	48 / 122 (39%)	750	NA	(NE)	NA	(NE)	16	(38)	NA	(NE)	8	(130)	16	(38)
Benzo (b) fluoranthene	µg/kg	60 / 122 (49%)	1,400	NA	(NE)	NA	(NE)	6	(380)	NA	(NE)	1	(1,300)	6	(380)
Benzo (ghi) perylene	µg/kg	49 / 122 (40%)	550	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Benzo (k) fluoranthene	µg/kg	40 / 122 (33%)	1,400	NA	(NE)	NA	(NE)	2	(380)	NA	(NE)	1	(1,300)	2	(380)
Chrysene	µg/kg	53 / 122 (43%)	1,200	NA	(NE)	NA	(NE)	0	(3,800)	NA	(NE)	0	(13,000)	0	(3,800)
Dibenzo (a,h) anthracene	µg/kg	22 / 122 (18%)	93	NA	(NE)	NA	(NE)	0	(110)	NA	(NE)	0	(380)	0	(380)
Fluoranthene	µg/kg	70 / 122 (57%)	2,400	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Fluorene	µg/kg	1 / 122 (0.82%)	14	NA	(NE)	NA	(NE)	0	(2,300,000)	NA	(NE)	0	(22,000,000)	0	(2,300,000)
Indeno (1,2,3-cd) pyrene	µg/kg	45 / 122 (37%)	440	NA	(NE)	NA	(NE)	1	(380)	NA	(NE)	0	(1,300)	1	(380)
Naphthalene	µg/kg	1 / 122 (0.82%)	6.5	NA	(NE)	NA	(NE)	0	(3,600)	NA	(NE)	0	(18,000)	0	(3,600)
Phenanthrene	µg/kg	40 / 122 (33%)	1,200	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
Pyrene	µg/kg	67 / 122 (55%)	2,200	NA	(NE)	NA	(NE)	0	(1,700,000)	NA	(NE)	0	(17,000,000)	0	(1,700,000)
PAH Low molecular weight	µg/kg	40 / 122 (33%)	1,300	NA	(NE)	0	(10,000)	NA	(NE)	NA	(NE)	NA	(NE)	0	(10,000)
PAH High molecular weight	µg/kg	71 / 122 (58%)	10,000	NA	(NE)	12	(1,160)	NA	(NE)	NA	(NE)	NA	(NE)	12	(1,160)
B(a)P Equivalent	µg/kg	71 / 122 (58%)	1,100	NA	(NE)	NA	(NE)	20	(38)	NA	(NE)	10	(130)	20	(38)
Polychlorinated biphenyls															
Aroclor 1016	µg/kg	8 / 120 (6.7%)	60	NA	(NE)	NA	(NE)	0	(3,900)	NA	(NE)	0	(21,000)	0	(3,900)
Aroclor 1254	µg/kg	70 / 120 (58%)	5,900	NA	(NE)	NA	(NE)	26	(220)	NA	(NE)	10	(740)	26	(220)
Aroclor 1260	µg/kg	11 / 120 (9.2%)	640	NA	(NE)	NA	(NE)	1	(220)	NA	(NE)	0	(740)	1	(220)
Total PCBs	µg/kg	70 / 120 (58%)	6,000	NA	(NE)	26	(204)	NA	(NE)	NA	(NE)	NA	(NE)	26	(204)

TABLE C10-10

Constituent Concentrations in Soil Compared to Screening Values
AOC 4 – Debris Ravine
Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station Needles,California

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Notes

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil" July 1

[3] Residential screening level - residential DTSC CHHSL. If the residential DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[5] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[6] Interim screening level is equal to the appropriate background value, if a background value is not available then the lesser of the soil ecological comparison values and DTSC CHHSL is used, if the DTSC CHHSL is not available, the USEPA regional screening level is used.

[7] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[8] Number of exceedences are the number of detections that are equal to or exceeds the screening level (ecological comparison value, residential reporting limit, commercial reporting limit or interim screening level) or otherwise noted.

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the interim screening level

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board

Calculations:

Regional Water Quality Control Board
Total PCBs by Area = Sum of Result of PCBs. Detected values are summed plus ½ the RL for nondetect Aroclors if the Aroclor is detected somewhere in the area. If all aroclors in a particular sample are nondetect the PCB Total is 0.
PAHLow = Sum of Result of low molecular weight PAHs, zero is used for nondetect values
PAHHigh= Sum of Result of high molecular weight PAHs, zero is used for nondetect values
BaP equivalent = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all PAHs are nondetect, the final qualifier code is U.
Teq = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is U.
TeqBird = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is U.
TeqMammals = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is U.

TABLE C10-11
Central Tendency Comparisons (Site to Background)
AOC 4 - Debris Ravine
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Parameter	Comparison Test Used	Probability that the Observed Differences Would Occur Purely by Chance	Statistical Decision with 0.05 Significance Level	Mean of Site Detects	Mean of Bkgd Detects	Median of Site Detects	Median of Bkgd Detects	Number of Site Detects	Number of Site Samples	Number of Bkgd Detects	Number of Bkgd Samples	Percent Detects Site	Percent Detects Bkgd
Barium	WRS	0.000	Site > Bkgd	257	165	210	135	125	125	60	60	100	100
Chromium	WRS	0.000	Site > Bkgd	43.3	22.3	37	21.9	125	125	70	70	100	100
Cobalt	WRS	0.000	Site > Bkgd	9.47	7.85	9	7.61	125	125	58	59	100	98
Copper	WRS	0.000	Site > Bkgd	28.1	10.5	15	10.1	125	125	70	70	100	100
Lead	Gehan	0.000	Site > Bkgd	10.4	4.38	5.7	3.5	124	125	59	60	99	98
Nickel	WRS	0.000	Site > Bkgd	27.3	15.4	26	15	125	125	70	70	100	100
Vanadium	WRS	0.000	Site > Bkgd	45	34	42	34.1	125	125	60	60	100	100
Zinc	WRS	0.000	Site > Bkgd	51.6	36.8	43	35.5	125	125	70	70	100	100

Bkgd = background

nsd = no statistical difference
< = less than

TABLE C10-12
Decision 2 Data Gaps Summary - AOC4
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California.

Compound/Depth	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [a]	> ECV or Background as Applicable? [a]	Proposed Sample ID	Notes
	Y or N	Det/# results		Y or N	Y or N		
Metals							
Antimony				**30 mg/kg**	**0.285 mg/kg**		
0-0.5 ft bgs	N	3 of 117	2.7 mg/kg	N	Y	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC as additional sampling would likely result in additional non-detect values
0-3 ft bgs	N	3 of 119	2.7 mg/kg	N	Y		
0-6 ft bgs	N	3 of 122	2.7 mg/kg	N	Y		
0-10 ft bgs	N	3 of 122	2.7 mg/kg	N	NA		
Barium				**5200 mg/kg**	**410 mg/kg (bckg)**		
0-0.5 ft bgs	Y	117 of 117	1300 mg/kg	N	Y	None	Compound exceeds ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	119 of 119	1300 mg/kg	N	Y		
0-6 ft bgs	Y	122 of 122	1300 mg/kg	N	Y		
0-10 ft bgs	Y	122 of 122	1300 mg/kg	N	NA		
Cadmium				**39 mg/kg**	**1.1 mg/kg (bckg)**		
0-0.5 ft bgs	N	3 of 117	1.7 mg/kg	N	Y	None	Compound exceeds ECV. Although there are insufficient detections to allow calculation of a 95% UCL on the mean, additional data collection is not expected to yield sufficient detections to strongly influence the EPC as additional sampling would likely result in additional non-detect values.
0-3 ft bgs	N	3 of 119	1.7 mg/kg	N	Y		
0-6 ft bgs	N	3 of 122	1.7 mg/kg	N	Y		
0-10 ft bgs	N	3 of 122	1.7 mg/kg	N	NA		
Chromium-Total				**280 mg/kg**	**39.8 mg/kg (bckg)**		
0-0.5 ft bgs	Y	118 of 118	160 mg/kg	N	Y	None	Compound exceeds ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	120 of 120	160 mg/kg	N	Y		
0-6 ft bgs	Y	123 of 123	160 mg/kg	N	Y		
0-10 ft bgs	Y	123 of 123	160 mg/kg	N	NA		
Cobalt				**23 mg/kg**	**13 mg/kg**		
0-0.5 ft bgs	Y	118 of 118	20 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	120 of 120	20 mg/kg	N	Y		

TABLE C10-12

Decision 2 Data Gaps Summary - AOC4

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California.

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable? [a] Y or N	> ECV or Background as Applicable? [a] Y or N	Proposed Sample ID	Notes
0-6 ft bgs	Y	123 of 123	20 mg/kg	N	Y		
0-10 ft bgs	Y	123 of 123	20 mg/kg	N	NA		

TABLE C10-12
Decision 2 Data Gaps Summary - AOC4
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California.

	Adequate EPC?		Maximum Detected Value	> HHCV or Background as Applicable? [a]	> ECV or Background as Applicable? [a]	Proposed Sample ID	Notes
Compound/Depth	Y or N	Det/# results		Y or N	Y or N		
Copper				**3000 mg/kg**	**20.6 mg/kg**		
0-0.5 ft bgs	Y	118 of 118	790 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	120 of 120	790 mg/kg	N	Y		
0-6 ft bgs	Y	123 of 123	790 mg/kg	N	Y		
0-10 ft bgs	Y	123 of 123	790 mg/kg	N	NA		
Lead				**80 mg/kg**	**8.39 mg/kg (bckg)**		
0-0.5 ft bgs	Y	117 of 118	220 mg/kg	Y	Y	None	Compound exceeds HHCV, ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	119 of 120	220 mg/kg	Y	Y		
0-6 ft bgs	Y	122 of 123	220 mg/kg	Y	Y		
0-10 ft bgs	Y	122 of 123	220 mg/kg	Y	NA		
Mercury				**18 mg/kg**	**0.0125 mg/kg**		
0-0.5 ft bgs	Y	5 of 117	0.52 mg/kg	N	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	5 of 119	0.52 mg/kg	N	Y		
0-6 ft bgs	Y	5 of 122	0.52 mg/kg	N	Y		
0-10 ft bgs	Y	5 of 122	0.52 mg/kg	N	NA		
Nickel				**1600 mg/kg**	**27.3 mg/kg (bckg)**		
0-0.5 ft bgs	Y	117 of 117	75 mg/kg	N	Y	None	Compound exceeds ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	119 of 119	75 mg/kg	N	Y		
0-6 ft bgs	Y	122 of 122	75 mg/kg	N	Y		
0-10 ft bgs	Y	122 of 122	75 mg/kg	N	NA		

TABLE C10-12
Decision 2 Data Gaps Summary - AOC4
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California.

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable? [a] Y or N	> ECV or Background as Applicable? [a] Y or N	Proposed Sample ID	Notes
Vanadium				**390 mg/kg**	**52.2 mg/kg (bckg)**		
0-0.5 ft bgs	Y	117 of 117	100 mg/kg	N	Y	None	Compound exceeds ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	119 of 119	100 mg/kg	N	Y		
0-6 ft bgs	Y	122 of 122	100 mg/kg	N	Y		
0-10 ft bgs	Y	122 of 122	100 mg/kg	N	NA		
Zinc				**23000 mg/kg**	**58 mg/kg (bckg)**		
0-0.5 ft bgs	Y	117 of 117	410 mg/kg	N	Y	None	Compound exceeds ECV and background. Existing data adequate for EPC.
0-3 ft bgs	Y	119 of 119	410 mg/kg	N	Y		
0-6 ft bgs	Y	122 of 122	410 mg/kg	N	Y		
0-10 ft bgs	Y	122 of 122	410 mg/kg	N	NA		

TABLE C10-12

Decision 2 Data Gaps Summary - AOC4

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California.

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable? [a] Y or N	> ECV or Background as Applicable? [a] Y or N	Proposed Sample ID	Notes
Dioxins/Furans							
TEQ Human				**50 ng/kg**	**NA**		
0-0.5 ft bgs	Y	115 of 116	250 ng/kg	Y	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	115 of 116	250 ng/kg	Y	NA		
0-6 ft bgs	Y	118 of 119	250 ng/kg	Y	NA		
0-10 ft bgs	Y	118 of 119	250 ng/kg	Y	NA		
TEQ Bird				**NA**	**16 ng/kg**		
0-0.5 ft bgs	Y	115 of 116	280 ng/kg	NA	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	115 of 116	280 ng/kg	NA	Y		
0-6 ft bgs	Y	118 of 119	280 ng/kg	NA	Y		
TEQ Mammals				**NA**	**1.6 ng/kg**		
0-0.5 ft bgs	Y	115 of 116	250 ng/kg	NA	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	115 of 116	250 ng/kg	NA	Y		
0-6 ft bgs	Y	118 of 119	250 ng/kg	NA	Y		
Polycyclic Aromatic Hydrocarbons							
PAHs (BaP TEQ)				**38 µg/kg**	**NA**		
0-0.5 ft bgs	Y	68 of 117	1100 µg/kg	Y	NA	None	Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	68 of 119	1100 µg/kg	Y	NA		
0-6 ft bgs	Y	71 of 122	1100 µg/kg	Y	NA		
0-10 ft bgs	Y	71 of 122	1100 µg/kg	Y	NA		
HMW PAHs				**NA**	**1160 µg/kg**		
0-0.5 ft bgs	Y	68 of 117	10000 µg/kg	NA	Y	None	Compound exceeds ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	68 of 119	10000 µg/kg	NA	Y		
0-6 ft bgs	Y	71 of 122	10000 µg/kg	NA	Y		

TABLE C10-12

Decision 2 Data Gaps Summary - AOC4

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Company Topock Compressor Station, Needles, California.

Compound/Depth	Adequate EPC? Y or N	Adequate EPC? Det/# results	Maximum Detected Value	> HHCV or Background as Applicable? [a] Y or N	> ECV or Background as Applicable? [a] Y or N	Proposed Sample ID	Notes
Polychlorinated Biphenyls							
Total PCBs				**220 µg/kg**	**204 µg/kg**		
0-0.5 ft bgs	Y	67 of 117	6000 µg/kg	Y	Y	None	Compound exceeds HHCV and ECV. Existing data adequate for EPC.
0-3 ft bgs	Y	67 of 117	6000 µg/kg	Y	Y		
0-6 ft bgs	Y	70 of 120	6000 µg/kg	Y	Y		
0-10 ft bgs	Y	70 of 120	6000 µg/kg	Y	NA		

Footnotes:

a. The higher value of either the HHCV/ECV or background was selected as the screening criteria and are included in these columns for the respective compound in **BOLDED BLUE FONT**. Values based on background are indicated with "(bckg)" next to the value.

Acronyms and Abbreviations:

AOC - area of concern
BaP TEQ - benzo(a)pyrene toxic equivalents
ECV - ecological comparison values
EPC - exposure point concentration
ft bgs - feet below ground surface
HHCV - human health comparison values
HMW PAH - high molecular weight polycyclic aromatic hydrocarbons
mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram
N - no
NA - not applicable
TEQ - toxic equivalents
Y - yes

TABLE C10-13
Results of Tiered Analysis at AOC 4
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Metal	**Step 1 Do COPCs/COPECs Exceed Background?**	**Step 2 Do COPCs/COPECs Exceed SSL?**	**Step 3 Does Screening Model Eliminate Potential for Leaching to Groundwater?**
Barium	√		
Cadmium	√		
Chromium	√		
Chromium, Hexavalent	√	√	√
Cobalt	√	√	√
Copper	√		
Lead	√		
Nickel	√		
Vanadium	√	√	
Zinc	√		

SSL = soil screening level.

TABLE C10-14

Constituent Concentrations in Soil Compared to Total Threshold Limit Concentration (TTLC), Soluble Threshold Limit Concentration (STLC), and Toxic Characteristic Leaching Procedure (TCLP)

AOC 4 - Debris Ravine

Soil Investigation Part A Phase 1 Data Gaps Evaluation Report

Pacific Gas and Electric Topock Compressor Station, Needles, California

			TTLC in mg/kg[1]		**STLC in mg/L[1]**			**TCLP in mg/L[1]**		
Parameter	**Frequency of detection**	**Maximum Detected Value (mg/kg)**	**# of Exceedences**	**TTLC**	**# of Exceedences of STLC x 10**	**STLC x 10**	**STLC**	**# of Exceedences of TCLP x 20**	**TCLP x 20**	**TCLP**
Antimony	3 / 122 (2.5%)	2.7	0	500	0	150	15	0	NE	NE
Arsenic	30 / 122 (25%)	7.6	0	500	0	50	5	0	100	5
Barium	122 / 122 (100%)	1,300	0	10000	1	1000	100	0	2000	100
Beryllium	0 / 122 (0%)	ND (5.5)	0	75	0	7.5	0.75	0	NE	NE
Cadmium	3 / 122 (2.5%)	1.7	0	100	0	10	1	0	20	1
Chromium, Hexavalent	25 / 122 (20%)	16	0	500	0	50	5	0	NE	NE
Chromium, total	123 / 123 (100%)	160	0	2500	37	50	5	4	100	5
Cobalt	123 / 123 (100%)	20	0	8000	0	800	80	0	NE	NE
Copper	123 / 123 (100%)	790	0	2500	1	250	25	0	NE	NE
Lead	122 / 123 (99%)	220	0	1000	4	50	5	1	100	5
Mercury	5 / 122 (4.1%)	0.52	0	20	0	2	0.2	0	4	0.2
Molybdenum	0 / 122 (0%)	ND (5.5)	0	3500	0	3500	350	0	NE	NE
Nickel	122 / 122 (100%)	75	0	2000	0	200	20	0	NE	NE
Selenium	0 / 122 (0%)	ND (5.5)	0	100	0	10	1	0	20	1
Silver	0 / 122 (0%)	ND (5.5)	0	500	0	50	5	0	100	5
Thallium	0 / 122 (0%)	ND (11)	0	700	0	70	7	0	NE	NE
Vanadium	122 / 122 (100%)	100	0	2400	0	240	24	0	NE	NE
Zinc	122 / 122 (100%)	410	0	5000	0	2500	250	0	NE	NE

Notes:

[1] Code of Regulations, Title 22, Chapter 11, Article 3

mg/kg	miligrams per kilogram
mg/L	milligrams per liter
ND	not detected in any of the samples
NE	not established
‡	maximum reporting limit greater than or equal to the STLC x 10.

TABLE C10-15
Potential Phase 2 Soil Sample Locations at AOC 4 – Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[a]
AOC4-BCW1	0, 2, 5, and 9	To resolve Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.	Title 22 metals, PCBs, dioxins/furans	Rotosonic
AOC4-BCW2	0, 2, 5, and 9	To resolve Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.	Title 22 metals, PCBs, dioxins/furans	Rotosonic
AOC4-BCW3	0, 2, 5, and 9	To resolve Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.	Title 22 metals, PCBs, dioxins/furans	Rotosonic
AOC4-BCW4	0, 2, 5, and 9	To resolve Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.	Title 22 metals, PCBs, dioxins/furans	Rotosonic
AOC4-BCW5	0, 2, 5, and 9	To resolve Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.	Title 22 metals, PCBs, dioxins/furans, asbestos (surface soil sample only)	Rotosonic
AOC4-BCW6	0, 2, 5, and 9	To resolve Data Gap #3 – Lateral and vertical extent of metals, PAHs, PCBs, and dioxins/furans at the mouth of the ravine near and in Bat Cave Wash.	Title 22 metals, PCBs, dioxins/furans	Rotosonic
AOC4-17	2, 5, and 9	To resolve Data Gaps #2 – Vertical extent of various metals, PCBs, and dioxin/furans across the AOC; however, given the shallow depth to bedrock additional sampling is limited to the northern portion of AOC, where bedrock is not near the surface	Title 22 metals, PCBs, dioxins/furans	Rotosonic
AOC4-18	2, 5, and 9	To resolve Data Gaps #2 and #4 – Vertical extent of various metals, PCBs, and dioxin/furans across the AOC; however, given the shallow depth to bedrock additional sampling is limited to the northern portion of AOC, where bedrock is not near the surface, and soil physical property parameters to support the corrective measures study/ feasibility study	Title 22 metals, PCBs, dioxins/furans; soil physical parameters (Atterberg limits, relative compaction, alkalinity, cation exchange, capacity, and particle size distribution) – three samples from boring	Rotosonic

TABLE C10-15
Potential Phase 2 Soil Sample Locations at AOC 4 – Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Location ID	**Depths (ft bgs)**	**Description/Rationale**	**Analytes**	**Proposed Collection Method**[a]
AOC4-19	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans near south, southeastern corner of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-20	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans near south, southeastern corner of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-21	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans near south, southeastern corner of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-22	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans near south, southeastern corner of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-23	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans along eastern edge of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-24	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans along eastern edge of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-25	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans along eastern edge of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-26	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans along eastern edge of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-27	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans along eastern edge of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools
AOC4-28	0 and 2, if feasible	To resolve Data Gap #1 - Lateral extent of various metals, PAHs, PCBs, and dioxins/furans along eastern edge of the AOC.	Title 22 metals, PAHs, PCBs, dioxins/furans	Hand tools

TABLE C10-15
Potential Phase 2 Soil Sample Locations at AOC 4 – Southeast Fence Line
Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California

Location ID	Depths (ft bgs)	Description/Rationale	Analytes	Proposed Collection Method[a]

Notes:

[a] Proposed collection methods listed on this table are based on experience and knowledge of the site; actual collection method will be chosen in the field based on field conditions and site access restrictions.

Figures

FIGURE 10-1
AOC4 PROPOSED PHASE 2
SOIL SAMPLE LOCATIONS
AOC4 -DEBRIS RAVINE
SOIL INVESTIGATION PART A PHASE 1
DATA GAPS EVALUATION REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

D:\GIS\Projects\Topock\MapFiles\2011\AOC4\LocationMap

VICINITY MAP

LEGEND

- ◆ Existing Soil Sample Location
- ▨ Gabion

Potential Release Mechanisms

- ➔ Infrequent Surface Water Runoff
- Infiltration (Site-wide)
- Windblown Dispersion of Soil (Site-wide)
- Volatilization (Site-wide)
- Degradation by Heat/Light (Site-wide)
- △ Surface Soil Scouring & Redeposition (Possible Throughout the Wash)
- ➔ Downstream Movement During Flow Events

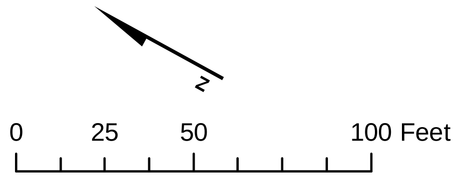
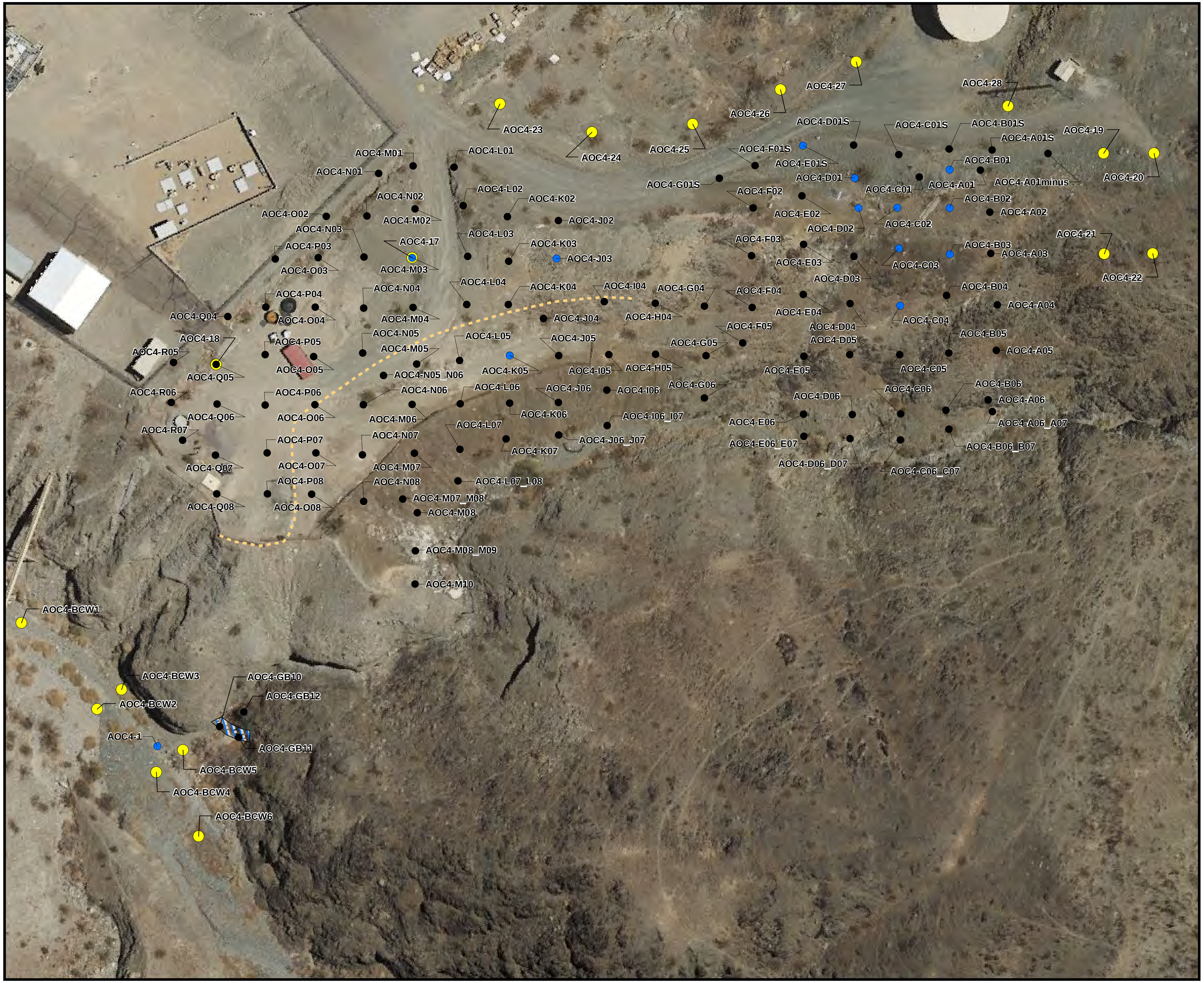


FIGURE C10-2
CONCEPTUAL SITE MODEL AOC4 DEBRIS RAVINE

AOC4 -DEBRIS RAVINE
SOIL INVESTIGATION PART A PHASE 1
DATA GAPS EVALUATION REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA



VICINITY MAP

LEGEND

- ● Sample Location
- ● Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

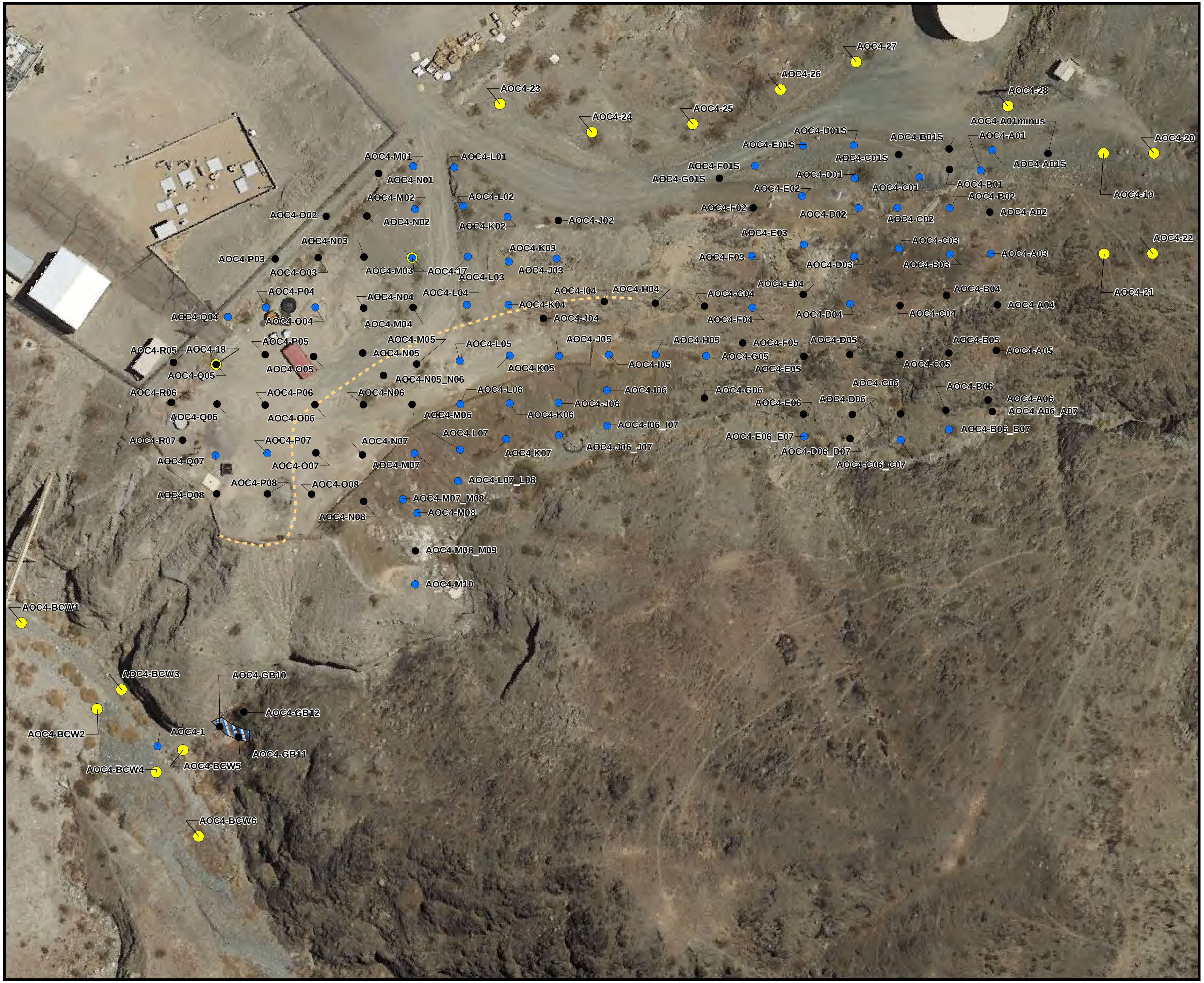
1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (410 mg/kg) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (5,200 mg/kg) are shown in ORANGE..
4. Ecological Comparison Value (330 mg/kg) is below background value; therefore, the screening level is set at the background value.
5. Proposed samples collocated with existing locations, will be sampled at depth.

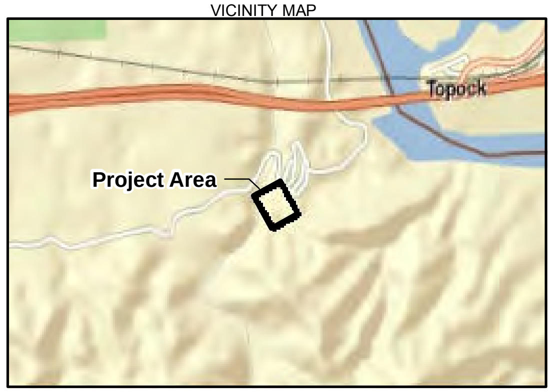
FIGURE C10-3
BARIUM SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

\\zinfandel\proj\PacificGasElectricCo\TopockProgram\GIS_New\MapFiles\2011\AOC4_BARIUM_PTS_B

CH2MHILL





LEGEND

- ● Sample Location
- ○ Proposed Sample Location
- - - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (39.8 mg/kg) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (280 mg/kg) are shown in ORANGE.
4. Ecological Comparison Value (36.3) is below background value; therefore, the screening level is set at the background value.
5. Proposed samples collocated with existing locations, will be sampled at depth.

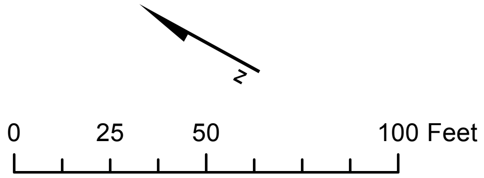
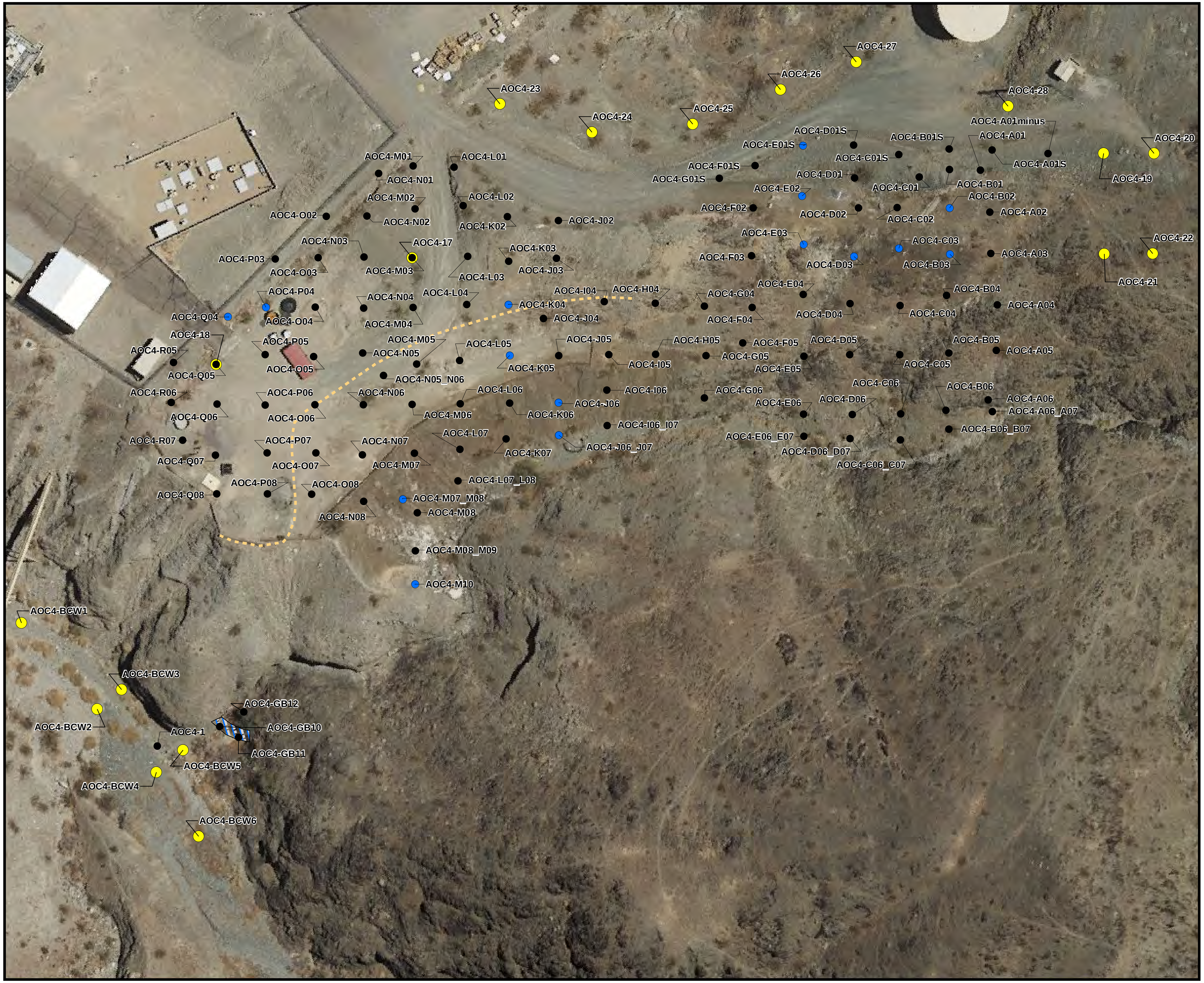


FIGURE C10-4
TOTAL CHROMIUM SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

\\zinfandel\proj\PacificGasElectricCo\TopockProgram\GIS_New\MapFiles\2011\AOC4_TCHROM_PTS_B

CH2MHILL



VICINITY MAP

LEGEND

- ● Sample Location
- ○ Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (0.83 mg/kg) are in BLUE.
3. Results greater than or equal to the Ecological Comparison Value (139.6 mg/kg) are in PURPLE.
4. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (17 mg/kg) are shown in ORANGE.
5. Proposed samples collocated with existing locations, will be sampled at depth.

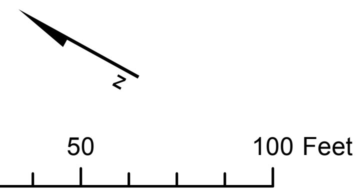


FIGURE C10-5
HEXAVALENT CHROMIUM SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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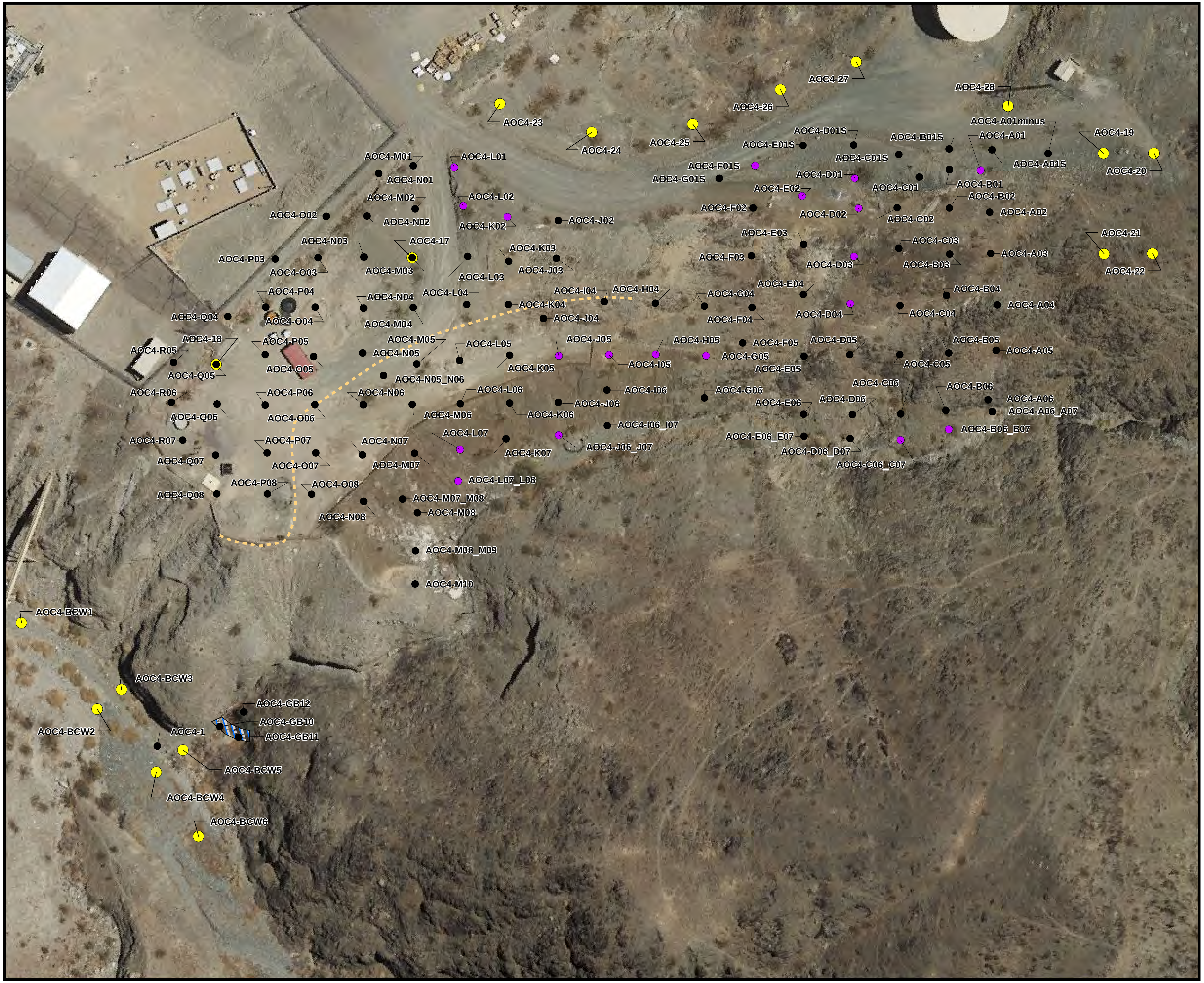
CH2MHILL



VICINITY MAP

LEGEND

- ● Sample Location
- ● Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.

2. Results greater than Background (12.7) are shown in BLUE.

2. Results greater than or equal to the Ecological Comparison Value (13 mg/kg) are in PURPLE.

3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (23 mg/kg) are shown in ORANGE.

4. Proposed samples collocated with existing locations, will be sampled at depth.

N

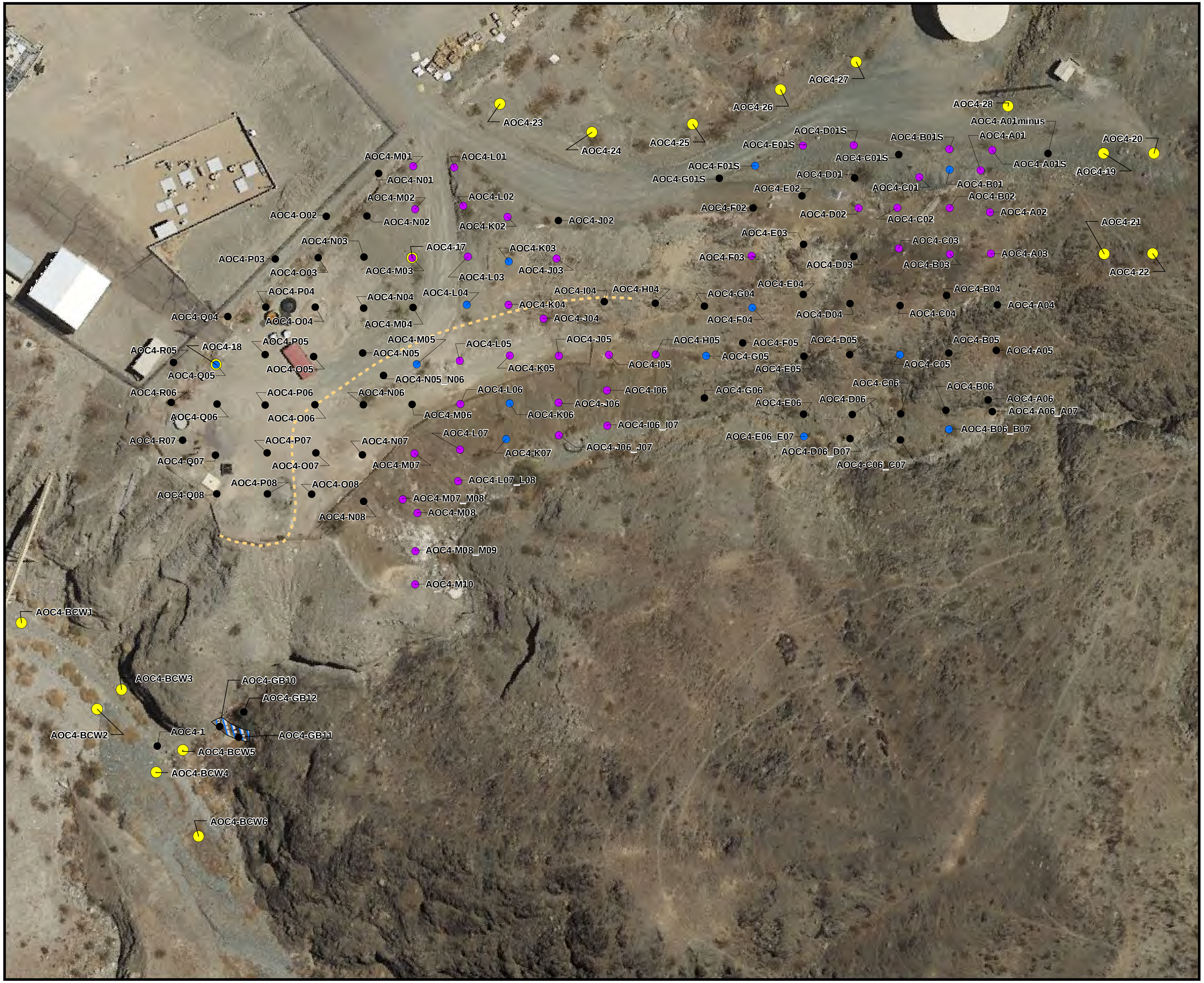
0 25 50 100 Feet

FIGURE C10-6
COBALT SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

\\zinfandel\proj\PacificGasElectricCo\TopockProgram\GIS_New\MapFiles\2011\AOC4_COBALT_PTS_B

CH2MHILL



VICINITY MAP

LEGEND

- ● Sample Location
- ● Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (16.8 mg/kg) are in BLUE.
3. Results greater than or equal to the Ecological Comparison Value (20.6 mg/kg) are in PURPLE.
4. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (3,000 mg/kg) are shown in ORANGE.
5. Proposed samples collocated with existing locations, will be sampled at depth.

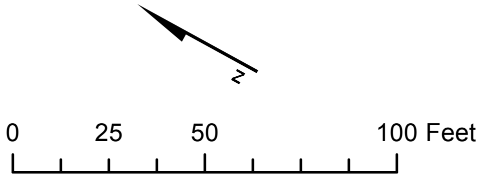


FIGURE C10-7
COPPER SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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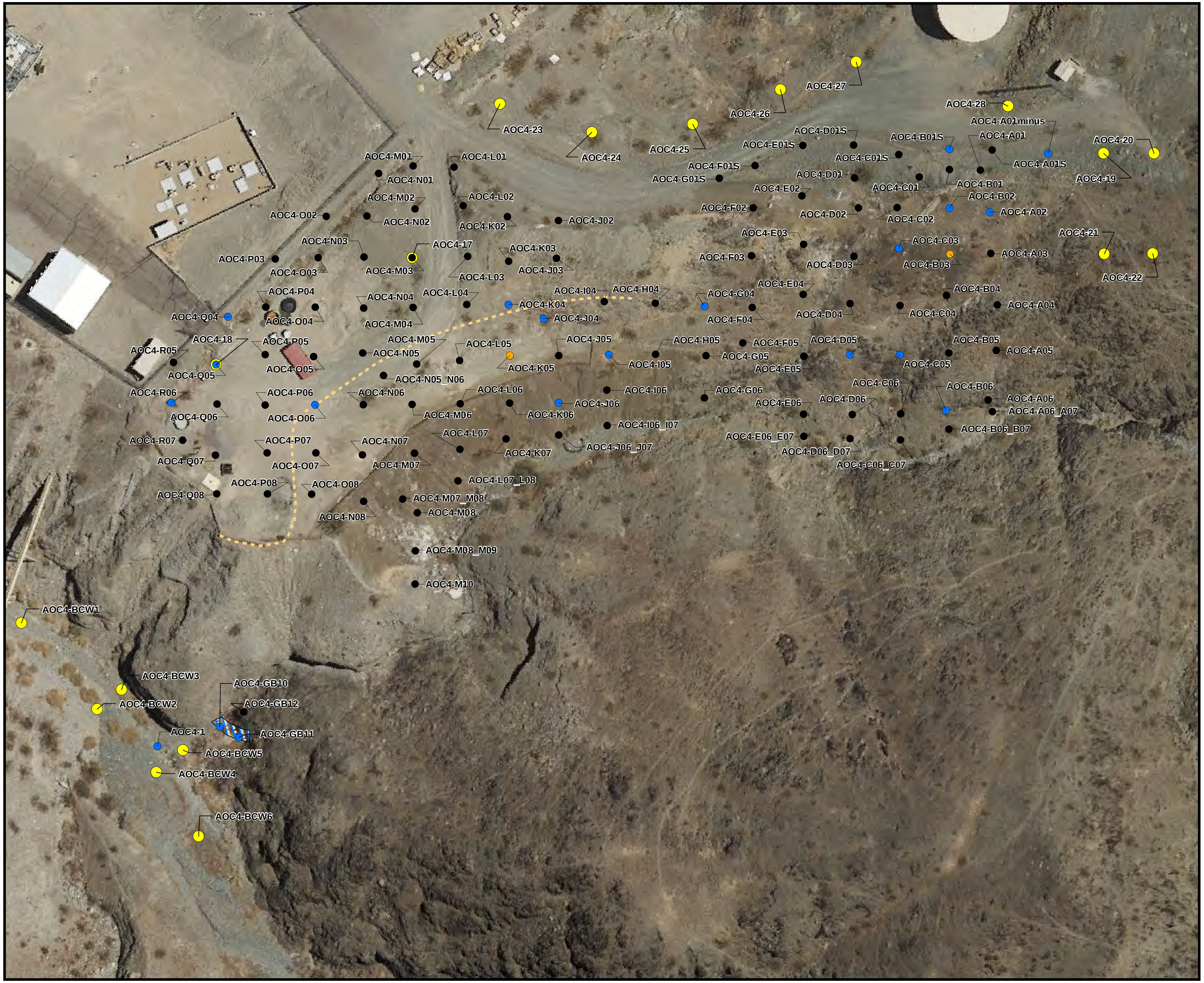
CH2MHILL



VICINITY MAP

LEGEND

- ● Sample Location
- ● Proposed Sample Location
- ┅ Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (8.39 mg/kg) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (80 mg/kg) are shown in ORANGE.
4. Ecological Comparison Value (0.0166) is below background value; therefore, the screening level is set at the background value.
5. Proposed samples collocated with existing locations, will be sampled at depth.

N

0 25 50 100 Feet

FIGURE C10-8
LEAD SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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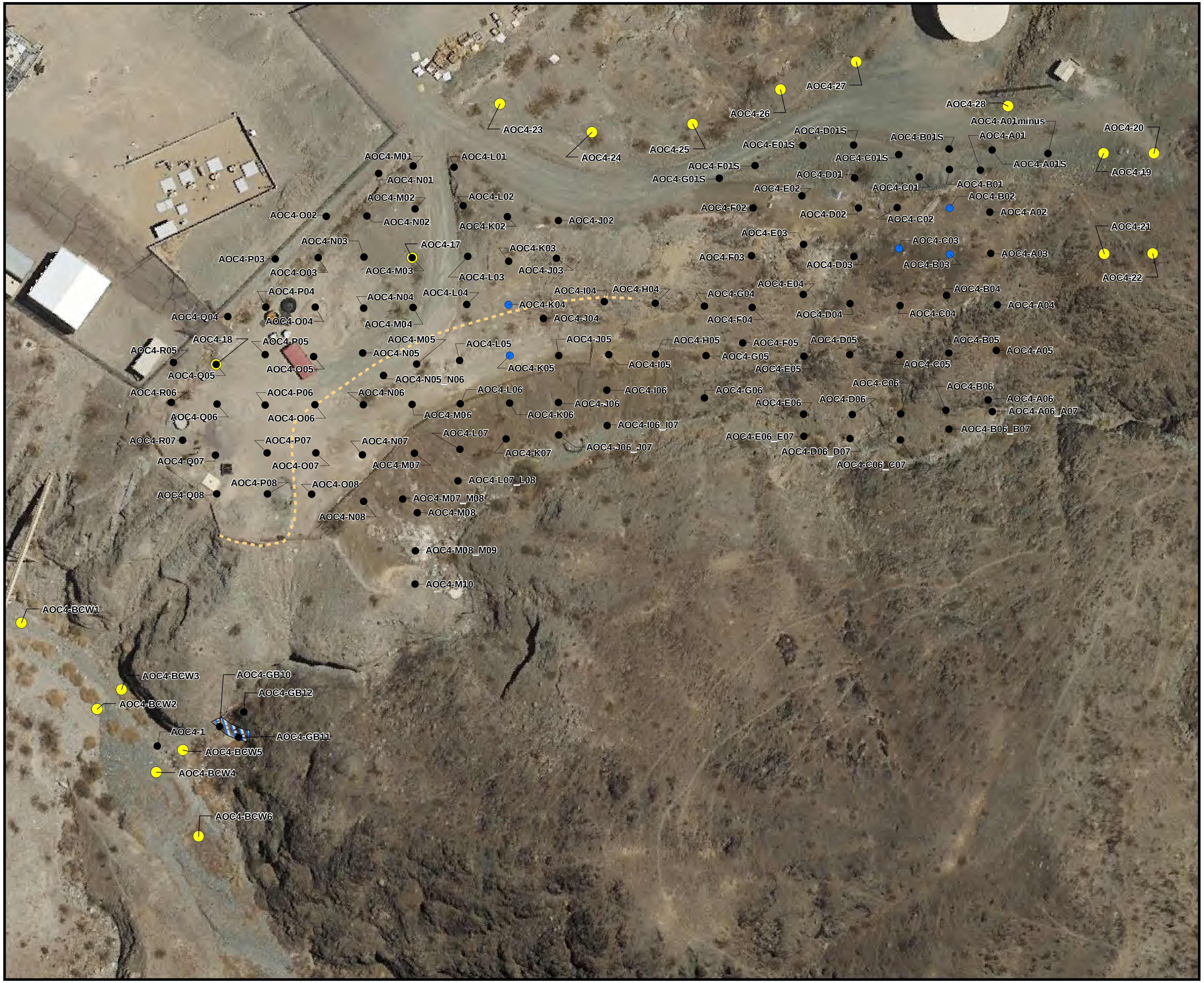
CH2MHILL



VICINITY MAP

LEGEND

- ● Sample Location
- ● Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than or equal to the Ecological Comparison Value (0.0125 mg/kg) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (18 mg/kg) are shown in ORANGE.
4. 116 Non-detects displayed have a reporting limit exceeding listed screening levels.
5. Proposed samples collocated with existing locations, will be sampled at depth.

N

0 25 50 100 Feet

FIGURE C10-9
MERCURY SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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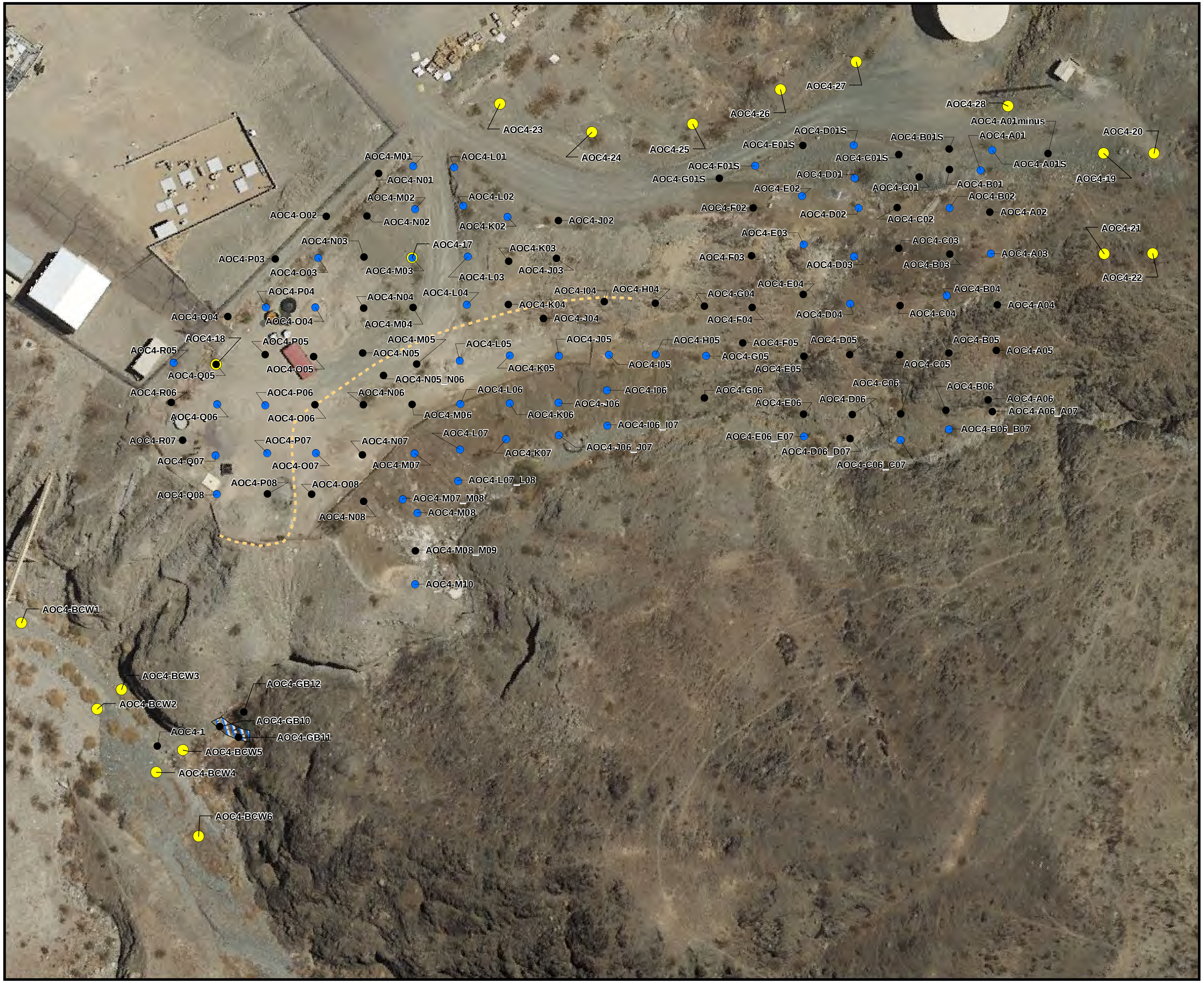

VICINITY MAP

LEGEND

● Sample Location

○ Proposed Sample Location

- - - Top of Slope After TRCA Grading

▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (27.3 mg/kg) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (1,600 mg/kg) are shown in ORANGE.
4. Ecological Comparison Value (0.607) is below background value; therefore, the screening level is set at the background value.
5. Proposed samples collocated with existing locations, will be sampled at depth.

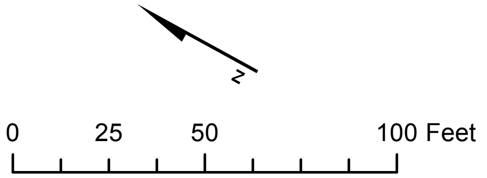

FIGURE C10-10
NICKEL SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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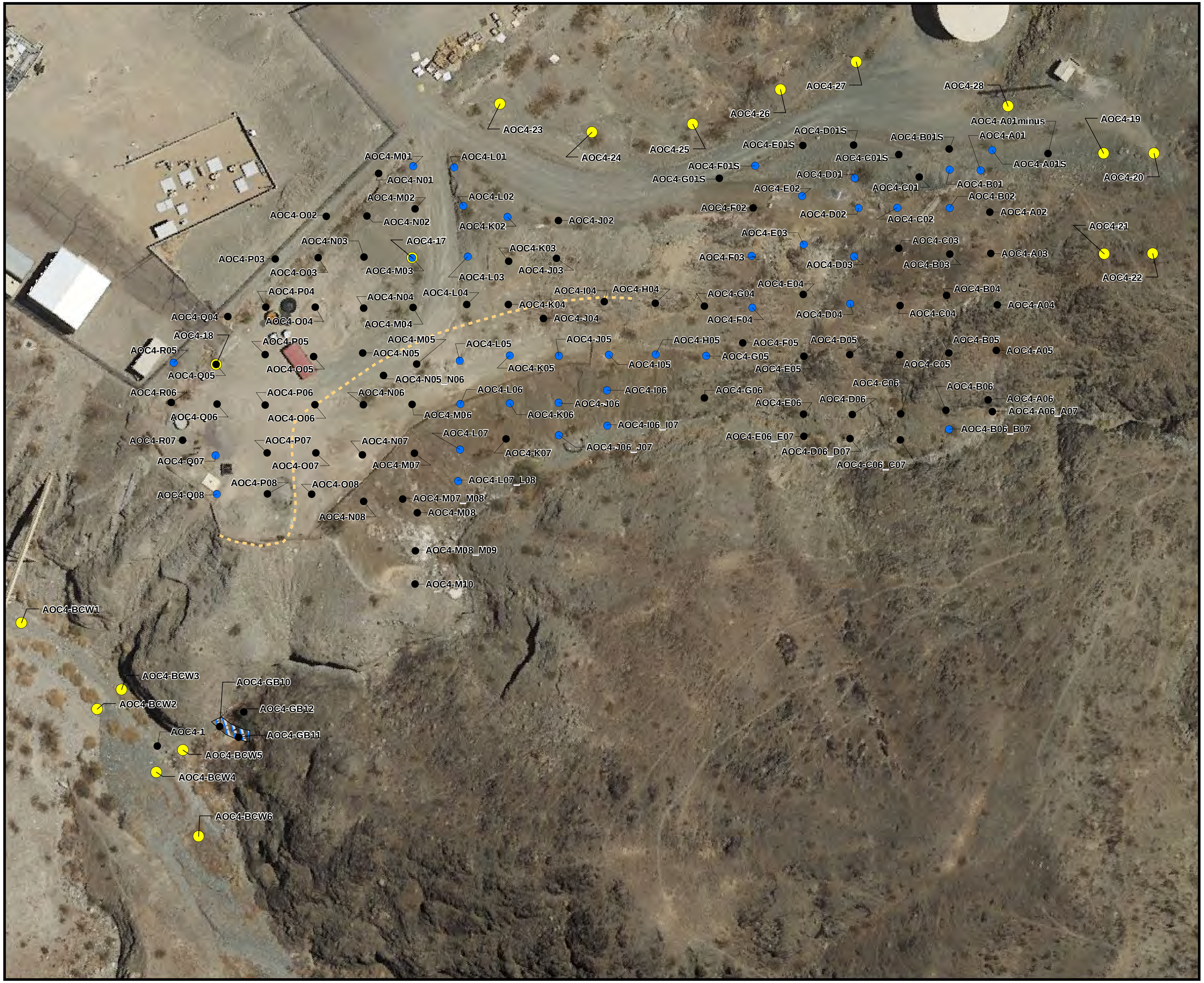
CH2MHILL



VICINITY MAP

LEGEND

- ● Sample Location
- ● Proposed Sample Location
- ┅ Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (52.2 mg/kg) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (390 mg/kg) are shown in ORANGE.
4. Ecological Comparison Value (13.9) is below background value; therefore, the screening level is set at the background value.
5. Proposed samples collocated with existing locations, will be sampled at depth.

N

0 25 50 100 Feet

FIGURE C10-11 VANADIUM SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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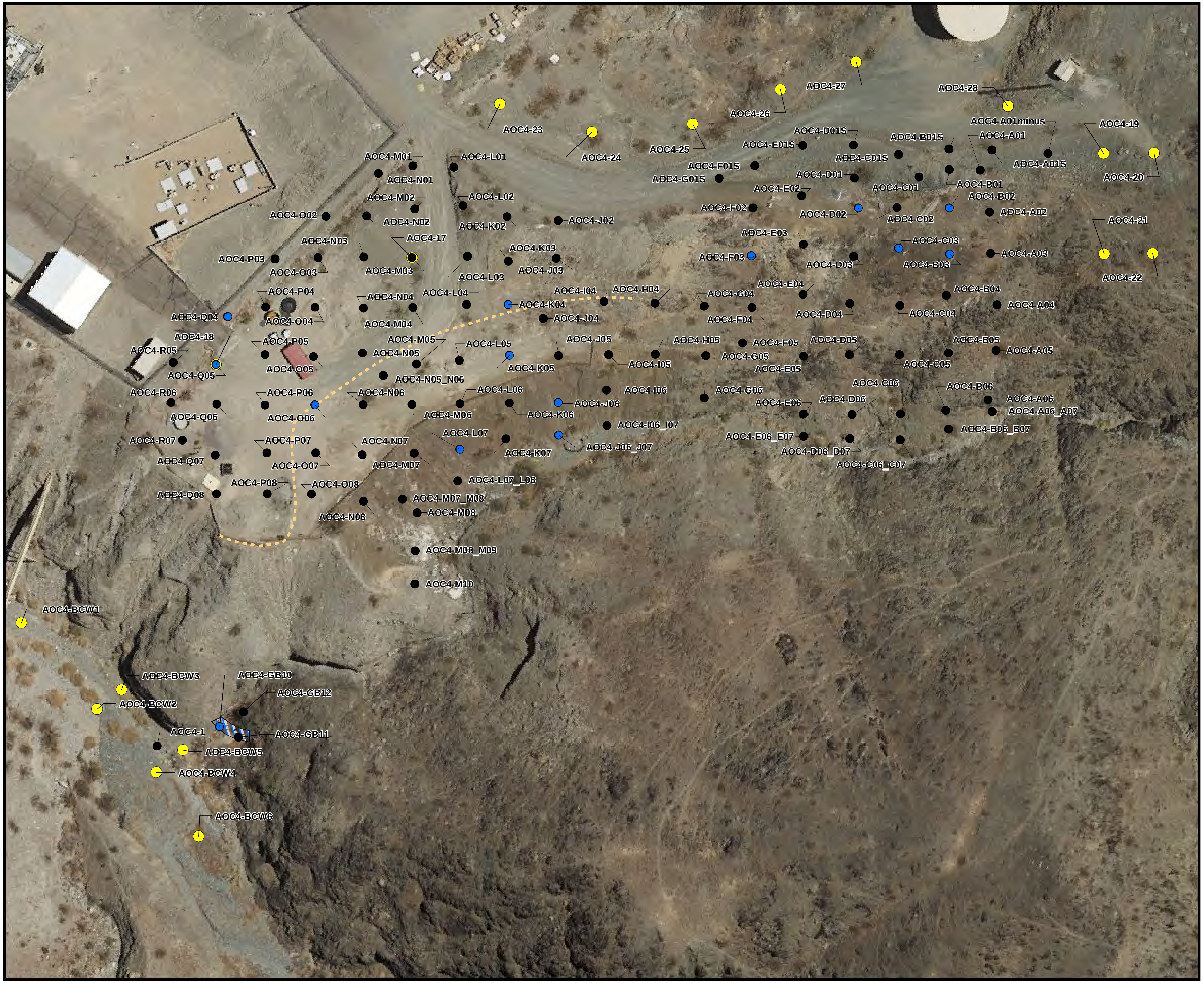
VICINITY MAP



LEGEND

● Sample Location

🟡 Proposed Sample Location

- - - Top of Slope After TRCA Grading

▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than background (58 mg/kg) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (23,000 mg/kg) are shown in ORANGE.
4. Ecological Comparison Value (0.164) is below background value; therefore, the screening level is set at the background value.
5. Proposed samples collocated with existing locations, will be sampled at depth.

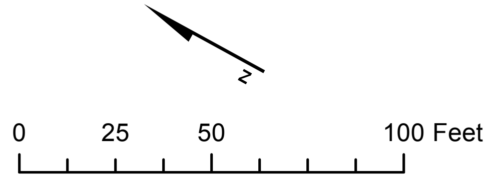
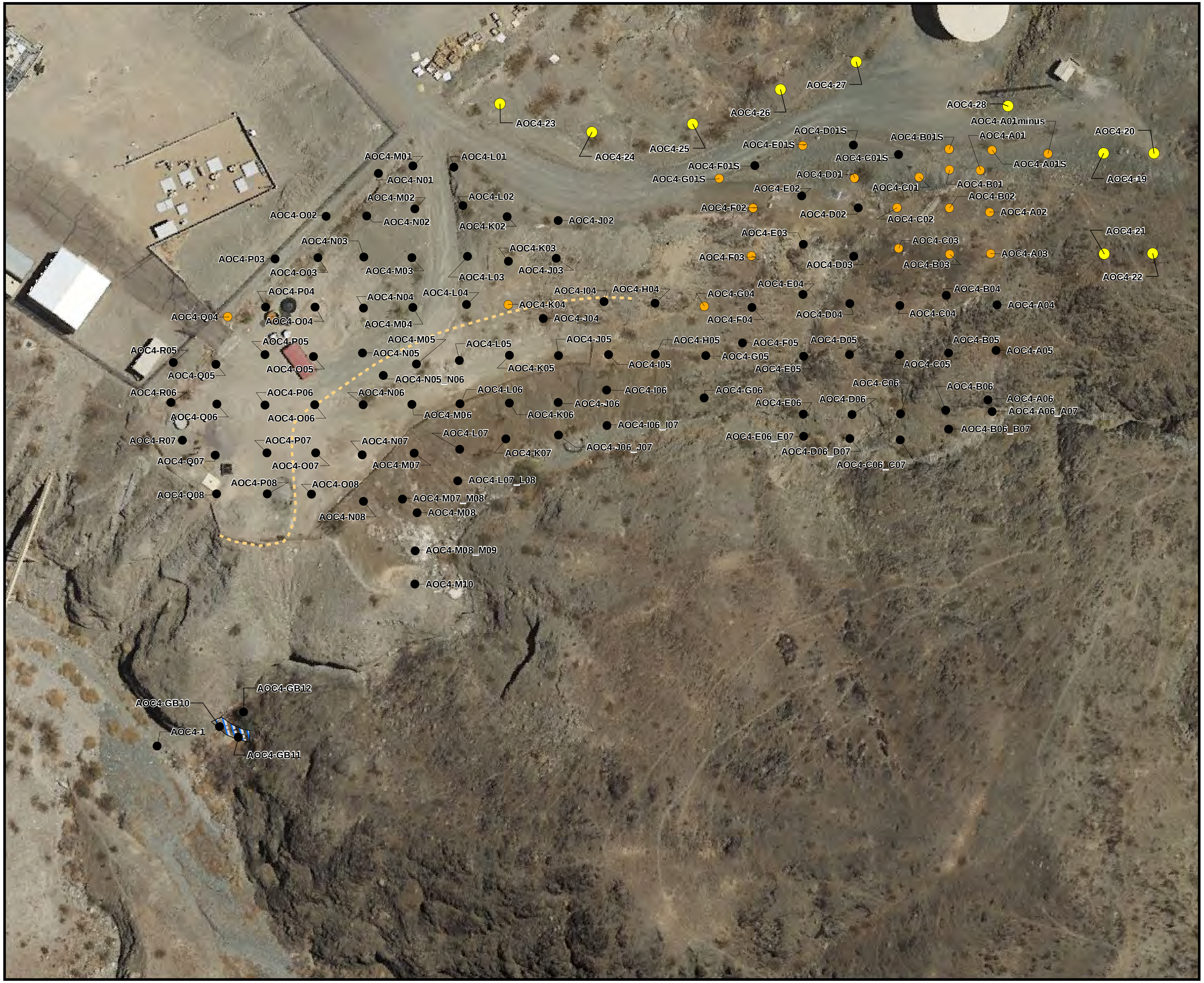


FIGURE C10-12
ZINC SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

\\zinfandel\proj\PacificGasElectricCo\TopockProgram\GIS_New\MapFiles\2011\AOC4_ZINC_PTS_B

CH2MHILL



VICINITY MAP

LEGEND

● Sample Location

● Proposed Sample Location

--- Top of Slope After TRCA Grading

▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (38 µg/kg) are shown in ORANGE.

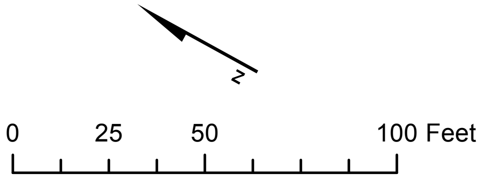


FIGURE C10-13
BENZO(A)PYRENE EQUIVILENTS SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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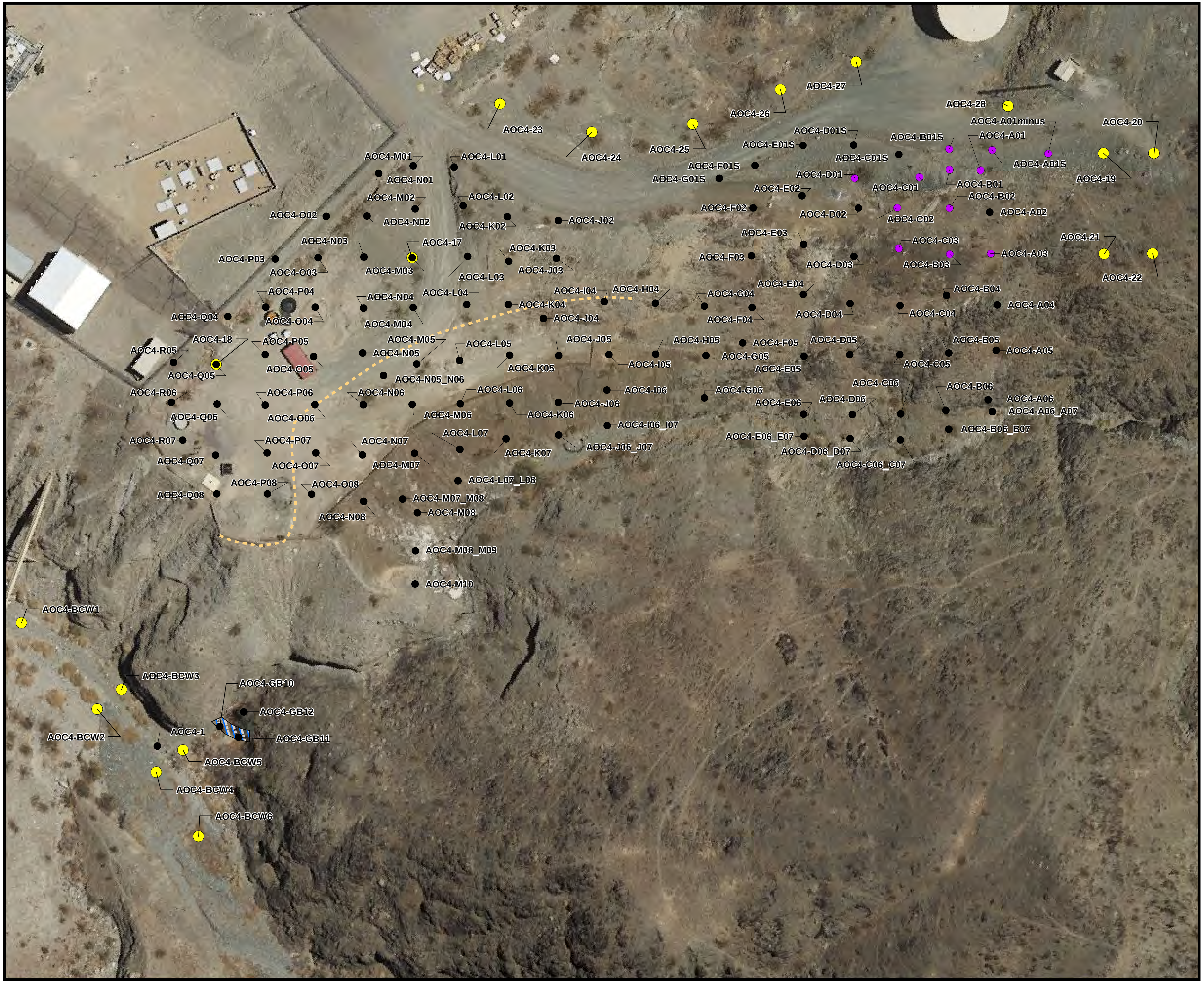

VICINITY MAP

LEGEND

- ● Sample Location
- ○ Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than or equal to the Ecological Comparison Value (1,160 µg/kg) are in PURPLE.
3. Proposed samples collocated with existing locations, will be sampled at depth.

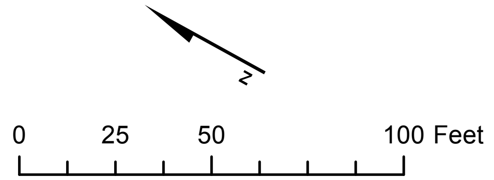

FIGURE C10-14
POLYCYCLIC AROMATIC HYDROCARBON HIGH MOLECULAR WEIGHT SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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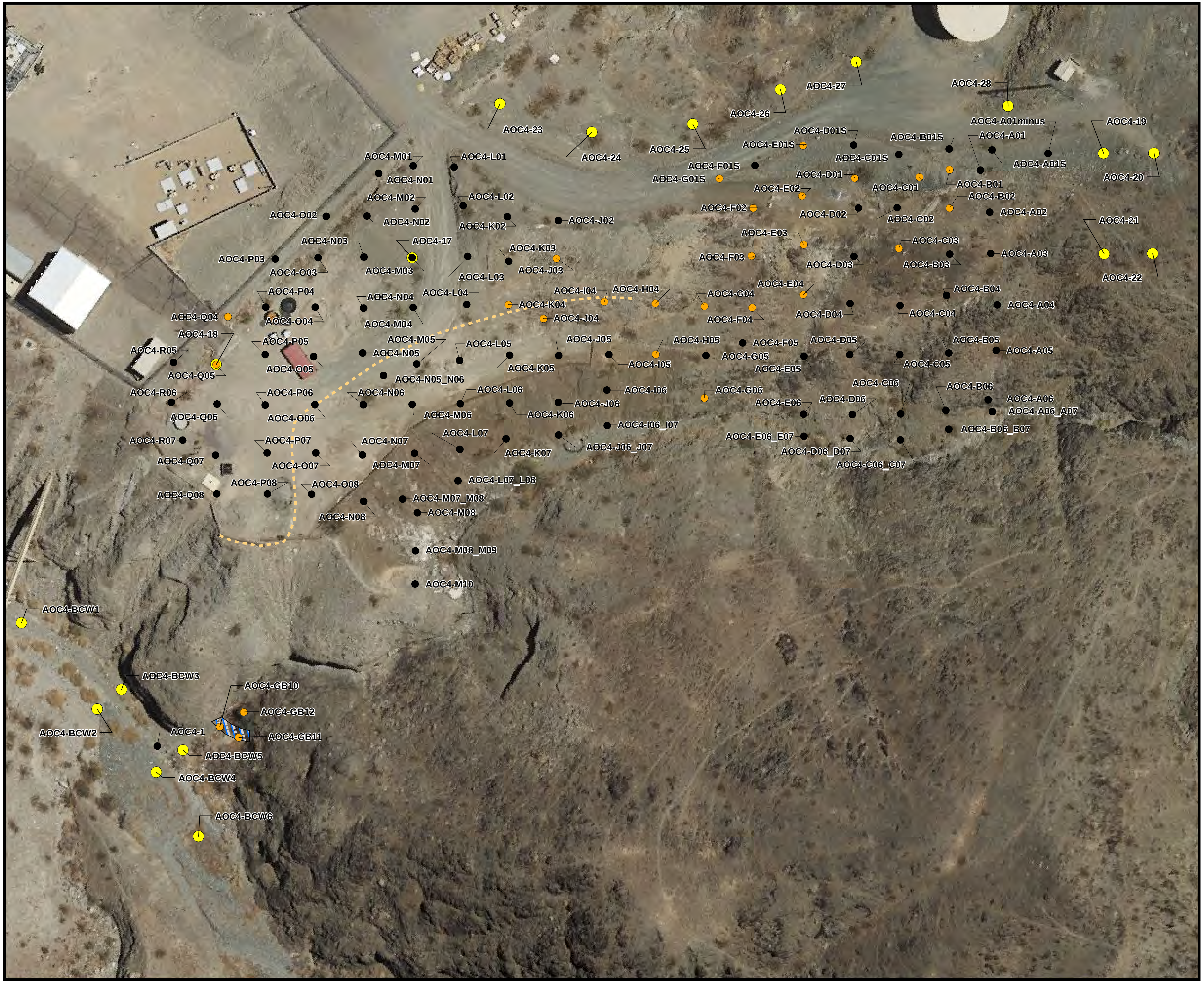


VICINITY MAP

LEGEND

- ● Sample Location
- ● Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (220 µg/kg) are shown in ORANGE.
3. Proposed samples collocated with existing locations, will be sampled at depth.

N

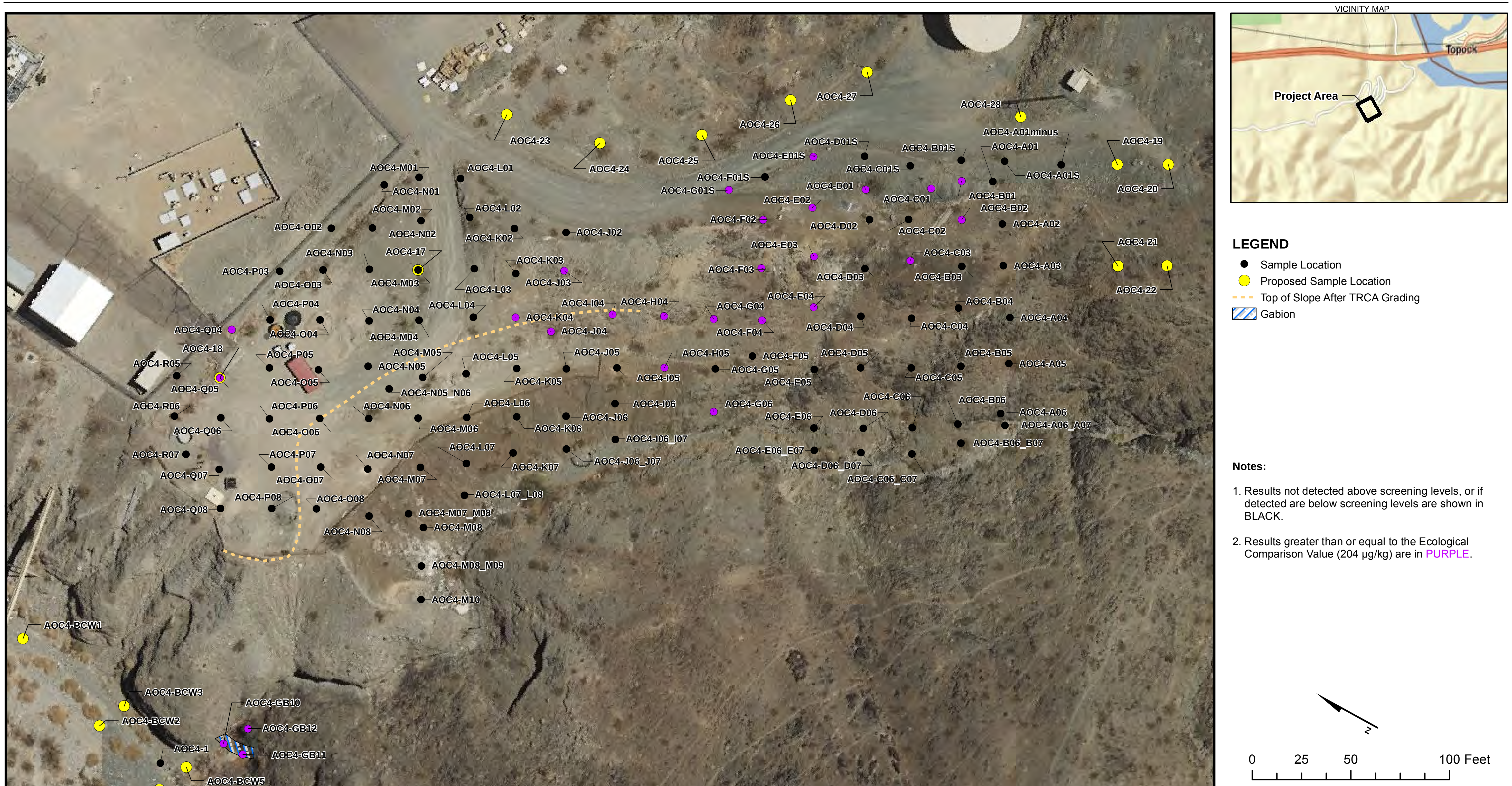
0 25 50 100 Feet

FIGURE C10-15
AROCLOR-1254 SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\COYOTECREST\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2011\AOC4\AOC4_A-1254_PTS_B.MXD AOC4_A-1254_PTS_B.MXD JLAMANTI 4/22/2011 15:27:38



Notes:

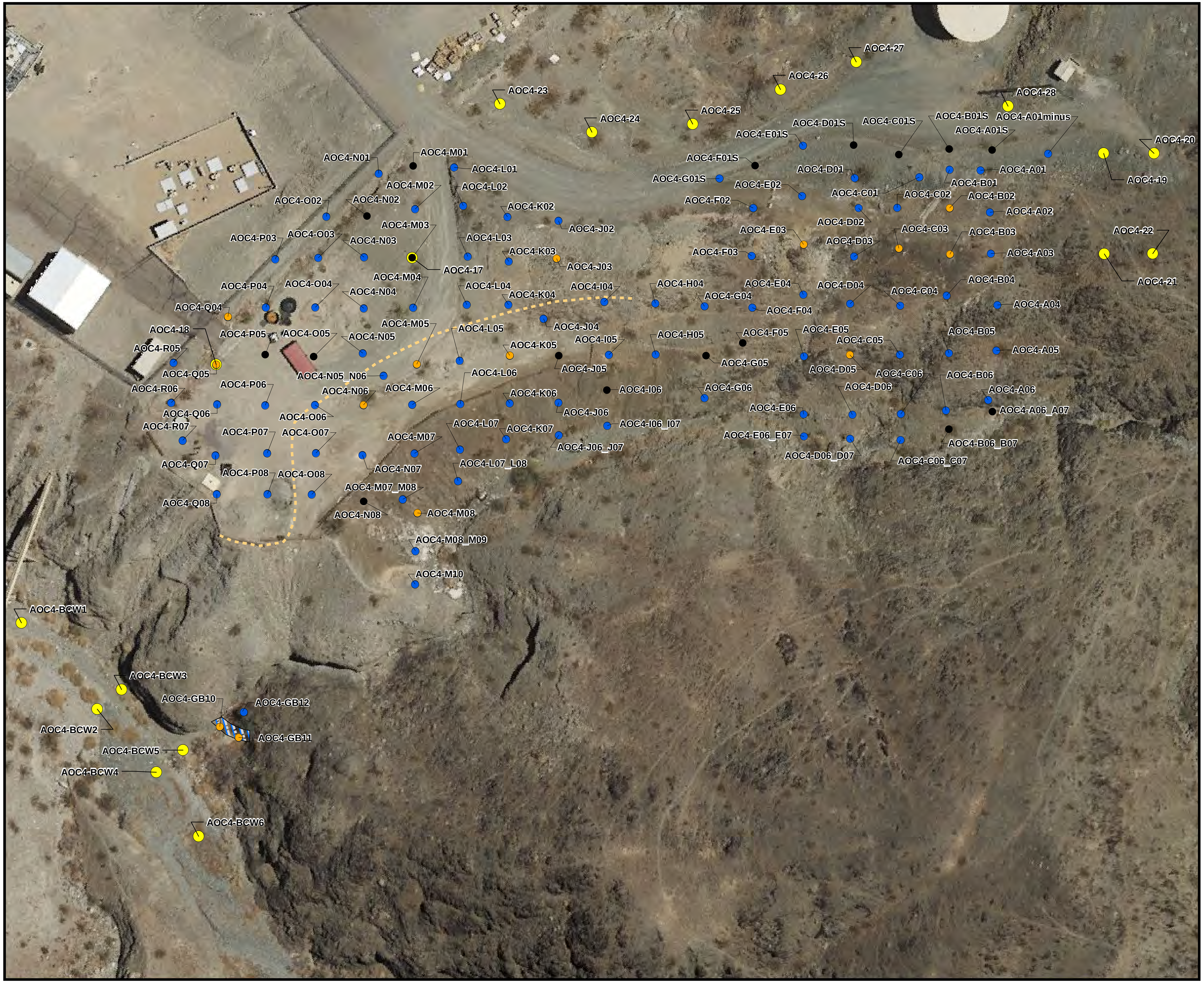
1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than or equal to the Ecological Comparison Value (204 µg/kg) are in PURPLE.

FIGURE C10-16 TOTAL PCBs SOIL SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

BAO \\COYOTECREST\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS_NEW\MAPFILES\2011\AOC4\AOC4_TPCB_PTS_B.MXD AOC4_TPCB_PTS_B.MXD JLAMANTI 4/22/2011 15:34:26



VICINITY MAP

LEGEND

- ● Sample Location
- 🟡 Proposed Sample Location
- - - Top of Slope After TRCA Grading
- ▨ Gabion

Notes:

1. Results not detected above screening levels, or if detected are below screening levels are shown in BLACK.
2. Results greater than or equal to the Ecological Comparison Value (16 ng/kg for TEQ Avian, 1.6 ng/kg for TEQ Mammal) are in BLUE.
3. Results greater than or equal to the California Department of Toxic Substances Control Residential California Human Health Screening Level (50 ng/kg for TEQ Human) are shown in ORANGE.
4. Proposed samples collocated with existing locations, will be sampled at depth.

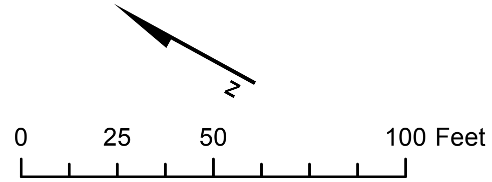


FIGURE C10-17 DIOXIN/FURANS TOXICITY EQUIVALENCY QUOTIENT SAMPLE LOCATIONS

AOC4 – DEBRIS RAVINE
PHASE 1 DATA GAPS EVALUATION REPORT
PACIFIC GAS AND ELECTRIC COMPANY
TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

FIGURE C10-18
AOC4 PROPOSED PHASE 2
SOIL SAMPLE LOCATIONS

AOC4 -DEBRIS RAVINE
SOIL INVESTIGATION PART A PHASE 1
DATA GAPS EVALUATION REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

D:\GIS\Projects\Topock\MapFiles\2011\AOC4\SampleLocations

Appendix D

Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station

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Acronyms and Abbreviations

AOC	Area of Concern
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
ATL	Advanced Technology Laboratories
BHC	benzene hexachloride
BKG	background
CCV	continuing calibration verification
Cr(VI)	hexavalent chromium
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DQE	data quality evaluation
DRO	diesel-range organic
GRO	gasoline-range organic
LCL	lower control limit
LCS	laboratory control sample
MO	motor-oil-range organic
MS/MSD	matrix spike/matrix spike duplicate
PAH	polynuclear aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PDS	post-digestion spike
PG&E	Pacific Gas and Electric Company
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI/RI	RCRA facility investigation/remedial investigation
RPD	relative percent difference
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit

TLI	Truesdail Laboratories, Inc.
TPH	total petroleum hydrocarbons
UCL	upper control limit
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

APPENDIX D

Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station

D.1 Introduction

This data quality evaluation (DQE) assesses the data quality of analytical results for the Part A, Phase 1 Resource Conservation and Recovery Act (RCRA) facility investigation/ remedial soil investigation (RFI/RI) at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station near Needles, California, between August 22, 2008 and December 16, 2008. Samples were collected and analyzed as specified in the *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A* (CH2M HILL, 2006). The *PG&E Program Quality Assurance Project Plan* (QAPP) (CH2M HILL, 2008a), *Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil* (CH2M HILL, 2008b), individual method requirements, internal laboratory quality control criteria, guidelines from the United States Environmental Protection Agency (USEPA) *Contract Laboratory National Functional Guidelines for Inorganic Data Review* (USEPA, 2002), and US*EPA National Functional Guidelines for Organic Data Review* (USEPA, 1999) were used in this assessment. Soil collected between 1988 and 2003 were evaluated in the *Final Soil and Sediment Data Usability Technical Memorandum, PG&E Topock Compressor Station* (CH2M HILL, 2008c).

The goal of this review is to evaluate whether a sufficient number of representative samples were collected and whether the resulting analytical data can be used to support the decision-making process. The procedures for assessing the precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters are addressed in the QAPP (CH2M HILL, 2008a). The following summary highlights the PARCC findings for the Part A, Phase 1 RFI/RI at the Topock Compressor Station.

The overall data quality met the data quality objectives and the project-specific objectives despite some issues with the analysis of a difficult soil matrix, which are summarized in the following statements:

- The completeness objective for the PG&E program is 90 percent for soil samples. The completeness objectives were met for all method/analyte combinations collected except acetone. See Attachment 11.
- Samples were collected and analyzed based on approved methods/procedures, and the results are reported using industry-standard units.
- No data were qualified due to method blank contamination, and a minimum number of samples were qualified due to equipment blank contamination.

- With the exceptions discussed above, the routinely acceptable performance of field and laboratory quality control indicators (field duplicates, field blanks, laboratory blanks, laboratory control sample [LCS], matrix spike/matrix spike duplicate [MS/MSD], and calibrations) show the accuracy and precision of the data meet the project objectives.
- Matrix effects were encountered, resulting in elevated reporting limits.
- Analytical data as qualified meet the data quality objectives (except acetone) and can be used in project decision-making.

D.2 Analytical Data

This DQE report covers 672 soil (and other solid) samples, 63 soil field duplicate samples, and the associated quality control samples (e.g., trip blanks and equipment blanks). These samples were reported by the laboratories in 159 sample delivery groups.

Truesdail Laboratories, Inc. (TLI) of Tustin, California; Advanced Technology Laboratories (ATL) of Signal Hill, California; the ATL satellite laboratory of Las Vegas, Nevada; and Agriculture and Priority Pollutants Laboratories, Inc. (APPL) of Fresno, California performed the required analyses. All laboratories are certified by the California Department of Health Service's Environmental Laboratory Accreditation Program for the analyses included in Table D-1, where appropriate. Samples were analyzed for one or more of the analytes/methods provided in Table D-1.

TABLE D-1
Analytical Parameters
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Parameter	Method	Laboratory
Percent moisture	D2216 [a]	ATL/TLI
Metals	SW6010B [b]	ATL-NV
Synthetic precipitation leaching procedure chromium	SW6020A [b]	TLI
Hexavalent chromium	SW7199 [b]	TLI
Mercury	SW7471A [b]	ATL-CA
Total petroleum hydrocarbon diesel-range organics/motor oil-range organics	SW8015B-E [b]	TLI
TPH gasoline-range organics	SW8015B-P [b]	ATL-NV
Organochlorine pesticides	SW8081A [b]	ATL-CA
Polychlorinated biphenyls	SW8082 [b]	ATL-CA
Volatile organic compounds	SW8260B [b]	ATL-NV
Semivolatile organic compounds	SW8270C [b]	ATL-CA
Polynuclear aromatic hydrocarbons	SW8270 Selected Ion Monitoring (SIM) [b]	ATL-CA
Dioxins and furans	SW8290 [b]	APPL
Cyanide	SW9012A [b]	TLI
pH	SW9045 [b]	TLI

TABLE D-1
Analytical Parameters
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Parameter	Method	Laboratory

[a] American Society for Testing and Materials – ASTM – 2005.

[b] SW-846 Test Methods for Evaluating Solid Waste, 3rd Edition, revision 4, 1996.

The assessment of data includes a review of:

- Chain of custody documentation.
- Holding time compliance.
- Required quality control samples at the specified frequencies.
- Method blanks.
- LCS.
- Surrogate spike recoveries.
- MS/MSD samples.
- Field duplicate precision.
- Initial and continuing calibration criteria.

Field samples were also reviewed to ascertain field compliance and data quality issues. This review includes evaluation of field duplicates, as well as equipment blank and trip blank data.

Data flags were assigned according to the QAPP (CH2M HILL, 2008a). These flags, as well as the reason for each flag, are entered into the electronic database and can be found in Attachments 1 through 10 to this DQE report. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample effects.

The data flags are listed and defined below:

- J = Analyte was present but the reported value might not be accurate or precise (estimated).
- R = Data were unusable due to deficiencies in the ability to analyze the sample and meet quality control criteria.
- U = Analyte was not detected at the specified reporting limit.
- UJ = Analyte was not detected and the specified reporting limit might not be accurate or precise (estimated).

D.3 Data Assessment

Data assessment includes a review of the activities described in the following sections.

D.3.1 Holding Times

Holding time exceedances result in the possible loss of target analytes due to degradation or chemical reactions that usually cause a negative bias to sample results. Detected and non-detected sample results exceeding the method recommended holding time were qualified as estimated and flagged “J” and “UJ.” Refer to the site-specific tables in Attachments D1 through D10 for the data discussed below.

- **Background (BKG).** All holding time acceptance criteria were met for the background samples.
- **Solid Waste Management Unit (SWMU) 1 (Former Percolation Bed).** Seven samples for polychlorinated biphenyls (PCBs) (SW8082) were analyzed outside the recommended holding time. The seven samples were not scheduled for PCB analysis in the original sampling plan, and the PCB analysis was requested after the holding time had been exceeded. See Attachment D2, Table D2-1.
- **Area of Concern (AOC) 1 (Area around Former Percolation Bed).** One sample for PCB (SW8082) was analyzed outside the recommended holding time. This sample was not scheduled for PCB analysis in the original sampling plan, and the PCB analysis was requested after the holding time had been exceeded. See Attachment D3, Table D3-1.
- **AOC 4 (Debris Ravine).** Two samples for hexavalent chromium [Cr(VI)] (SW7199), 14 samples for total petroleum hydrocarbon diesel-range organics (TPH-DRO) (SW8015B-E), one sample for pesticides (SW8081A), one sample for PCBs (SW8082), 14 samples for semivolatile organic compounds (SVOCs) (SW8270C), 17 samples for polynuclear aromatic hydrocarbons (PAHs) (SW8270sim), one sample for cyanide (SW9012), and two samples for pH (SW9045) were analyzed outside the recommended holding time. With the exception of the two samples for Cr(VI), the remaining samples were mistakenly held in the field (stored at 4° Celsius) past the recommended holding time.
- Due to the complex nature of the “wood” samples for Cr(VI) the laboratory made several attempts to extract the Cr(VI) using the standard soil extraction method (SW3060A) prior to a successful extraction that allowed analysis to proceed. The final analysis was delayed past the recommended holding time due to the difficulty of the matrix. See Attachment D4, Table D4-1.
- **AOC 9 (Southeast Fence Line -Outside Visitor Parking Area).** One sample for total petroleum hydrocarbons motor-oil-range organics (TPH-MO) (SW8015B-E) and two samples for PCBs (SW8082) were analyzed outside the recommended holding time. The original motor-oil fraction result was greater than the calibration range, and the analyst overlooked the need for reanalysis until after the sample was outside the holding time. The samples for PCBs were not scheduled for PCB analysis in the original sampling plan, and the analysis was requested after the holding time had been exceeded. See Attachment D5, Table D5-1.
- **AOC 10 (East Ravine).** Six samples for mercury (SW7471A), five samples for TPH-DRO (SW8015B-E), and five samples for PCBs (SW8082) were analyzed outside the recommended holding time. In the original sampling plan, the six samples for mercury analysis were designated as supplemental samples, with the analysis to be determined

after results from contiguous samples could be evaluated. The mercury analysis was requested after the holding time had been exceeded. The five samples for TPH-DRO were analyzed a few days outside the recommended holding time due to lab capacity issues. The samples for PCBs were not scheduled for PCB analysis in the original sampling plan, and the analysis was requested after the holding time had been exceeded. See Attachment D6, Table D6-1.

- **AOC 11 (Topographic Low Area).** Thirty-nine samples for mercury (SW7471A), 12 samples for TPH-DRO (SW8015B-E), six samples for total petroleum hydrocarbons gasoline-range organics (TPH-GRO) (SW8015B-P), two samples for PCBs (SW8082), and five samples for volatile organic compounds (VOCs) (SW8020B) were analyzed outside the recommended holding time. In the original sampling plan, the 39 samples for mercury analysis were designate as supplemental samples, with the analysis to be determined after results from contiguous samples could be evaluated. The mercury analysis was requested after the holding time had been exceeded. The five samples for TPH-DRO were analyzed a few days outside the recommended holding time due to lab capacity issues. The six samples for TPH-GRO were received in the lab just outside the 48-hour preservation requirement for frozen samples. The samples for PCBs were not scheduled for PCB analysis in the original sampling plan, and the analysis was requested after the holding time had been exceeded. See Attachment D7, Table D7-1.
- **AOC 12 (Fill Area).** One sample for PCB (SW8082) was analyzed outside the recommended holding time. This sample was not scheduled for PCB analysis in the original sampling plan, and the PCB analysis was requested after the holding time had been exceeded. See Attachment D8, Table D8-1.
- **AOC 14 (Railroad Debris Site).** Eighteen samples for TPH-DRO (SW0815B-E), two samples for SVOCs (SW8270C), two samples for PAHs (SW8270SIM), and two samples for pH (SW9045) were analyzed outside the recommended holding time. Fifteen of the TPH-DRO samples were analyzed a few days outside the recommended holding time due to lab capacity issues. The remaining three TPH-DRO, two SVOC, two PAH, and two pH samples were mistakenly held in the field (stored at 4^o Celsius) past the recommended holding time. See Attachment D9, Table D9-1.
- **300B (Former 300B Pipeline Liquids Tank).** All holding time acceptance criteria were met in this area of concern.

D.3.2 Method Blanks

Method blanks are used to monitor and evaluate each preparation or analytical batch for potential contamination throughout the analytical process from sources such as glassware, reagents, instrumentation, and other potential contaminant sources within the laboratory. If a target analyte is detected in the method blank, similar detections in the samples are possibly artifacts of laboratory contamination.

Method blanks were analyzed at the required frequency. No target analytes were detected in the method blanks that affected the reporting limit for the associated samples.

D.3.3 Equipment Blanks

Equipment blanks are used to assess the effectiveness of sampling equipment decontamination procedures. Target analytes detected in equipment blanks may indicate that field equipment was not thoroughly decontaminated and/or samples could have been cross contaminated. Equipment blanks are collected at a frequency of one per sampling crew per day where non-dedicated equipment is used. Where equipment blank detections occur, reporting levels are adjusted up to reflect the possibility the results detected in a sample are actually a manifestation of contamination. Detected sample results greater than five times the equipment blank result and non-detected sample results are considered to be unaffected. Refer to the site-specific tables in Attachments 1 through 10.

- **BKG.** Sodium (SW6010B), a target analyte, was detected at or above the reporting limit for an equipment blank. Four associated samples with detected sodium results that were less than five times the equipment blank result were qualified as not detected and were flagged as “U.”
- **SWMU 1.** Sodium (SW6010B), a target analyte, was detected at or above the reporting limit for two equipment blanks. Seven associated samples with detected sodium results that were less than five times the equipment blank results were qualified as not detected and were flagged as “U.”
- **AOC 1.** Copper (SW6010B), a target analyte, was detected at or above the reporting limit for an equipment blank. Two associated samples with detected copper results that were less than five times the equipment blank result were qualified as not detected and were flagged “U.” Sodium (SW6010B), a target analyte, was detected at or above the reporting limit for three equipment blanks. Four associated samples with detected results that were less than five times the equipment blank result were qualified as not detected and were as flagged “U.”
- **AOC 4.** Sodium (SW6010B), a target analyte, was detected at or above the reporting limit for an equipment blank. One associated sample’s detected sodium result that was less than five times the equipment blank result was qualified as not detected and flagged “U.”
- **AOC 9.** All equipment blank acceptance criteria were met in this area of concern.
- **AOC 10.** All equipment blank acceptance criteria were met in this area of concern.
- **AOC 11.** Sodium (SW6010B), a target analyte, was detected at or above the reporting limit for an equipment blank. One associated sample’s detected sodium result that was less than five times the equipment blank result was qualified as not detected and was flagged as “U.”
- **AOC 12.** All equipment blank acceptance criteria were met in this area of concern.
- **AOC 14.** All equipment blank acceptance criteria were met in this area of concern.
- **300B.** All equipment blank acceptance criteria were met in this area of concern.

D.3.4 Calibration

Initial calibration and periodic verification are essential to generating defensible analytical data. Initial calibrations that do not meet method requirements result in data that may be either positively or negatively biased. Periodic calibration verification ensures that the instrument has not been adversely affected by the sample matrix or other instrument failures that would increase or decrease the sensitivity or accuracy of the method. The inability to meet initial or continuing calibration analyses may result in qualifying the data as estimated or rejecting the data for project decision-making purposes. Refer to the site-specific tables in Attachments D1 through D10.

All initial calibrations were performed as required by the methods and met the method criteria.

- **BKG.** All continuing calibration verification (CCV) standard acceptance criteria were met for the background samples.
- **SWMU 1.** One CCV for bromoform (SW8060B) had a recovery that was less than the lower control limit (LCL). Two associated non-detect results were qualified as estimated and were flagged as “UJ.” See Attachment D2, Table D2-1.
- **AOC 1.** One CCV for bromoform (SW8060B) had a recovery that was less than the LCL. Seven associated non-detected results were qualified as estimated and were flagged as “UJ.” See Attachment D3, Table D3-1.
- **AOC 4.** One CCV for gasoline (SW8015B-P) had a recovery that was less than the LCL. Five associated non-detect results were qualified as estimated and were flagged as “UJ.” One CCV for endrin aldehyde (SW8081A) had a low-bias recovery. One associated non-detected result was qualified as estimated and was flagged as “UJ.” See Attachment D4, Table D4-1.
- **AOC 9.** One CCV for bromoform (SW8060B) had a recovery that was less than the LCL. Five associated non-detected results were qualified as estimated and were flagged as “UJ.” One Cr(VI) sample result was greater than the linear range of the initial calibration range. The sample was qualified as estimated and was flagged as “J.” See Attachment D5, Table D5-1.
- **AOC 10.** One CCV for 4,4´-DDT (dichlorodiphenyltrichloroethane), endosulfan I, endrin aldehyde, methoxychlor, and toxaphene (SW8081A) had recoveries that were less than the LCL. The associated non-detected results from one sample were qualified as estimated and were flagged as “UJ.” One CCV for bromoform (SW8060B) had a recovery that was less than the LCL. Seven associated non-detected results were qualified as estimated and were flagged as “UJ.” See Attachment D6, Table D6-1.
- **AOC 11.** One CCV for bromoform (SW8060B) had a low-bias recovery. Fourteen associated non-detected results were qualified as estimated and were flagged as “UJ.” See Attachment D7, Table D7-1.
- **AOC 12.** One CCV for acrolein (SW8060B) had a recovery that was less than the LCL. Seven associated non-detected results were qualified as estimated and were flagged as “UJ.” See Attachment D8, Table D8-1.

- **AOC 14.** One CCV for bromoform (SW8060B) had a recovery that was less than the LCL. Two associated non-detected results were qualified as estimated and were flagged as "UJ." See Attachment D9, Table D9-1.
- **300B.** All CCV acceptance criteria were met in this area of concern.

D.3.5 Field Duplicates

Field duplicates are collected and analyzed to determine if field collection activities or the sample matrix influence the precision of the analytical measurements obtained at the sample site. Soils samples are inherently more variable than water samples, despite homogenizing and lead to larger relative percent differences (RPD). Large RPDs do not necessarily indicate lack of precision when associated with soil samples. Detected and non-detected results were qualified as estimated and were flagged as "J" and "UJ." Refer to a list of field duplicate pairs and reference the site-specific tables in Attachments D1 through D10.

- **BKG.** All field duplicate acceptance criteria were met for the background samples.
- **SWMU 1.** One field duplicate pair had an RPD greater than the upper control limit (UCL) for chromium (SW6010B, 20 percent). One field duplicate pair had an RPD greater than the UCL for nickel (SW6010B, 20 percent). One field duplicate pair had an RPD greater than UCL for cobalt (SW6010B, 20 percent). One field duplicate pair had RPDs greater than the UCL for barium, cobalt, chromium, and nickel (SW6010B, 20 percent). Two field duplicate pairs had RPDs greater than the UCL for acetone (SW8260B, 30 percent). See Attachment D2, Table D2-1.
- **AOC 1.** One field duplicate pair had a RPD greater than the UCL for chromium (SW6010B, 20 percent). One field duplicate pair had an RPD greater than the UCL for lead (SW6010B, 20 percent). One field duplicate pair had RPDs greater than the UCL for lead (SW6010B, 20 percent) and acetone (SW8260B, 30 percent). One field duplicate pair had an RPD greater than the UCL for lead, nickel, zinc (SW6010B, 20 percent), and Cr(VI) (SW7199, 20 percent). See Attachment D3, Table D3-1.
- **AOC 4.** One field duplicate pair had an RPD greater than the UCL for Cr(VI) (SW7199, 20 percent). One field duplicate pair had RPDs greater than the UCL for anthracene, benzo(a)anthracene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and fluoranthene (SW8270SIM, 30 percent). One field duplicate pair had RPDs greater than the UCL for benzo(a)anthracene, benzo(a)pyrene, chrysene, fluoranthene, and pyrene (SW8270SIM, 30 percent). See Attachment D4, Table D4-1.
- **AOC 9.** One field duplicate pair had an RPD greater than the UCL for acetone (SW8260B, 30 percent). One field duplicate pair had RPDs greater than the UCL for chrysene, phenanthrene, (SW8270SIM, 30 percent), and chromium (SW6010B, 20 percent). One field duplicate pair had RPDs greater than the UCL for 1-methylnaphthalene and 2-methylnaphthalene (SW8270SIM, 30 percent). See Attachment D5, Table D5-1.
- **AOC 10.** One field duplicate pair had an RPD greater than the UCL for lead (SW6010B, 20 percent). One field duplicate pair had an RPD greater than the UCL for acetone (SW8260B, 30 percent). One field duplicate pair had RPDs greater than the UCL for lead, zinc (SW6010B, 20 percent) and acetone (SW8260B, 30 percent). One field duplicate pair

had RPDs greater than the UCL for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(k)fluoranthene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene (SW8270SIM, 30 percent), and acetone (SW8260B, 30 percent). See Attachment D6, Table D6-1.

- **AOC 11.** One field duplicate pair had RPDs greater than the UCL for barium, calcium (SW6010B, 20 percent), alpha chlordane, and gamma chlordane (SW8081A, 50 percent). One field duplicate pair had RPDs greater than the UCL for TPH-DRO (SW8015B-E, 50 percent) and acetone (SW8260B, 30 percent). One field duplicate pair had RPDs greater than the UCL for fluoranthene, phenanthrene, and pyrene (SW8270SIM, 30 percent). See Attachment D7, Table D7-1.
- **AOC 12.** All field duplicate acceptance criteria were met in this area of concern.
- **AOC 14.** One field duplicate pair had an RPD greater than the UCL for acetone (SW8260B, 30 percent). One field duplicate pair had an RPD greater than the UCL for copper (SW6010B, 20 percent). See Attachment D9, Table D9-1.
- **300B.** All field duplicate acceptance criteria were met in this area of concern.

D.3.6 Laboratory Control Samples

A LCS measures laboratory accuracy. Accuracy is the degree of agreement between a measured value and the expected value. The LCS is prepared from laboratory deionized or reagent-grade water and spiked with known amounts of the target analytes of interest. Recovery of analytes outside of quality control limits generally indicates a problem with the analytical procedure. A low LCS recovery indicates that the target analyte in associated samples is likely biased low. Associated detected and non-detected sample results were qualified as estimated and were flagged as “J” and “UJ.” Likewise, a high LCS recovery indicates that the target analyte in associated samples is likely biased high. All of the LCS recoveries recovered outside the quality control limits were biased high for the Part A, Phase 1 samples. Associated detected results were qualified as estimated and were flagged as “J.” Non-detected results associated with a high-bias recovery were not qualified. Refer to the site-specific tables in Attachments D1 through D10.

- **BKG.** LCSs were analyzed at the required frequency and were recovered within quality control limits.
- **SWMU 1.** One LCS for TPH-MO (SW8015B-E) had a recovery that was greater than the UCL (120 percent). Five associated detected sample results were qualified as estimated and were flagged as “J.” One LCS for TPH-MO (SW8015-E) had a recovery that was greater than the UCL (120 percent). Ten associated detected sample results were qualified as estimated and were flagged as “J.” See Attachment D2, Table D2-1.
- **AOC 1.** One LCS for TPH-MO (SW8015B-E) had a recovery that was greater than the UCL (120 percent). One associated detected sample result was qualified as estimated and was flagged as “J.” Another LCS for TPH-MO (SW8015B-E) had a recovery that was greater than the UCL (120 percent). Ten associated detected sample results were qualified as estimated and were flagged as “J.” See Attachment D3, Table D3-1.

- **AOC 4.** LCSs were analyzed at the required frequency and were recovered within quality control limits.
- **AOC 9.** One LCS for TPH-MO (SW8015B-E) had a recovery that was greater than the UCL (120 percent). Three associated detected sample results were qualified as estimated and were flagged as "J." The RPD of acenaphthylene (SW8270SIM) between the results for two LCSs was greater than the UCL (126 percent). Sixteen associated non-detected sample results were qualified as estimated and were flagged as "UJ." See Attachment D5, Table D5-1.
- **AOC 10.** One LCS for TPH-MO (SW8015B-E) had a recovery that was greater than the UCL (120 percent). Three associated detected sample results were qualified as estimated and were flagged as "J." See Attachment D6, Table D6-1.
- **AOC 11.** One LCS for TPH-MO (SW8015-E) had a recovery that was greater than the UCL (120 percent). Nine associated detected sample results were qualified as estimated and were flagged as "J." One LCS for benzo(k)fluoranthene (SW8270SIM) had a recovery that was greater than the UCL (129 percent). Seven associated detected sample results were qualified as estimated and were flagged as "J." See Attachment D7, Table D7-1.
- **AOC 12.** One LCS for TPH-MO (SW8015B-E) had a recovery that was greater than the UCL (120 percent). Two associated detected sample results were qualified as estimated and were flagged as "J." One LCS for benzo(k)fluoranthene (SW8270SIM) had a recovery that was greater than the UCL (129 percent). One associated detected sample result was qualified as estimated and was flagged as "J." See Attachment D8, Table D8-1.
- **AOC 14.** One LCS for TPH-MO (SW8015B-E) had a recovery that was greater than the UCL (120 percent). Two associated detected sample results were qualified as estimated and were flagged as "J." One LCS and LCS duplicate for TPH-MO (SW8015B-E) had recoveries that were greater than the UCL (120 percent). Four associated detected sample results were qualified as estimated and were flagged as "J." See Attachment D9, Table D9-1.
- **300B.** One LCS and LCS duplicate for TPH-MO (SW8015-E) had recoveries that were greater than the UCL (120 percent). Six associated detected sample results were qualified as estimated and were flagged as "J." See Attachment D10, Table D10-1.

D.3.7 Matrix Spike Samples

Matrix spike recoveries are used to evaluate the effect of the sample matrix on the recovery of target analytes. A sample is fortified with a known quantity of a target analyte and is carried through the same preparation and analytical procedures as the non-spiked sample. Matrix spike recoveries outside the quality control limits may indicate that the sample's matrix is affecting the method's ability to accurately quantify the target analyte in the associated sample or samples from similar locations. A low matrix spike recovery generally indicates a negative bias in the sample data. Associated parent detected and non-detected sample results are qualified as estimated and are flagged as "J" or "UJ." When the matrix spike, MSD, or both have recoveries that are below 10 percent and the associated parent sample has a detected result, the result is qualified as estimated and is flagged as "J" (low bias). However, an associated non-detected parent sample result is considered unusable and is flagged as "R." A high matrix spike recovery indicates a potential positive bias to the associated sample data. The associated parent detected results are qualified as estimated and are flagged as "J." Non-detected parent results associated with a high-bias recovery are not qualified. If a matrix spike and an MSD are analyzed, an RPD greater than the quality control criteria may further indicate that the sample matrix is affecting the precision of the method for the target analyte that did not meet criteria. Refer to the site-specific tables in Attachments D1 through D10.

- **BKG.** The MS/MSD samples for the background data set had recovery of antimony and barium (SW6010B), target analytes, outside the control limits established in the QAPP (75 to 125 percent). The associated parent analytes were qualified as estimated and were flagged as "J." See Attachment D1, Table D1-1.

- **SWMU 1.** The MS/MSD samples for SWMU 1 had recovery of target analytes outside the control limits established in the QAPP. Nine target analytes were qualified as estimated: antimony (SW6010B), Cr(VI) (SW7199), 4,4-DDE (dichlorodiphenyldichloroethylene), dieldrin, endrin ketone (SW8081A), 2,4-dinitrophenol, acetophenone, benzaldehyde, and caprolactam (SW8270C). Four benzoic acid (SW8270C) results were unusable (flagged as "R") due to MS/MSD recoveries less than 10 percent. Three serial dilution sample results had RPDs greater than the UCL. Three target analytes were qualified as estimated: iron, magnesium, and potassium (SW6010B); the associated sample results were qualified as estimated. See Attachment D2, Table D2-1.

- **AOC 1.** The MS/MSD samples for AOC1 had recovery of target analytes outside the control limits established in the QAPP. Three target analytes were qualified as estimated: caprolactam, hexachlorocyclopentadine (SW8270C), and antimony (SW6010B). Two benzoic acid (SW8270C) results were unusable due to MS/MSD recoveries of less than 10 percent and were flagged as "R." The serial dilution for a potassium sample result had an RPD greater than the UCL, and the associated sample was qualified as estimated. See Attachment D3, Table D3-1.

- **AOC 4.** The MS/MSD samples for AOC 4 had recovery of target analytes outside the control limits established in the QAPP. Twenty-six target analytes were qualified as estimated: antimony, barium, chromium, copper, lead, potassium, sodium, zinc (SW6010B), 4,4-DDE, alpha-BHC (benzene hexachloride), alpha chlordane, beta-BHC, delta-BHC, dieldrin, endosulfan sulfide, endrin ketone, gamma-BHC, heptachlor, heptachlor epoxide (SW8081A), Aroclor-1260 (SW8082) benzaldehyde (SW8270C), benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and pyrene (SW8270SIM). Two MS/MSD samples for benzoic acid and caprolactam (SW8270C) had recoveries less than 10 percent, and the sample non-detected results were rejected (flagged as "R"). One copper and lead (SW6010B) MS/MSD pair had RPDs greater than the UCL, and the associated sample results were qualified as estimated. One Cr(VI) (SW7199) sample had a high bias post-digestion spike (PDS) and was qualified as estimated. See Attachment D4, Table D4-1.

- **AOC 9.** The MS/MSD samples for AOC 9 had recovery of target analytes outside the control limits established in the QAPP. Seven target analytes were qualified as estimated: antimony (SW6010B), 1,1-biphenyl, 1,2,4,5-tetrachlorobenzene, acetophenone, benzaldehyde, benzoic acid, and caprolactam (SW8270C). The serial dilution for one sample had an RPD greater than the UCL for barium, iron, magnesium, and manganese (SW6010B), and the sample was qualified as estimated. See Attachment D5, Table D5-1.

- **AOC 10.** The MS/MSD samples for AOC 10 had recovery of target analytes outside the control limits established in the QAPP. Twenty-one target analytes were qualified as estimated: aluminum, antimony, barium, copper, iron, lead, zinc (SW6010B), 4,4-DDE, alpha-BHC, alpha chlordane, beta-BHC, delta-BHC, dieldrin, endosulfan sulfide, endrin ketone, gamma-BHC, heptachlor, heptachlor epoxide (SW8081A), Aroclor-1260 (SW8082) benzoic acid, and caprolactan (SW8270C). One lead (SW6010B) MS/MSD pair had an RPD greater than the UCL, and the associated sample was qualified as estimated. The serial dilution for one sample had an RPD greater than the UCL for barium, iron, and magnesium (SW6010B), and the sample was qualified as estimated. See Attachment D6, Table D6-1.

- **AOC 11.** The MS/MSD samples for AOC 11 had recovery of target analytes outside the control limits established in the QAPP. Four target analytes were qualified as estimated: antimony, barium (SW6010B), Cr(VI) (SW7199), and caprolactam (SW8270C). The serial dilution for one sample had an RPD greater than the UCL for aluminum, barium, calcium, iron, magnesium, manganese, and zinc (SW6010B), and the sample was qualified as estimated. A PDS was also outside the control limits for calcium (SW6010B), and the sample was qualified as estimated. See Attachment D7, Table D7-1.

- **AOC 12.** The MS/MSD samples for AOC 12 had recovery of target analytes outside the control limits established in the QAPP. Eight target analytes were qualified as estimated: antimony, barium, magnesium (SW6010B), 1,2,4,5-tetrachlorobenzene, 2,3,4,6-tetrachlorophenol, acetophenone, benzaldehyde, and caprolactam (SW8270C). A PDS was also out of the control range for calcium and iron (SW6010B), and the associated sample was qualified as estimated. See Attachment D8, Table D8-1.

- **AOC 14.** The MS/MSD samples for AOC 14 had recoveries of target analytes outside the control limits established in the QAPP. Seven target analytes were qualified as estimated: antimony, barium (SW6010B), 1,2,4,5-tetrachlorobenzene, acetophenone, benzaldehyde, benzoic acid, and caprolactam (SW8270C). One benzoic acid (SW8270C) result was unusable due to a matrix spike recovery less than 10 percent and was flagged as “R.” A PDS was also out of the control range for barium, chromium, potassium, vanadium, and zinc (SW6010B), and the associated sample was qualified as estimated. See Attachment D9, Table D9-1.

- **300B.** The MS/MSD samples for area 300B had recovery of target analytes outside the control limits established in the QAPP. Two target analytes were qualified as estimated: antimony and barium (SW6010B). Two MS/MSD samples for benzoic acid and caprolactam (SW8270C) had recovery of less than 10 percent, and the sample results for benzoic acid and caprolactan (SW8270C) were rejected and were flagged as “R.” See Attachment D10, Table D10-1.

D.3.8 Surrogates

Surrogates are primarily used in organic chromatography methods and are added prior to sample preparation. The surrogates are added to all samples, standards, and blanks in an analytical run and provide a measurement to determine recovery for every sample matrix. Surrogate compounds are chosen to represent the various chemistries of the target analytes in a specific method. They are often specified by the method and are deliberately selected for their improbability of occurring as environmental contaminants. The results are compared to the acceptance criteria as established by the method or the QAPP.

Sample results with surrogate recoveries outside the acceptance criteria were qualified as estimated and were flagged as “J” for all detected results, qualified as estimated and flagged as “UJ” for all non-detect results where the surrogate recovery is equal to or greater than 10 percent, and rejected and flagged as “R” if the surrogate recovery is less than 10 percent. Refer to the site-specific tables in Attachments D1 through D10.

- **BKG.** All surrogate acceptance criteria were met for the background sample set.
- **SWMU 1.** One non-detect sample had surrogate recovery less than the LCL for TPH-DRO (SW8015B-E), four non-detect TPH-GRO (SW8015B-P) samples had a surrogate recovery less than the LCL, and one sample with detected TPH-DRO (SW8015B-E) had a surrogate recovery greater than the UCL. The samples results were qualified as described above. See Attachment D2, Table D2-1.
- **AOC 1.** Seven non-detect TPH-DRO/TPH-MO (SW8015B-E) samples had surrogate recoveries less than the LCL; two of the seven samples had less than 10 percent surrogate recovery. One detected TPH-MO (SW8015-E) sample had a surrogate recovery greater than the UCL. One detected PAH (SW8270SIM) sample had a surrogate recovery greater than the UCL; the samples results were qualified as described above. See Attachment D3, Table D3-1.
- **AOC 4.** One non-detect TPH-GRO (SW8015B-P) sample had a surrogate recovery less than the LCL. One sample had surrogate recovery less than the LCL for pesticides (SW8081A) and PCB (SW8082). The detect sample results were qualified as estimated and were flagged as “J”; the non-detect sample results were qualified as estimated and were flagged as “UJ.” See Attachment D4, Table D4-1.
- **AOC 9.** One sample had surrogate recovery less than the LCL for TPH-DRO (SW8015B-E). Three non-detect TPH-GRO (SW8015B-P) samples had a surrogate recovery less than the LCL. One PAH (SW8270SIM) sample had a surrogate recovery greater than the UCL, and the samples results were qualified as described above. See Attachment D5, Table D5-1.
- **AOC 10.** Four samples had surrogate recovery less than the LCL for TPH-DRO (SW8015B-E). Six non-detect TPH-GRO (SW8015B-P) samples had a surrogate recovery less than the LCL; one of the six samples had less than 10 percent surrogate recovery. One sample had surrogate recovery less than the LCL for pesticides (SW8081A). One PAH (SW8270SIM) sample had a surrogate recovery greater than the UCL. The samples results were qualified as described above. See Attachment D6, Table D6-1.

- **AOC 11.** Two samples had surrogate recovery less than the LCL for TPH-DRO (SW8015B-E). Three non-detect TPH-GRO (SW8015B-P) samples had a surrogate recovery less than the LCL. One TPH-MO (SW8015B-E) sample had a surrogate recovery greater than the UCL. See Attachment D7, Table D7-1.
- **AOC 12.** One non-detect TPH-GRO (SW8015B-P) sample had a surrogate recovery less than the LCL. See Attachment D8, Table D8-1.
- **AOC 14.** Four samples had surrogate recovery less than the LCL for TPH-DRO (SW8015B-E), and seven non-detect TPH-GRO (SW8015B-P) samples had a surrogate recovery less than the LCL. One TPH-MO (SW8015B-E) sample had a surrogate recovery greater than the UCL. One PAH (SW8270SIM) sample had a surrogate recovery greater than the UCL. One VOC (SW8260B) sample had a surrogate recovery greater than the UCL. The samples results were qualified as described above. See Attachment D9, Table D9-1.
- **300B.** One sample had surrogate recovery less than the LCL for TPH-DRO (SW8015B-E). See Attachment D10, Table D10-1. The samples results were qualified as described above.

D.3.9 Other

D.3.9.1 Internal Standards

Internal standards have similar chemical characteristics to those of the analytes and provide an analytical response that is distinct from the analyte and not normally subject to interference. The internal standards are added prior to analysis for the purpose of determining analyte concentrations. The internal standard’s response is referenced against a relative response factor, and the sample’s analyte concentration can be corrected for matrix effects. Sample results with internal standard relative response factors outside the acceptance criteria are qualified and flagged as “J” for all detected results, qualified and flagged as “UJ” for all non-detect results where the internal standard recovery is equal to or greater than 10 percent, and rejected and flagged as “R” if the surrogate recovery is less than 10 percent. See the site-specific table in Attachments 1 through 10 for the data discussed below. Three investigation areas had samples results that were flagged due to internal standards results.

- **AOC 4.** One VOC (SW8260B) sample had an internal standard recovery less than the LCL; the associated analytes were qualified as described above. One PAH (SW8270SIM) sample had an internal standard recovery greater than the UCL; the associated detected analytes were qualified as described above. See Attachment D4, Table D4-1.
- **AOC 14.** One VOC (SW8260B) sample had four internal standards recovered at less than the LCL; the associated analytes were qualified as described above. See Attachment D9, Table D9-1.
- **300B.** One VOC (SW8260B) sample had an internal standard recovery less than the LCL; the associated analytes were qualified as described above. See Attachment D10, Table D10-1.

D.3.9.2 Contamination

VOC soil samples were collected following the Method SW5035A protocols. Based on Method SW5035A there are multiple methods of preservation. Because soil samples that contain carbonate minerals may effervesce upon contact with sodium bisulfate preservative (the "normal" preservative), to reduce the possibility of gas forming in the samples vials, the VOC samples were collected using a minimum of three pre-weighed vials—two containing reagent water and one preserved with methanol.

During the process of VOC analysis, ATL determined that the reagent water certified pre-weighed vials it received from its supplier were contaminated with acetone. After analyzing approximately a dozen vials from new cases within the lot purchased, the laboratory determined the concentration of acetone varied from non-detect to over 2,000 micrograms per kilogram. Because of the highly variable concentration, it was decided to reject all detected acetone results. Acetone data from seven of the investigation areas were rejected. See the site-specific table in Appendix H of the Data Gaps Report for the data discussed below.

- **SWMU 1.** Twenty-two of 132 samples had acetone detects; acetone detects were rejected and flagged as "R." See Attachment D2, Table D2-1.
- **AOC 1.** Twelve of 90 samples had acetone detects; acetone detects were rejected and flagged as "R." See Attachment D3, Table D3-1.
- **AOC 9.** Nine of 19 samples had acetone detects; acetone detects were rejected and flagged as "R." See Attachment D5, Table D5-1.
- **AOC 10.** Thirty-one of 57 samples had acetone detects; acetone detects were rejected and flagged as "R." See Attachment D6, Table D6-1.
- **AOC 11.** Twenty-four of 38 samples had acetone detects; acetone detects were rejected and flagged as "R." See Attachment D7, Table D7-1.
- **AOC 12.** Six of 16 samples had acetone detects; acetone detects were rejected and flagged as "R." See Attachment D8, Table D8-1.
- **AOC 14.** Twenty-six of 75 samples had acetone detects; acetone detects were rejected and flagged as "R." See Attachment D9, Table D9-1.

D.3.9.3 Retention Time Window

Retention time is one form of measurement associated with liquid and gas chromatography. Ion chromatography introduces a sample, either manually or with an auto sampler, into a sample loop of known volume. A buffered aqueous solution known as the mobile phase carries the sample from the loop onto a column that contains some form of stationary phase material. The time it takes for an analyte to move from the injection loop, through the column, to the detector is referred to as the retention time. Because retention times vary with the identity of the component, they are used for qualitative analysis. Once the laboratory has established a retention time window (the laboratory averages the retention time of multiple standards and calculates a retention time window by using ± 3 times the standard deviation from the average), the retention time is used to positively identify the analyte in subsequent samples.

When a sample's chromatogram has a "suspect peak" (that is believed to be the analyte in question, but is not within the retention time window), the analyst should dilute and re-analyze the sample with the suspect peak to positively identify the analyte. If the sample is not re-analyzed, a detect sample result is qualified and flagged as "J"; a non-detect result is qualified and flagged as "UJ."

Two Cr(VI) samples from SWMU 1 had a chromatogram peak that was not within the retention time window. The detected results were qualified and flagged as "J." See Attachment D2, Table D2-1.

D.3.9.4 Matrix Interference

Matrix interference was encountered in many of the soil samples. Some interferences are listed in the method for metals (SW6010B), and others can be inferred from poor MS/MSD (all methods), surrogate (organic methods), or internal standard (mass spectrometer methods) recovery. Matrix interference may require a dilution, resulting in the sample being reported at an elevated reporting level. Alternatively, matrix interference may require the sample result be qualified due to poor MS/MSD, surrogate, or internal standard recovery.

D.3.10 Laboratory Duplicates

Laboratory duplicates measure laboratory precision. RPDs that exceed method criteria indicate imprecision in some aspect of the analytical procedure.

The laboratory analyzed duplicate aliquots of field samples at the required frequency. The quality control acceptance criteria for laboratory duplicates were met for all methods.

D.3.11 Chain of Custody/Sample Receipt

Samples are collected under chain of custody to ensure that sample integrity is documented and known from the time of collection through receipt at the laboratory, where custody is relinquished to the laboratory.

Each sample was documented in a completed chain of custody and was received by the laboratory courier in good condition. All discrepancies identified by the laboratory were promptly resolved.

All samples were transported to the laboratories by couriers provided by the laboratories.

D.4 References

CH2M HILL. 2006. *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A*.

__________. 2008a. *PG&E Program Quality Assurance Project Plan*.

__________. 2008b. *Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil*.

__________. 2008c. *Final Soil and Sediment Data Usability Technical Memorandum, PG&E Topock Compressor Station*. August 29.

United States Environmental Protection Agency (USEPA). 1999. *USEPA National Functional Guidelines for Organic Data Review.*

__________. 2002. *Contract Laboratory National Functional Guidelines for Inorganic Data Review*. July.

Attachment D1
Summary of Samples Qualified in Background (BKG)

TABLE D1-1
Topock Soil RFI/RI Part A – BKG
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
NA	NA	NA	NA	NA	NA	NA	HT>UCL
Continuing Calibration Summary							
NA	NA	NA	NA	NA	NA	NA	CCV<LCL
Field Duplicate Summary							
NA	NA	NA	NA	NA	NA	NA	FD>RPD
Laboratory Control Sample Summary							
NA	NA	NA	NA	NA	NA	NA	LCS>UCL
Matrix Spike Summary							
N002154	BKG-07-11024	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
N002058	BKG-08-11029	SW6010B	Antimony	mg/Kg	10	UJ	MS<LCL
N002186	BKG-17-11061	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
Matrix Spike Duplicate Summary							
N002154	BKG-07-11024	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
N002154	BKG-07-11024	SW6010B	Barium	mg/Kg	190	J	SD<LCL
N002058	BKG-08-11029	SW6010B	Antimony	mg/Kg	10	UJ	SD<LCL
N002186	BKG-17-11061	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
Serial Dilution Summary							
NA	NA	NA	NA	NA	NA	NA	SerDil
Surrogate Summary							
NA	NA	NA	NA	NA	NA	NA	Sur<LCL
NA	NA	NA	NA	NA	NA	NA	Sur>UCL
Contamination Summary							
NA	NA	NA	NA	NA	NA	NA	Reject Contamination

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.

FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.

HT>UCL = Holding time exceeded the upper control limit.

LCS>UCL = Laboratory Control Sample greater than upper control limit.

MS<LCL = Matrix spike recovery less than lower control limit.

RejectContamination = Result was rejected due to possible contamination.

TABLE D1-1
Topock Soil RFI/RI Part A – BKG
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason

SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.
Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D1-2
Topock Soil RFI/RI Part A Field Duplicate Pairs - BKG
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
BKG-04-11011	BKG-04-11012	BKG-11-11034	BKG-11-11035
BKG-07-11023	BKG-07-11024	BKG-14-11045	BKG-14-11046

TABLE D1-3
Topock Soil RFI/RI Part A - BKG - Equipment Blank Summary Table
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
N002184	BKG-16-11054	SW6010B	Sodium	mg/Kg	240	U	EB>RL	1200
N002184	BKG-16-11055	SW6010B	Sodium	mg/Kg	700	U	EB>RL	1200
N002184	BKG-16-11056	SW6010B	Sodium	mg/Kg	1100	U	EB>RL	1200
N002184	BKG-16-11057	SW6010B	Sodium	mg/Kg	850	U	EB>RL	1200

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:

EB>RL = Equipment blank contamination greater than the reporting limit

Attachment D2

Summary of Samples Qualified in SWMU 1

TABLE D2-1
Topock Soil RFI/RI Part A – SWMU 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
N002326	SWMU1-15-1076	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1221	µg/Kg	35	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-15-1076	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-3-1010	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1016	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1221	µg/Kg	35	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1232	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1242	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1248	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1254	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1260	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1262	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-5h-2028	SW8082	Aroclor 1268	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1221	µg/Kg	33	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6a-2033	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL

TABLE D2-1
Topock Soil RFI/RI Part A – SWMU 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP-6h-2041	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1016	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1221	µg/Kg	37	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1232	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1242	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1248	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1254	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1260	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1262	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP7-2047	SW8082	Aroclor 1268	µg/Kg	18	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	SWMU1-WP8-2054	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
Continuing Calibration Summary							
N002182	SWMU1-15-1087	SW8260B	Bromoform	µg/Kg	5.2	UJ	CCV<LCL
N002182	SWMU1-15-1089	SW8260B	Bromoform	µg/Kg	6	UJ	CCV<LCL
Field Duplicate Summary							
N002170	SWMU1-17-1097	SW6010B	Chromium	mg/Kg	43	J	FD>RPD
N002170	SWMU1-17-1098	SW6010B	Chromium	mg/Kg	53	J	FD>RPD
N002274	SWMU1-7-1043	SW6010B	Nickel	mg/Kg	14	J	FD>RPD
N002274	SWMU1-7-1044	SW6010B	Nickel	mg/Kg	11	J	FD>RPD
N002236	SWMU1-WP-6a-2033	SW6010B	Cobalt	mg/Kg	8.8	J	FD>RPD
N002236	SWMU1-WP-6a-2034	SW6010B	Cobalt	mg/Kg	11	J	FD>RPD
N002170	SWMU1-WP9-2061	SW6010B	Barium	mg/Kg	150	J	FD>RPD
N002170	SWMU1-WP9-2061	SW6010B	Chromium	mg/Kg	34	J	FD>RPD
N002170	SWMU1-WP9-2061	SW6010B	Cobalt	mg/Kg	9.5	J	FD>RPD
N002170	SWMU1-WP9-2061	SW6010B	Nickel	mg/Kg	20	J	FD>RPD
N002170	SWMU1-WP9-2062	SW6010B	Barium	mg/Kg	1900	J	FD>RPD
N002170	SWMU1-WP9-2062	SW6010B	Chromium	mg/Kg	20	J	FD>RPD
N002170	SWMU1-WP9-2062	SW6010B	Cobalt	mg/Kg	5.9	J	FD>RPD
N002170	SWMU1-WP9-2062	SW6010B	Nickel	mg/Kg	12	J	FD>RPD
N002173	SWMU1-15-1078	SW8260B	Acetone	µg/Kg	1400	J	FD>RPD
N002173	SWMU1-15-1079	SW8260B	Acetone	µg/Kg	830	J	FD>RPD
N002170	SWMU1-WP9-2061	SW8260B	Acetone	µg/Kg	52	UJ	FD>RPD
N002170	SWMU1-WP9-2062	SW8260B	Acetone	µg/Kg	960	J	FD>RPD

TABLE D2-1
Topock Soil RFI/RI Part A – SWMU 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Laboratory Control Sample Summary							
978650	SWMU1-16-1090	SW8015-E	TPH-Motor Oil	mg/kg	19.2	J	LCS>UCL
978650	SWMU1-16-1092	SW8015-E	TPH-Motor Oil	mg/kg	33.8	J	LCS>UCL
978650	SWMU1-17-1094	SW8015-E	TPH-Motor Oil	mg/kg	150	J	LCS>UCL
978650	SWMU1-17-1096	SW8015-E	TPH-Motor Oil	mg/kg	27.2	J	LCS>UCL
979189	SWMU1-9-1049	SW8015-E	TPH-Motor Oil	mg/kg	41.2	J	LCS>UCL
979189	SWMU1-9-1050	SW8015-E	TPH-Motor Oil	mg/kg	41.9	J	LCS>UCL
979189	SWMU1-9-1051	SW8015-E	TPH-Motor Oil	mg/kg	20.4	J	LCS>UCL
979189	SWMU1-9-1052	SW8015-E	TPH-Motor Oil	mg/kg	11.8	J	LCS>UCL
979189	SWMU1-WP-3a-2006	SW8015-E	TPH-Motor Oil	mg/kg	86	J	LCS>UCL
979189	SWMU1-WP-3a-2007	SW8015-E	TPH-Motor Oil	mg/kg	14.9	J	LCS>UCL
979189	SWMU1-WP-3a-2008	SW8015-E	TPH-Motor Oil	mg/kg	18.5	J	LCS>UCL
979189	SWMU1-WP-3a-2009	SW8015-E	TPH-Motor Oil	mg/kg	11.6	J	LCS>UCL
979189	SWMU1-WP-3a-2010	SW8015-E	TPH-Motor Oil	mg/kg	13.3	J	LCS>UCL
979189	SWMU1-WP-3a-2011	SW8015-E	TPH-Motor Oil	mg/kg	12.5	J	LCS>UCL
978650	SWMU1-WP9-2063	SW8015-E	TPH-Motor Oil	mg/kg	17.4	J	LCS>UCL
Matrix Spike Summary							
N002283	SWMU1-1-1001	SW6010B	Antimony	mg/Kg	2.4	UJ	MS<LCL
N002270	SWMU1-13-1066	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002173	SWMU1-15-1075	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002274	SWMU1-4-1025	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002236	SWMU1-WP-5a-2019	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002252	SWMU1-WP-5h-2027	SW6010B	Antimony	mg/Kg	2.2	UJ	MS<LCL
N002247	SWMU1-WP8-2057	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002236	SWMU1-WP-T3a-2076	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
978925	SWMU1-WP-5a-2022	SW7199	Chromium, hexavalent	mg/kg	0.42	UJ	MS<LCL
N002274	SWMU1-4-1025	SW8081A	Endrin ketone	µg/Kg	2	UJ	MS<LCL
N002236	SWMU1-WP-6a-2038	SW8270C	2,4-Dinitrophenol	µg/Kg	1600	UJ	MS<LCL
N002283	SWMU1-1-1001	SW8270C	Acetophenone	µg/Kg	840	UJ	MS<LCL
N002252	SWMU1-WP-1h-2001	SW8270C	Acetophenone	µg/Kg	730	UJ	MS<LCL
N002283	SWMU1-1-1001	SW8270C	Benzaldehyde	µg/Kg	840	UJ	MS<LCL
N002252	SWMU1-WP-1h-2001	SW8270C	Benzaldehyde	µg/Kg	730	UJ	MS<LCL
N002236	SWMU1-WP-5a-2019	SW8270C	Benzaldehyde	µg/Kg	710	UJ	MS<LCL
N002283	SWMU1-1-1004	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
N002170	SWMU1-17-1098	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
N002274	SWMU1-6-1038	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
N002236	SWMU1-WP-6a-2038	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
N002283	SWMU1-1-1001	SW8270C	Caprolactam	µg/Kg	400	UJ	MS<LCL
N002252	SWMU1-WP-1h-2001	SW8270C	Caprolactam	µg/Kg	340	UJ	MS<LCL
N002236	SWMU1-WP-5a-2019	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
Matrix Spike Duplicate Summary							
N002283	SWMU1-1-1001	SW6010B	Antimony	mg/Kg	2.4	UJ	SD<LCL

TABLE D2-1
Topock Soil RFI/RI Part A – SWMU 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002270	SWMU1-13-1066	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002173	SWMU1-15-1075	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002274	SWMU1-4-1025	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002236	SWMU1-WP-5a-2019	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002252	SWMU1-WP-5h-2027	SW6010B	Antimony	mg/Kg	2.2	UJ	SD<LCL
N002247	SWMU1-WP8-2057	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002236	SWMU1-WP-T3a-2076	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002274	SWMU1-4-1025	SW8081A	4,4´-DDE	µg/Kg	2	UJ	SD<LCL
N002274	SWMU1-4-1025	SW8081A	Dieldrin	µg/Kg	2	UJ	SD<LCL
N002274	SWMU1-4-1025	SW8081A	Endrin ketone	µg/Kg	2	UJ	SD<LCL
N002252	SWMU1-WP-1h-2001	SW8270C	Acetophenone	µg/Kg	730	UJ	SD<LCL
N002283	SWMU1-1-1001	SW8270C	Benzaldehyde	µg/Kg	840	UJ	SD<LCL
N002252	SWMU1-WP-1h-2001	SW8270C	Benzaldehyde	µg/Kg	730	UJ	SD<LCL
N002236	SWMU1-WP-5a-2019	SW8270C	Benzaldehyde	µg/Kg	710	UJ	SD<LCL
N002283	SWMU1-1-1004	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
N002170	SWMU1-17-1098	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
N002274	SWMU1-6-1038	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
N002236	SWMU1-WP-6a-2038	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
N002283	SWMU1-1-1001	SW8270C	Caprolactam	µg/Kg	400	UJ	SD<LCL
N002252	SWMU1-WP-1h-2001	SW8270C	Caprolactam	µg/Kg	340	UJ	SD<LCL
N002236	SWMU1-WP-5a-2019	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
Serial Dilution Summary							
N002173	SWMU1-15-1075	SW6010B	Iron	mg/Kg	20000	J	SerDil
N002236	SWMU1-WP-5a-2019	SW6010B	Iron	mg/Kg	23000	J	SerDil
N002236	SWMU1-WP-T3a-2076	SW6010B	Iron	mg/Kg	24000	J	SerDil
N002173	SWMU1-15-1075	SW6010B	Magnesium	mg/Kg	6900	J	SerDil
N002236	SWMU1-WP-T3a-2076	SW6010B	Magnesium	mg/Kg	8000	J	SerDil
N002173	SWMU1-15-1075	SW6010B	Manganese	mg/Kg	280	J	SerDil
N002173	SWMU1-15-1075	SW6010B	Potassium	mg/Kg	2800	J	SerDil
N002236	SWMU1-WP-5a-2019	SW6010B	Potassium	mg/Kg	2800	J	SerDil
N002252	SWMU1-WP-5h-2027	SW6010B	Potassium	mg/Kg	2300	J	SerDil
N002236	SWMU1-WP-T3a-2076	SW6010B	Potassium	mg/Kg	2900	J	SerDil
Surrogate Summary							
979189	SWMU1-WP-3a-2008	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
979189	SWMU1-WP-3a-2008	SW8015-E	TPH-Motor Oil	mg/kg	18.5	J	Sur<LCL
N002270	SWMU1-10-1054	SW8015-P	TPH-Gasoline	µg/Kg	910	UJ	Sur<LCL
N002173	SWMU1-15-1078	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	Sur<LCL
N002170	SWMU1-17-1095	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	Sur<LCL
N002236	SWMU1-WP10-2070	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	Sur<LCL
978650	SWMU1-16-1092	SW8015-E	TPH-Diesel	mg/kg	14.5	J	Sur>UCL
978650	SWMU1-16-1092	SW8015-E	TPH-Motor Oil	mg/kg	33.8	J	Sur>UCL
979189	SWMU1-WP-3a-2008	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
979189	SWMU1-WP-3a-2008	SW8015-E	TPH-Motor Oil	mg/kg	18.5	J	Sur<LCL

TABLE D2-1
Topock Soil RFI/RI Part A – SWMU 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002270	SWMU1-10-1054	SW8015-P	TPH-Gasoline	µg/Kg	910	UJ	Sur<LCL
N002173	SWMU1-15-1078	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	Sur<LCL
N002170	SWMU1-17-1095	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	Sur<LCL
N002236	SWMU1-WP10-2070	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	Sur<LCL
Contamination Summary							
N002173	SWMU1-15-1077	SW8260B	Acetone	µg/Kg	870	R	Reject Contamination
N002173	SWMU1-15-1078	SW8260B	Acetone	µg/Kg	1400	R	Reject Contamination
N002173	SWMU1-15-1079	SW8260B	Acetone	µg/Kg	830	R	Reject Contamination
N002173	SWMU1-15-1080	SW8260B	Acetone	µg/Kg	850	R	Reject Contamination
N002173	SWMU1-15-1081	SW8260B	Acetone	µg/Kg	350	R	Reject Contamination
N002173	SWMU1-15-1082	SW8260B	Acetone	µg/Kg	560	R	Reject Contamination
N002173	SWMU1-15-1083	SW8260B	Acetone	µg/Kg	870	R	Reject Contamination
N002173	SWMU1-15-1084	SW8260B	Acetone	µg/Kg	1200	R	Reject Contamination
N002173	SWMU1-15-1085	SW8260B	Acetone	µg/Kg	6100	R	Reject Contamination
N002173	SWMU1-15-1086	SW8260B	Acetone	µg/Kg	1300	R	Reject Contamination
N002182	SWMU1-15-1087	SW8260B	Acetone	µg/Kg	1900	R	Reject Contamination
N002182	SWMU1-15-1089	SW8260B	Acetone	µg/Kg	1600	R	Reject Contamination
N002170	SWMU1-16-1091	SW8260B	Acetone	µg/Kg	1500	R	Reject Contamination
N002170	SWMU1-16-1092	SW8260B	Acetone	µg/Kg	440	R	Reject Contamination
N002170	SWMU1-17-1095	SW8260B	Acetone	µg/Kg	970	R	Reject Contamination
N002170	SWMU1-17-1096	SW8260B	Acetone	µg/Kg	590	R	Reject Contamination
N002170	SWMU1-17-1098	SW8260B	Acetone	µg/Kg	630	R	Reject Contamination
N002170	SWMU1-WP9-2062	SW8260B	Acetone	µg/Kg	960	R	Reject Contamination
N002170	SWMU1-WP9-2063	SW8260B	Acetone	µg/Kg	510	R	Reject Contamination
N002170	SWMU1-WP9-2064	SW8260B	Acetone	µg/Kg	450	R	Reject Contamination
N002170	SWMU1-WP9-2065	SW8260B	Acetone	µg/Kg	1000	R	Reject Contamination

TABLE D2-1
Topock Soil RFI/RI Part A – SWMU 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002236	SWMU1-WP-T3a-2084	SW8260B	Acetone	µg/Kg	57	R	Reject Contamination
Laboratory Accuracy and Precision Summary							
979047	SWMU1-3-1013	SW7199	Chromium, hexavalent	mg/kg	1.55	J	LabA&P
978925	SWMU1-WP10-2070	SW7199	Chromium, hexavalent	mg/kg	0.494	J	LabA&P

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.
FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.
HT>UCL = Holding time exceeded the upper control limit.
LabA&P = Laboratory Accuracy and Precision
LCS>UCL = Laboratory Control Sample greater than upper control limit.
MS<LCL = Matrix spike recovery less than lower control limit.
Reject Contamination = Result was rejected due to possible contamination.
SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.
Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D2-2
Topock Soil RFI/RI Part A – SWMU 1 Field Duplicate Pairs
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
SWMU1-10-1055	SWMU1-10-1056	SWMU1-7-1043	SWMU1-7-1044
SWMU1-13-1067	SWMU1-13-1068	SWMU1-WP-3a-2010	SWMU1-WP-3a-2011
SWMU1-15-1078	SWMU1-15-1079	SWMU1-WP-5a-2021	SWMU1-WP-5a-2022
SWMU1-15-1084	SWMU1-15-1089	SWMU1-WP-6a-2033	SWMU1-WP-6a-2034
SWMU1-17-1097	SWMU1-17-1098	SWMU1-WP-6h-2042	SWMU1-WP-6h-2043
SWMU1-3-1010	SWMU1-3-1011	SWMU1-WP9-2061	SWMU1-WP9-2062
SWMU1-3-1020	SWMU1-3-1022	SWMU1-WP-T3a-2078	SWMU1-WP-T3a-2079
SWMU1-5-1032	SWMU1-5-1033		

TABLE D2-3
Topock Soil RFI/RI Part A – SWMU 1 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
N002247	SWMU1-3-1009	SW6010B	Sodium	mg/Kg	260	U	EB>RL	8000
N002236	SWMU1-WP-5a-2019	SW6010B	Sodium	mg/Kg	280	U	EB>RL	8200
N002236	SWMU1-WP-6a-2032	SW6010B	Sodium	mg/Kg	370	U	EB>RL	8200
N002247	SWMU1-WP-6h-2040	SW6010B	Sodium	mg/Kg	690	U	EB>RL	8200
N002247	SWMU1-WP7-2046	SW6010B	Sodium	mg/Kg	1000	U	EB>RL	8200
N002247	SWMU1-WP8-2053	SW6010B	Sodium	mg/Kg	320	U	EB>RL	8200
N002236	SWMU1-WP-T3a-2076	SW6010B	Sodium	mg/Kg	330	U	EB>RL	8200

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:
U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:
EB>RL = Equipment blank contamination greater than the RL.

Attachment D3
Summary of Samples Qualified in AOC 1

TABLE D3-1
Topock Soil RFI/RI Part A – AOC 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
N002326	AOC1-BCW1-101	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1221	µg/Kg	33	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC1-BCW1-101	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
Continuing Calibration Summary							
N002204	AOC1-T6a-087	SW8260B	Bromoform	µg/Kg	4.2	UJ	CCV<LCL
N002204	AOC1-T6a-088	SW8260B	Bromoform	µg/Kg	3.8	UJ	CCV<LCL
N002204	AOC1-T6b-092	SW8260B	Bromoform	µg/Kg	4	UJ	CCV<LCL
N002204	AOC1-T6b-093	SW8260B	Bromoform	µg/Kg	3.7	UJ	CCV<LCL
N002204	AOC1-T6b-099	SW8260B	Bromoform	µg/Kg	4	UJ	CCV<LCL
N002204	AOC1-T6c-096	SW8260B	Bromoform	µg/Kg	5	UJ	CCV<LCL
N002204	AOC1-T6c-097	SW8260B	Bromoform	µg/Kg	4.1	UJ	CCV<LCL
Field Duplicate Summary							
N002284	AOC1-T1b-005	SW6010B	Chromium	mg/Kg	43	J	FD>RPD
N002284	AOC1-T1b-006	SW6010B	Chromium	mg/Kg	33	J	FD>RPD
N002284	AOC1-T1c-011	SW6010B	Lead	mg/Kg	20	J	FD>RPD
N002284	AOC1-T1c-012	SW6010B	Lead	mg/Kg	32	J	FD>RPD
N002218	AOC1-T4b-065	SW6010B	Lead	mg/Kg	8.8	J	FD>RPD
N002218	AOC1-T4b-066	SW6010B	Lead	mg/Kg	7	J	FD>RPD
N002204	AOC1-T6b-094	SW6010B	Lead	mg/Kg	3.1	J	FD>RPD
N002204	AOC1-T6b-099	SW6010B	Lead	mg/Kg	8.5	J	FD>RPD
N002284	AOC1-T1c-011	SW6010B	Nickel	mg/Kg	11	J	FD>RPD
N002284	AOC1-T1c-012	SW6010B	Nickel	mg/Kg	14	J	FD>RPD
N002284	AOC1-T1c-011	SW6010B	Zinc	mg/Kg	82	J	FD>RPD
N002284	AOC1-T1c-012	SW6010B	Zinc	mg/Kg	110	J	FD>RPD
979247	AOC1-T1c-011	SW7199	Chromium, hexavalent	mg/kg	4.77	J	FD>RPD
979247	AOC1-T1c-012	SW7199	Chromium, hexavalent	mg/kg	3.58	J	FD>RPD
N002204	AOC1-T6b-094	SW8260B	Acetone	µg/Kg	470	J	FD>RPD
N002204	AOC1-T6b-099	SW8260B	Acetone	µg/Kg	170	J	FD>RPD
Laboratory Control Sample Summary							
978927	AOC1-BCW2-104	SW8015-E	TPH-Motor Oil	mg/kg	31	J	LCS>UCL
978927	AOC1-BCW2-105	SW8015-E	TPH-Motor Oil	mg/kg	11.1	J	LCS>UCL
978927	AOC1-BCW2-106	SW8015-E	TPH-Motor Oil	mg/kg	17.6	J	LCS>UCL
978927	AOC1-BCW3-108	SW8015-E	TPH-Motor Oil	mg/kg	21.6	J	LCS>UCL
978927	AOC1-BCW3-109	SW8015-E	TPH-Motor Oil	mg/kg	10.7	J	LCS>UCL
978927	AOC1-BCW4-113	SW8015-E	TPH-Motor Oil	mg/kg	17.8	J	LCS>UCL

TABLE D3-1
Topock Soil RFI/RI Part A – AOC 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
978927	AOC1-BCW5-117	SW8015-E	TPH-Motor Oil	mg/kg	30.1	J	LCS>UCL
978927	AOC1-BCW5-118	SW8015-E	TPH-Motor Oil	mg/kg	22.6	J	LCS>UCL
978927	AOC1-T4a-060	SW8015-E	TPH-Motor Oil	mg/kg	25	J	LCS>UCL
978927	AOC1-T4a-061	SW8015-E	TPH-Motor Oil	mg/kg	15.6	J	LCS>UCL
978927	AOC1-T5a-077	SW8015-E	TPH-Motor Oil	mg/kg	16.5	J	LCS>UCL
Matrix Spike Summary							
N002284	AOC1-T2b-019	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002261	AOC1-T2c-024	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002230	AOC1-T4c-069	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002230	AOC1-T5b-078	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002230	AOC1-BCW2-107	SW8270C	Benzoic acid	µg/Kg	1800	UJ	MS<LCL
N002058	AOC1-BCW6-122	SW8270C	Benzoic acid	µg/Kg	2300	UJ	MS<LCL
N002058	AOC1-BCW6-122	SW8270C	Hexachlorocyclopentadiene	µg/Kg	940	UJ	MS<LCL
N002284	AOC1-T1a-001	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002284	AOC1-T1a-004	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
N002284	AOC1-T2b-022	SW8270C	Benzoic acid	µg/Kg	1700	UJ	MS<LCL
N002204	AOC1-T6c-095	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002204	AOC1-T6c-097	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
Matrix Spike Duplicate Summary							
N002284	AOC1-T2b-019	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002261	AOC1-T2c-024	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002230	AOC1-T4c-069	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002230	AOC1-T5b-078	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002058	AOC1-BCW6-122	SW8270C	Hexachlorocyclopentadiene	µg/Kg	940	UJ	SD<LCL
N002284	AOC1-T1a-001	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002284	AOC1-T1a-004	SW8270C	Benzoic acid	µg/Kg	1700	UJ	SD<LCL
N002284	AOC1-T2b-022	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
N002204	AOC1-T6c-095	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002204	AOC1-T6c-097	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
Serial Dilution Summary							
N002284	AOC1-T2b-019	SW6010B	Potassium	mg/Kg	3000	J	SerDil
Surrogate Summary							
978927	AOC1-T4c-069	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T4c-070	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T4c-071	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T4c-072	SW8015-E	TPH-Diesel	mg/kg	10	R	Sur<LCL
978927	AOC1-T5a-073	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T5a-074	SW8015-E	TPH-Diesel	mg/kg	10	R	Sur<LCL
978927	AOC1-T5b-081	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T4c-069	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T4c-070	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T4c-071	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL

TABLE D3-1
Topock Soil RFI/RI Part A – AOC 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
978927	AOC1-T4c-072	SW8015-E	TPH-Motor Oil	mg/kg	10	R	Sur<LCL
978927	AOC1-T5a-073	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T5a-074	SW8015-E	TPH-Motor Oil	mg/kg	10	R	Sur<LCL
978927	AOC1-T5b-081	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
978927	AOC1-T5a-077	SW8015-E	TPH-Motor Oil	mg/kg	16.5	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Benzo(a)anthracene	µg/Kg	7.9	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Benzo(a)pyrene	µg/Kg	10	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	9.7	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	7.7	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	11	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Chrysene	µg/Kg	10	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Fluoranthene	µg/Kg	19	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	7.3	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Phenanthrene	µg/Kg	6.2	J	Sur>UCL
N002230	AOC1-BCW2-105	SW8270SIM	Pyrene	µg/Kg	16	J	Sur>UCL
Contamination Summary							
N002284	AOC1-T1a-003	SW8260B	Acetone	µg/Kg	51	R	Reject Contamination
N002284	AOC1-T1b-009	SW8260B	Acetone	µg/Kg	65	R	Reject Contamination
N002284	AOC1-T3b-053	SW8260B	Acetone	µg/Kg	69	R	Reject Contamination
N002204	AOC1-T6a-087	SW8260B	Acetone	µg/Kg	230	R	Reject Contamination
N002204	AOC1-T6a-088	SW8260B	Acetone	µg/Kg	100	R	Reject Contamination
N002204	AOC1-T6a-090	SW8260B	Acetone	µg/Kg	86	R	Reject Contamination
N002204	AOC1-T6b-092	SW8260B	Acetone	µg/Kg	210	R	Reject Contamination
N002204	AOC1-T6b-093	SW8260B	Acetone	µg/Kg	150	R	Reject Contamination
N002204	AOC1-T6b-094	SW8260B	Acetone	µg/Kg	470	R	Reject Contamination
N002204	AOC1-T6b-099	SW8260B	Acetone	µg/Kg	170	R	Reject Contamination
N002204	AOC1-T6c-096	SW8260B	Acetone	µg/Kg	180	R	Reject Contamination
N002204	AOC1-T6c-097	SW8260B	Acetone	µg/Kg	300	R	Reject Contamination

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

TABLE D3-1
Topock Soil RFI/RI Part A – AOC 1
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason

Validation Reasons:
CCV<LCL = Continuing calibration recovery less than the lower control limit.
FD>RPD = Field duplicate's relative percent difference is greater than the control limit.
HT>UCL = Holding time exceeded the upper control limit.
LCS>UCL = Laboratory Control Sample greater than upper control limit.
MS<LCL = Matrix spike recovery less than lower control limit.
RejectContamination = Result was rejected due to possible contamination.
SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.
Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D3-2
Topock Soil RFI/RI Part A - AOC1-*Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
AOC1-BCW3-111	AOC1-BCW3-112	AOC1-T2e-043	AOC1-T2e-044
AOC1-BCW5-120	AOC1-BCW5-121	AOC1-T3b-054	AOC1-T3b-055
AOC1-T1b-005	AOC1-T1b-006	AOC1-T4b-065	AOC1-T4b-066
AOC1-T1c-011	AOC1-T1c-012	AOC1-T5a-076	AOC1-T5a-077
AOC1-T2b-022	AOC1-T2b-023	AOC1-T6a-087	AOC1-T6a-088
AOC1-T2d-033	AOC1-T2d-034	AOC1-T6b-094	AOC1-T6b-099

TABLE D3-3
Topock Soil RFI/RI Part A - AOC1 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
N002230	AOC1-BCW5-120	SW6010B	Copper	mg/Kg	7.4	U	EB>RL	15
N002230	AOC1-BCW5-121	SW6010B	Copper	mg/Kg	7.3	U	EB>RL	15
N002230	AOC1-BCW5-117	SW6010B	Sodium	mg/Kg	360	U	EB>RL	7800
N002235	AOC1-T3a-047	SW6010B	Sodium	mg/Kg	250	U	EB>RL	7900
N002230	AOC1-T4c-069	SW6010B	Sodium	mg/Kg	240	U	EB>RL	8000
N002230	AOC1-T5b-078	SW6010B	Sodium	mg/Kg	210	U	EB>RL	8000

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:
U = the analyte is qualified as "not detected" due to blank contamination.

Validation Reasons:
EB>RL = Equipment blank contamination greater than the RL.

Attachment D4
Summary of Samples Qualified in AOC 4

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
978924	AOC4-Wood1-3070R	SW7199	Chromium, hexavalent	mg/kg	47.7	J	HT>UCL
978924	AOC4-Wood2-3071R	SW7199	Chromium, hexavalent	mg/kg	89.2	J	HT>UCL
979250	AOC4-12-3037R	SW8015-E	TPH-Diesel	mg/kg	67.7	J	HT>UCL
979250	AOC4-12-3037R	SW8015-E	TPH-Motor Oil	mg/kg	54.4	J	HT>UCL
979250	AOC4-12-3038R	SW8015-E	TPH-Diesel	mg/kg	48.4	J	HT>UCL
979250	AOC4-12-3038R	SW8015-E	TPH-Motor Oil	mg/kg	43.1	J	HT>UCL
979387	AOC4-B10-11005	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979387	AOC4-B10-11005	SW8015-E	TPH-Motor Oil	mg/kg	51.4	J	HT>UCL
979387	AOC4-B20-11006	SW8015-E	TPH-Diesel	mg/kg	10.2	J	HT>UCL
979387	AOC4-B20-11006	SW8015-E	TPH-Motor Oil	mg/kg	67.6	J	HT>UCL
979387	AOC4-B30-11007	SW8015-E	TPH-Diesel	mg/kg	57.9	J	HT>UCL
979387	AOC4-B30-11007	SW8015-E	TPH-Motor Oil	mg/kg	541	J	HT>UCL
979387	AOC4-D10-11013	SW8015-E	TPH-Diesel	mg/kg	95.4	J	HT>UCL
979387	AOC4-D10-11013	SW8015-E	TPH-Motor Oil	mg/kg	219	J	HT>UCL
979387	AOC4-D20-11014	SW8015-E	TPH-Diesel	mg/kg	10	J	HT>UCL
979387	AOC4-D20-11014	SW8015-E	TPH-Motor Oil	mg/kg	59.7	J	HT>UCL
979387	AOC4-D30-11015	SW8015-E	TPH-Diesel	mg/kg	12.2	J	HT>UCL
979387	AOC4-D30-11015	SW8015-E	TPH-Motor Oil	mg/kg	83.5	J	HT>UCL
979387	AOC4-DE5-11002	SW8015-E	TPH-Diesel	mg/kg	73.8	J	HT>UCL
979387	AOC4-DE5-11002	SW8015-E	TPH-Motor Oil	mg/kg	186	J	HT>UCL
979387	AOC4-GH10-11029	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979387	AOC4-GH10-11029	SW8015-E	TPH-Motor Oil	mg/kg	20.6	J	HT>UCL
979387	AOC4-GH30-11031	SW8015-E	TPH-Diesel	mg/kg	72.9	J	HT>UCL
979387	AOC4-GH30-11031	SW8015-E	TPH-Motor Oil	mg/kg	334	J	HT>UCL
979387	AOC4-I20-11038	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979387	AOC4-I20-11038	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979387	AOC4-I30-11039	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979387	AOC4-I30-11039	SW8015-E	TPH-Motor Oil	mg/kg	10.3	J	HT>UCL
979387	AOC4-Z25-11001	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979387	AOC4-Z25-11001	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	4,4´-DDD	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	4,4´-DDE	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	4,4´-DDT	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Aldrin	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	alpha-BHC	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	alpha-Chlordane	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	beta-BHC	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	delta-BHC	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Dieldrin	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Endosulfan I	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Endosulfan II	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Endosulfan sulfate	µg/Kg	2.3	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-DE5-11002	SW8081A	Endrin	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Endrin aldehyde	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Endrin ketone	µg/Kg	2.3	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	gamma-BHC	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	gamma-Chlordane	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Heptachlor	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Heptachlor epoxide	µg/Kg	1.1	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Methoxychlor	µg/Kg	5.7	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8081A	Toxaphene	µg/Kg	57	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1016	µg/Kg	19	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1221	µg/Kg	37	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1232	µg/Kg	19	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1242	µg/Kg	19	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1248	µg/Kg	19	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1254	µg/Kg	780	J	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1260	µg/Kg	19	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1262	µg/Kg	19	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8082	Aroclor 1268	µg/Kg	19	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	1,2-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	1,3-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	1,4-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2,4,6-Trichlorophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2,4-Dichlorophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2,4-Dimethylphenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2,4-Dinitrophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2,4-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2,6-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2-Chloronaphthalene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2-Chlorophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2-Methylnaphthalene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2-Methylphenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	2-Nitrophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	3-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1700	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	4-Bromophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	4-Chloro-3-methylphenol	µg/Kg	660	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	4-Chloroaniline	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	4-Methylphenol	µg/Kg	330	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002285	AOC4-12-3037R	SW8270C	4-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	4-Nitrophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Acenaphthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Acenaphthylene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Anthracene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Benzo(a)anthracene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Benzo(a)pyrene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Benzo(b)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Benzo(g,h,i)perylene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Benzo(k)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Benzoic acid	µg/Kg	1700	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Benzyl alcohol	µg/Kg	660	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Butylbenzylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Chrysene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Dibenz(a,h)anthracene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Dibenzofuran	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Diethylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Dimethylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Di-n-butylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Di-n-octylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Fluoranthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Fluorene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Hexachlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Hexachlorobutadiene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Hexachloroethane	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Isophorone	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Naphthalene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Nitrobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	N-Nitrosodiphenylamine	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Pentachlorophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Phenanthrene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Phenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270C	Pyrene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	1,2-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	1,3-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	1,4-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002285	AOC4-12-3038R	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2,4,6-Trichlorophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2,4-Dichlorophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2,4-Dimethylphenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2,4-Dinitrophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2,4-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2,6-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2-Chloronaphthalene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2-Chlorophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2-Methylnaphthalene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2-Methylphenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	2-Nitrophenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	3-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1700	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4-Bromophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4-Chloro-3-methylphenol	µg/Kg	660	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4-Chloroaniline	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4-Methylphenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	4-Nitrophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Acenaphthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Acenaphthylene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Anthracene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Benzo(a)anthracene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Benzo(a)pyrene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Benzo(b)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Benzo(g,h,i)perylene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Benzo(k)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Benzoic acid	µg/Kg	1700	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Benzyl alcohol	µg/Kg	660	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Butylbenzylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Chrysene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Dibenz(a,h)anthracene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Dibenzofuran	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Diethylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Dimethylphthalate	µg/Kg	330	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002285	AOC4-12-3038R	SW8270C	Di-n-butylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Di-n-octylphthalate	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Fluoranthene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Fluorene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Hexachlorobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Hexachlorobutadiene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Hexachloroethane	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Isophorone	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Naphthalene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Nitrobenzene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	N-Nitrosodiphenylamine	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Pentachlorophenol	µg/Kg	1600	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Phenanthrene	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Phenol	µg/Kg	330	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270C	Pyrene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	1,2-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	1,3-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	1,4-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2,4,6-Trichlorophenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2,4-Dichlorophenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2,4-Dimethylphenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2,4-Dinitrophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2,4-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2,6-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2-Chloronaphthalene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2-Chlorophenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2-Methylnaphthalene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2-Methylphenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	2-Nitrophenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	3-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	4-Bromophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	4-Chloro-3-methylphenol	µg/Kg	670	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	4-Chloroaniline	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	4-Methylphenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	4-Nitroaniline	µg/Kg	1600	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-B10-11005	SW8270C	4-Nitrophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Acenaphthene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Acenaphthylene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Anthracene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Benzo(a)anthracene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Benzo(a)pyrene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Benzo(b)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Benzo(g,h,i)perylene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Benzo(k)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Benzoic acid	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Benzyl alcohol	µg/Kg	670	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Butylbenzylphthalate	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Chrysene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Dibenz(a,h)anthracene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Dibenzofuran	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Diethylphthalate	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Dimethylphthalate	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Di-n-butylphthalate	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Di-n-octylphthalate	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Fluoranthene	µg/Kg	370	J	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Fluorene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Hexachlorobenzene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Hexachlorobutadiene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Hexachloroethane	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Isophorone	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Naphthalene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Nitrobenzene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	N-Nitrosodiphenylamine	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Pentachlorophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Phenanthrene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Phenol	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270C	Pyrene	µg/Kg	330	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	1,2-Dichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	1,3-Dichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	1,4-Dichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1700	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-B20-11006	SW8270C	2,4,6-Trichlorophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2,4-Dichlorophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2,4-Dimethylphenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2,4-Dinitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2,4-Dinitrotoluene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2,6-Dinitrotoluene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2-Chloronaphthalene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2-Chlorophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2-Methylnaphthalene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2-Methylphenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	2-Nitrophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	3-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4-Bromophenyl-phenylether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4-Chloro-3-methylphenol	µg/Kg	690	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4-Chloroaniline	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4-Methylphenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	4-Nitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Acenaphthene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Acenaphthylene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Anthracene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Benzo(a)anthracene	µg/Kg	600	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Benzo(a)pyrene	µg/Kg	600	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Benzo(b)fluoranthene	µg/Kg	1300	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Benzo(g,h,i)perylene	µg/Kg	430	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Benzo(k)fluoranthene	µg/Kg	410	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Benzoic acid	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Benzyl alcohol	µg/Kg	690	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Butylbenzylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Chrysene	µg/Kg	730	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Dibenz(a,h)anthracene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Dibenzofuran	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Diethylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Dimethylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Di-n-butylphthalate	µg/Kg	340	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-B20-11006	SW8270C	Di-n-octylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Fluoranthene	µg/Kg	860	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Fluorene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Hexachlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Hexachlorobutadiene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Hexachloroethane	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	370	J	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Isophorone	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Naphthalene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Nitrobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	N-Nitrosodiphenylamine	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Pentachlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Phenanthrene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Phenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270C	Pyrene	µg/Kg	810	J	HT>UCL
N002309	AOC4-B30-11007	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	1,2-Dichlorobenzene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	1,3-Dichlorobenzene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	1,4-Dichlorobenzene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2,4,5-Trichlorophenol	µg/Kg	2200	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2,4,6-Trichlorophenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2,4-Dichlorophenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2,4-Dimethylphenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2,4-Dinitrophenol	µg/Kg	2200	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2,4-Dinitrotoluene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2,6-Dinitrotoluene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2-Chloronaphthalene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2-Chlorophenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2-Methylnaphthalene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2-Methylphenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2-Nitroaniline	µg/Kg	2200	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	2-Nitrophenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	3-Nitroaniline	µg/Kg	2200	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	2300	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4-Bromophenyl-phenylether	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4-Chloro-3-methylphenol	µg/Kg	900	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4-Chloroaniline	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4-Methylphenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4-Nitroaniline	µg/Kg	2200	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	4-Nitrophenol	µg/Kg	2200	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-B30-11007	SW8270C	Acenaphthene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Acenaphthylene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Anthracene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Benzo(a)anthracene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Benzo(a)pyrene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Benzo(b)fluoranthene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Benzo(g,h,i)perylene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Benzo(k)fluoranthene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Benzoic acid	µg/Kg	2300	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Benzyl alcohol	µg/Kg	900	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Butylbenzylphthalate	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Chrysene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Dibenz(a,h)anthracene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Dibenzofuran	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Diethylphthalate	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Dimethylphthalate	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Di-n-butylphthalate	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Di-n-octylphthalate	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Fluoranthene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Fluorene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Hexachlorobenzene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Hexachlorobutadiene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Hexachloroethane	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Isophorone	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Naphthalene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Nitrobenzene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	N-Nitrosodiphenylamine	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Pentachlorophenol	µg/Kg	2200	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Phenanthrene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Phenol	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270C	Pyrene	µg/Kg	450	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	1,2-Dichlorobenzene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	1,3-Dichlorobenzene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	1,4-Dichlorobenzene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2,4,5-Trichlorophenol	µg/Kg	8800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2,4,6-Trichlorophenol	µg/Kg	1800	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-D10-11013	SW8270C	2,4-Dichlorophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2,4-Dimethylphenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2,4-Dinitrophenol	µg/Kg	8800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2,4-Dinitrotoluene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2,6-Dinitrotoluene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2-Chloronaphthalene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2-Chlorophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2-Methylnaphthalene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2-Methylphenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2-Nitroaniline	µg/Kg	8800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	2-Nitrophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	3-Nitroaniline	µg/Kg	8800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	9100	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4-Bromophenyl-phenylether	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4-Chloro-3-methylphenol	µg/Kg	3600	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4-Chloroaniline	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4-Methylphenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4-Nitroaniline	µg/Kg	8800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	4-Nitrophenol	µg/Kg	8800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Acenaphthene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Acenaphthylene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Anthracene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Benzo(a)anthracene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Benzo(a)pyrene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Benzo(b)fluoranthene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Benzo(g,h,i)perylene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Benzo(k)fluoranthene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Benzoic acid	µg/Kg	9100	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Benzyl alcohol	µg/Kg	3600	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Butylbenzylphthalate	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Chrysene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Dibenz(a,h)anthracene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Dibenzofuran	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Diethylphthalate	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Dimethylphthalate	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Di-n-butylphthalate	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Di-n-octylphthalate	µg/Kg	1800	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-D10-11013	SW8270C	Fluoranthene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Fluorene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Hexachlorobenzene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Hexachlorobutadiene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Hexachloroethane	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Isophorone	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Naphthalene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Nitrobenzene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	N-Nitrosodiphenylamine	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Pentachlorophenol	µg/Kg	8800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Phenanthrene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Phenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270C	Pyrene	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	1,2-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	1,3-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	1,4-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2,4,6-Trichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2,4-Dichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2,4-Dimethylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2,4-Dinitrophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2,4-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2,6-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2-Chloronaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2-Chlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2-Methylnaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	2-Nitrophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	3-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4-Bromophenyl-phenylether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4-Chloro-3-methylphenol	µg/Kg	730	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4-Chloroaniline	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	4-Nitrophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Acenaphthene	µg/Kg	360	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-D20-11014	SW8270C	Acenaphthylene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Benzo(a)anthracene	µg/Kg	1700	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Benzo(a)pyrene	µg/Kg	1100	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Benzo(b)fluoranthene	µg/Kg	2000	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Benzo(g,h,i)perylene	µg/Kg	900	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Benzo(k)fluoranthene	µg/Kg	670	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Benzoic acid	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Benzyl alcohol	µg/Kg	730	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Butylbenzylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Chrysene	µg/Kg	1700	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Dibenz(a,h)anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Dibenzofuran	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Diethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Dimethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Di-n-butylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Di-n-octylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Fluoranthene	µg/Kg	3700	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Fluorene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Hexachlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Hexachlorobutadiene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Hexachloroethane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	800	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Isophorone	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Naphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Nitrobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	N-Nitrosodiphenylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Pentachlorophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Phenanthrene	µg/Kg	2100	J	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Phenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270C	Pyrene	µg/Kg	3300	J	HT>UCL
N002309	AOC4-D30-11015	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	1,2-Dichlorobenzene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	1,3-Dichlorobenzene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	1,4-Dichlorobenzene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2,4,5-Trichlorophenol	µg/Kg	4100	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2,4,6-Trichlorophenol	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2,4-Dichlorophenol	µg/Kg	850	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-D30-11015	SW8270C	2,4-Dimethylphenol	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2,4-Dinitrophenol	µg/Kg	4100	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2,4-Dinitrotoluene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2,6-Dinitrotoluene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2-Chloronaphthalene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2-Chlorophenol	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2-Methylnaphthalene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2-Methylphenol	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2-Nitroaniline	µg/Kg	4100	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	2-Nitrophenol	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	3-Nitroaniline	µg/Kg	4100	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	4300	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4-Bromophenyl-phenylether	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4-Chloro-3-methylphenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4-Chloroaniline	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4-Methylphenol	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4-Nitroaniline	µg/Kg	4100	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	4-Nitrophenol	µg/Kg	4100	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Acenaphthene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Acenaphthylene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Anthracene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Benzo(a)anthracene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Benzo(a)pyrene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Benzo(b)fluoranthene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Benzo(g,h,i)perylene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Benzo(k)fluoranthene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Benzoic acid	µg/Kg	4300	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Benzyl alcohol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Butylbenzylphthalate	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Chrysene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Dibenz(a,h)anthracene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Dibenzofuran	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Diethylphthalate	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Dimethylphthalate	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Di-n-butylphthalate	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Di-n-octylphthalate	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Fluoranthene	µg/Kg	850	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-D30-11015	SW8270C	Fluorene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Hexachlorobenzene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Hexachlorobutadiene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Hexachloroethane	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Isophorone	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Naphthalene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Nitrobenzene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	N-Nitrosodiphenylamine	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Pentachlorophenol	µg/Kg	4100	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Phenanthrene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Phenol	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270C	Pyrene	µg/Kg	850	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	1,1´-Biphenyl	µg/Kg	790	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	1,2,4,5-Tetrachlorobenzene	µg/Kg	790	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	1,2-Dichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	1,3-Dichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	1,4-Dichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	1,4-Dioxane	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,3,4,6-Tetrachlorophenol	µg/Kg	790	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,4,6-Trichlorophenol	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,4-Dichlorophenol	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,4-Dimethylphenol	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,4-Dinitrophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,4-Dinitrotoluene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2,6-Dinitrotoluene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2-Chloronaphthalene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2-Chlorophenol	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2-Methylnaphthalene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2-Methylphenol	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	2-Nitrophenol	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	3-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1900	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	4-Bromophenyl-phenylether	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	4-Chloro-3-methylphenol	µg/Kg	750	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	4-Chloroaniline	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	4-Methylphenol	µg/Kg	370	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-DE5-11002	SW8270C	4-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	4-Nitrophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Acenaphthene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Acenaphthylene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Acetophenone	µg/Kg	790	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Anthracene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Atrazine	µg/Kg	790	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzaldehyde	µg/Kg	790	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzo(a)anthracene	µg/Kg	470	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzo(a)pyrene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzo(b)fluoranthene	µg/Kg	1200	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzo(g,h,i)perylene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzo(k)fluoranthene	µg/Kg	380	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzoic acid	µg/Kg	1900	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Benzyl alcohol	µg/Kg	750	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Butylbenzylphthalate	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Caprolactam	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Carbazole	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Chrysene	µg/Kg	940	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Dibenz(a,h)anthracene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Dibenzofuran	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Diethylphthalate	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Dimethylphthalate	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Di-n-butylphthalate	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Di-n-octylphthalate	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Fluoranthene	µg/Kg	2200	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Fluorene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Hexachlorobenzene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Hexachlorobutadiene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Hexachlorocyclopentadiene	µg/Kg	750	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Hexachloroethane	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Isophorone	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Naphthalene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Nitrobenzene	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	N-Nitrosodiphenylamine	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Pentachlorophenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Phenanthrene	µg/Kg	1200	J	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-DE5-11002	SW8270C	Phenol	µg/Kg	370	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270C	Pyrene	µg/Kg	1500	J	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	1,2-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	1,3-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	1,4-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2,4,6-Trichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2,4-Dichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2,4-Dimethylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2,4-Dinitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2,4-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2,6-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2-Chloronaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2-Chlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2-Methylnaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	2-Nitrophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	3-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4-Bromophenyl-phenylether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4-Chloro-3-methylphenol	µg/Kg	720	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4-Chloroaniline	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	4-Nitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Acenaphthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Acenaphthylene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Benzo(a)anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Benzo(a)pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Benzo(b)fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Benzo(g,h,i)perylene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Benzo(k)fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Benzoic acid	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Benzyl alcohol	µg/Kg	720	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	360	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-GH10-11029	SW8270C	Butylbenzylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Chrysene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Dibenz(a,h)anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Dibenzofuran	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Diethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Dimethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Di-n-butylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Di-n-octylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Fluorene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Hexachlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Hexachlorobutadiene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Hexachloroethane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Isophorone	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Naphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Nitrobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	N-Nitrosodiphenylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Pentachlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Phenanthrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Phenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270C	Pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	1,2-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	1,3-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	1,4-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2,4,6-Trichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2,4-Dichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2,4-Dimethylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2,4-Dinitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2,4-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2,6-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2-Chloronaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2-Chlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2-Methylnaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	2-Nitrophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	3-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1800	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-GH30-11031	SW8270C	4-Bromophenyl-phenylether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	4-Chloro-3-methylphenol	µg/Kg	720	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	4-Chloroaniline	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	4-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	4-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	4-Nitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Acenaphthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Acenaphthylene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Benzo(a)anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Benzo(a)pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Benzo(b)fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Benzo(g,h,i)perylene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Benzo(k)fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Benzoic acid	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Benzyl alcohol	µg/Kg	720	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Butylbenzylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Chrysene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Dibenz(a,h)anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Dibenzofuran	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Diethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Dimethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Di-n-butylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Di-n-octylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Fluorene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Hexachlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Hexachlorobutadiene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Hexachloroethane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Isophorone	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Naphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Nitrobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	N-Nitrosodiphenylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Pentachlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Phenanthrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270C	Phenol	µg/Kg	360	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-GH30-11031	SW8270C	Pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	1,2-Dichlorobenzene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	1,3-Dichlorobenzene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	1,4-Dichlorobenzene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2,4,6-Trichlorophenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2,4-Dichlorophenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2,4-Dimethylphenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2,4-Dinitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2,4-Dinitrotoluene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2,6-Dinitrotoluene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2-Chloronaphthalene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2-Chlorophenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2-Methylnaphthalene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2-Methylphenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	2-Nitrophenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	3-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4-Bromophenyl-phenylether	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4-Chloro-3-methylphenol	µg/Kg	710	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4-Chloroaniline	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4-Methylphenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	4-Nitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Acenaphthene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Acenaphthylene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Anthracene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Benzo(a)anthracene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Benzo(a)pyrene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Benzo(b)fluoranthene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Benzo(g,h,i)perylene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Benzo(k)fluoranthene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Benzoic acid	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Benzyl alcohol	µg/Kg	710	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Butylbenzylphthalate	µg/Kg	350	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-I20-11038	SW8270C	Chrysene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Dibenz(a,h)anthracene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Dibenzofuran	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Diethylphthalate	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Dimethylphthalate	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Di-n-butylphthalate	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Di-n-octylphthalate	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Fluoranthene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Fluorene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Hexachlorobenzene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Hexachlorobutadiene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Hexachloroethane	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Isophorone	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Naphthalene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Nitrobenzene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	N-Nitrosodiphenylamine	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Pentachlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Phenanthrene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Phenol	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270C	Pyrene	µg/Kg	350	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	1,2-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	1,3-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	1,4-Dichlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2,4,6-Trichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2,4-Dichlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2,4-Dimethylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2,4-Dinitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2,4-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2,6-Dinitrotoluene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2-Chloronaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2-Chlorophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2-Methylnaphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	2-Nitrophenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	3-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	4-Bromophenyl-phenylether	µg/Kg	360	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-I30-11039	SW8270C	4-Chloro-3-methylphenol	µg/Kg	710	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	4-Chloroaniline	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	4-Methylphenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	4-Nitroaniline	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	4-Nitrophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Acenaphthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Acenaphthylene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Benzo(a)anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Benzo(a)pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Benzo(b)fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Benzo(g,h,i)perylene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Benzo(k)fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Benzoic acid	µg/Kg	1800	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Benzyl alcohol	µg/Kg	710	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Butylbenzylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Chrysene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Dibenz(a,h)anthracene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Dibenzofuran	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Diethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Dimethylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Di-n-butylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Di-n-octylphthalate	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Fluoranthene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Fluorene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Hexachlorobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Hexachlorobutadiene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Hexachloroethane	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Isophorone	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Naphthalene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Nitrobenzene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	N-Nitrosodiphenylamine	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Pentachlorophenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Phenanthrene	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Phenol	µg/Kg	360	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270C	Pyrene	µg/Kg	360	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-Z25-11001	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	1,2-Dichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	1,3-Dichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	1,4-Dichlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2,4,6-Trichlorophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2,4-Dichlorophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2,4-Dimethylphenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2,4-Dinitrophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2,4-Dinitrotoluene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2,6-Dinitrotoluene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2-Chloronaphthalene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2-Chlorophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2-Methylnaphthalene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2-Methylphenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	2-Nitrophenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	3-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4-Bromophenyl-phenylether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4-Chloro-3-methylphenol	µg/Kg	680	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4-Chloroaniline	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4-Methylphenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	4-Nitrophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Acenaphthene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Acenaphthylene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Anthracene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Benzo(a)anthracene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Benzo(a)pyrene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Benzo(b)fluoranthene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Benzo(g,h,i)perylene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Benzo(k)fluoranthene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Benzoic acid	µg/Kg	1700	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Benzyl alcohol	µg/Kg	680	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Butylbenzylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Chrysene	µg/Kg	340	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-Z25-11001	SW8270C	Dibenz(a,h)anthracene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Dibenzofuran	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Diethylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Dimethylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Di-n-butylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Di-n-octylphthalate	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Fluoranthene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Fluorene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Hexachlorobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Hexachlorobutadiene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Hexachloroethane	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Isophorone	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Naphthalene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Nitrobenzene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	N-Nitrosodiphenylamine	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Pentachlorophenol	µg/Kg	1600	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Phenanthrene	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Phenol	µg/Kg	340	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270C	Pyrene	µg/Kg	340	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	1-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	2-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Acenaphthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Anthracene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Benzo(a)anthracene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Benzo(a)pyrene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Chrysene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Fluoranthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Fluorene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Naphthalene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Phenanthrene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3037R	SW8270SIM	Pyrene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	1-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	2-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Acenaphthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002285	AOC4-12-3038R	SW8270SIM	Anthracene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Benzo(a)anthracene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Benzo(a)pyrene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Chrysene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Fluoranthene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Fluorene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Naphthalene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Phenanthrene	µg/Kg	5	UJ	HT>UCL
N002285	AOC4-12-3038R	SW8270SIM	Pyrene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	1-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	2-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Acenaphthene	µg/Kg	9.9	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Acenaphthylene	µg/Kg	7.3	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Anthracene	µg/Kg	500	UJ	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Benzo(a)anthracene	µg/Kg	10000	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Benzo(a)pyrene	µg/Kg	6600	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	11000	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	4000	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	4300	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Chrysene	µg/Kg	9300	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	1100	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Fluoranthene	µg/Kg	24000	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Fluorene	µg/Kg	6.7	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	4100	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Naphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Phenanthrene	µg/Kg	2200	J	HT>UCL
N002062	AOC4-13-3040	SW8270SIM	Pyrene	µg/Kg	23000	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	1-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	2-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Acenaphthene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Anthracene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Benzo(a)anthracene	µg/Kg	70	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Benzo(a)pyrene	µg/Kg	54	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	83	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	38	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	21	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Chrysene	µg/Kg	80	J	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002062	AOC4-4-3010	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	11	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Fluoranthene	µg/Kg	140	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Fluorene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	38	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Naphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Phenanthrene	µg/Kg	23	J	HT>UCL
N002062	AOC4-4-3010	SW8270SIM	Pyrene	µg/Kg	120	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	1-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	2-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Acenaphthene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Anthracene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(a)anthracene	µg/Kg	29	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(a)pyrene	µg/Kg	27	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	51	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	25	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	21	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Chrysene	µg/Kg	43	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	6.9	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Fluoranthene	µg/Kg	75	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Fluorene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	24	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Naphthalene	µg/Kg	5	UJ	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Phenanthrene	µg/Kg	16	J	HT>UCL
N002062	AOC4-4-3011	SW8270SIM	Pyrene	µg/Kg	63	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Acenaphthene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Anthracene	µg/Kg	12	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Benzo(a)anthracene	µg/Kg	76	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Benzo(a)pyrene	µg/Kg	57	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	140	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	44	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	33	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Chrysene	µg/Kg	100	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	13	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Fluoranthene	µg/Kg	290	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Fluorene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	38	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Naphthalene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Phenanthrene	µg/Kg	45	J	HT>UCL
N002309	AOC4-B10-11005	SW8270SIM	Pyrene	µg/Kg	190	J	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-B20-11006	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Acenaphthene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Acenaphthylene	µg/Kg	17	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Anthracene	µg/Kg	76	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Benzo(a)anthracene	µg/Kg	270	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Benzo(a)pyrene	µg/Kg	310	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	600	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	320	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	180	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Chrysene	µg/Kg	390	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	56	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Fluoranthene	µg/Kg	400	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Fluorene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	200	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Naphthalene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Phenanthrene	µg/Kg	99	J	HT>UCL
N002309	AOC4-B20-11006	SW8270SIM	Pyrene	µg/Kg	360	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	1-Methylnaphthalene	µg/Kg	6.9	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	2-Methylnaphthalene	µg/Kg	6.9	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Acenaphthene	µg/Kg	6.9	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Acenaphthylene	µg/Kg	6.9	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Anthracene	µg/Kg	9.8	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Benzo(a)anthracene	µg/Kg	63	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Benzo(a)pyrene	µg/Kg	52	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	97	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	40	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	35	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Chrysene	µg/Kg	89	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	11	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Fluoranthene	µg/Kg	180	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Fluorene	µg/Kg	6.9	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	38	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Naphthalene	µg/Kg	6.9	UJ	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Phenanthrene	µg/Kg	99	J	HT>UCL
N002309	AOC4-B30-11007	SW8270SIM	Pyrene	µg/Kg	130	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Acenaphthene	µg/Kg	25	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Acenaphthylene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Anthracene	µg/Kg	32	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Benzo(a)anthracene	µg/Kg	140	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Benzo(a)pyrene	µg/Kg	260	J	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-D10-11013	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	410	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	190	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	150	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Chrysene	µg/Kg	170	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	48	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Fluoranthene	µg/Kg	590	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Fluorene	µg/Kg	17	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	170	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Naphthalene	µg/Kg	33	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Phenanthrene	µg/Kg	220	J	HT>UCL
N002309	AOC4-D10-11013	SW8270SIM	Pyrene	µg/Kg	570	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Acenaphthene	µg/Kg	18	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Acenaphthylene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Anthracene	µg/Kg	64	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Benzo(a)anthracene	µg/Kg	670	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Benzo(a)pyrene	µg/Kg	510	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	750	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	350	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	290	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Chrysene	µg/Kg	660	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	89	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Fluoranthene	µg/Kg	1100	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Fluorene	µg/Kg	11	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	340	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Naphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Phenanthrene	µg/Kg	390	J	HT>UCL
N002309	AOC4-D20-11014	SW8270SIM	Pyrene	µg/Kg	960	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Acenaphthene	µg/Kg	11	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Acenaphthylene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Anthracene	µg/Kg	40	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Benzo(a)anthracene	µg/Kg	120	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Benzo(a)pyrene	µg/Kg	130	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	210	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	99	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	70	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Chrysene	µg/Kg	140	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	25	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Fluoranthene	µg/Kg	380	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Fluorene	µg/Kg	7	J	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-D30-11015	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	88	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Naphthalene	µg/Kg	5.2	UJ	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Phenanthrene	µg/Kg	230	J	HT>UCL
N002309	AOC4-D30-11015	SW8270SIM	Pyrene	µg/Kg	290	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	1-Methylnaphthalene	µg/Kg	14	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	2-Methylnaphthalene	µg/Kg	17	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Acenaphthene	µg/Kg	7.4	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Acenaphthylene	µg/Kg	5.7	UJ	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Anthracene	µg/Kg	23	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Benzo(a)anthracene	µg/Kg	190	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Benzo(a)pyrene	µg/Kg	140	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	330	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	94	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	120	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Chrysene	µg/Kg	330	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	26	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Fluoranthene	µg/Kg	550	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Fluorene	µg/Kg	5.9	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	91	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Naphthalene	µg/Kg	22	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Phenanthrene	µg/Kg	350	J	HT>UCL
N002309	AOC4-DE5-11002	SW8270SIM	Pyrene	µg/Kg	410	J	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Acenaphthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Acenaphthylene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Benzo(a)anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Benzo(a)pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Chrysene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Fluorene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Naphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Phenanthrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH10-11029	SW8270SIM	Pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Acenaphthene	µg/Kg	5.5	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-GH30-11031	SW8270SIM	Acenaphthylene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Anthracene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Benzo(a)anthracene	µg/Kg	15	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Benzo(a)pyrene	µg/Kg	15	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	31	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	16	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	11	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Chrysene	µg/Kg	24	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Fluoranthene	µg/Kg	31	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Fluorene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	12	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Naphthalene	µg/Kg	5.5	UJ	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Phenanthrene	µg/Kg	9.7	J	HT>UCL
N002309	AOC4-GH30-11031	SW8270SIM	Pyrene	µg/Kg	28	J	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Acenaphthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Acenaphthylene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Benzo(a)anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Benzo(a)pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Chrysene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Fluorene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Naphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Phenanthrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I20-11038	SW8270SIM	Pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Acenaphthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Acenaphthylene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Benzo(a)anthracene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Benzo(a)pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5.4	UJ	HT>UCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002309	AOC4-I30-11039	SW8270SIM	Chrysene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5.4	UJ	HT>UCL
N0023 09	AOC4-I30-11039	SW8270SIM	Fluoranthene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Fluorene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Naphthalene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Phenanthrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-I30-11039	SW8270SIM	Pyrene	µg/Kg	5.4	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Acenaphthene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Anthracene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Benzo(a)anthracene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Benzo(a)pyrene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Chrysene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Fluoranthene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Fluorene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Naphthalene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Phenanthrene	µg/Kg	5.1	UJ	HT>UCL
N002309	AOC4-Z25-11001	SW8270SIM	Pyrene	µg/Kg	5.1	UJ	HT>UCL
979387	AOC4-DE5-11002	SW9012A	Cyanide	mg/kg	1.08	UJ	HT>UCL
979250	AOC4-12-3037R	SW9045	PH	pH	8.54	J	HT>UCL
979250	AOC4-12-3038R	SW9045	PH	pH	8.57	J	HT>UCL
Continuing Calibration Summary							
N002309	AOC4-T1-12001	SW8015-P	TPH-Gasoline	µg/Kg	800	UJ	CCV<LCL
N002309	AOC4-T2-12002	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	CCV<LCL
N002309	AOC4-T2-12003	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	CCV<LCL
N002309	AOC4-T2-12004	SW8015-P	TPH-Gasoline	µg/Kg	1400	UJ	CCV<LCL
N002309	AOC4-T2-12005	SW8015-P	TPH-Gasoline	µg/Kg	1000	UJ	CCV<LCL
N002271	AOC4-1-3001	SW8081A	Endrin aldehyde	µg/Kg	2	UJ	CCV<LCL
Field Duplicate Summary							
979422	AOC4-11041	SW7199	Chromium, hexavalent	mg/kg	10.7	J	FD>RPD
979422	AOC4-T3-12007	SW7199	Chromium, hexavalent	mg/kg	13.6	J	FD>RPD
N002062	AOC4-14-3043	SW8270SIM	Anthracene	µg/Kg	21	J	FD>RPD
N002062	AOC4-14-3043	SW8270SIM	Benzo(a)anthracene	µg/Kg	970	J	FD>RPD
N002062	AOC4-14-3043	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	530	J	FD>RPD
N002062	AOC4-14-3043	SW8270SIM	Chrysene	µg/Kg	1000	J	FD>RPD

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002062	AOC4-14-3043	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	110	J	FD>RPD
N002062	AOC4-14-3043	SW8270SIM	Fluoranthene	µg/Kg	2400	J	FD>RPD
N002062	AOC4-14-3044	SW8270SIM	Anthracene	µg/Kg	45	J	FD>RPD
N002062	AOC4-14-3044	SW8270SIM	Benzo(a)anthracene	µg/Kg	2100	J	FD>RPD
N002062	AOC4-14-3044	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	1300	J	FD>RPD
N002062	AOC4-14-3044	SW8270SIM	Chrysene	µg/Kg	2000	J	FD>RPD
N002062	AOC4-14-3044	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	310	J	FD>RPD
N002062	AOC4-14-3044	SW8270SIM	Fluoranthene	µg/Kg	4100	J	FD>RPD
N002062	AOC4-4-3010	SW8270SIM	Benzo(a)anthracene	µg/Kg	70	J	FD>RPD
N002062	AOC4-4-3010	SW8270SIM	Benzo(a)pyrene	µg/Kg	54	J	FD>RPD
N002062	AOC4-4-3010	SW8270SIM	Chrysene	µg/Kg	80	J	FD>RPD
N002062	AOC4-4-3010	SW8270SIM	Fluoranthene	µg/Kg	140	J	FD>RPD
N002062	AOC4-4-3010	SW8270SIM	Pyrene	µg/Kg	120	J	FD>RPD
N002062	AOC4-4-3011	SW8270SIM	Benzo(a)anthracene	µg/Kg	29	J	FD>RPD
N002062	AOC4-4-3011	SW8270SIM	Benzo(a)pyrene	µg/Kg	27	J	FD>RPD
N002062	AOC4-4-3011	SW8270SIM	Chrysene	µg/Kg	43	J	FD>RPD
N002062	AOC4-4-3011	SW8270SIM	Fluoranthene	µg/Kg	75	J	FD>RPD
N002062	AOC4-4-3011	SW8270SIM	Pyrene	µg/Kg	63	J	FD>RPD
Laboratory Control Sample Summary							
NA	NA	NA	NA	NA	NA	NA	LCS>UCL
Matrix Spike Summary							
N002226	AOC4-11-3034R	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002271	AOC4-1-3001	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002271	AOC4-1-3001	SW6010B	Barium	mg/Kg	440	J	MS<LCL
N002062	AOC4-3-3007	SW6010B	Antimony	mg/Kg	4	UJ	MS<LCL
N002309	AOC4-DE5-11002	SW6010B	Antimony	mg/Kg	2.3	UJ	MS<LCL
N002311	AOC4-T3-12007	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002311	AOC4-T3-12007	SW6010B	Zinc	mg/Kg	290	J	MS<LCL
N002062	AOC4-13-3040	SW8081A	alpha-BHC	µg/Kg	1	UJ	MS<LCL
N002062	AOC4-13-3040	SW8081A	beta-BHC	µg/Kg	1	UJ	MS<LCL
N002062	AOC4-13-3040	SW8081A	delta-BHC	µg/Kg	1	UJ	MS<LCL
N002062	AOC4-13-3040	SW8081A	Endrin ketone	µg/Kg	2	UJ	MS<LCL
N002062	AOC4-13-3040	SW8081A	gamma-BHC	µg/Kg	1	UJ	MS<LCL
N002062	AOC4-13-3040	SW8081A	Heptachlor	µg/Kg	1	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	4,4´-DDE	µg/Kg	2	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	alpha-BHC	µg/Kg	1	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	alpha-Chlordane	µg/Kg	1	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	beta-BHC	µg/Kg	1	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	Dieldrin	µg/Kg	2	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	Endosulfan sulfate	µg/Kg	2	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	Endrin ketone	µg/Kg	2	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8081A	Heptachlor epoxide	µg/Kg	1	UJ	MS<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1260	µg/Kg	290	J	MS<LCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002062	AOC4-13-3040	SW8270C	Benzaldehyde	µg/Kg	3500	UJ	MS<LCL
N002062	AOC4-13-3040	SW8270C	Caprolactam	µg/Kg	1700	R	MS<LCL
N002062	AOC4-3-3007	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
N002226	AOC4-7-3020	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002309	AOC4-T1-12000	SW8270C	Caprolactam	µg/Kg	340	UJ	MS<LCL
N002311	AOC4-T4-12010	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002224	AOC4-T5a-3068	SW8270C	Benzoic acid	µg/Kg	1700	UJ	MS<LCL
N002224	AOC4-T5a-3068	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002226	AOC4-11-3034R	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002226	AOC4-11-3034R	SW6010B	Barium	mg/Kg	200	J	MS>UCL
N002271	AOC4-1-3001	SW6010B	Potassium	mg/Kg	2500	J	MS>UCL
N002309	AOC4-DE5-11002	SW6010B	Barium	mg/Kg	140	J	MS>UCL
N002309	AOC4-DE5-11002	SW6010B	Sodium	mg/Kg	680	J	MS>UCL
N002311	AOC4-T3-12007	SW6010B	Copper	mg/Kg	63	J	MS>UCL
N002311	AOC4-T3-12007	SW6010B	Lead	mg/Kg	78	J	MS>UCL
N002311	AOC4-T3-12007	SW6010B	Copper	mg/Kg	63	J	MSRPD
N002311	AOC4-T3-12007	SW6010B	Lead	mg/Kg	78	J	MSRPD
Matrix Spike Duplicate Summary							
N002226	AOC4-11-3034R	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002271	AOC4-1-3001	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002271	AOC4-1-3001	SW6010B	Barium	mg/Kg	440	J	SD<LCL
N002062	AOC4-3-3007	SW6010B	Antimony	mg/Kg	4	UJ	SD<LCL
N002309	AOC4-DE5-11002	SW6010B	Antimony	mg/Kg	2.3	UJ	SD<LCL
N002311	AOC4-T3-12007	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002311	AOC4-T3-12007	SW6010B	Chromium	mg/Kg	280	J	SD<LCL
N002311	AOC4-T3-12007	SW6010B	Zinc	mg/Kg	290	J	SD<LCL
N002062	AOC4-13-3040	SW8081A	alpha-BHC	µg/Kg	1	UJ	SD<LCL
N002062	AOC4-13-3040	SW8081A	beta-BHC	µg/Kg	1	UJ	SD<LCL
N002062	AOC4-13-3040	SW8081A	delta-BHC	µg/Kg	1	UJ	SD<LCL
N002062	AOC4-13-3040	SW8081A	Endrin ketone	µg/Kg	2	UJ	SD<LCL
N002062	AOC4-13-3040	SW8081A	gamma-BHC	µg/Kg	1	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8081A	4,4´-DDE	µg/Kg	2	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8081A	alpha-BHC	µg/Kg	1	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8081A	alpha-Chlordane	µg/Kg	1	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8081A	beta-BHC	µg/Kg	1	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8081A	Dieldrin	µg/Kg	2	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8081A	Endosulfan sulfate	µg/Kg	2	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8081A	Endrin ketone	µg/Kg	2	UJ	SD<LCL
N002062	AOC4-13-3040	SW8270C	Caprolactam	µg/Kg	1700	R	SD<LCL
N002062	AOC4-3-3007	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
N002226	AOC4-7-3020	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002311	AOC4-T4-12010	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002224	AOC4-T5a-3068	SW8270C	Benzoic acid	µg/Kg	1700	UJ	SD<LCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002224	AOC4-T5a-3068	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002226	AOC4-11-3034R	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002271	AOC4-1-3001	SW6010B	Potassium	mg/Kg	2500	J	SD>UCL
N002309	AOC4-DE5-11002	SW6010B	Barium	mg/Kg	140	J	SD>UCL
N002309	AOC4-DE5-11002	SW6010B	Sodium	mg/Kg	680	J	SD>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(a)anthracene	µg/Kg	29	J	SD>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(a)pyrene	µg/Kg	27	J	SD>UCL
N002062	AOC4-4-3011	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	51	J	SD>UCL
N002062	AOC4-4-3011	SW8270SIM	Chrysene	µg/Kg	43	J	SD>UCL
N002062	AOC4-4-3011	SW8270SIM	Pyrene	µg/Kg	63	J	SD>UCL
Post Digestion Spike							
978924	AOC4-6-3019	SW7199	Chromium, hexavalent	mg/kg	1.98	J	PDS>UCL
Serial Dilution Summary							
NA	NA	NA	NA	NA	NA	NA	SerDil
Surrogate Summary							
N002311	AOC4-T4-12012	SW8015-P	TPH-Gasoline	µg/Kg	960	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	4,4´-DDD	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	4,4´-DDE	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	4,4´-DDT	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Aldrin	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	alpha-BHC	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	alpha-Chlordane	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	beta-BHC	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	delta-BHC	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Dieldrin	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Endosulfan I	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Endosulfan II	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Endosulfan sulfate	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Endrin	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Endrin aldehyde	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Endrin ketone	µg/Kg	2	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	gamma-BHC	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	gamma-Chlordane	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Heptachlor	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Heptachlor epoxide	µg/Kg	1	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Methoxychlor	µg/Kg	5	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8081A	Toxaphene	µg/Kg	50	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1016	µg/Kg	17	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1221	µg/Kg	33	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1232	µg/Kg	17	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1242	µg/Kg	17	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1248	µg/Kg	17	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1254	µg/Kg	790	J	Sur<LCL

TABLE D4-1
Topock Soil RFI/RI Part A – AOC 4
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002062	AOC4-13-3040	SW8082	Aroclor 1260	µg/Kg	290	J	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1262	µg/Kg	17	UJ	Sur<LCL
N002062	AOC4-13-3040	SW8082	Aroclor 1268	µg/Kg	17	UJ	Sur<LCL
Internal Standard Summary							
N002311	AOC4-11041	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,2,3-Trichloropropane	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,2-Dichlorobenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,3-Dichlorobenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	1,4-Dichlorobenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	2-Chlorotoluene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	Bromobenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	Isopropylbenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	n-Butylbenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	n-Propylbenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	sec-Butylbenzene	µg/Kg	5.6	UJ	IS<LCL
N002311	AOC4-11041	SW8260B	tert-Butylbenzene	µg/Kg	5.6	UJ	IS<LCL
N002309	AOC4-D10-11013	SW8270SIM	Benzo(a)anthracene	µg/Kg	140	J	IS>UCL
N002309	AOC4-D10-11013	SW8270SIM	Chrysene	µg/Kg	170	J	IS>UCL

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.
FD>RPD = Field duplicate's relative percent difference is greater than the control limit.
HT>UCL = Holding time exceeded the upper control limit.
IS<LCL = Internal Standard recovery less than lower control limit.
IS>UCL = Internal Standard recovery greater than upper control limit.
LCS>UCL = Laboratory Control Sample greater than upper control limit.
MS<LCL = Matrix spike recovery less than lower control limit.
MS>UCL = Matrix spike recovery greater than upper control limit.
MSRPD = Relative percent difference between matrix spike and matrix spike duplicate greater than control limit.
PDS>UCL = Post digestion spike recovery greater than upper control limit.
RejectContamination = Result was rejected due to possible contamination.
SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SD>UCL = Matrix spike duplicate recovery greater than upper control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.
Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D4-2
Topock Soil RFI/RI Part A - AOC4 - *Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
AOC4-T3-12007	AOC4-11041	AOC4-4-3010	AOC4-4-3011
AOC4-14-3043	AOC4-14-3044		

TABLE D4-3
Topock Soil RFI/RI Part A - AOC4 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
N002224	AOC4-T5a-3068	SW6010B	Sodium	mg/Kg	3400	U	EB>RL	2200

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:
U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:
EB>RL = Equipment blank contamination greater than the RL.

Attachment D5
Summary of Samples Qualified in AOC 9

TABLE D5-1
Topock Soil RFI/RI Part A – AOC 9
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
978926	AOC9-14-4033	SW8015-E	TPH-Motor Oil	mg/kg	702	J	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-12-4028	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1221	µg/Kg	33	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1254	µg/Kg	160	J	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC9-5-4010	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
Continuing Calibration Summary							
N002211	AOC9-10-4024	SW8260B	Bromoform	µg/Kg	5.1	UJ	CCV<LCL
N002211	AOC9-1-4002	SW8260B	Bromoform	µg/Kg	4	UJ	CCV<LCL
N002211	AOC9-5-4010	SW8260B	Bromoform	µg/Kg	5.3	UJ	CCV<LCL
N002211	AOC9-5-4011	SW8260B	Bromoform	µg/Kg	4.3	UJ	CCV<LCL
N002211	AOC9-9-4022	SW8260B	Bromoform	µg/Kg	4.1	UJ	CCV<LCL
978844	AOC9-8-4016	SW7199	Chromium, hexavalent	mg/kg	48.6	J	>ICLinear Range
Field Duplicate Summary							
N002156	AOC9-13-4030	SW6010B	Chromium	mg/Kg	23	J	FD>RPD
N002156	AOC9-13-4031	SW6010B	Chromium	mg/Kg	18	J	FD>RPD
N002211	AOC9-9-4021	SW8260B	Acetone	µg/Kg	46	UJ	FD>RPD
N002211	AOC9-9-4022	SW8260B	Acetone	µg/Kg	300	J	FD>RPD
N002156	AOC9-13-4030	SW8270SIM	Chrysene	µg/Kg	39	J	FD>RPD
N002156	AOC9-13-4030	SW8270SIM	Phenanthrene	µg/Kg	49	J	FD>RPD
N002156	AOC9-13-4031	SW8270SIM	Chrysene	µg/Kg	18	J	FD>RPD
N002156	AOC9-13-4031	SW8270SIM	Phenanthrene	µg/Kg	9	J	FD>RPD
N002211	AOC9-5-4010	SW8270SIM	1-Methylnaphthalene	µg/Kg	220	J	FD>RPD
N002211	AOC9-5-4010	SW8270SIM	2-Methylnaphthalene	µg/Kg	240	J	FD>RPD
N002211	AOC9-5-4011	SW8270SIM	1-Methylnaphthalene	µg/Kg	120	J	FD>RPD
N002211	AOC9-5-4011	SW8270SIM	2-Methylnaphthalene	µg/Kg	81	J	FD>RPD

TABLE D5-1
Topock Soil RFI/RI Part A – AOC 9
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Laboratory Control Sample Summary							
978647	AOC9-13-4029	SW8015-E	TPH-Motor Oil	mg/kg	19.2	J	LCS>UCL
978647	AOC9-13-4030	SW8015-E	TPH-Motor Oil	mg/kg	77.9	J	LCS>UCL
978647	AOC9-13-4031	SW8015-E	TPH-Motor Oil	mg/kg	62	J	LCS>UCL
N002211	AOC9-10-4023	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	LCSRPD
N002211	AOC9-10-4024	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-12-4027	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-12-4028	SW8270SIM	Acenaphthylene	µg/Kg	5.2	UJ	LCSRPD
N002211	AOC9-1-4001	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	LCSRPD
N002211	AOC9-1-4002	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-5-4009	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	LCSRPD
N002211	AOC9-5-4010	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-5-4011	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-8-4016	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-8-4017	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-8-4018	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-9-4019	SW8270SIM	Acenaphthylene	µg/Kg	5.1	UJ	LCSRPD
N002211	AOC9-9-4020	SW8270SIM	Acenaphthylene	µg/Kg	5.2	UJ	LCSRPD
N002211	AOC9-9-4021	SW8270SIM	Acenaphthylene	µg/Kg	5.2	UJ	LCSRPD
N002211	AOC9-9-4022	SW8270SIM	Acenaphthylene	µg/Kg	5.2	UJ	LCSRPD
Matrix Spike Summary							
N002211	AOC9-12-4027	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002156	AOC9-13-4029	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002150	AOC9-11-4025	SW8270C	1,1´-Biphenyl	µg/Kg	750	UJ	MS<LCL
N002211	AOC9-12-4027	SW8270C	1,1´-Biphenyl	µg/Kg	710	UJ	MS<LCL
N002150	AOC9-11-4025	SW8270C	1,2,4,5-Tetrachlorobenzene	µg/Kg	750	UJ	MS<LCL
N002211	AOC9-12-4027	SW8270C	1,2,4,5-Tetrachlorobenzene	µg/Kg	710	UJ	MS<LCL
N002150	AOC9-11-4025	SW8270C	Acetophenone	µg/Kg	750	UJ	MS<LCL
N002211	AOC9-12-4027	SW8270C	Acetophenone	µg/Kg	710	UJ	MS<LCL
N002150	AOC9-11-4025	SW8270C	Benzaldehyde	µg/Kg	750	UJ	MS<LCL
N002211	AOC9-12-4027	SW8270C	Benzaldehyde	µg/Kg	710	UJ	MS<LCL
N002211	AOC9-8-4018	SW8270C	Benzoic acid	µg/Kg	1700	UJ	MS<LCL
N002150	AOC9-11-4025	SW8270C	Caprolactam	µg/Kg	350	UJ	MS<LCL
N002211	AOC9-12-4027	SW8270C	Caprolactam	µg/Kg	340	UJ	MS<LCL
Matrix Spike Duplicate Summary							
N002211	AOC9-12-4027	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002156	AOC9-13-4029	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002150	AOC9-11-4025	SW8270C	1,1´-Biphenyl	µg/Kg	750	UJ	SD<LCL
N002150	AOC9-11-4025	SW8270C	1,2,4,5-Tetrachlorobenzene	µg/Kg	750	UJ	SD<LCL
N002211	AOC9-8-4018	SW8270C	1,2-Dichlorobenzene	µg/Kg	340	UJ	SD<LCL
N002150	AOC9-11-4025	SW8270C	Acetophenone	µg/Kg	750	UJ	SD<LCL
N002211	AOC9-12-4027	SW8270C	Acetophenone	µg/Kg	710	UJ	SD<LCL

TABLE D5-1
Topock Soil RFI/RI Part A – AOC 9
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002150	AOC9-11-4025	SW8270C	Benzaldehyde	µg/Kg	750	UJ	SD<LCL
N002211	AOC9-12-4027	SW8270C	Benzaldehyde	µg/Kg	710	UJ	SD<LCL
N002211	AOC9-8-4018	SW8270C	Benzoic acid	µg/Kg	1700	UJ	SD<LCL
N002150	AOC9-11-4025	SW8270C	Caprolactam	µg/Kg	350	UJ	SD<LCL
N002211	AOC9-12-4027	SW8270C	Caprolactam	µg/Kg	340	UJ	SD<LCL
Serial Dilution Summary							
N002211	AOC9-12-4027	SW6010B	Barium	mg/Kg	190	J	SerDil
N002211	AOC9-12-4027	SW6010B	Iron	mg/Kg	22000	J	SerDil
N002211	AOC9-12-4027	SW6010B	Magnesium	mg/Kg	9600	J	SerDil
N002211	AOC9-12-4027	SW6010B	Manganese	mg/Kg	310	J	SerDil
Surrogate Summary							
978926	AOC9-14-4032	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978926	AOC9-14-4032	SW8015-E	TPH-Motor Oil	mg/kg	48.4	J	Sur<LCL
N002156	AOC9-13-4031	SW8015-P	TPH-Gasoline	µg/Kg	1100	UJ	Sur<LCL
N002211	AOC9-1-4002	SW8015-P	TPH-Gasoline	µg/Kg	850	UJ	Sur<LCL
N002150	AOC9-3-4006	SW8015-P	TPH-Gasoline	µg/Kg	1200	UJ	Sur<LCL
N002227	AOC9-14-4033	SW8270SIM	Anthracene	µg/Kg	6.5	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Benzo(a)anthracene	µg/Kg	15	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Benzo(a)pyrene	µg/Kg	15	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	19	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	17	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	15	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Chrysene	µg/Kg	16	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	17	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Fluoranthene	µg/Kg	10	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	17	J	Sur>UCL
N002227	AOC9-14-4033	SW8270SIM	Pyrene	µg/Kg	11	J	Sur>UCL
Contamination Summary							
N002211	AOC9-10-4024	SW8260B	Acetone	µg/Kg	280	R	Reject Contamination
N002150	AOC9-11-4026	SW8260B	Acetone	µg/Kg	150	R	Reject Contamination
N002156	AOC9-13-4031	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination
N002227	AOC9-14-4033	SW8260B	Acetone	µg/Kg	57	R	Reject Contamination
N002150	AOC9-2-4004	SW8260B	Acetone	µg/Kg	550	R	Reject Contamination
N002150	AOC9-3-4006	SW8260B	Acetone	µg/Kg	110	R	Reject Contamination
N002150	AOC9-6-4013	SW8260B	Acetone	µg/Kg	460	R	Reject Contamination
N002150	AOC9-7-4015	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination

TABLE D5-1
Topock Soil RFI/RI Part A – AOC 9
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002211	AOC9-9-4022	SW8260B	Acetone	µg/Kg	300	R	Reject Contamination

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.

FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.

HT>UCL = Holding time exceeded the upper control limit.

LCS>UCL = Laboratory Control Sample greater than upper control limit.

LCSRPD = Laboratory Control Sample’s relative percent difference is greater than control limit.

MS<LCL = Matrix spike recovery less than lower control limit.

RejectContamination = Result was rejected due to possible contamination.

SD<LCL = Matrix spike duplicate recovery less than lower control limit.

SerDil = Serial Dilution is greater than 10% RPD.

Sur<LCL = Surrogate recovery less than lower control limit.

Sur>UCL = Surrogate recovery greater than upper control limit.

>ICLinearRange = The result reported exceeds the linear range of the calibration

TABLE D5-2
Topock Soil RFI/RI Part A - AOC9 - *Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
AOC9-13-4030	AOC9-13-4031	AOC9-9-4021	AOC9-9-4022
AOC9-5-4010	AOC9-5-4011		

TABLE D5-3
Topock Soil RFI/RI Part A - AOC9 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
NA	NA	NA	NA	NA	NA	NA	EB>RL	NA

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:

TABLE D5-3
Topock Soil RFI/RI Part A - AOC9 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L

EB>RL = Equipment blank contamination greater than the RL.

Attachment D6
Summary of Samples Qualified in AOC 10

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
N002325	AOC10-3-5013	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC10-4-5017	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC10d-1-5084	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC10d-2-5088	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC10d-3-5093	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC10d-4-5097	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
978845	AOC10b-3-5053	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
978845	AOC10b-3-5053	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
978845	AOC10c-1-5061	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
978845	AOC10c-1-5061	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
978902	AOC10c-4-5075	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
978902	AOC10c-4-5075	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
978902	AOC10c-5-5079	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
978902	AOC10c-5-5079	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1254	µg/Kg	33	J	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC10-5-5019	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1221	µg/Kg	33	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1254	µg/Kg	68	J	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5063	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1221	µg/Kg	33	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1254	µg/Kg	46	J	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC10c-2-5064	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002326	AOC10d-2-5086	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-2-5086	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC10d-3-5090	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
Continuing Calibration Summary							
N002286	AOC10a-1-5036	SW8081A	4,4´-DDT	µg/Kg	2.1	UJ	CCV<LCL
N002286	AOC10a-1-5036	SW8081A	Endosulfan I	µg/Kg	1.1	UJ	CCV<LCL
N002286	AOC10a-1-5036	SW8081A	Endrin aldehyde	µg/Kg	2.1	UJ	CCV<LCL
N002286	AOC10a-1-5036	SW8081A	Methoxychlor	µg/Kg	5.3	UJ	CCV<LCL
N002286	AOC10a-1-5036	SW8081A	Toxaphene	µg/Kg	53	UJ	CCV<LCL
N002203	AOC10b-1-5041	SW8260B	Bromoform	µg/Kg	6.9	UJ	CCV<LCL
N002203	AOC10b-1-5042	SW8260B	Bromoform	µg/Kg	6.8	UJ	CCV<LCL
N002203	AOC10b-1-5043	SW8260B	Bromoform	µg/Kg	7.5	UJ	CCV<LCL
N002203	AOC10b-2-5046	SW8260B	Bromoform	µg/Kg	6.8	UJ	CCV<LCL
N002203	AOC10b-2-5047	SW8260B	Bromoform	µg/Kg	6.6	UJ	CCV<LCL
N002203	AOC10b-4-5055	SW8260B	Bromoform	µg/Kg	6.3	UJ	CCV<LCL
N002203	AOC10b-4-5056	SW8260B	Bromoform	µg/Kg	7	UJ	CCV<LCL
Field Duplicate Summary							
N002058	AOC10-8-5031	SW6010B	Lead	mg/Kg	15	J	FD>RPD
N002058	AOC10-8-5033	SW6010B	Lead	mg/Kg	12	J	FD>RPD
N002203	AOC10b-1-5041	SW6010B	Lead	mg/Kg	8.4	J	FD>RPD
N002203	AOC10b-1-5041	SW6010B	Zinc	mg/Kg	110	J	FD>RPD
N002203	AOC10b-1-5042	SW6010B	Lead	mg/Kg	12	J	FD>RPD
N002203	AOC10b-1-5042	SW6010B	Zinc	mg/Kg	160	J	FD>RPD
N002203	AOC10b-1-5041	SW8260B	Acetone	µg/Kg	69	UJ	FD>RPD
N002203	AOC10b-1-5042	SW8260B	Acetone	µg/Kg	400	J	FD>RPD
N002210	AOC10c-2-5063	SW8260B	Acetone	µg/Kg	58	UJ	FD>RPD
N002210	AOC10c-2-5064	SW8260B	Acetone	µg/Kg	570	J	FD>RPD
N002217	AOC10c-3-5068	SW8260B	Acetone	µg/Kg	320	J	FD>RPD

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002217	AOC10c-3-5069	SW8260B	Acetone	µg/Kg	1700	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Benzo(a)anthracene	µg/Kg	230	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Benzo(a)pyrene	µg/Kg	180	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	200	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	84	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	170	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Chrysene	µg/Kg	260	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	33	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Fluoranthene	µg/Kg	400	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	92	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Phenanthrene	µg/Kg	72	J	FD>RPD
N002217	AOC10c-3-5068	SW8270SIM	Pyrene	µg/Kg	350	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Benzo(a)anthracene	µg/Kg	14	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Benzo(a)pyrene	µg/Kg	24	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	36	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	22	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	25	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Chrysene	µg/Kg	30	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	6.2	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Fluoranthene	µg/Kg	39	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	20	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Phenanthrene	µg/Kg	11	J	FD>RPD
N002217	AOC10c-3-5069	SW8270SIM	Pyrene	µg/Kg	38	J	FD>RPD
Laboratory Control Sample Summary							
978602	AOC10d-2-5086	SW8015-E	TPH-Motor Oil	mg/kg	27.3	J	LCS>UCL
978602	AOC10d-2-5087	SW8015-E	TPH-Motor Oil	mg/kg	38.3	J	LCS>UCL
978602	AOC10d-3-5089	SW8015-E	TPH-Motor Oil	mg/kg	16.1	J	LCS>UCL
Matrix Spike Summary							
N002153	AOC10-3-5009	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002163	AOC10-6-5023	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002286	AOC10a-1-5036	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
N002286	AOC10a-1-5036	SW6010B	Iron	mg/Kg	32000	J	MS<LCL
N002286	AOC10a-1-5036	SW6010B	Lead	mg/Kg	200	J	MS<LCL
N002210	AOC10c-1-5058	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002149	AOC10d-1-5080	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	4,4´-DDE	µg/Kg	2	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	alpha-BHC	µg/Kg	1	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	alpha-Chlordane	µg/Kg	1	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	delta-BHC	µg/Kg	1	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	Dieldrin	µg/Kg	2	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	Endrin ketone	µg/Kg	2	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	gamma-BHC	µg/Kg	1	UJ	MS<LCL

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002153	AOC10-3-5009	SW8081A	Heptachlor	µg/Kg	1	UJ	MS<LCL
N002153	AOC10-3-5009	SW8081A	Heptachlor epoxide	µg/Kg	1	UJ	MS<LCL
N002139	AOC10d-2-5085	SW8081A	alpha-BHC	µg/Kg	1	UJ	MS<LCL
N002139	AOC10d-2-5085	SW8081A	beta-BHC	µg/Kg	1	UJ	MS<LCL
N002139	AOC10d-2-5085	SW8081A	delta-BHC	µg/Kg	1	UJ	MS<LCL
N002139	AOC10d-2-5085	SW8081A	Dieldrin	µg/Kg	2	UJ	MS<LCL
N002139	AOC10d-2-5085	SW8081A	Endosulfan sulfate	µg/Kg	2	UJ	MS<LCL
N002139	AOC10d-2-5085	SW8081A	Endrin ketone	µg/Kg	2	UJ	MS<LCL
N002153	AOC10-3-5010	SW8082	Aroclor 1260	µg/Kg	17	UJ	MS<LCL
N002217	AOC10-2-5006	SW8270C	Benzoic acid	µg/Kg	1700	UJ	MS<LCL
N002153	AOC10-3-5009	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002210	AOC10c-1-5058	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002139	AOC10d-3-5089	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002163	AOC10-6-5023	SW6010B	Barium	mg/Kg	220	J	MS>UCL
N002286	AOC10a-1-5036	SW6010B	Aluminum	mg/Kg	4100	J	MS>UCL
N002286	AOC10a-1-5036	SW6010B	Copper	mg/Kg	270	J	MS>UCL
N002286	AOC10a-1-5036	SW6010B	Zinc	mg/Kg	1000	J	MS>UCL
N002286	AOC10a-1-5036	SW6010B	Lead	mg/Kg	200	J	MSRPD
Matrix Spike Duplicate Summary							
N002153	AOC10-3-5009	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002163	AOC10-6-5023	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002286	AOC10a-1-5036	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
N002286	AOC10a-1-5036	SW6010B	Lead	mg/Kg	200	J	SD<LCL
N002210	AOC10c-1-5058	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002149	AOC10d-1-5080	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	4,4´-DDE	µg/Kg	2	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	alpha-BHC	µg/Kg	1	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	alpha-Chlordane	µg/Kg	1	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	delta-BHC	µg/Kg	1	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	Dieldrin	µg/Kg	2	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	Endrin ketone	µg/Kg	2	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	gamma-BHC	µg/Kg	1	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	Heptachlor	µg/Kg	1	UJ	SD<LCL
N002153	AOC10-3-5009	SW8081A	Heptachlor epoxide	µg/Kg	1	UJ	SD<LCL
N002139	AOC10d-2-5085	SW8081A	alpha-BHC	µg/Kg	1	UJ	SD<LCL
N002139	AOC10d-2-5085	SW8081A	beta-BHC	µg/Kg	1	UJ	SD<LCL
N002139	AOC10d-2-5085	SW8081A	delta-BHC	µg/Kg	1	UJ	SD<LCL
N002139	AOC10d-2-5085	SW8081A	Dieldrin	µg/Kg	2	UJ	SD<LCL
N002139	AOC10d-2-5085	SW8081A	Endosulfan sulfate	µg/Kg	2	UJ	SD<LCL
N002139	AOC10d-2-5085	SW8081A	Endrin ketone	µg/Kg	2	UJ	SD<LCL
N002139	AOC10d-2-5085	SW8081A	gamma-BHC	µg/Kg	1	UJ	SD<LCL
N002217	AOC10-2-5006	SW8270C	Benzoic acid	µg/Kg	1700	UJ	SD<LCL
N002153	AOC10-3-5009	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002210	AOC10c-1-5058	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002139	AOC10d-3-5089	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002163	AOC10-6-5023	SW6010B	Barium	mg/Kg	220	J	SD>UCL
N002286	AOC10a-1-5036	SW6010B	Aluminum	mg/Kg	4100	J	SD>UCL
N002286	AOC10a-1-5036	SW6010B	Iron	mg/Kg	32000	J	SD>UCL
N002286	AOC10a-1-5036	SW6010B	Zinc	mg/Kg	1000	J	SD>UCL
Serial Dilution Summary							
N002153	AOC10-3-5009	SW6010B	Iron	mg/Kg	13000	J	SerDil
N002153	AOC10-3-5009	SW6010B	Magnesium	mg/Kg	7700	J	SerDil
N002163	AOC10-6-5023	SW6010B	Barium	mg/Kg	220	J	SerDil
Surrogate Summary							
978902	AOC10-1-5001	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978902	AOC10-1-5001	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
978902	AOC10-1-5003	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978902	AOC10-1-5003	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
978902	AOC10-2-5005	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978902	AOC10-2-5005	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
979251	AOC10a-1-5036	SW8015-E	TPH-Diesel	mg/kg	213	UJ	Sur<LCL
979251	AOC10a-1-5036	SW8015-E	TPH-Motor Oil	mg/kg	297	J	Sur<LCL
N002163	AOC10-6-5024	SW8015-P	TPH-Gasoline	µg/Kg	1500	UJ	Sur<LCL
N002163	AOC10-7-5028	SW8015-P	TPH-Gasoline	µg/Kg	1600	UJ	Sur<LCL
N002163	AOC10-7-5029	SW8015-P	TPH-Gasoline	µg/Kg	1200	R	Sur<LCL
N002203	AOC10b-1-5043	SW8015-P	TPH-Gasoline	µg/Kg	1100	UJ	Sur<LCL
N002210	AOC10c-1-5059	SW8015-P	TPH-Gasoline	µg/Kg	1900	UJ	Sur<LCL
N002149	AOC10d-4-5096	SW8015-P	TPH-Gasoline	µg/Kg	1500	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	4,4´-DDD	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	4,4´-DDE	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	4,4´-DDT	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Aldrin	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	alpha-BHC	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	alpha-Chlordane	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	beta-BHC	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	delta-BHC	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Dieldrin	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Endosulfan I	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Endosulfan II	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Endosulfan sulfate	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Endrin	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Endrin aldehyde	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Endrin ketone	µg/Kg	2.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	gamma-BHC	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	gamma-Chlordane	µg/Kg	1.1	UJ	Sur<LCL

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002286	AOC10a-1-5036	SW8081A	Heptachlor	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Heptachlor epoxide	µg/Kg	1.1	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Methoxychlor	µg/Kg	5.3	UJ	Sur<LCL
N002286	AOC10a-1-5036	SW8081A	Toxaphene	µg/Kg	53	UJ	Sur<LCL
N002163	AOC10-7-5027	SW8270SIM	Benzo(a)anthracene	µg/Kg	5.4	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Benzo(a)pyrene	µg/Kg	10	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	9.7	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	8.6	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	11	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Chrysene	µg/Kg	13	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Fluoranthene	µg/Kg	18	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	7.9	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Phenanthrene	µg/Kg	5.7	J	Sur>UCL
N002163	AOC10-7-5027	SW8270SIM	Pyrene	µg/Kg	17	J	Sur>UCL
Internal Standard Summary							
N002153	AOC10-3-5012	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination
N002153	AOC10-4-5015	SW8260B	Acetone	µg/Kg	83	R	Reject Contamination
N002153	AOC10-4-5016	SW8260B	Acetone	µg/Kg	170	R	Reject Contamination
N002163	AOC10-7-5028	SW8260B	Acetone	µg/Kg	340	R	Reject Contamination
N002163	AOC10-7-5029	SW8260B	Acetone	µg/Kg	98	R	Reject Contamination
N002203	AOC10b-1-5042	SW8260B	Acetone	µg/Kg	400	R	Reject Contamination
N002266	AOC10b-1-5044	SW8260B	Acetone	µg/Kg	170	R	Reject Contamination
N002203	AOC10b-2-5046	SW8260B	Acetone	µg/Kg	83	R	Reject Contamination
N002203	AOC10b-2-5047	SW8260B	Acetone	µg/Kg	320	R	Reject Contamination
N002266	AOC10b-2-5048	SW8260B	Acetone	µg/Kg	110	R	Reject Contamination
N002210	AOC10b-3-5050	SW8260B	Acetone	µg/Kg	550	R	Reject Contamination
N002210	AOC10b-3-5051	SW8260B	Acetone	µg/Kg	700	R	Reject Contamination
N002210	AOC10b-3-5052	SW8260B	Acetone	µg/Kg	570	R	Reject Contamination
N002210	AOC10b-3-5053	SW8260B	Acetone	µg/Kg	530	R	Reject Contamination
N002203	AOC10b-4-5055	SW8260B	Acetone	µg/Kg	87	R	Reject Contamination

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002203	AOC10b-4-5056	SW8260B	Acetone	µg/Kg	320	R	Reject Contamination
N002266	AOC10b-4-5057	SW8260B	Acetone	µg/Kg	700	R	Reject Contamination
N002210	AOC10c-1-5060	SW8260B	Acetone	µg/Kg	310	R	Reject Contamination
N002210	AOC10c-2-5064	SW8260B	Acetone	µg/Kg	570	R	Reject Contamination
N002217	AOC10c-3-5068	SW8260B	Acetone	µg/Kg	320	R	Reject Contamination
N002217	AOC10c-3-5069	SW8260B	Acetone	µg/Kg	1700	R	Reject Contamination
N002217	AOC10c-3-5070	SW8260B	Acetone	µg/Kg	600	R	Reject Contamination
N002149	AOC10d-1-5082	SW8260B	Acetone	µg/Kg	240	R	Reject Contamination
N002149	AOC10d-1-5083	SW8260B	Acetone	µg/Kg	210	R	Reject Contamination
N002139	AOC10d-2-5086	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination
N002139	AOC10d-2-5087	SW8260B	Acetone	µg/Kg	74	R	Reject Contamination
N002149	AOC10d-3-5090	SW8260B	Acetone	µg/Kg	420	R	Reject Contamination
N002149	AOC10d-3-5091	SW8260B	Acetone	µg/Kg	350	R	Reject Contamination
N002149	AOC10d-3-5092	SW8260B	Acetone	µg/Kg	560	R	Reject Contamination
N002149	AOC10d-4-5095	SW8260B	Acetone	µg/Kg	340	R	Reject Contamination
N002149	AOC10d-4-5096	SW8260B	Acetone	µg/Kg	420	R	Reject Contamination

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:
J = the analyte is present but reported value may not be accurate or precise (estimated).
UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.
R = the result is rejected.

Validation Reasons:
CCV<LCL = Continuing calibration recovery less than the lower control limit.
FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.
HT>UCL = Holding time exceeded the upper control limit.
LCS>UCL = Laboratory Control Sample greater than upper control limit.
MS<LCL = Matrix spike recovery less than lower control limit.
MS>UCL = Matrix spike recovery greater than upper control limit.
MSRPD = Relative percent difference between matrix spike and matrix spike duplicate greater than control limit.
RejectContamination = Result was rejected due to possible contamination.

TABLE D6-1
Topock Soil RFI/RI Part A – AOC 10
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason

SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SD>UCL = Matrix spike duplicate recovery greater than upper control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.
Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D6-2
Topock Soil RFI/RI Part A - AOC10 - *Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
AOC10-3-5009	AOC10-3-5010	AOC10c-2-5063	AOC10c-2-5064
AOC10-5-5020	AOC10-5-5021	AOC10c-3-5068	AOC10c-3-5069
AOC10-8-5031	AOC10-8-5033	AOC10d-1-5082	AOC10d-1-5083
AOC10b-1-5041	AOC10b-1-5042	AOC10d-3-5091	AOC10d-3-5092
AOC10b-3-5051	AOC10b-3-5052		

TABLE D6-3
Topock Soil RFI/RI Part A - AOC10 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
NA	NA	NA	NA	NA	NA	NA	EB>RL	NA

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:
U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:
EB>RL = Equipment blank contamination greater than the RL.

Attachment D7

Summary of Samples Qualified in AOC 11

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
N002325	AOC11a-1-6004	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-2-6008	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-3-6013	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-4-6017	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-5-6022	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-1-6055	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-1-6056	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-1-6057	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-1-6058	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-2-6059	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-2-6060	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-3-6063	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-3-6064	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-3-6065	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11a-SS-3-6066	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11b-1-6027	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11b-2-6031	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-1-6036	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-2-6040	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-1-6067	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-1-6068	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-1-6069	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-1-6070	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-2-6071	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-2-6072	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-2-6073	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11c-SS-2-6074	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11d-1-6045	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-1-6049	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-2-6054	SW7471A	Mercury	mg/Kg	0.11	UJ	HT>UCL
N002325	AOC11e-SS-1-6075	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-1-6076	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-1-6077	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-1-6078	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-2-6079	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-2-6080	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-2-6081	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-2-6082	SW7471A	Mercury	mg/Kg	0.1	UJ	HT>UCL
N002325	AOC11e-SS-2-6083	SW7471A	Mercury	mg/Kg	0.11	UJ	HT>UCL
980620	AOC11d-1-6045	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11d-1-6045	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-1-6049	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
980620	AOC11e-1-6049	SW8015-E	TPH-Motor Oil	mg/kg	17.7	J	HT>UCL
980620	AOC11e-2-6054	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-2-6054	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-1-6075	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-1-6075	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-1-6076	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-1-6076	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-1-6077	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-1-6077	SW8015-E	TPH-Motor Oil	mg/kg	10.5	J	HT>UCL
980620	AOC11e-SS-1-6078	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-1-6078	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6079	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6079	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6080	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6080	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6081	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6081	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6082	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6082	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
980620	AOC11e-SS-2-6083	SW8015-E	TPH-Diesel	mg/kg	10	J	HT>UCL
980620	AOC11e-SS-2-6083	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8015-P	TPH-Gasoline	µg/Kg	3800	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8015-P	TPH-Gasoline	µg/Kg	2400	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8015-P	TPH-Gasoline	µg/Kg	1500	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8015-P	TPH-Gasoline	µg/Kg	2300	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8015-P	TPH-Gasoline	µg/Kg	1500	UJ	HT>UCL
N002180	AOC11e-SS-2-6083	SW8015-P	TPH-Gasoline	µg/Kg	1100	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1016	µg/Kg	18	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1221	µg/Kg	35	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1232	µg/Kg	18	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1242	µg/Kg	18	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1248	µg/Kg	18	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1254	µg/Kg	190	J	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1260	µg/Kg	18	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1262	µg/Kg	18	UJ	HT>UCL
N002326	AOC11c-2-6038	SW8082	Aroclor 1268	µg/Kg	18	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1221	µg/Kg	34	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002326	AOC11d-1-6043	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC11d-1-6043	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,1,1,2-Tetrachloroethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,1,1-Trichloroethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,1,2-Trichloroethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,1-Dichloroethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,1-Dichloroethene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,1-Dichloropropene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2,3-Trichlorobenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2,3-Trichloropropane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2-Dibromoethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2-Dichlorobenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2-Dichloroethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,2-Dichloropropane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,3-Dichlorobenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,3-Dichloropropane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	1,4-Dichlorobenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	2,2-Dichloropropane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	2-Butanone	µg/Kg	150	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	2-Chlorotoluene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	4-Chlorotoluene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	4-Isopropyltoluene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	4-Methyl-2-pentanone	µg/Kg	150	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Acetone	µg/Kg	8100	J	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Acrolein	µg/Kg	300	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Acrylonitrile	µg/Kg	150	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Benzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Bromobenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Bromochloromethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Bromodichloromethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Bromoform	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Bromomethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Carbon disulfide	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Carbon tetrachloride	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Chlorobenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Chloroethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Chloroform	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Chloromethane	µg/Kg	15	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-1-6033	SW8260B	cis-1,2-Dichloroethene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	cis-1,3-Dichloropropene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Dibromochloromethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Dibromomethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Dichlorodifluoromethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Ethylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Freon-113	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Hexachlorobutadiene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Isopropylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	m,p-Xylene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Methylene chloride	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	MTBE	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Naphthalene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	n-Butylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	n-Propylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	o-Xylene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	sec-Butylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Styrene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	tert-Butylbenzene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Tetrachloroethene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Toluene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	trans-1,2-Dichloroethene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	trans-1,3-Dichloropropene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Trichloroethene	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Trichlorofluoromethane	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Vinyl chloride	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6033	SW8260B	Xylenes, Total	µg/Kg	15	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,1,1,2-Tetrachloroethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,1,1-Trichloroethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,1,2-Trichloroethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,1-Dichloroethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,1-Dichloroethene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,1-Dichloropropene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2,3-Trichlorobenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2,3-Trichloropropane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2-Dibromoethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2-Dichlorobenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2-Dichloroethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,2-Dichloropropane	µg/Kg	12	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-1-6034	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,3-Dichlorobenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,3-Dichloropropane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	1,4-Dichlorobenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	2,2-Dichloropropane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	2-Butanone	µg/Kg	120	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	2-Chlorotoluene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	4-Chlorotoluene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	4-Isopropyltoluene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	4-Methyl-2-pentanone	µg/Kg	120	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Acetone	µg/Kg	520	J	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Acrolein	µg/Kg	230	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Acrylonitrile	µg/Kg	120	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Benzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Bromobenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Bromochloromethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Bromodichloromethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Bromoform	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Bromomethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Carbon disulfide	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Carbon tetrachloride	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Chlorobenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Chloroethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Chloroform	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Chloromethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	cis-1,2-Dichloroethene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	cis-1,3-Dichloropropene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Dibromochloromethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Dibromomethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Dichlorodifluoromethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Ethylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Freon-113	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Hexachlorobutadiene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Isopropylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	m,p-Xylene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Methylene chloride	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	MTBE	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Naphthalene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	n-Butylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	n-Propylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	o-Xylene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	sec-Butylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Styrene	µg/Kg	12	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-1-6034	SW8260B	tert-Butylbenzene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Tetrachloroethene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Toluene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	trans-1,2-Dichloroethene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	trans-1,3-Dichloropropene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Trichloroethene	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Trichlorofluoromethane	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Vinyl chloride	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6034	SW8260B	Xylenes, Total	µg/Kg	12	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,1,1,2-Tetrachloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,1,1-Trichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,1,2-Trichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,1-Dichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,1-Dichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,1-Dichloropropene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2,3-Trichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2,3-Trichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2-Dibromoethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2-Dichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2-Dichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,2-Dichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,3-Dichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,3-Dichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	1,4-Dichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	2,2-Dichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	2-Butanone	µg/Kg	69	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	2-Chlorotoluene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	4-Chlorotoluene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	4-Isopropyltoluene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	4-Methyl-2-pentanone	µg/Kg	69	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Acetone	µg/Kg	190	J	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Acrolein	µg/Kg	140	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Acrylonitrile	µg/Kg	69	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Benzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Bromobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Bromochloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Bromodichloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Bromoform	µg/Kg	6.9	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-1-6035	SW8260B	Bromomethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Carbon disulfide	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Carbon tetrachloride	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Chlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Chloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Chloroform	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Chloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	cis-1,2-Dichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	cis-1,3-Dichloropropene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Dibromochloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Dibromomethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Dichlorodifluoromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Ethylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Freon-113	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Hexachlorobutadiene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Isopropylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	m,p-Xylene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Methylene chloride	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	MTBE	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Naphthalene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	n-Butylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	n-Propylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	o-Xylene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	sec-Butylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Styrene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	tert-Butylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Tetrachloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Toluene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	trans-1,2-Dichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	trans-1,3-Dichloropropene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Trichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Trichlorofluoromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Vinyl chloride	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-1-6035	SW8260B	Xylenes, Total	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,1,1,2-Tetrachloroethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,1,1-Trichloroethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,1,2-Trichloroethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,1-Dichloroethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,1-Dichloroethene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,1-Dichloropropene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2,3-Trichlorobenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2,3-Trichloropropane	µg/Kg	16	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-2-6038	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2-Dibromoethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2-Dichlorobenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2-Dichloroethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,2-Dichloropropane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,3-Dichlorobenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,3-Dichloropropane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	1,4-Dichlorobenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	2,2-Dichloropropane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	2-Butanone	µg/Kg	160	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	2-Chlorotoluene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	2-Hexanone	µg/Kg	160	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	4-Chlorotoluene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	4-Isopropyltoluene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	4-Methyl-2-pentanone	µg/Kg	160	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Acetone	µg/Kg	5600	J	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Acrolein	µg/Kg	320	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Acrylonitrile	µg/Kg	160	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Benzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Bromobenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Bromochloromethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Bromodichloromethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Bromoform	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Bromomethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Carbon disulfide	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Carbon tetrachloride	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Chlorobenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Chloroethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Chloroform	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Chloromethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	cis-1,2-Dichloroethene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	cis-1,3-Dichloropropene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Cyclohexane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Dibromochloromethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Dibromomethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Dichlorodifluoromethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Ethylbenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Freon-113	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Hexachlorobutadiene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Isopropylbenzene	µg/Kg	16	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-2-6038	SW8260B	m,p-Xylene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Methyl Acetate	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Methylcyclohexane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Methylene chloride	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	MTBE	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Naphthalene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	n-Butylbenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	n-Propylbenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	o-Xylene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	sec-Butylbenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Styrene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	tert-Butylbenzene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Tetrachloroethene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Toluene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	trans-1,2-Dichloroethene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	trans-1,3-Dichloropropene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Trichloroethene	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Trichlorofluoromethane	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Vinyl chloride	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6038	SW8260B	Xylenes, Total	µg/Kg	16	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,1,1,2-Tetrachloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,1,1-Trichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,1,2-Trichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,1-Dichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,1-Dichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,1-Dichloropropene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2,3-Trichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2,3-Trichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2-Dibromoethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2-Dichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2-Dichloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,2-Dichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,3-Dichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,3-Dichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	1,4-Dichlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	2,2-Dichloropropane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	2-Butanone	µg/Kg	69	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	2-Chlorotoluene	µg/Kg	6.9	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-2-6039	SW8260B	4-Chlorotoluene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	4-Isopropyltoluene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	4-Methyl-2-pentanone	µg/Kg	69	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Acetone	µg/Kg	760	J	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Acrolein	µg/Kg	140	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Acrylonitrile	µg/Kg	69	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Benzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Bromobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Bromochloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Bromodichloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Bromoform	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Bromomethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Carbon disulfide	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Carbon tetrachloride	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Chlorobenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Chloroethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Chloroform	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Chloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	cis-1,2-Dichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	cis-1,3-Dichloropropene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Dibromochloromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Dibromomethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Dichlorodifluoromethane	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Ethylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Freon-113	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Hexachlorobutadiene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Isopropylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	m,p-Xylene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Methylene chloride	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	MTBE	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Naphthalene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	n-Butylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	n-Propylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	o-Xylene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	sec-Butylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Styrene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	tert-Butylbenzene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Tetrachloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Toluene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	trans-1,2-Dichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	trans-1,3-Dichloropropene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Trichloroethene	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Trichlorofluoromethane	µg/Kg	6.9	UJ	HT>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11c-2-6039	SW8260B	Vinyl chloride	µg/Kg	6.9	UJ	HT>UCL
N002180	AOC11c-2-6039	SW8260B	Xylenes, Total	µg/Kg	6.9	UJ	HT>UCL
Continuing Calibration Summary							
N002180	AOC11c-1-6035	SW8260B	Bromoform	µg/Kg	6.9	UJ	CCV<LCL
N002180	AOC11c-2-6038	SW8260B	Bromoform	µg/Kg	16	UJ	CCV<LCL
N002180	AOC11c-2-6039	SW8260B	Bromoform	µg/Kg	6.9	UJ	CCV<LCL
N002180	AOC11d-1-6043	SW8260B	Bromoform	µg/Kg	4.4	UJ	CCV<LCL
N002180	AOC11d-1-6044	SW8260B	Bromoform	µg/Kg	3.5	UJ	CCV<LCL
N002180	AOC11d-1-6045	SW8260B	Bromoform	µg/Kg	5.1	UJ	CCV<LCL
N002180	AOC11e-1-6047	SW8260B	Bromoform	µg/Kg	5.4	UJ	CCV<LCL
N002180	AOC11e-1-6048	SW8260B	Bromoform	µg/Kg	4.6	UJ	CCV<LCL
N002180	AOC11e-1-6049	SW8260B	Bromoform	µg/Kg	5	UJ	CCV<LCL
N002180	AOC11e-2-6051	SW8260B	Bromoform	µg/Kg	5.1	UJ	CCV<LCL
N002180	AOC11e-2-6053	SW8260B	Bromoform	µg/Kg	4.5	UJ	CCV<LCL
N002180	AOC11e-2-6054	SW8260B	Bromoform	µg/Kg	4	UJ	CCV<LCL
N002180	AOC11e-SS-1-6076	SW8260B	Bromoform	µg/Kg	4.5	UJ	CCV<LCL
N002180	AOC11e-SS-1-6077	SW8260B	Bromoform	µg/Kg	3.9	UJ	CCV<LCL
N002180	AOC11e-SS-1-6078	SW8260B	Bromoform	µg/Kg	4.3	UJ	CCV<LCL
Field Duplicate Summary							
N002180	AOC11d-1-6041	SW6010B	Barium	mg/Kg	310	J	FD>RPD
N002180	AOC11d-1-6041	SW6010B	Calcium	mg/Kg	43000	J	FD>RPD
N002180	AOC11d-1-6042	SW6010B	Barium	mg/Kg	250	J	FD>RPD
N002180	AOC11d-1-6042	SW6010B	Calcium	mg/Kg	33000	J	FD>RPD
978698	AOC11c-1-6033	SW8015-E	TPH-Diesel	mg/kg	10	UJ	FD>RPD
978698	AOC11c-1-6034	SW8015-E	TPH-Diesel	mg/kg	78	J	FD>RPD
N002180	AOC11d-1-6041	SW8081A	alpha-Chlordane	µg/Kg	12	J	FD>RPD
N002180	AOC11d-1-6041	SW8081A	gamma-Chlordane	µg/Kg	13	J	FD>RPD
N002180	AOC11d-1-6042	SW8081A	alpha-Chlordane	µg/Kg	1	UJ	FD>RPD
N002180	AOC11d-1-6042	SW8081A	gamma-Chlordane	µg/Kg	1	UJ	FD>RPD
N002180	AOC11c-1-6033	SW8260B	Acetone	µg/Kg	8100	J	FD>RPD
N002180	AOC11c-1-6034	SW8260B	Acetone	µg/Kg	520	J	FD>RPD
N002180	AOC11e-SS-2-6081	SW8270SIM	Fluoranthene	µg/Kg	38	J	FD>RPD
N002180	AOC11e-SS-2-6081	SW8270SIM	Phenanthrene	µg/Kg	28	J	FD>RPD
N002180	AOC11e-SS-2-6081	SW8270SIM	Pyrene	µg/Kg	31	J	FD>RPD
N002180	AOC11e-SS-2-6082	SW8270SIM	Fluoranthene	µg/Kg	5.1	UJ	FD>RPD
N002180	AOC11e-SS-2-6082	SW8270SIM	Phenanthrene	µg/Kg	5.1	UJ	FD>RPD
N002180	AOC11e-SS-2-6082	SW8270SIM	Pyrene	µg/Kg	5.1	UJ	FD>RPD
Laboratory Control Sample Summary							
978645	AOC11a-1-6001	SW8015-E	TPH-Motor Oil	mg/kg	45.7	J	LCS>UCL
978645	AOC11a-1-6002	SW8015-E	TPH-Motor Oil	mg/kg	10.1	J	LCS>UCL
978645	AOC11a-3-6012	SW8015-E	TPH-Motor Oil	mg/kg	35.6	J	LCS>UCL
978645	AOC11a-4-6014	SW8015-E	TPH-Motor Oil	mg/kg	14	J	LCS>UCL
978645	AOC11a-4-6015	SW8015-E	TPH-Motor Oil	mg/kg	47.5	J	LCS>UCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
978645	AOC11a-4-6016	SW8015-E	TPH-Motor Oil	mg/kg	11.9	J	LCS>UCL
978645	AOC11a-5-6018	SW8015-E	TPH-Motor Oil	mg/kg	11.2	J	LCS>UCL
978645	AOC11a-5-6019	SW8015-E	TPH-Motor Oil	mg/kg	37.4	J	LCS>UCL
978645	AOC11a-5-6020	SW8015-E	TPH-Motor Oil	mg/kg	11.3	J	LCS>UCL
N002180	AOC11c-2-6039	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	120	J	LCS>UCL
N002180	AOC11d-1-6041	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	61	J	LCS>UCL
N002180	AOC11d-1-6042	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	55	J	LCS>UCL
N002180	AOC11e-1-6046	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	85	J	LCS>UCL
N002180	AOC11e-1-6047	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	22	J	LCS>UCL
N002180	AOC11e-1-6048	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	8.1	J	LCS>UCL
N002180	AOC11e-2-6050	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	39	J	LCS>UCL
Matrix Spike Summary							
N002169	AOC11a-1-6002	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
N002325	AOC11a-5-6022	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
N002138	AOC11b-1-6023	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002180	AOC11d-1-6041	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
N002325	AOC11e-SS-1-6075	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
978645	AOC11a-4-6016	SW7199	Chromium, hexavalent	mg/kg	0.407	UJ	MS<LCL
N002169	AOC11a-1-6001	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002138	AOC11b-1-6023	SW6010B	Barium	mg/Kg	200	J	MS>UCL
Matrix Spike Duplicate Summary							
N002169	AOC11a-1-6002	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
N002325	AOC11a-5-6022	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
N002138	AOC11b-1-6023	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002180	AOC11d-1-6041	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
N002325	AOC11e-SS-1-6075	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002169	AOC11a-1-6001	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
Post Digestion Spike							
N002180	AOC11d-1-6041	SW6010B	Calcium	mg/Kg	43000	J	PDS>UCL
Serial Dilution Summary							
N002180	AOC11d-1-6041	SW6010B	Aluminum	mg/Kg	19000	J	SerDil
N002325	AOC11e-SS-1-6075	SW6010B	Barium	mg/Kg	96	J	SerDil
N002180	AOC11d-1-6041	SW6010B	Calcium	mg/Kg	43000	J	SerDil
N002180	AOC11d-1-6041	SW6010B	Iron	mg/Kg	21000	J	SerDil
N002180	AOC11d-1-6041	SW6010B	Magnesium	mg/Kg	11000	J	SerDil
N002180	AOC11d-1-6041	SW6010B	Manganese	mg/Kg	390	J	SerDil
N002325	AOC11e-SS-1-6075	SW6010B	Zinc	mg/Kg	35	J	SerDil
Surrogate Summary							
978645	AOC11a-3-6012	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978645	AOC11a-3-6012	SW8015-E	TPH-Motor Oil	mg/kg	35.6	J	Sur<LCL
980620	AOC11e-SS-2-6080	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
980620	AOC11e-SS-2-6080	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
N002180	AOC11e-2-6051	SW8015-P	TPH-Gasoline	µg/Kg	900	UJ	Sur<LCL

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11e-2-6052	SW8015-P	TPH-Gasoline	µg/Kg	1100	UJ	Sur<LCL
N002180	AOC11e-2-6053	SW8015-P	TPH-Gasoline	µg/Kg	1000	UJ	Sur<LCL
978698	AOC11e-1-6047	SW8015-E	TPH-Motor Oil	mg/kg	42.2	J	Sur>UCL
Contamination Summary							
N002169	AOC11a-1-6003	SW8260B	Acetone	µg/Kg	170	R	Reject Contamination
N002169	AOC11a-2-6006	SW8260B	Acetone	µg/Kg	650	R	Reject Contamination
N002169	AOC11a-2-6007	SW8260B	Acetone	µg/Kg	560	R	Reject Contamination
N002162	AOC11a-3-6010	SW8260B	Acetone	µg/Kg	400	R	Reject Contamination
N002162	AOC11a-3-6011	SW8260B	Acetone	µg/Kg	110	R	Reject Contamination
N002162	AOC11a-4-6015	SW8260B	Acetone	µg/Kg	760	R	Reject Contamination
N002162	AOC11a-4-6016	SW8260B	Acetone	µg/Kg	330	R	Reject Contamination
N002169	AOC11a-5-6019	SW8260B	Acetone	µg/Kg	420	R	Reject Contamination
N002169	AOC11a-5-6020	SW8260B	Acetone	µg/Kg	320	R	Reject Contamination
N002169	AOC11a-5-6021	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination
N002138	AOC11b-2-6029	SW8260B	Acetone	µg/Kg	290	R	Reject Contamination
N002138	AOC11b-2-6030	SW8260B	Acetone	µg/Kg	140	R	Reject Contamination
N002180	AOC11c-1-6033	SW8260B	Acetone	µg/Kg	8100	R	Reject Contamination
N002180	AOC11c-1-6034	SW8260B	Acetone	µg/Kg	520	R	Reject Contamination
N002180	AOC11c-1-6035	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination
N002180	AOC11c-2-6038	SW8260B	Acetone	µg/Kg	5600	R	Reject Contamination
N002180	AOC11c-2-6039	SW8260B	Acetone	µg/Kg	760	R	Reject Contamination
N002180	AOC11d-1-6044	SW8260B	Acetone	µg/Kg	48	R	Reject Contamination
N002180	AOC11d-1-6045	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination
N002180	AOC11e-1-6047	SW8260B	Acetone	µg/Kg	330	R	Reject Contamination
N002180	AOC11e-1-6048	SW8260B	Acetone	µg/Kg	320	R	Reject Contamination
N002180	AOC11e-1-6049	SW8260B	Acetone	µg/Kg	420	R	Reject Contamination

TABLE D7-1
Topock Soil RFI/RI Part A – AOC 11
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002180	AOC11e-2-6052	SW8260B	Acetone	µg/Kg	100	R	Reject Contamination
N002180	AOC11e-SS-2-6083	SW8260B	Acetone	µg/Kg	99	R	Reject Contamination

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.

FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.

HT>UCL = Holding time exceeded the upper control limit.

LCS>UCL = Laboratory Control Sample greater than upper control limit.

MS<LCL = Matrix spike recovery less than lower control limit.

MS>UCL = Matrix spike recovery greater than upper control limit.

PDS>UCL = Post digestion spike recovery greater than upper control limit.

RejectContamination = Result was rejected due to possible contamination.

SD<LCL = Matrix spike duplicate recovery less than lower control limit.

SerDil = Serial Dilution is greater than 10% RPD.

Sur<LCL = Surrogate recovery less than lower control limit.

Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D7-2
Topock Soil RFI/RI Part A - AOC11 - *Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
AOC11a-3-6010	AOC11a-3-6011	AOC11d-1-6041	AOC11d-1-6042
AOC11a-5-6020	AOC11a-5-6021	AOC11e-2-6051	AOC11e-2-6052
AOC11b-1-6023	AOC11b-1-6024	AOC11e-SS-2-6081	AOC11e-SS-2-6082
AOC11c-1-6033	AOC11c-1-6034		

TABLE D7-3
Topock Soil RFI/RI Part A - AOC11 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flaga	Validation Reason	Equipment Blank Result µg/L
N002180	AOC11e-2-6050	SW6010B	Sodium	mg/Kg	580	U	EB>RL	7200

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

U = the analyte is qualified as “not detected” due to blank contamination.

TABLE D7-3
Topock Soil RFI/RI Part A - AOC11 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flaga	Validation Reason	Equipment Blank Result µg/L

Validation Reasons:
EB>RL = Equipment blank contamination greater than the RL.

Attachment D8
Summary of Samples Qualified in AOC 12

TABLE D8-1
Topock Soil RFI/RI Part A – AOC 12
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flaga	Validation Reason
Holding Time Summary							
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1016	µg/Kg	17	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1221	µg/Kg	33	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1232	µg/Kg	17	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1242	µg/Kg	17	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1248	µg/Kg	17	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1254	µg/Kg	17	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1260	µg/Kg	17	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1262	µg/Kg	17	UJ	HT>UCL
N002326	AOC12a-T1a-7002	SW8082	Aroclor 1268	µg/Kg	17	UJ	HT>UCL
Continuing Calibration Summary							
N002161	AOC12c-T1b-7016	SW8260B	Acrolein	µg/Kg	130	UJ	CCV<LCL
N002161	AOC12c-T1c-7017	SW8260B	Acrolein	µg/Kg	110	UJ	CCV<LCL
N002161	AOC12c-T2a-7018	SW8260B	Acrolein	µg/Kg	120	UJ	CCV<LCL
N002161	AOC12c-T2b-7019	SW8260B	Acrolein	µg/Kg	110	UJ	CCV<LCL
N002161	AOC12c-T2c-7020	SW8260B	Acrolein	µg/Kg	99	UJ	CCV<LCL
N002161	AOC12c-T2d-7021	SW8260B	Acrolein	µg/Kg	110	UJ	CCV<LCL
N002161	AOC12c-T2d-7022	SW8260B	Acrolein	µg/Kg	96	UJ	CCV<LCL
Field Duplicate Summary							
NA	NA	NA	NA	NA	NA	NA	FD>RPD
Laboratory Control Sample Summary							
978651	AOC12c-T2d-7021	SW8015-E	TPH-Motor Oil	mg/kg	97.5	J	LCS>UCL
978651	AOC12c-T2d-7022	SW8015-E	TPH-Motor Oil	mg/kg	120	J	LCS>UCL
N002181	AOC12a-T1a-7001	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	20	J	LCS>UCL
Matrix Spike Summary							
N002181	AOC12a-T1a-7001	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002161	AOC12c-T1b-7015	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002181	AOC12a-T1a-7001	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002181	AOC12a-T1a-7001	SW6010B	Magnesium	mg/Kg	3000	J	MS>UCL
Matrix Spike Duplicate Summary							
N002181	AOC12a-T1a-7001	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002161	AOC12c-T1b-7015	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002161	AOC12c-T1b-7015	SW8270C	1,2,4,5-Tetrachlorobenzene	µg/Kg	710	UJ	SD<LCL
N002161	AOC12c-T1b-7015	SW8270C	2,3,4,6-Tetrachlorophenol	µg/Kg	710	UJ	SD<LCL
N002161	AOC12c-T1b-7015	SW8270C	Acetophenone	µg/Kg	710	UJ	SD<LCL
N002161	AOC12c-T1b-7015	SW8270C	Benzaldehyde	µg/Kg	710	UJ	SD<LCL
N002181	AOC12a-T1a-7001	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002161	AOC12c-T1b-7015	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002161	AOC12c-T1b-7015	SW6010B	Barium	mg/Kg	110	J	SD>UCL
N002181	AOC12a-T1a-7001	SW6010B	Magnesium	mg/Kg	3000	J	SD>UCL

TABLE D8-1
Topock Soil RFI/RI Part A – AOC 12
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flaga	Validation Reason
Post Digestion Spike							
N002181	AOC12a-T1a-7001	SW6010B	Calcium	mg/Kg	10000	J	PDS>UCL
N002181	AOC12a-T1a-7001	SW6010B	Iron	mg/Kg	9900	J	PDS>UCL
Serial Dilution Summary							
NA	NA	NA	NA	NA	NA	NA	SerDil
Surrogate Summary							
N002181	AOC12a-T2a-7005	SW8015-P	TPH-Gasoline	µg/Kg	1000	UJ	Sur<LCL
Contamination Summary							
N002181	AOC12a-T1c-7004	SW8260B	Acetone	µg/Kg	84	R	Reject Contamination
N002181	AOC12a-T2b-7006	SW8260B	Acetone	µg/Kg	55	R	Reject Contamination
N002161	AOC12c-T1a-7014	SW8260B	Acetone	µg/Kg	180	R	Reject Contamination
N002161	AOC12c-T2a-7018	SW8260B	Acetone	µg/Kg	280	R	Reject Contamination
N002161	AOC12c-T2c-7020	SW8260B	Acetone	µg/Kg	240	R	Reject Contamination
N002161	AOC12c-T2d-7021	SW8260B	Acetone	µg/Kg	150	R	Reject Contamination

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.
FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.
HT>UCL = Holding time exceeded the upper control limit.
LCS>UCL = Laboratory Control Sample greater than upper control limit.
MS<LCL = Matrix spike recovery less than lower control limit.
MS>UCL = Matrix spike recovery greater than upper control limit.
PDS>UCL = Post digestion spike recovery greater than upper control limit.
RejectContamination = Result was rejected due to possible contamination.
SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SD>UCL = Matrix spike duplicate recovery greater than upper control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.
Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D8-2
Topock Soil RFI/RI Part A - AOC12 - *Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
AOC12c-T2d-7021	AOC12c-T2d-7022		

TABLE D8-3
Topock Soil RFI/RI Part A - AOC12 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
NA	NA	NA	NA	NA	NA	NA	EB>RL	NA

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:

EB>RL = Equipment blank contamination greater than the RL.

Attachment D9
Summary of Samples Qualified in AOC 14

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
979156	AOC14-10-8055	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-10-8055	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-11-8058	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-11-8058	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979252	AOC14-13-8089	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979252	AOC14-13-8089	SW8015-E	TPH-Motor Oil	mg/kg	89.1	J	HT>UCL
979252	AOC14-2-8088	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979252	AOC14-2-8088	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-3-8016	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-3-8016	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-4-8022	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-4-8022	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-9-8049	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-9-8049	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8066	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8066	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8067	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8067	SW8015-E	TPH-Motor Oil	mg/kg	56.7	J	HT>UCL
979156	AOC14-SS-1-8068	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8068	SW8015-E	TPH-Motor Oil	mg/kg	38.9	J	HT>UCL
979156	AOC14-SS-1-8069	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8069	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8070	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-1-8070	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8071	SW8015-E	TPH-Diesel	mg/kg	11	J	HT>UCL
979156	AOC14-SS-2-8071	SW8015-E	TPH-Motor Oil	mg/kg	134	J	HT>UCL
979156	AOC14-SS-2-8072	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8072	SW8015-E	TPH-Motor Oil	mg/kg	28.2	J	HT>UCL
979156	AOC14-SS-2-8073	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8073	SW8015-E	TPH-Motor Oil	mg/kg	10.9	J	HT>UCL
979156	AOC14-SS-2-8074	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8074	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8075	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8075	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8076	SW8015-E	TPH-Diesel	mg/kg	10	UJ	HT>UCL
979156	AOC14-SS-2-8076	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	1,2-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	1,3-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	1,4-Dichlorobenzene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1600	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2,4,6-Trichlorophenol	µg/Kg	330	UJ	HT>UCL

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002287	AOC14-13-8089	SW8270C	2,4-Dichlorophenol	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2,4-Dimethylphenol	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2,4-Dinitrophenol	µg/Kg	1600	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2,4-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2,6-Dinitrotoluene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2-Chloronaphthalene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2-Chlorophenol	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2-Methylnaphthalene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2-Methylphenol	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	2-Nitrophenol	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	3-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1700	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4-Bromophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4-Chloro-3-methylphenol	µg/Kg	660	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4-Chloroaniline	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4-Methylphenol	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4-Nitroaniline	µg/Kg	1600	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	4-Nitrophenol	µg/Kg	1600	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Acenaphthene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Acenaphthylene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Anthracene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Benzo(a)anthracene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Benzo(a)pyrene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Benzo(b)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Benzo(g,h,i)perylene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Benzo(k)fluoranthene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Benzoic acid	µg/Kg	1700	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Benzyl alcohol	µg/Kg	660	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Butylbenzylphthalate	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Chrysene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Dibenz(a,h)anthracene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Dibenzofuran	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Diethylphthalate	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Dimethylphthalate	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Di-n-butylphthalate	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Di-n-octylphthalate	µg/Kg	330	UJ	HT>UCL

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002287	AOC14-13-8089	SW8270C	Fluoranthene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Fluorene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Hexachlorobenzene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Hexachlorobutadiene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Hexachloroethane	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Isophorone	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Naphthalene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Nitrobenzene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	N-Nitrosodiphenylamine	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Pentachlorophenol	µg/Kg	1600	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Phenanthrene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Phenol	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270C	Pyrene	µg/Kg	330	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	1,2,4-Trichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	1,2-Dichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	1,3-Dichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	1,4-Dichlorobenzene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2,4,5-Trichlorophenol	µg/Kg	1800	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2,4,6-Trichlorophenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2,4-Dichlorophenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2,4-Dimethylphenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2,4-Dinitrophenol	µg/Kg	1800	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2,4-Dinitrotoluene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2,6-Dinitrotoluene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2-Chloronaphthalene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2-Chlorophenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2-Methylnaphthalene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2-Methylphenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	2-Nitrophenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	3,3´-Dichlorobenzidine	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	3-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4,6-Dinitro-2-methylphenol	µg/Kg	1900	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4-Bromophenyl-phenylether	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4-Chloro-3-methylphenol	µg/Kg	750	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4-Chloroaniline	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4-Chlorophenyl-phenylether	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4-Methylphenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4-Nitroaniline	µg/Kg	1800	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	4-Nitrophenol	µg/Kg	1800	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Acenaphthene	µg/Kg	370	UJ	HT>UCL

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002287	AOC14-2-8088	SW8270C	Acenaphthylene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Anthracene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Benzo(a)anthracene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Benzo(a)pyrene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Benzo(b)fluoranthene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Benzo(g,h,i)perylene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Benzo(k)fluoranthene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Benzoic acid	µg/Kg	1900	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Benzyl alcohol	µg/Kg	750	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Bis(2-chloroethoxy)methane	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Bis(2-chloroethyl)ether	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Bis(2-chloroisopropyl)ether	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Bis(2-ethylhexyl)phthalate	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Butylbenzylphthalate	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Chrysene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Dibenz(a,h)anthracene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Dibenzofuran	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Diethylphthalate	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Dimethylphthalate	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Di-n-butylphthalate	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Di-n-octylphthalate	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Fluoranthene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Fluorene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Hexachlorobenzene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Hexachlorobutadiene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Hexachloroethane	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Indeno(1,2,3-cd)pyrene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Isophorone	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Naphthalene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Nitrobenzene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	N-Nitrosodi-n-propylamine	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	N-Nitrosodiphenylamine	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Pentachlorophenol	µg/Kg	1800	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Phenanthrene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Phenol	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270C	Pyrene	µg/Kg	370	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	1-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	2-Methylnaphthalene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Acenaphthene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Acenaphthylene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Anthracene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Benzo(a)anthracene	µg/Kg	16	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Benzo(a)pyrene	µg/Kg	12	J	HT>UCL

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002287	AOC14-13-8089	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	17	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	6.6	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	12	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Chrysene	µg/Kg	17	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Fluoranthene	µg/Kg	25	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Fluorene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5.8	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Naphthalene	µg/Kg	5	UJ	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Phenanthrene	µg/Kg	5.3	J	HT>UCL
N002287	AOC14-13-8089	SW8270SIM	Pyrene	µg/Kg	22	J	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	1-Methylnaphthalene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	2-Methylnaphthalene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Acenaphthene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Acenaphthylene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Anthracene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Benzo(a)anthracene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Benzo(a)pyrene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Chrysene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Dibenz(a,h)anthracene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Fluoranthene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Fluorene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Indeno(1,2,3-cd)pyrene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Naphthalene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Phenanthrene	µg/Kg	5.7	UJ	HT>UCL
N002287	AOC14-2-8088	SW8270SIM	Pyrene	µg/Kg	5.7	UJ	HT>UCL
979252	AOC14-13-8089	SW9045	PH	pH	8.85	J	HT>UCL
979252	AOC14-2-8088	SW9045	PH	pH	8.88	J	HT>UCL
Continuing Calibration Summary							
N002207	AOC14-10-8051	SW8260B	Bromoform	µg/Kg	4.7	UJ	CCV<LCL
N002207	AOC14-10-8052	SW8260B	Bromoform	µg/Kg	4.4	UJ	CCV<LCL
Field Duplicate Summary							
N002202	AOC14-2-8009	SW6010B	Copper	mg/Kg	16	J	FD>RPD
N002202	AOC14-2-8010	SW6010B	Copper	mg/Kg	11	J	FD>RPD
N002216	AOC14-SS-4-8086	SW8260B	Acetone	µg/Kg	290	J	FD>RPD
N002216	AOC14-SS-4-8087	SW8260B	Acetone	µg/Kg	37	UJ	FD>RPD
Laboratory Control Sample Summary							
979252	AOC14-13-8089	SW8015-E	TPH-Motor Oil	mg/kg	89.1	J	LCS>UCL
978903	AOC14-9-8045	SW8015-E	TPH-Motor Oil	mg/kg	57.5	J	LCS>UCL

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
978903	AOC14-9-8046	SW8015-E	TPH-Motor Oil	mg/kg	22.1	J	LCS>UCL
978903	AOC14-9-8047	SW8015-E	TPH-Motor Oil	mg/kg	57	J	LCS>UCL
978903	AOC14-9-8048	SW8015-E	TPH-Motor Oil	mg/kg	14	J	LCS>UCL
Matrix Spike Summary							
N002207	AOC14-3-8012	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002325	AOC14-8-8044	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
N002325	AOC14-9-8049	SW6010B	Antimony	mg/Kg	2	UJ	MS<LCL
N002207	AOC14-10-8050	SW8270C	1,2,4,5-Tetrachlorobenzene	µg/Kg	700	UJ	MS<LCL
N002207	AOC14-10-8050	SW8270C	Acetophenone	µg/Kg	700	UJ	MS<LCL
N002207	AOC14-10-8050	SW8270C	Benzaldehyde	µg/Kg	700	UJ	MS<LCL
N002207	AOC14-10-8054	SW8270C	Benzoic acid	µg/Kg	1700	UJ	MS<LCL
N002216	AOC14-5-8025	SW8270C	Benzoic acid	µg/Kg	1700	R	MS<LCL
N002207	AOC14-10-8050	SW8270C	Caprolactam	µg/Kg	330	UJ	MS<LCL
N002325	AOC14-9-8049	SW6010B	Barium	mg/Kg	120	J	MS>UCL
Matrix Spike Duplicate Summary							
N002207	AOC14-3-8012	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002325	AOC14-8-8044	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
N002325	AOC14-9-8049	SW6010B	Antimony	mg/Kg	2	UJ	SD<LCL
N002207	AOC14-10-8050	SW8270C	1,2,4,5-Tetrachlorobenzene	µg/Kg	700	UJ	SD<LCL
N002207	AOC14-10-8050	SW8270C	Acetophenone	µg/Kg	700	UJ	SD<LCL
N002207	AOC14-10-8050	SW8270C	Benzaldehyde	µg/Kg	700	UJ	SD<LCL
N002207	AOC14-10-8054	SW8270C	Benzoic acid	µg/Kg	1700	UJ	SD<LCL
N002216	AOC14-5-8025	SW8270C	Benzoic acid	µg/Kg	1700	R	SD<LCL
N002207	AOC14-10-8050	SW8270C	Caprolactam	µg/Kg	330	UJ	SD<LCL
N002202	AOC14-1-8001	SW6010B	Barium	mg/Kg	190	J	SD>UCL
N002325	AOC14-9-8049	SW6010B	Barium	mg/Kg	120	J	SD>UCL
Post Digestion Spike							
NA	NA	NA	NA	NA	NA	NA	PDS>UCL
Serial Dilution Summary							
N002325	AOC14-8-8044	SW6010B	Barium	mg/Kg	73	J	SerDil
N002325	AOC14-8-8044	SW6010B	Chromium	mg/Kg	23	J	SerDil
N002207	AOC14-3-8012	SW6010B	Potassium	mg/Kg	2800	J	SerDil
N002325	AOC14-8-8044	SW6010B	Vanadium	mg/Kg	36	J	SerDil
N002325	AOC14-8-8044	SW6010B	Zinc	mg/Kg	42	J	SerDil
Surrogate Summary							
979156	AOC14-8-8044	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
979156	AOC14-8-8044	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
979156	AOC14-SS-1-8067	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
979156	AOC14-SS-1-8067	SW8015-E	TPH-Motor Oil	mg/kg	56.7	J	Sur<LCL
979156	AOC14-SS-4-8085	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
979156	AOC14-SS-4-8085	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
979156	AOC14-SS-4-8086	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
979156	AOC14-SS-4-8086	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
N002207	AOC14-3-8016	SW8015-P	TPH-Gasoline	µg/Kg	1100	UJ	Sur<LCL
N002207	AOC14-9-8047	SW8015-P	TPH-Gasoline	µg/Kg	890	UJ	Sur<LCL
N002207	AOC14-9-8049	SW8015-P	TPH-Gasoline	µg/Kg	940	UJ	Sur<LCL
N002207	AOC14-SS-1-8068	SW8015-P	TPH-Gasoline	µg/Kg	1000	UJ	Sur<LCL
N002207	AOC14-SS-1-8069	SW8015-P	TPH-Gasoline	µg/Kg	1100	UJ	Sur<LCL
N002207	AOC14-SS-1-8070	SW8015-P	TPH-Gasoline	µg/Kg	1000	UJ	Sur<LCL
N002216	AOC14-SS-4-8087	SW8015-P	TPH-Gasoline	µg/Kg	970	UJ	Sur<LCL
978846	AOC14-1-8001	SW8015-E	TPH-Motor Oil	mg/kg	30.8	J	Sur>UCL
N002207	AOC14-3-8014	SW8260B	Acetone	µg/Kg	380	J	Sur>UCL
N002216	AOC14-6-8028	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	5.9	J	Sur>UCL
N002216	AOC14-6-8028	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	5.9	J	Sur>UCL
N002216	AOC14-6-8028	SW8270SIM	Chrysene	µg/Kg	5.2	J	Sur>UCL
N002216	AOC14-6-8028	SW8270SIM	Fluoranthene	µg/Kg	5.9	J	Sur>UCL
N002216	AOC14-6-8028	SW8270SIM	Pyrene	µg/Kg	5.3	J	Sur>UCL
N002267	AOC14-SS-1-8066	SW8270SIM	Benzo(b)fluoranthene	µg/Kg	11	J	Sur>UCL
N002267	AOC14-SS-1-8066	SW8270SIM	Benzo(g,h,i)perylene	µg/Kg	5.3	J	Sur>UCL
N002267	AOC14-SS-1-8066	SW8270SIM	Benzo(k)fluoranthene	µg/Kg	9.8	J	Sur>UCL
N002267	AOC14-SS-1-8066	SW8270SIM	Chrysene	µg/Kg	11	J	Sur>UCL
N002267	AOC14-SS-1-8066	SW8270SIM	Fluoranthene	µg/Kg	8.1	J	Sur>UCL
N002267	AOC14-SS-1-8066	SW8270SIM	Pyrene	µg/Kg	7.1	J	Sur>UCL
Internal Standard Summary							
N002207	AOC14-4-8019	SW8260B	1,1,1,2-Tetrachloroethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,1,1-Trichloroethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,1,2-Trichloroethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,1-Dichloroethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,1-Dichloroethene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2,3-Trichloropropane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2-Dibromoethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2-Dichlorobenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2-Dichloroethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2-Dichloropropane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,3-Dichlorobenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,4-Dichlorobenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	2-Butanone	µg/Kg	45	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	2-Chlorotoluene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	4-Methyl-2-pentanone	µg/Kg	45	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Acetone	µg/Kg	490	J	IS<LCL

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002207	AOC14-4-8019	SW8260B	Acrolein	µg/Kg	90	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Acrylonitrile	µg/Kg	45	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Benzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Bromobenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Bromodichloromethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Bromoform	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Bromomethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Carbon disulfide	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Carbon tetrachloride	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Chlorobenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Chloroethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Chloroform	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Chloromethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	cis-1,2-Dichloroethene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Dibromochloromethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Dichlorodifluoromethane	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Ethylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Freon-113	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Isopropylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	m,p-Xylene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Methylene chloride	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	MTBE	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	n-Butylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	n-Propylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	o-Xylene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	sec-Butylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Styrene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	tert-Butylbenzene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Tetrachloroethene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Toluene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	trans-1,2-Dichloroethene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Trichloroethene	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Vinyl chloride	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	Xylenes, Total	µg/Kg	4.5	UJ	IS<LCL
N002207	AOC14-4-8019	SW8260B	1,2,3-Trichloropropane	µg/Kg	4.5	UJ	IS<LCL
Contamination Summary							
N002207	AOC14-10-8051	SW8260B	Acetone	µg/Kg	72	R	Reject Contamination
N002202	AOC14-12-8059	SW8260B	Acetone	µg/Kg	260	R	Reject Contamination
N002202	AOC14-12-8060	SW8260B	Acetone	µg/Kg	220	R	Reject Contamination
N002266	AOC14-12-8061	SW8260B	Acetone	µg/Kg	180	R	Reject Contamination

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002202	AOC14-13-8062	SW8260B	Acetone	µg/Kg	170	R	Reject Contamination
N002202	AOC14-13-8063	SW8260B	Acetone	µg/Kg	500	R	Reject Contamination
N002266	AOC14-13-8064	SW8260B	Acetone	µg/Kg	300	R	Reject Contamination
N002266	AOC14-13-8065	SW8260B	Acetone	µg/Kg	470	R	Reject Contamination
N002202	AOC14-1-8002	SW8260B	Acetone	µg/Kg	98	R	Reject Contamination
N002202	AOC14-1-8004	SW8260B	Acetone	µg/Kg	430	R	Reject Contamination
N002266	AOC14-1-8005	SW8260B	Acetone	µg/Kg	750	R	Reject Contamination
N002202	AOC14-2-8007	SW8260B	Acetone	µg/Kg	300	R	Reject Contamination
N002202	AOC14-2-8008	SW8260B	Acetone	µg/Kg	190	R	Reject Contamination
N002202	AOC14-2-8009	SW8260B	Acetone	µg/Kg	260	R	Reject Contamination
N002202	AOC14-2-8010	SW8260B	Acetone	µg/Kg	400	R	Reject Contamination
N002266	AOC14-2-8011	SW8260B	Acetone	µg/Kg	1000	R	Reject Contamination
N002207	AOC14-3-8013	SW8260B	Acetone	µg/Kg	210	R	Reject Contamination
N002207	AOC14-3-8014	SW8260B	Acetone	µg/Kg	380	R	Reject Contamination
N002207	AOC14-3-8015	SW8260B	Acetone	µg/Kg	83	R	Reject Contamination
N002207	AOC14-3-8016	SW8260B	Acetone	µg/Kg	330	R	Reject Contamination
N002207	AOC14-4-8018	SW8260B	Acetone	µg/Kg	91	R	Reject Contamination
N002207	AOC14-4-8019	SW8260B	Acetone	µg/Kg	490	R	Reject Contamination
N002207	AOC14-9-8046	SW8260B	Acetone	µg/Kg	120	R	Reject Contamination
N002207	AOC14-9-8049	SW8260B	Acetone	µg/Kg	81	R	Reject Contamination
N002216	AOC14-SS-3-8081	SW8260B	Acetone	µg/Kg	2000	R	Reject Contamination
N002216	AOC14-SS-4-8086	SW8260B	Acetone	µg/Kg	290	R	Reject Contamination

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC

TABLE D9-1
Topock Soil RFI/RI Part A – AOC 14
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason

exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.
FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.
HT>UCL = Holding time exceeded the upper control limit.
IS<LCL = Internal Standard recovery less than lower control limit.
LCS>UCL = Laboratory Control Sample greater than upper control limit.
MS<LCL = Matrix spike recovery less than lower control limit.
MS>UCL = Matrix spike recovery greater than upper control limit.
PDS>UCL = Post digestion spike recovery greater than upper control limit.
RejectContamination = Result was rejected due to possible contamination.
SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SD>UCL = Matrix spike duplicate recovery greater than upper control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.
Sur>UCL = Surrogate recovery greater than upper control limit.

TABLE D9-2
Topock Soil RFI/RI Part A - AOC14 - *Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
AOC14-10-8052	AOC14-10-8053	AOC14-6-8031	AOC14-6-8032
AOC14-13-8064	AOC14-13-8065	AOC14-8-8042	AOC14-8-8043
AOC14-2-8009	AOC14-2-8010	AOC14-SS-2-8075	AOC14-SS-2-8076
AOC14-4-8020	AOC14-4-8021	AOC14-SS-4-8086	AOC14-SS-4-8087

TABLE D9-3
Topock Soil RFI/RI Part A - AOC14 - Equipment Blank Contamination Summary
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
NA	NA	NA	NA	NA	NA	NA	EB>RL	NA

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:

EB>RL = Equipment blank contamination greater than the RL.

Attachment D10
Summary of Samples Qualified in 300B

TABLE D10-1
Topock Soil RFI/RI Part A – 300B
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
Holding Time Summary							
NA	NA	NA	NA	NA	NA	NA	HT>UCL
Continuing Calibration Summary							
NA	NA	NA	NA	NA	NA	NA	CCV<LCL
Field Duplicate Summary							
NA	NA	NA	NA	NA	NA	NA	FD>RPD
Laboratory Control Sample Summary							
978928	300B-2-10005	SW8015-E	TPH-Motor Oil	mg/kg	15.1	J	LCS>UCL
978928	300B-2-10006	SW8015-E	TPH-Motor Oil	mg/kg	12.2	J	LCS>UCL
978928	300B-2-10007	SW8015-E	TPH-Motor Oil	mg/kg	13	J	LCS>UCL
978928	300B-5-10018	SW8015-E	TPH-Motor Oil	mg/kg	59.9	J	LCS>UCL
978928	300B-5-10019	SW8015-E	TPH-Motor Oil	mg/kg	29.7	J	LCS>UCL
978928	300B-5-10020	SW8015-E	TPH-Motor Oil	mg/kg	11.2	J	LCS>UCL
Matrix Spike Summary							
N002154	BKG-07-11024	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
N002058	BKG-08-11029	SW6010B	Antimony	mg/Kg	10	UJ	MS<LCL
N002186	BKG-17-11061	SW6010B	Antimony	mg/Kg	2.1	UJ	MS<LCL
Matrix Spike Duplicate Summary							
N002154	BKG-07-11024	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
N002154	BKG-07-11024	SW6010B	Barium	mg/Kg	190	J	SD<LCL
N002058	BKG-08-11029	SW6010B	Antimony	mg/Kg	10	UJ	SD<LCL
N002186	BKG-17-11061	SW6010B	Antimony	mg/Kg	2.1	UJ	SD<LCL
Serial Dilution Summary							
NA	NA	NA	NA	NA	NA	NA	SerDil
Surrogate Summary							
978928	300B-3-10013	SW8015-E	TPH-Diesel	mg/kg	10	UJ	Sur<LCL
978928	300B-3-10013	SW8015-E	TPH-Motor Oil	mg/kg	10	UJ	Sur<LCL
Internal Standard Summary							
N002312	300B-1-10003	SW8260B	1,1,2,2-Tetrachloroethane	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,2,3-Trichloropropane	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,2,4-Trichlorobenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,2,4-Trimethylbenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,2-Dibromo-3-chloropropane	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,2-Dichlorobenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,3,5-Trimethylbenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,3-Dichlorobenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	1,4-Dichlorobenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	2-Chlorotoluene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	Bromobenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	Isopropylbenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	n-Butylbenzene	µg/Kg	6.3	UJ	IS<LCL

TABLE D10-1
Topock Soil RFI/RI Part A – 300B
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason
N002312	300B-1-10003	SW8260B	n-Propylbenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	sec-Butylbenzene	µg/Kg	6.3	UJ	IS<LCL
N002312	300B-1-10003	SW8260B	tert-Butylbenzene	µg/Kg	6.3	UJ	IS<LCL

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

J = the analyte is present but reported value may not be accurate or precise (estimated).

UJ = the analyte is not detected and the specified detection limit value may not be accurate (estimated) due to QC exceedances.

R = the result is rejected.

Validation Reasons:

CCV<LCL = Continuing calibration recovery less than the lower control limit.
FD>RPD = Field duplicate’s relative percent difference is greater than the control limit.
HT>UCL = Holding time exceeded the upper control limit.
IS<LCL = Internal Standard recovery less than lower control limit.
LCS>UCL = Laboratory Control Sample greater than upper control limit.
MS<LCL = Matrix spike recovery less than lower control limit.
RejectContamination = Result was rejected due to possible contamination.
SD<LCL = Matrix spike duplicate recovery less than lower control limit.
SerDil = Serial Dilution is greater than 10% RPD.
Sur<LCL = Surrogate recovery less than lower control limit.

TABLE D10-2
Topock Soil RFI/RI Part A - 300B - *Field Duplicate Pairs*
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

Sample	Field Duplicate	Sample	Field Duplicate
300B-3-10010	300B-3-10011		

TABLE D10-3
Topock Soil RFI/RI Part A - 300B - Equipment Blank Summary Table
Review of Analytical Data for the RCRA Facility Investigation/Remedial Investigation for Soil at the Topock Compressor Station, Needles, California

SDG	Sample ID	Method	Analyte	Units	Final Result	Validation Flag[a]	Validation Reason	Equipment Blank Result µg/L
NA	NA	NA	NA	NA	NA	NA	EB>RL	NA

[a] This is the qualifier flag for the analyte/method combination associated with the Validation Reason.

Validation Flags:

U = the analyte is qualified as “not detected” due to blank contamination.

Validation Reasons:

EB>RL = Equipment blank contamination greater than the reporting limit

Attachment D11

Site Completeness by Analyte – Qualified Data

Attachment D-11

Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	**Analyte**	**Units**	**Analyses**	**Detects**	**Non-detects**	**Blank Flags**	**J Flags**	**M Flags**	**Contractor R Flags**	**Total R Flags**	**Contractor Percent Completeness**	**Overall Percent Completeness**
D2216	Percent Moisture	%	2	2							100	100
D2216	SOLIDS, PERCENT	%	2	2							100	100
SW6010B	Aluminum, add	MG/KG	134	134			2				100	100
SW6010B	Antimony	MG/KG	721	6	715		38				100	100
SW6010B	Arsenic	MG/KG	721	705	16						100	100
SW6010B	Barium	MG/KG	721	721			17				100	100
SW6010B	Beryllium	MG/KG	721		721						100	100
SW6010B	Cadmium	MG/KG	721	6	715						100	100
SW6010B	Calcium, add	MG/KG	134	134			3				100	100
SW6010B	Chromium	MG/KG	731	731			10				100	100
SW6010B	Cobalt	MG/KG	721	711	10		4				100	100
SW6010B	Copper	MG/KG	721	713	8		4				100	100
SW6010B	Iron, add	MG/KG	134	134			8				100	100
SW6010B	Lead	MG/KG	721	717	4		12				100	100
SW6010B	Magnesium, add	MG/KG	134	134			6				100	100
SW6010B	Manganese, add	MG/KG	134	134			3				100	100
SW6010B	Molybdenum	MG/KG	721	148	573						100	100
SW6010B	Nickel	MG/KG	721	721			6				100	100
SW6010B	Potassium, add	MG/KG	134	134			7				100	100
SW6010B	Selenium	MG/KG	721	15	706						100	100
SW6010B	Silver	MG/KG	721		721						100	100
SW6010B	Sodium, add	MG/KG	134	117	17		1				100	100
SW6010B	Thallium	MG/KG	721	2	719						100	100
SW6010B	Vanadium	MG/KG	721	720	1		1				100	100
SW6010B	Zinc	MG/KG	721	720	1		8				100	100
SW6010B	Chromium, SPLP	MG/L	1	1							100	100
SW6020A	Chromium, SPLP	MG/L	16	16							100	100
SW7199	Chromium, hexavalent	MG/KG	731	212	519		12				100	100
SW7199	Chromium, hexavalent, SPLP	MG/L	17	17			17				100	100

Attachment D-11

Site Completeness by Analyte – Qualified Data

Method	Analyte	Units	Number of Occurrences Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
SW7471A	Mercury	MG/KG	721	31	690		45				100	100
SW8015-E	Motor Oil	MG/KG	629	286	341		131			2	100	100
SW8015-E	TPH-Diesel	MG/KG	629	68	559		80			2	100	100
SW8015-P	TPH-Gasoline	µG/KG	446		445		35			1	100	100
SW8081A	4,4'-DDD	µG/KG	95		95		3				100	100
SW8081A	4,4'-DDE	µG/KG	95	3	92		6				100	100
SW8081A	4,4'-DDT	µG/KG	95	1	94		3				100	100
SW8081A	Aldrin	µG/KG	95		95		3				100	100
SW8081A	alpha-BHC	µG/KG	95		95		6				100	100
SW8081A	alpha-Chlordane	µG/KG	95	1	94		7				100	100
SW8081A	beta-BHC	µG/KG	95		95		5				100	100
SW8081A	delta-BHC	µG/KG	95		95		5				100	100
SW8081A	Dieldrin	µG/KG	95	1	94		7				100	100
SW8081A	Endosulfan I	µG/KG	95		95		3				100	100
SW8081A	Endosulfan II	µG/KG	95		95		3				100	100
SW8081A	Endosulfan sulfate	µG/KG	95		95		5				100	100
SW8081A	Endrin	µG/KG	95		95		3				100	100
SW8081A	Endrin aldehyde	µG/KG	95		95		4				100	100
SW8081A	Endrin ketone	µG/KG	94		94		7				100	100
SW8081A	gamma-BHC	µG/KG	95		95		5				100	100
SW8081A	gamma-Chlordane	µG/KG	95	1	94		5				100	100
SW8081A	Heptachlor	µG/KG	95		95		4				100	100
SW8081A	Heptachlor epoxide	µG/KG	95		95		5				100	100
SW8081A	Methoxychlor	µG/KG	95		95		3				100	100
SW8081A	Toxaphene	µG/KG	95		95		3				100	100
SW8082	Aroclor 1016	µG/KG	122		122		20				100	100
SW8082	Aroclor 1221	µG/KG	122		122		20				100	100
SW8082	Aroclor 1232	µG/KG	122		122		20				100	100
SW8082	Aroclor 1242	µG/KG	122		122		20				100	100

Attachment D-11
Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	**Analyte**	**Units**	**Analyses**	**Detects**	**Non-detects**	**Blank Flags**	**J Flags**	**M Flags**	**Contractor R Flags**	**Total R Flags**	**Contractor Percent Completeness**	**Overall Percent Completeness**
SW8082	Aroclor 1248	µG/KG	122		122		20				100	100
SW8082	Aroclor 1254	µG/KG	122	45	77		20				100	100
SW8082	Aroclor 1260	µG/KG	122	4	118		21				100	100
SW8082	Aroclor 1262	µG/KG	122		122		20				100	100
SW8082	Aroclor 1268	µG/KG	122		122		20				100	100
SW8260B	1,1,1,2-Tetrachloroethane	µG/KG	447		447		6				100	100
SW8260B	1,1,1-Trichloroethane (TCA)	µG/KG	447		447		6				100	100
SW8260B	1,1,2,2-Tetrachloroethane	µG/KG	447		447		8				100	100
SW8260B	1,1,2-Trichloroethane	µG/KG	447		447		6				100	100
SW8260B	1,1,2-Trichlorotrifluoroethane (Freon 113)	µG/KG	447		447		6				100	100
SW8260B	1,1-Dichloroethane	µG/KG	447		447		6				100	100
SW8260B	1,1-Dichloroethene	µG/KG	447		447		6				100	100
SW8260B	1,1-Dichloropropene	µG/KG	447		447		5				100	100
SW8260B	1,2,3-Trichlorobenzene	µG/KG	447		447		5				100	100
SW8260B	1,2,3-Trichloropropane	µG/KG	447		447		8				100	100
SW8260B	1,2,4-Trichlorobenzene	µG/KG	447		447		8				100	100
SW8260B	1,2,4-Trimethylbenzene	µG/KG	447		447		8				100	100
SW8260B	1,2-Dibromo-3-chloropropane	µG/KG	447		447		9				100	100
SW8260B	1,2-Dibromoethane (EDB)	µG/KG	447		447		6				100	100
SW8260B	1,2-Dichlorobenzene	µG/KG	447		447		8				100	100
SW8260B	1,2-Dichloroethane (EDC)	µG/KG	447		447		6				100	100
SW8260B	1,2-Dichloropropane	µG/KG	447		447		6				100	100
SW8260B	1,3,5-Trimethylbenzene	µG/KG	447		447		8				100	100
SW8260B	1,3-Dichlorobenzene	µG/KG	447		447		8				100	100
SW8260B	1,3-Dichloropropane	µG/KG	447		447		5				100	100
SW8260B	1,4-Dichlorobenzene	µG/KG	447		447		8				100	100
SW8260B	2,2-Dichloropropane	µG/KG	447		447		5				100	100
SW8260B	2-Butanone (MEK)	µG/KG	447		447		6				100	100
SW8260B	2-Chlorotoluene	µG/KG	447		447		8				100	100

Attachment D-11

Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
SW8260B	2-Hexanone, add	µG/KG	76		76		1				100	100
SW8260B	4-Chlorotoluene	µG/KG	447		447		5				100	100
SW8260B	4-Isopropyltoluene	µG/KG	447		447		5				100	100
SW8260B	4-Methyl-2-Pentanone	µG/KG	447		447		6				100	100
SW8260B	Acetone	µG/KG	447		317		5			130	100	71
SW8260B	Acrolein	µG/KG	447		447		13				100	100
SW8260B	Acrylonitrile	µG/KG	447		447		6				100	100
SW8260B	Benzene	µG/KG	447		447		6				100	100
SW8260B	Bromobenzene	µG/KG	447		447		8				100	100
SW8260B	Bromochloromethane	µG/KG	447		447		5				100	100
SW8260B	Bromodichloromethane	µG/KG	447		447		6				100	100
SW8260B	Bromoform	µG/KG	447		447		41				100	100
SW8260B	Bromomethane	µG/KG	447		447		6				100	100
SW8260B	Carbon disulfide	µG/KG	447		447		6				100	100
SW8260B	Carbon tetrachloride	µG/KG	447		447		6				100	100
SW8260B	Chlorobenzene	µG/KG	447		447		6				100	100
SW8260B	Chloroethane	µG/KG	447		447		6				100	100
SW8260B	Chloroform	µG/KG	447		447		6				100	100
SW8260B	Chloromethane	µG/KG	447		447		6				100	100
SW8260B	cis-1,2-Dichloroethene	µG/KG	447		447		6				100	100
SW8260B	cis-1,3-Dichloropropene	µG/KG	447		447		5				100	100
SW8260B	Cyclohexane, add	µG/KG	67		67		1				100	100
SW8260B	Dibromochloromethane	µG/KG	447		447		6				100	100
SW8260B	Dibromomethane	µG/KG	447		447		5				100	100
SW8260B	Dichlorodifluoromethane	µG/KG	447		447		6				100	100
SW8260B	Ethylbenzene	µG/KG	447		447		6				100	100
SW8260B	Hexachlorobutadiene	µG/KG	447		447		5				100	100
SW8260B	Isopropylbenzene	µG/KG	447		447		8				100	100
SW8260B	m,p-Xylene	µG/KG	447		447		6				100	100

Attachment D-11
Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
SW8260B	Methyl Acetate, add	µG/KG	67	3	64		1				100	100
SW8260B	Methylcyclohexane, add	µG/KG	67		67		1				100	100
SW8260B	Methylene chloride	µG/KG	447		447		6				100	100
SW8260B	Naphthalene	µG/KG	447	1	446		5				100	100
SW8260B	n-Butylbenzene	µG/KG	447		447		8				100	100
SW8260B	n-Propylbenzene	µG/KG	447		447		8				100	100
SW8260B	o-Xylene	µG/KG	447		447		6				100	100
SW8260B	sec-Butylbenzene	µG/KG	447		447		8				100	100
SW8260B	Styrene	µG/KG	447		447		6				100	100
SW8260B	tert-Butyl Methyl Ether (MTBE)	µG/KG	447		447		6				100	100
SW8260B	tert-Butylbenzene	µG/KG	447		447		8				100	100
SW8260B	Tetrachloroethene (PCE)	µG/KG	447		447		7				100	100
SW8260B	Toluene	µG/KG	447		447		6				100	100
SW8260B	trans-1,2-Dichloroethene	µG/KG	447		447		6				100	100
SW8260B	trans-1,3-Dichloropropene	µG/KG	447		447		5				100	100
SW8260B	Trichloroethene (TCE)	µG/KG	447		447		6				100	100
SW8260B	Trichlorofluoromethane (Freon 11)	µG/KG	447		447		5				100	100
SW8260B	Vinyl chloride	µG/KG	447		447		6				100	100
SW8260B	Xylenes, Total	µG/KG	447		447		6				100	100
SW8270C	1,1´-Biphenyl, add	µG/KG	74		74		3				100	100
SW8270C	1,2,4,5-Tetrachlorobenzene, add	µG/KG	74		74		5				100	100
SW8270C	1,2,4-Trichlorobenzene	µG/KG	629		629		16				100	100
SW8270C	1,2-Dichlorobenzene	µG/KG	629		629		17				100	100
SW8270C	1,3-Dichlorobenzene	µG/KG	629		629		16				100	100
SW8270C	1,4-Dichlorobenzene	µG/KG	629		629		16				100	100
SW8270C	1,4-Dioxane, add	µG/KG	74		74		1				100	100
SW8270C	2,3,4,6-Tetrachlorophenol, add	µG/KG	74		74		2				100	100
SW8270C	2,4,5-Trichlorophenol	µG/KG	629		629		16				100	100
SW8270C	2,4,6-Trichlorophenol	µG/KG	629		629		16				100	100

Attachment D-11
Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	Analyte	Units	Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags	Contractor Percent Completeness	Overall Percent Completeness
SW8270C	2,4-Dichlorophenol	µG/KG	629		629		16				100	100
SW8270C	2,4-Dimethylphenol	µG/KG	629		629		16				100	100
SW8270C	2,4-Dinitrophenol	µG/KG	629		629		17				100	100
SW8270C	2,4-Dinitrotoluene	µG/KG	629		629		16				100	100
SW8270C	2,6-Dinitrotoluene	µG/KG	629		629		16				100	100
SW8270C	2-Chloronaphthalene	µG/KG	629		629		16				100	100
SW8270C	2-Chlorophenol	µG/KG	629		629		16				100	100
SW8270C	2-Methylnaphthalene	µG/KG	629		629		16				100	100
SW8270C	2-Methylphenol	µG/KG	629		629		16				100	100
SW8270C	2-Nitroaniline	µG/KG	629		629		16				100	100
SW8270C	2-Nitrophenol	µG/KG	629		629		16				100	100
SW8270C	3,3'-Dichlorobenzidine	µG/KG	629		629		16				100	100
SW8270C	3-Nitroaniline	µG/KG	629		629		16				100	100
SW8270C	4,6-Dinitro-2-methylphenol	µG/KG	629		629		16				100	100
SW8270C	4-Bromophenyl phenyl ether	µG/KG	629		629		16				100	100
SW8270C	4-Chloro-3-methylphenol	µG/KG	629		629		16				100	100
SW8270C	4-Chloroaniline	µG/KG	629		629		16				100	100
SW8270C	4-Chlorophenyl phenyl ether	µG/KG	629		629		16				100	100
SW8270C	4-Methylphenol	µG/KG	629	2	627		16				100	100
SW8270C	4-Nitroaniline	µG/KG	629		629		16				100	100
SW8270C	4-Nitrophenol	µG/KG	629		629		16				100	100
SW8270C	Acenaphthene	µG/KG	629	1	628		16				100	100
SW8270C	Acenaphthylene	µG/KG	629		629		16				100	100
SW8270C	Acetophenone, add	µG/KG	74		74		7				100	100
SW8270C	Anthracene	µG/KG	629	1	628		16				100	100
SW8270C	Atrazine, add	µG/KG	74		74		1				100	100
SW8270C	Benzaldehyde, add	µG/KG	74		74		9				100	100
SW8270C	Benzo (a) anthracene	µG/KG	629	9	620		16				100	100
SW8270C	Benzo (a) pyrene	µG/KG	629	7	622		16				100	100

Attachment D-11
Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	**Analyte**	**Units**	**Analyses**	**Detects**	**Non-detects**	**Blank Flags**	**J Flags**	**M Flags**	**Contractor R Flags**	**Total R Flags**	**Contractor Percent Completeness**	**Overall Percent Completeness**
SW8270C	Benzo (b) fluoranthene	µG/KG	629	11	618		16				100	100
SW8270C	Benzo (g,h,i) perylene	µG/KG	629	6	623		16				100	100
SW8270C	Benzo (k) fluoranthene	µG/KG	629	8	621		16				100	100
SW8270C	Benzoic acid	µG/KG	629		619		22			10	100	98
SW8270C	Benzyl alcohol	µG/KG	629		629		16				100	100
SW8270C	bis (2-chloroethoxy) methane	µG/KG	629		629		16				100	100
SW8270C	bis (2-chloroethyl) ether	µG/KG	629		629		16				100	100
SW8270C	bis (2-chloroisopropyl) ether	µG/KG	629		629		16				100	100
SW8270C	bis (2-ethylhexyl) phthalate	µG/KG	629	6	623		16				100	100
SW8270C	Butylbenzylphthalate	µG/KG	629		629		16				100	100
SW8270C	Caprolactam, add	µG/KG	74		72		19			2	100	97
SW8270C	Carbazole, add	µG/KG	74	1	73		1				100	100
SW8270C	Chrysene	µG/KG	629	10	619		16				100	100
SW8270C	Dibenzo (a,h) anthracene	µG/KG	629		629		16				100	100
SW8270C	Dibenzofuran	µG/KG	629		629		16				100	100
SW8270C	Diethyl phthalate	µG/KG	629		629		16				100	100
SW8270C	Dimethyl phthalate	µG/KG	629		629		16				100	100
SW8270C	Di-n-butylphthalate	µG/KG	629	2	627		16				100	100
SW8270C	Di-n-octylphthalate	µG/KG	629		629		16				100	100
SW8270C	Fluoranthene	µG/KG	629	17	612		16				100	100
SW8270C	Fluorene	µG/KG	629		629		16				100	100
SW8270C	Hexachlorobenzene	µG/KG	629		629		16				100	100
SW8270C	Hexachlorobutadiene	µG/KG	629		629		16				100	100
SW8270C	Hexachlorocyclopentadiene, add	µG/KG	74		74		2				100	100
SW8270C	Hexachloroethane	µG/KG	629		629		16				100	100
SW8270C	Indeno (1,2,3-c,d) pyrene	µG/KG	629	6	623		16				100	100
SW8270C	Isophorone	µG/KG	629		629		16				100	100
SW8270C	Naphthalene	µG/KG	629		629		16				100	100
SW8270C	Nitrobenzene	µG/KG	629		629		16				100	100

Attachment D-11

Site Completeness by Analyte – Qualified Data

Method	Analyte	Units	Number of Occurrences								Contractor Percent Completeness	Overall Percent Completeness
			Analyses	Detects	Non-detects	Blank Flags	J Flags	M Flags	Contractor R Flags	Total R Flags		
SW8270C	n-Nitrosodi-n-propylamine	µG/KG	629		629		16				100	100
SW8270C	n-Nitrosodiphenylamine	µG/KG	629		629		16				100	100
SW8270C	Pentachlorophenol	µG/KG	629	2	627		16				100	100
SW8270C	Phenanthrene	µG/KG	629	5	624		16				100	100
SW8270C	Phenol	µG/KG	629		629		16				100	100
SW8270C	Pyrene	µG/KG	629	13	616		16				100	100
SW8270SIM	1-Methylnaphthalene	µG/KG	683	9	674		21				100	100
SW8270SIM	2-Methylnaphthalene	µG/KG	683	9	674		21				100	100
SW8270SIM	Acenaphthene	µG/KG	683	11	672		19				100	100
SW8270SIM	Acenaphthylene	µG/KG	683	5	678		35				100	100
SW8270SIM	Anthracene	µG/KG	683	32	651		22				100	100
SW8270SIM	Benzo (a) anthracene	µG/KG	683	163	520		26				100	100
SW8270SIM	Benzo (a) pyrene	µG/KG	683	178	505		24				100	100
SW8270SIM	Benzo (b) fluoranthene	µG/KG	683	197	486		29				100	100
SW8270SIM	Benzo (g,h,i) perylene	µG/KG	683	185	498		25				100	100
SW8270SIM	Benzo (k) fluoranthene	µG/KG	683	177	506		36				100	100
SW8270SIM	Chrysene	µG/KG	683	199	484		30				100	100
SW8270SIM	Dibenzo (a,h) anthracene	µG/KG	683	91	592		24				100	100
SW8270SIM	Fluoranthene	µG/KG	683	221	462		30				100	100
SW8270SIM	Fluorene	µG/KG	683	10	673		19				100	100
SW8270SIM	Indeno (1,2,3-c,d) pyrene	µG/KG	683	165	518		24				100	100
SW8270SIM	Naphthalene	µG/KG	683	16	667		19				100	100
SW8270SIM	Phenanthrene	µG/KG	683	154	529		27				100	100
SW8270SIM	Pyrene	µG/KG	683	212	471		28				100	100
SW8290	1,2,3,4,6,7,8-Heptachlorodibenzofuran	PG/G	2		2						100	100
SW8290	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxi	PG/G	2	2							100	100
SW8290	1,2,3,4,7,8,9-Heptachlorodibenzofuran	PG/G	2	1	1						100	100
SW8290	1,2,3,4,7,8-Hexachlorodibenzofuran	PG/G	2	2							100	100
SW8290	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	PG/G	2	2							100	100

Attachment D-11

Site Completeness by Analyte – Qualified Data

			Number of Occurrences									
Method	**Analyte**	**Units**	**Analyses**	**Detects**	**Non-detects**	**Blank Flags**	**J Flags**	**M Flags**	**Contractor R Flags**	**Total R Flags**	**Contractor Percent Completeness**	**Overall Percent Completeness**
SW8290	1,2,3,6,7,8-Hexachlorodibenzofuran	PG/G	2	1	1						100	100
SW8290	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	PG/G	2	1	1						100	100
SW8290	1,2,3,7,8,9-Hexachlorodibenzofuran	PG/G	2	2							100	100
SW8290	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	PG/G	2	2							100	100
SW8290	1,2,3,7,8-Pentachlorodibenzofuran	PG/G	2	2							100	100
SW8290	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	PG/G	2	1	1						100	100
SW8290	2,3,4,6,7,8-Hexachlorodibenzofuran	PG/G	2	2							100	100
SW8290	2,3,4,7,8-Pentachlorodibenzofuran	PG/G	2	2							100	100
SW8290	2,3,7,8-Tetrachlorodibenzofuran	PG/G	2	2							100	100
SW8290	2,3,7,8-Tetrachlorodibenzo-p-dioxin	PG/G	2	2			1				100	100
SW8290	OCDD	PG/G	2	2							100	100
SW8290	OCDF	PG/G	2	2							100	100
SW8290	TEQ	PG/G	2	2							100	100
SW9012A	Cyanide	MG/KG	74		74		1				100	100
SW9045	pH	PH	444	444			4				100	100

Appendix E
Additional Inorganic Compounds – Soil Background Evaluation

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Attachments

E1 Data Set

Acronyms and Abbreviations

ANOVA	analysis of variance
bgs	below ground surface
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
IQR	interquartile range
PG&E	Pacific Gas and Electric Company
UTL	upper tolerance limit

APPENDIX E

Additional Detected Inorganic Compounds Background Investigation

E.1 Introduction

This appendix summarizes the data evaluation and calculation of representative background concentrations for the additional detected inorganic compounds (aluminum, calcium, iron, magnesium, manganese, potassium, and sodium) at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station, located in eastern San Bernardino County, California, approximately 15 miles southeast of Needles, California.

The evaluation and calculation approaches used to evaluate the additional detected organic compounds data followed the approaches used in the *Soil Background Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (hereafter referred to as the 2009 Soil Background Investigation) (CH2M HILL, 2009). The additional detected inorganic compounds were not analyzed or evaluated in the initial soil background investigation since they are not a constituent of potential concern at the compressor station. However, the United States Department of the Interior requested that a portion of soil samples be analyzed for the Contract Laboratory Procedure Target Analyte List/Target Compound List, which includes the additional inorganic compounds. These additional inorganic compounds will be carried through the risk assessment unless they can be screened out based on detected concentrations being at or below representative background concentrations at the PG&E Topock Compressor Station. Thus, it is useful to evaluate soil background concentrations for these constituents. Since the existing soil samples collected as part of the 2009 Topock Soil Background Investigation were still within the acceptable limits of the analytical hold time, these soil samples were analyzed for the Contract Laboratory Procedure Target Analyte List/Target Compound List using United States Environmental Protection Agency Method 6010B.

E.2 Combined Soil Background Additional Inorganic Compounds Data Evaluation

A combination of visual evaluation, statistical evaluation, and professional judgment were used to evaluate existing background data and establish a soil background data set. The additional inorganic compound dataset used for this background evaluation is provided in Attachment E1. To determine whether significant (practical or statistical) differences exist among the soil types and soil depths, two types of evaluation were performed:

1. Visual evaluation using graphical tools such as scatter and box-and-whisker plots

2. Statistical evaluation of the data using the analysis of variance (ANOVA), which includes a post hoc evaluation technique known as Tukey's test (Mason, Gunst, and Hess, 1993)

E.2.1 Visual Evaluation

To examine the relationship between depths and concentrations, the following depth partitioning was performed:

1. **Partition soil into two depth intervals.** The first interval consists of the 0 to 0.5 foot below ground surface (bgs), and the second interval consists of all subsurface depths (1, 2, 5, and 9 feet bgs). Note that most sample depths were recorded as the top of the sample interval. This corresponds to the surface and subsurface intervals.
2. **Partition soil into four depth intervals.** The first interval is 0 to 0.5 foot bgs, the second interval consists of 1 and 2 feet bgs, the third interval consists of 5 and 6 feet bgs, and the fourth interval consists of 9 and 10 feet bgs. These intervals are the surface interval, near-surface interval, typical maximum exposure depth for ecological receptors, and maximum depth for human receptors.

Scatter plots were prepared for each constituent, displaying the concentrations by soil type and depth intervals. Figures E-1 and E-2 present the scatter plots for the two-depth and four-depth partitioning, respectively. In these plots, blue closed symbols represent detected values while green open symbols represent proxy values of one-half of the reporting limit (i.e., non-detect samples). The detection frequencies for each partition are included at the top of each plot. In general, these plots suggest fairly consistent concentration spreads across each depth and soil type.

Additional visual evaluation was performed using the box-and-whisker plots, as shown in Figures E-3 and E-4. The box-and-whisker plot for each constituent presents the concentrations by soil type and depth separately.

Box-and-whisker plots present information on the central tendency, variability, and skewness for a sample data set by sketching the center 50 percent of the concentrations with a box and illustrating the tail regions of the distribution with whiskers. For concentrations that extend further from the center than the whiskers, individual data symbols are plotted.

Specifically, these box-and-whisker plots are constructed as follows:

- The height of the box represents the interquartile range (IQR). The IQR is the distance between the 25th and the 75th percentiles.
- The horizontal line in the box interior represents the median.
- The vertical lines issuing from the box extend to the minimum and maximum measured values (as long as these minimum and maximum values do not extend further from the box than a distance of 1.5 times the IQR).
- Individual data symbols are used for concentrations that exceed the whiskers.

Scatter plots were also prepared for each constituent, presenting concentrations by soil type and depth separately (Figures E-5 and E-6). These plots demonstrate an overall similarity across the soil types and depths for nutrient concentrations.

E.2.2 Statistical Evaluation

In addition to the visual evaluation, statistical evaluation was also performed to determine whether statistically significant differences (whether they carry practical significance or not) exist among the soil types and soil depths.

E.2.2.1 Analysis of Variance

To determine whether the mean values of multiple groups are statistically different from one another, a nonparametric ANOVA, using the ranks of the data as opposed to the concentrations themselves, was used for the background nutrient data. The ANOVA probabilities were compared to a significance level of 0.05. A more detailed discussion of ANOVA is presented in the 2009 Soil Background Investigation (CH2M HILL, 2009).

The ANOVA screening results suggest observed differences (at a significance level of 0.05) in the following groups: (1) between soil types (calcium and sodium), (2) between the two depth partitions (aluminum, calcium, iron, and sodium) and (3) between the four depth partitions (aluminum, iron, and sodium).

It is important to note that while the probabilities provide a quantitative measure of the degree of difference or similarity between soil types and depths, they should not be treated as precise representations of the actual confidences involved. For that to be true, the data would need to be balanced between the different partitions both in number of samples and variability. While this is not the case with most environmental evaluations, the ANOVA still offers useful insight into how similar the concentrations from the various partitions are to one another.

Realistic expectations from an evaluation of almost any data set with varying soil types and depths would suggest the presence of statistically significant differences for multiple constituents. Statistical differences from an ANOVA screening represent differences between partitions greater than the random variability in the data. Thus, if variability is small, even relatively minor differences between partitions (from a practical standpoint) may be statistically significant. From professional experience, it is not realistic to expect that all soil types or depths be statistically similar to one another in an evaluation (using ANOVA at a 0.05 significance level), regardless of the data set. As such, it is prudent to consider the practical significance of any statistical differences to gauge the usefulness of partitioning by soil type and/or depth. Complete reliance on statistical tests typically leads to varied assignments of soil types or depths, which can be problematic in actual site comparisons since many actual site samples tend to straddle two or more of these partitions. The statistical information provides an indication of the parameters that should be the focus of professional review.

E.2.2.2 Post Hoc Evaluation (Tukey’s Test)

In addition to the ANOVA screen, a post hoc evaluation technique, otherwise known as a test of contrasts, was done to determine which soil types (and subsequently depths) appeared statistically equivalent. Specifically, the Tukey's test (Mason, Gunst, and Hess, 1993) was performed to aid in this analysis. A more detailed discussion of the Tukey's Test is presented in the 2009 Soil Background Investigation (CH2M HILL, 2009).

The results of the Tukey's test are presented as alphabetic characters (A, B, etc.). Tables E-1 through E-5 consolidate the results of the Tukey soil type and depth partitions, with depth partitioned into two depth intervals and four depth intervals, respectively. Differences in soil type groupings and various depth intervals are displayed. The results suggest observed differences of the soil types and depths for aluminum, calcium, iron, magnesium, and sodium. As with the initial ANOVA screening, the tables suggest that professional review (i.e., geologist review) of the soil types and depths should focus on these constituents, since these were the constituents for which multiple soil type or depth categories were suggested using the ANOVA techniques.

E.2.2.3 Combined Data Evaluation Conclusions

A comparison of data collected from the various lithologic units and the two depth intervals and four depth intervals shows that aluminum, calcium, iron, magnesium, and sodium concentrations are very similar (i.e., well within an order of magnitude), and visual observations of the data plotted in the scatter plots in Figures E-5 and E-6 confirm that concentrations for the above-listed constituents are very similar. After careful review of the various graphical plots, the observed statistical differences between soil types or depth intervals are not sufficient to require separation of the data into separate partitions per constituent.

E.2.3 Evaluation of Outliers

With the combination of all soil types and depths for each constituent, the outlier analysis was evaluated by considering all data for each constituent that was detected in each soil type. Similar to the evaluation for soil type and depth differences, a combination of statistical evaluation, visual evaluation, and professional judgment were used to identify potential outliers.

Per United States Environmental Protection Agency guidance (2006), Rosner's test was applied when the sample size for a constituent is more than 25 with a 0.05 significance level. The Rosner's test was applied in such a way that multiple outliers would all be identified as mathematical outliers. A more detailed discussion of Rosner's test is presented in the 2009 Soil Background Investigation (CH2M HILL, 2009). The details of the Rosner's outlier analysis are provided in Table E-6. This table presents the selected transformation that promotes the best adherence to normality with the remaining concentrations (after the potential outlier is removed). It also provides, for each result, the Rosner-calculated statistic along with the critical value to which the statistic is compared. If the statistic is greater than the critical value, that result is considered a mathematical outlier. All results greater than that outlier result are also considered mathematical outliers, even if their statistics did not surpass the critical value. The mathematical outliers identified include two manganese concentrations of 540 and 1,100 milligrams per kilogram (mg/kg) and one potassium concentration of 8,700 mg/kg. These outliers have been removed from the dataset.

In addition, a visual evaluation of scatter plots (included in previous sections) and probability plots included in Figure E-7 were also used to identify potential outliers. No additional outliers were identified by this visual assessment.

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) previously recommended that outliers also be identified as those concentrations that exceed 1.5 times the IQR of the dataset above the third quartile as a simpler evaluation of identifying multiple outliers with each calculation (DTSC, 2007). The list of these quartile-based outliers (including nondetect proxy values of one-half the reporting limit) is included in Table E-7 and plots included in Figure E-8. These quartile-based outliers are also presented graphically on a box-and-whisker plot shown in Figures E-3 and E-4.

The dataset (excluding the two manganese and one potassium outliers) was carefully reviewed, and the outlier analysis evaluated both statistical outliers and outliers based on professional judgment. Based on the review of the background data set concentrations, the concentrations are representative of the natural variability of metals in soil.

E.3 Calculation of Background Threshold Values

Summary statistics for each constituent in the background soil data set are presented in Table E-8. These statistics include the mean, median, standard deviation, minimum detection limit, maximum detection limit, minimum detect, maximum detect, number of detects, number of samples, and percent detects for all concentrations retained in the data set after removal of outliers. These statistics also include the background threshold value calculated for the background data as an upper tolerance limit (UTL). These UTLs were targeted to be 95/95 UTLs (which are 95-percent upper confidence limits of the 95th percentile of the background population). The same statistical approaches used in the 2009 Soil Background Investigation for these UTL calculations were used for the nutrient inorganics.

E.4 References

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2007. Letter. "Soil Investigation Part A Work Plan Conditional Approval." August 10.

CH2M HILL. 2009. *Soil Background Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California*. February.

Mason, Robert L., Richard F. Gunst, and James L. Hess. 1993. *Statistical Design and Analysis of Experiments: With Applications to Engineering and Science.* John Wiley & Sons, New York.

United States Environmental Protection Agency. 2006. *Data Quality Assessment: Statistical Methods for Practitioners*. Office of Environmental Information, Washington, D.C.

Tables

TABLE E-1
Post Hoc Soil Type Comparisons
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

			***Post hoc* Tukey Groupings[b]**			
Parameter	**Soil Type Probabilities**	**Soil Type Decisions 0.05[a]**	**Qa**	**Toa**	**Wash**	**pTbr**
Aluminum	0.219		A	A	A	A
Calcium	0.008	Diff	B	A	B	AB
Iron	0.310		A	A	A	A
Magnesium	0.058		AB	A	AB	B
Manganese	0.528		A	A	A	A
Potassium	0.123		A	A	A	A
Sodium	0.000	Diff	A	A	B	B

Notes:

[a] A probability of less than 0.05 means that there is statistical difference between the soil types.

[b] Tukey grouping designation:

1) If the mean value (of the ranks) in a soil type is highest, it will be assigned an “A”, if the mean value (of the ranks) of all soil types are statistically similar to one another, then they all are assigned an “A”. If the mean value (of the ranks) of the same constituent in another soil type is statistically lower than the A group, it will be assigned a “B”. If the mean value (of the ranks) of the same constituent in yet another soil type is statistically lower than the B group, it will be assigned a “C”, and so on.
2) A soil type designated AB is not statistically distinguishable from either A or B groups.

TABLE E-2
Post Hoc Depth Comparisons with Two Depth Intervals
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

				Depth Intervals[b] (feet below ground surface)	
Parameter	**Soil Group**	**Depth Probabilities[a]**	**Depth Decision 0.05**	**0**	**1,2,5,6,9,10**
Aluminum	Qa Toa Wash pTbr	0.024	Diff	B	A
Calcium	Qa Wash pTbr	0.039	Diff	A	B
Calcium	Toa	0.079		A	A
Iron	Qa Toa Wash pTbr	0.002	Diff	B	A
Magnesium	Qa Wash pTbr	0.042	Diff	B	A
Magnesium	Toa	0.237		A	A
Manganese	Qa Toa Wash pTbr	0.185		A	A
Potassium	Qa Toa Wash pTbr	0.065		A	A
Sodium	Qa Toa	0.000	Diff	B	A
Sodium	Wash pTbr	0.345		A	A

Notes:

[a] A probability of less than 0.05 means that there appears to be a statistical difference between the depth intervals.

[b] Tukey grouping designation:

1) If the mean value (of the ranks) in a depth interval is highest, it will be assigned an “A”, If the mean value (of the ranks) of all soil types are statistically similar to one another, then they all are assigned an “A”. If the mean value (of the ranks) of the same constituent in another depth interval is statistically lower than the A group, it will be assigned a “B”.
2) If a constituent has a low percentage of detects (less than 50-percent), it will be assigned a default “A” across the depth intervals.

TABLE E-3
Post Hoc Depth Comparisons with Four Depth Intervals
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

				Depth Intervals[b]			
Parameter	**Soil Group**	**Depth Probabilities**[a]	**Depth Decision 0.05**	**0**	**1,2**	**5,6**	**9,10**
Aluminum	Qa Toa Wash pTbr	0.019	Diff	B	AB	AB	A
Calcium	Qa Wash pTbr	0.103		A	A	A	A
Calcium	Toa	0.267		A	A	A	A
Iron	Qa Toa Wash pTbr	0.006	Diff	B	AB	AB	A
Magnesium	Qa Wash pTbr	0.191		A	A	A	A
Magnesium	Toa	0.193		A	A	A	A
Manganese	Qa Toa Wash pTbr	0.136		A	A	A	A
Potassium	Qa Toa Wash pTbr	0.270		A	A	A	A
Sodium	Qa Toa	0.005	Diff	B	A	A	A
Sodium	Wash pTbr	0.664		A	A	A	A

Notes:

[a] A probability of less than 0.05 means that there appears to be a statistical difference between the depth intervals.

[b] Tukey grouping designation:

1) If the mean value (of the ranks) in a depth interval is highest, it will be assigned an “A”, If the mean value (of the ranks) of all soil types are statistically similar to one another, then they all are assigned an “A”. If the mean value (of the ranks) of the same constituent in another depth interval is statistically lower than the A group, it will be assigned a “B”. If the mean value (of the ranks) of the same constituent in yet another depth interval is statistically lower than the B group, it will be assigned a “C”, and so on.
2) A soil type designated AB is not statistically distinguishable from either A or B groups.

TABLE E-4
Soil Type and Depth Statistical Categories with Two Depth Intervals
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

Parameter	Soil Type	Depth Interval
Aluminum	Qa Toa Wash pTbr	1
Aluminum	Qa Toa Wash pTbr	2
Calcium	Qa Wash pTbr	1
Calcium	Qa Wash pTbr	2
Calcium	Toa	1 and 2
Iron	Qa Toa Wash pTbr	1
Iron	Qa Toa Wash pTbr	2
Magnesium	Qa Wash pTbr	1
Magnesium	Qa Wash pTbr	2
Magnesium	Toa	1 and 2
Manganese	Qa Toa Wash pTbr	1 and 2
Potassium	Qa Toa Wash pTbr	1 and 2
Sodium	Qa Toa	1
Sodium	Qa Toa	2
Sodium	Wash pTbr	1 and 2

Notes:

1 Depth interval includes surface soil samples only (collected at 0 foot).

2 Depth interval includes soil samples collected at 1, 2, 5, 6, 9, and 10 feet below ground surface.

TABLE E-5
Soil Type and Depth Statistical Categories with Four Depth Intervals
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

Parameter	**Soil Type**	**Depth Interval**
Aluminum	Qa Toa Wash pTbr	1 and 2
Aluminum	Qa Toa Wash pTbr	4
Calcium	Qa Wash pTbr	1, 2, and 4
Calcium	Toa	1, 2, and 4
Iron	Qa Toa Wash pTbr	1 and 2
Iron	Qa Toa Wash pTbr	4
Magnesium	Qa Wash pTbr	1, 2, and 4
Magnesium	Toa	1, 2, and 4
Manganese	Qa Toa Wash pTbr	1, 2, and 4
Potassium	Qa Toa Wash pTbr	1, 2, and 4
Sodium	Qa Toa	1
Sodium	Qa Toa	2 and 4
Sodium	Wash pTbr	1, 2, and 4

Notes:

1 Depth interval includes surface soil samples only (collected at 0 foot).
2 Depth interval includes soil samples collected at 1 and 2 feet below ground surface.
3 Depth interval includes soil samples collected at 5 and 6 feet below ground surface.
4 Depth interval includes soil samples collected at 9 and 10 feet below ground surface.

TABLE E-6
Details on Mathematical Outlier Testing
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

Parameter	Number of Samples When Potential Outlier Removed	Location	Transformed Result	Transformation	Original Result	Rosner's Critical Value	Rosner's Statistic	Exceeds Critical Value?	Result Identified as Mathematical Outlier?
Aluminum	54	BKG-07	18000	None	18000	3.13	2.598	no	no
Aluminum	53	BKG-06	17000	None	17000	3.12	2.442	no	no
Aluminum	52	BKG-07	16000	None	16000	3.11	2.235	no	no
Aluminum	51	BKG-07	15000	None	15000	3.1	1.975	no	no
Aluminum	50	BKG-11	15000	None	15000	3.09	2.076	no	no
Iron	61	BKG-06	34000	None	34000	3.2	2.967	no	no
Iron	60	BKG-07	32000	None	32000	3.19	2.832	no	no
Iron	59	BKG-06	27000	None	27000	3.19	1.990	no	no
Iron	58	BKG-07	26000	None	26000	3.18	1.857	no	no
Iron	57	BKG-07	26000	None	26000	3.17	1.932	no	no
Manganese	61	BKG-13	7.003	Logarithm	1100	3.2	4.343	**yes**	**yes**
Manganese	59	BKG-08	23.24	Square Root	540	3.19	3.207	**yes**	**yes**
Manganese	58	BKG-08	450	None	450	3.18	2.789	no	no
Manganese	57	EEBG-3	413	None	413	3.17	2.390	no	no
Calcium	54	BKG-13	40.62	Cubic Root	67000	3.13	2.438	no	no
Calcium	53	BKG-07	249.0	Square Root	62000	3.12	2.597	no	no
Calcium	52	BKG-13	228.0	Square Root	52000	3.11	2.235	no	no
Calcium	51	BKG-01	202.5	Square Root	41000	3.1	1.645	no	no
Calcium	50	BKG-06	202.5	Square Root	41000	3.09	1.707	no	no

TABLE E-6
Details on Mathematical Outlier Testing
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

Parameter	Number of Samples When Potential Outlier Removed	Location	Transformed Result	Transformation	Original Result	Rosner's Critical Value	Rosner's Statistic	Exceeds Critical Value?	Result Identified as Mathematical Outlier?
Magnesium	54	BKG-07	13000	None	13000	3.13	2.467	no	no
Magnesium	53	BKG-06	12000	None	12000	3.12	2.132	no	no
Magnesium	52	BKG-07	12000	None	12000	3.11	2.252	no	no
Magnesium	51	BKG-07	11000	None	11000	3.1	1.840	no	no
Magnesium	50	BKG-08	11000	None	11000	3.09	1.923	no	no
Potassium	54	BKG-08	8700	None	8700	3.13	5.146	**yes**	**yes**
Potassium	53	BKG-12	4300	None	4300	3.12	1.914	no	no
Potassium	52	BKG-01	4100	None	4100	3.11	1.751	no	no
Potassium	51	BKG-15	4100	None	4100	3.1	1.823	no	no
Potassium	50	BKG-08	3900	None	3900	3.09	1.639	no	no
Sodium	54	BKG-05	8.412	Logarithm	4500	3.13	2.819	no	no
Sodium	53	BKG-17	7.650	Logarithm	2100	3.12	2.124	no	no
Sodium	52	BKG-13	7.438	Logarithm	1700	3.11	1.966	no	no
Sodium	51	BKG-13	7.438	Logarithm	1700	3.1	2.064	no	no
Sodium	50	BKG-06	7.313	Logarithm	1500	3.09	2.004	no	no
Sodium	50	BKG-06	7.313	Logarithm	1500	3.09	2.004	no	no

TABLE E-7
Concentrations Exceeding 1.5 times the Interquartile Range
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

Parameter	Percent Detects	Result (mg/kg)	Detected?	Location	Upper Depth
Aluminum	100	17,000	Yes	BKG-06	9
Aluminum	100	18,000	Yes	BKG-07	9
Calcium	100	62,000	Yes	BKG-07	9
Calcium	100	67,000	Yes	BKG-13	0
Iron	100	34,000	Yes	BKG-06	9
Manganese	100	540	Yes	BKG-08	0
Manganese	100	450	Yes	BKG-08	1
Manganese	100	1,100	Yes	BKG-13	9
Sodium	93	45,00	Yes	BKG-05	0
Sodium	93	21,00	Yes	BKG-17	2

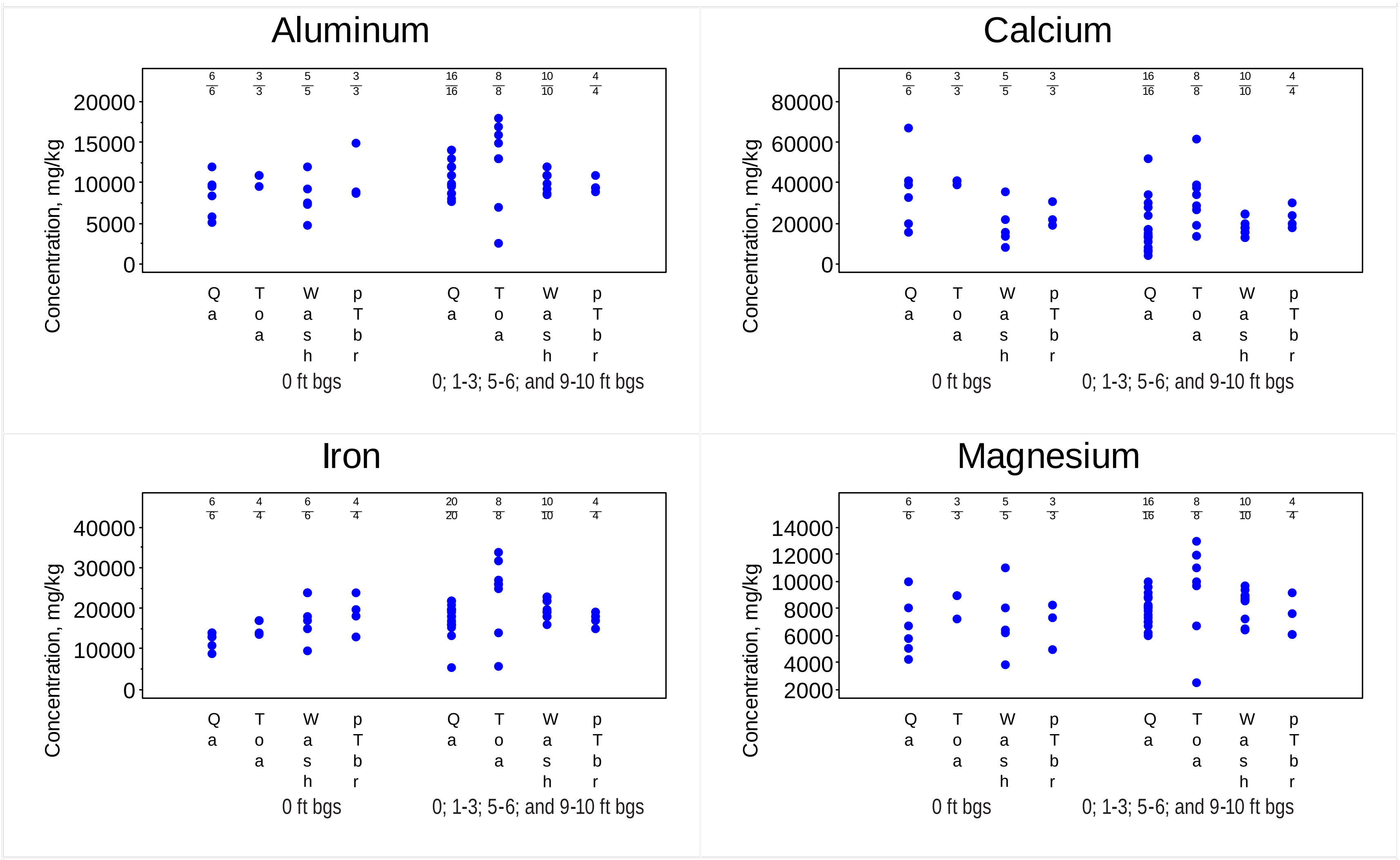
TABLE E-8
Summary Statistics Including Background Threshold Values for Combined Background Data
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report, Pacific Gas and Electric Topock Compressor Station, Needles, California

Parameter	BTV	BTV Basis (with target statistics a 95/95 UTL)	Mean	Median	Standard Deviation	Number of Detects	Number of Samples	Percent Detects	Minimum DL	Maximum DL	Minimum Detect	Maximum Detect
Aluminum	16,366	Normal	10,400	10,000	2,910	55	55	100	NA	NA	2,600	18,000
Calcium	66,459	Lognormal	24,300	20,000	13,300	55	55	100	NA	NA	4,100	67,000
Iron	29,303	Normal	18,400	18,000	5,380	59	59	100	NA	NA	5,570	34,000
Magnesium	12,117	Normal	7,950	8,100	2,050	55	55	100	NA	NA	2,500	13,000
Manganese	404.3	Normal	280	280	61.5	57	57	100	NA	NA	140	450
Potassium	4,402	Normal	2,750	2,750	811	54	54	100	NA	NA	540	4,300
Sodium	2,069	Kaplan Meier	617	290	721	51	55	93	240	1,100	170	4,500
Manganese	402.3	Normal	277	280	62.1	59	59	100	NA	NA	140	450

Notes:

95/95 UTL	upper threshold limits, which are 95-percent upper confidence limits of the 95th percentile.
BTV	background threshold value.
DL	detection limit.
mg/kg	milligrams per kilogram.
NA	not applicable.

Figures



LEGEND

Qa = Quaternary Alluvium and Surficial deposits, undifferentiated

Toa = Tertiary Alluvium (Fanglomerate of Metzger and Loeltz)

Wash (Qya) = Recent wash deposits

pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)

ft bgs = feet below ground surface

mg/kg = milligram per kilogram

● Detected value

○ Non-detected value

FIGURE E-1
SCATTER PLOTS BY FOUR SOIL TYPES AND TWO DEPTHS FOR BACKGROUND CONCENTRATIONS
SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

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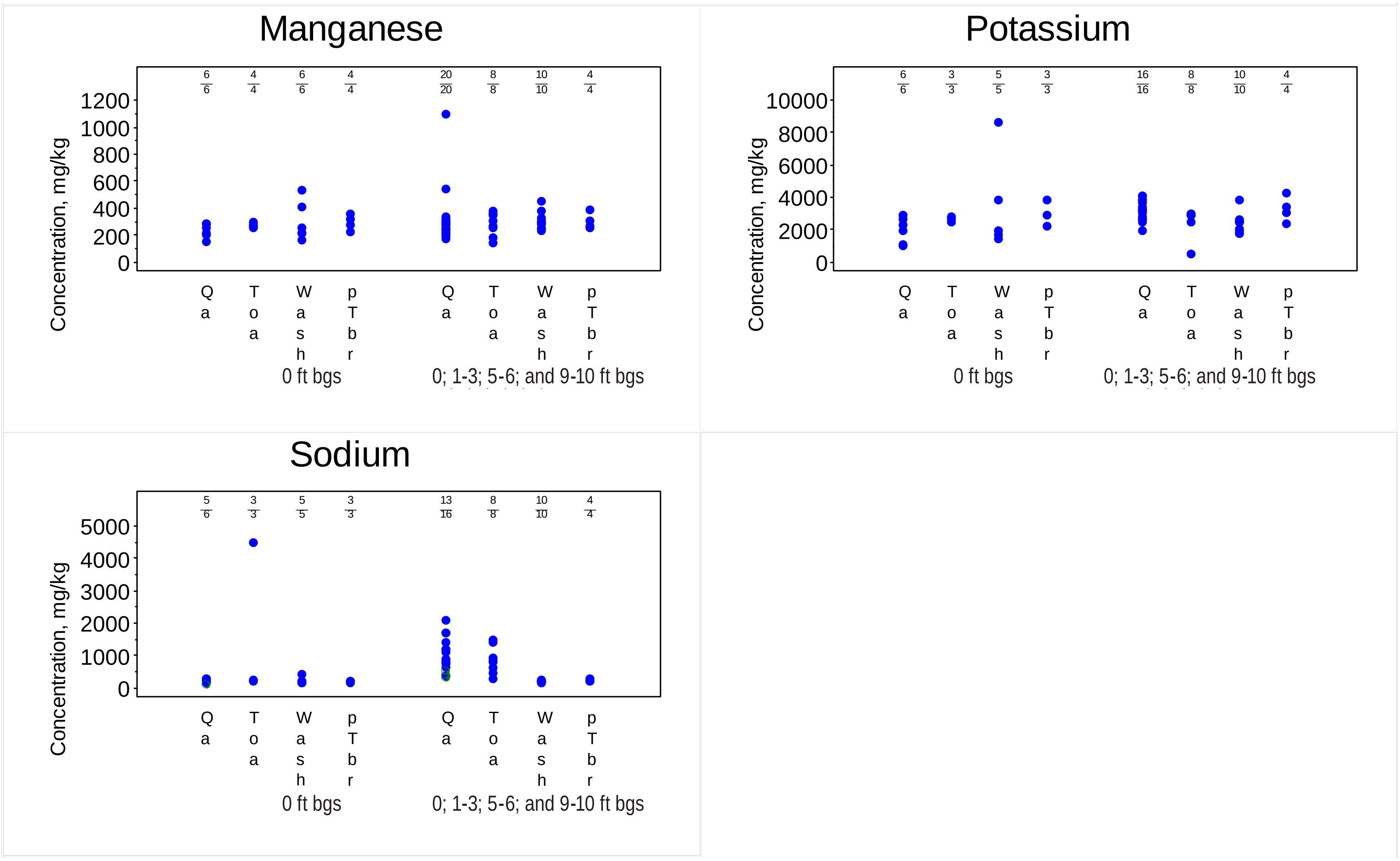

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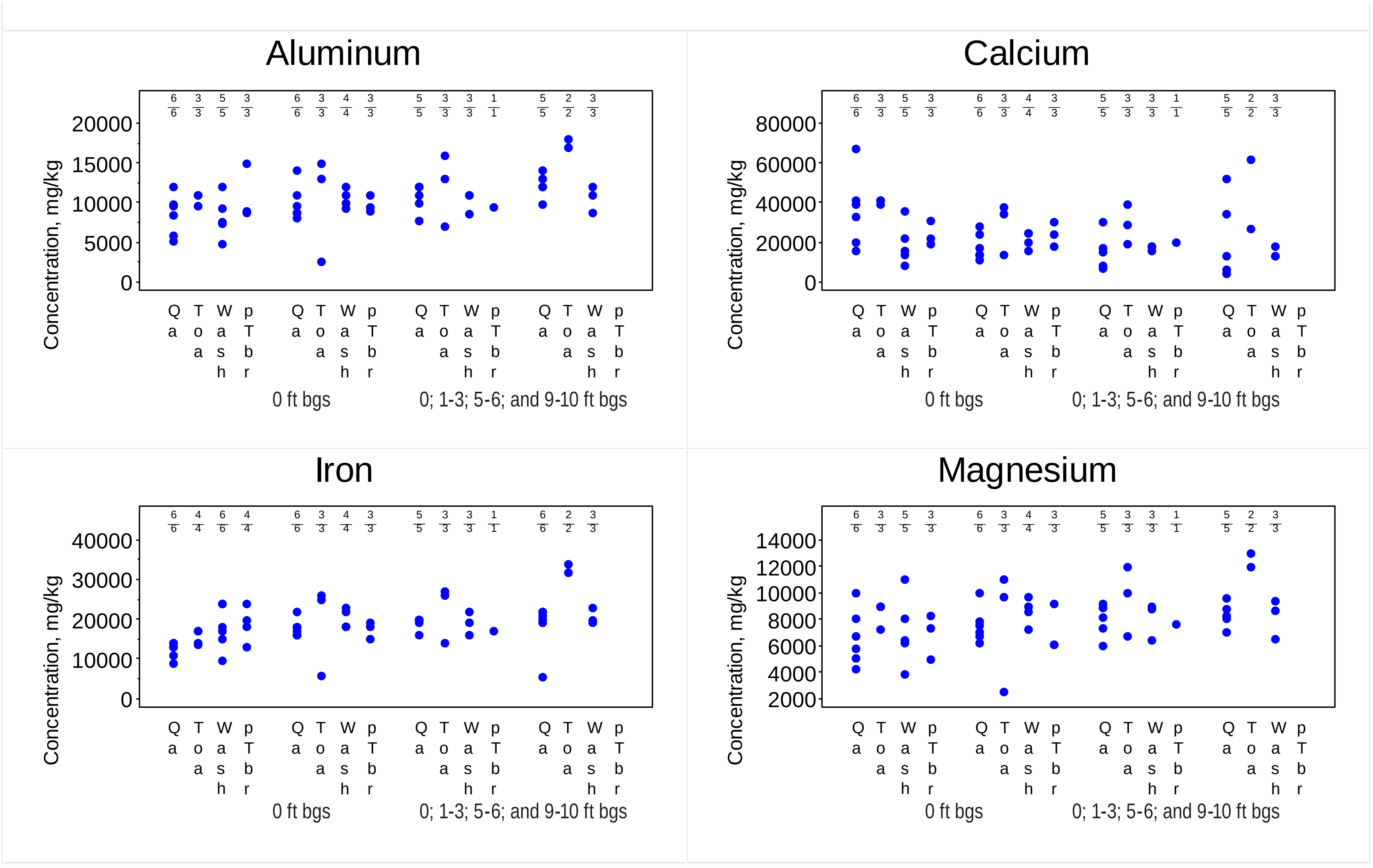
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value

FIGURE E-1
SCATTER PLOTS BY FOUR SOIL TYPES AND TWO DEPTHS FOR BACKGROUND CONCENTRATIONS

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL



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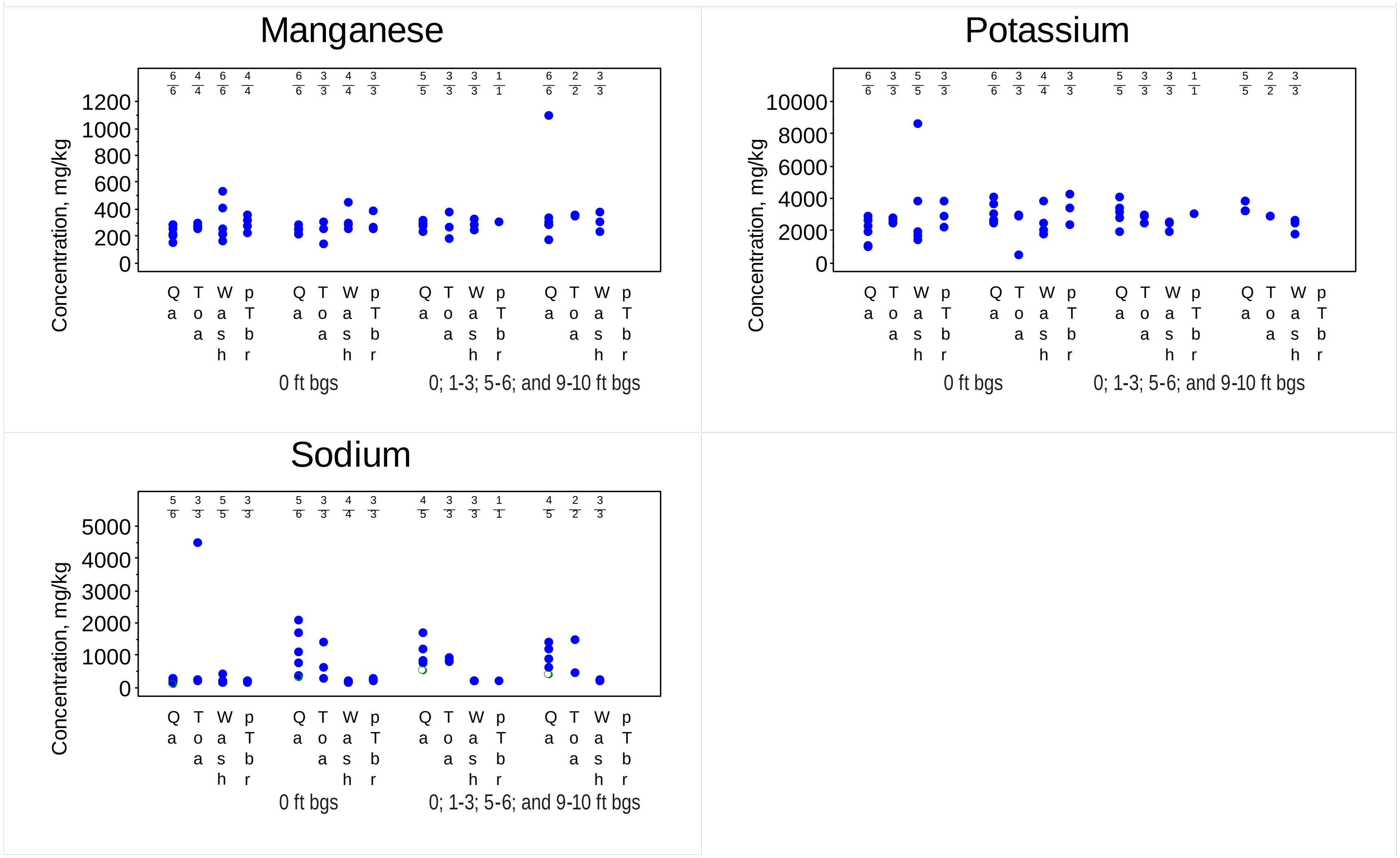
Wash (Qya) = Recent wash deposits
pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value

FIGURE E-2
SCATTER PLOTS BY FOUR SOIL TYPES AND FOUR DEPTHS FOR BACKGROUND CONCENTRATIONS

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL



LEGEND

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Toa = Tertiary Alluvium (Fanglomerate of Metzger and Loeltz)
Wash (Qya) = Recent wash deposits
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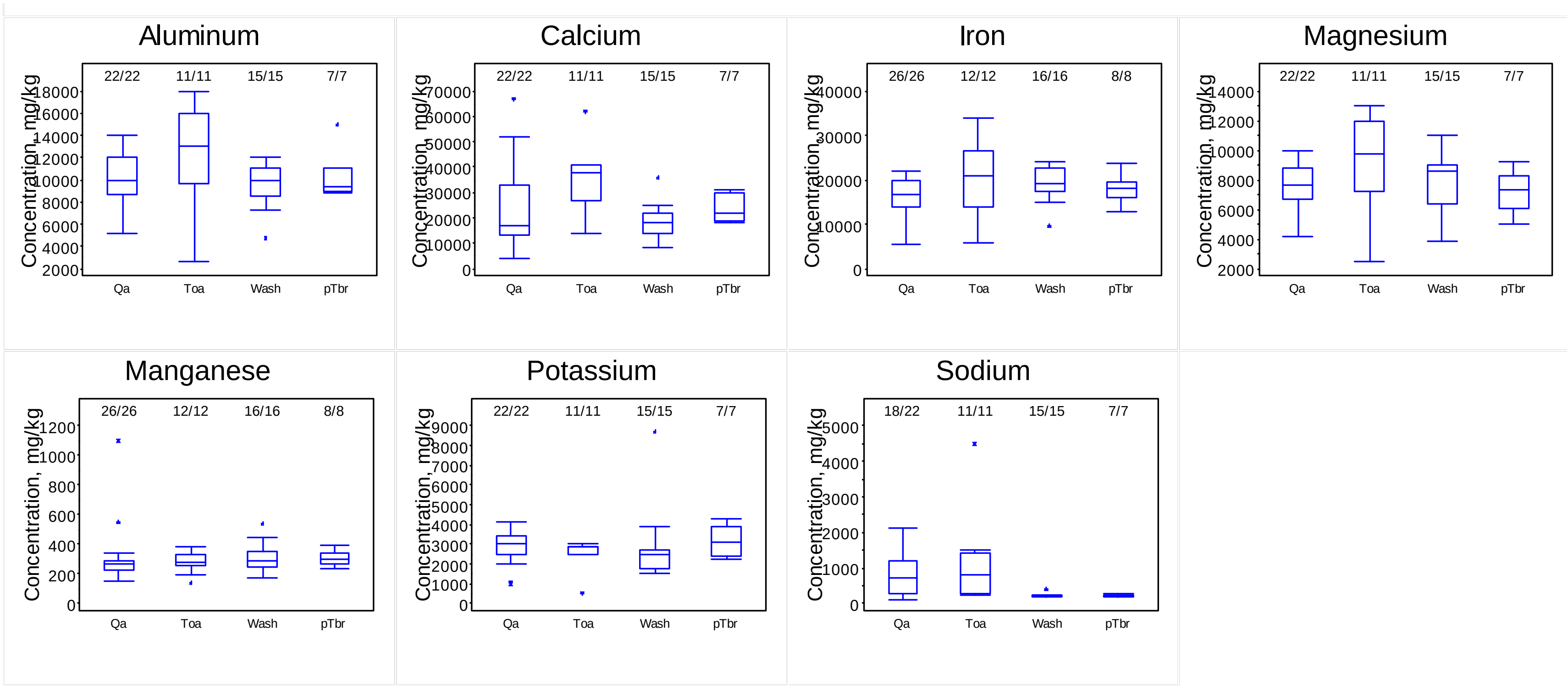
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value

FIGURE E-2
SCATTER PLOTS BY FOUR SOIL TYPES AND FOUR DEPTHS FOR BACKGROUND CONCENTRATIONS

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL



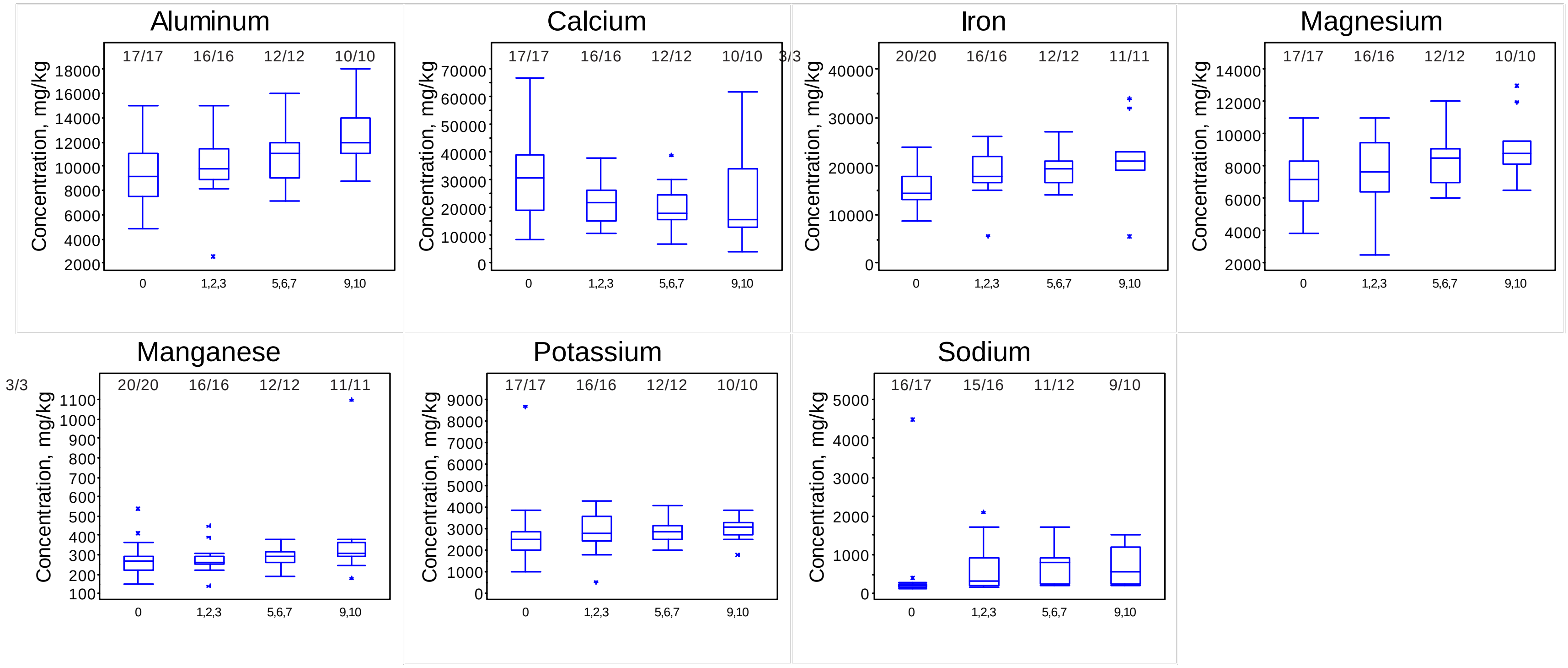
LEGEND

Qa = Quaternary Alluvium and Surficial deposits, undifferentiated
Toa = Tertiary Alluvium (Fanglomerate of Metzger and Loeltz)
Wash (Qya) = Recent wash deposits
pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value

FIGURE E-3
BOX-AND-WHISKER PLOTS BY SOIL TYPES

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



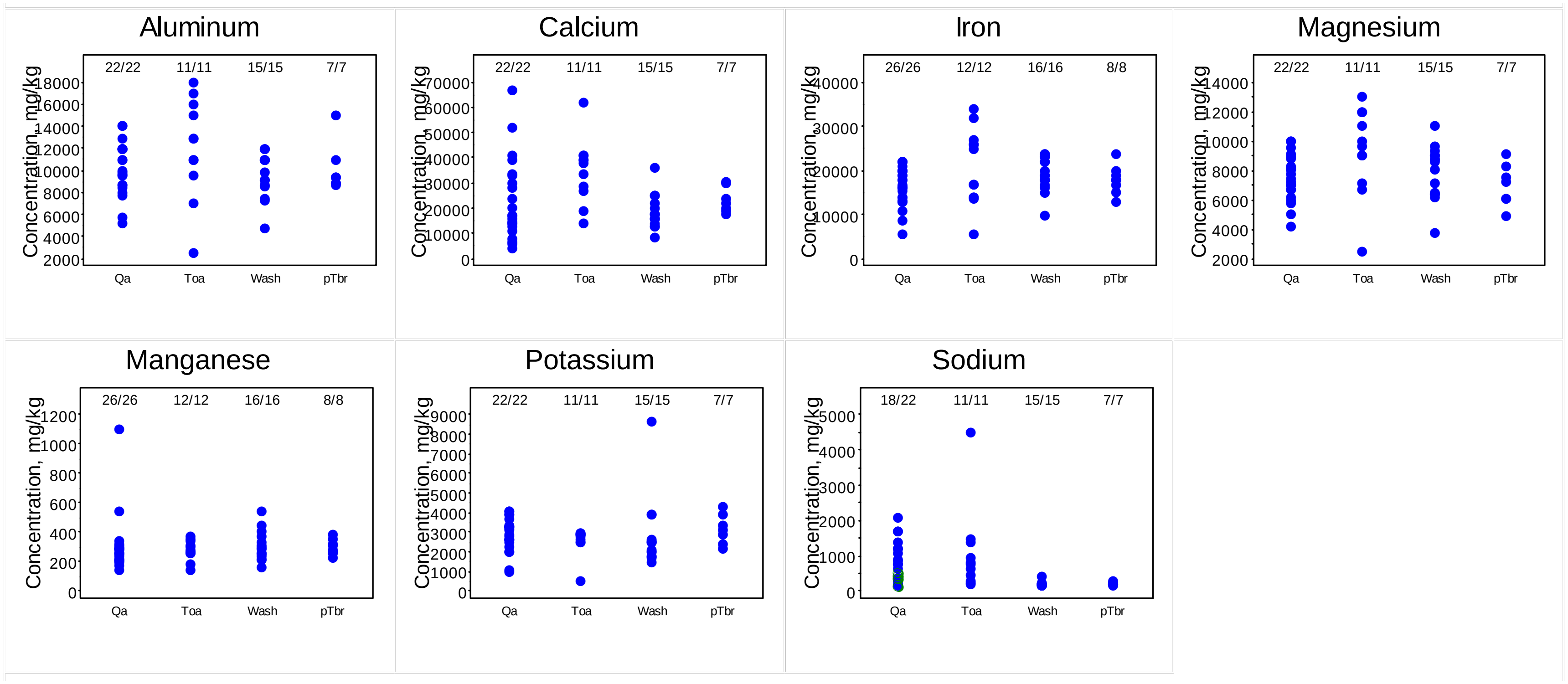
LEGEND

Qa = Quaternary Alluvium and Surficial deposits, undifferentiated
Toa = Tertiary Alluvium (Fanglomerate of Metzger and Loeltz)
Wash (Qya) = Recent wash deposits
pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)
mg/kg = milligram per kilogram

FIGURE E-4
BOX-AND-WHISKER PLOTS BY DEPTH

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

CH2MHILL

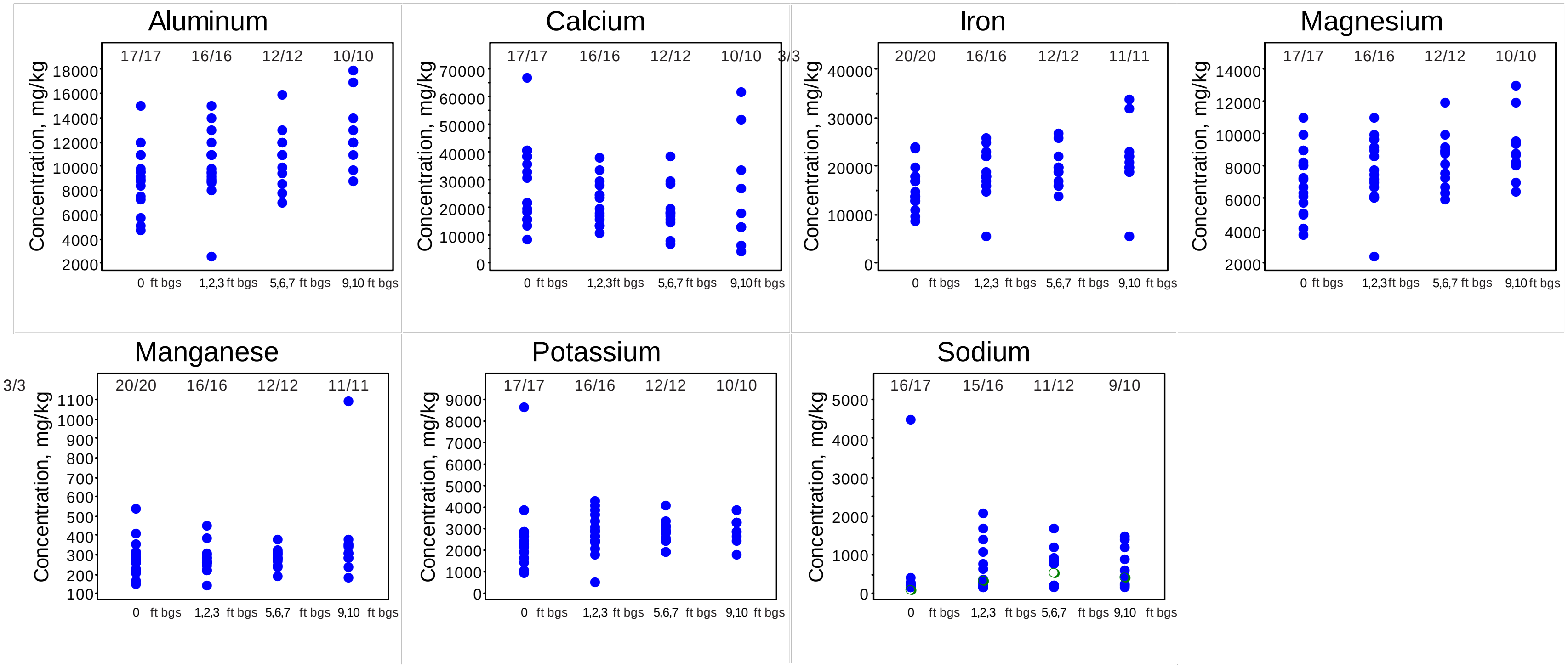


LEGEND

Qa = Quaternary Alluvium and Surficial deposits, undifferentiated
Toa = Tertiary Alluvium (Fanglomerate of Metzger and Loeltz)
Wash (Qya) = Recent wash deposits
pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

FIGURE E-5
SCATTER PLOTS BY SOIL TYPE

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



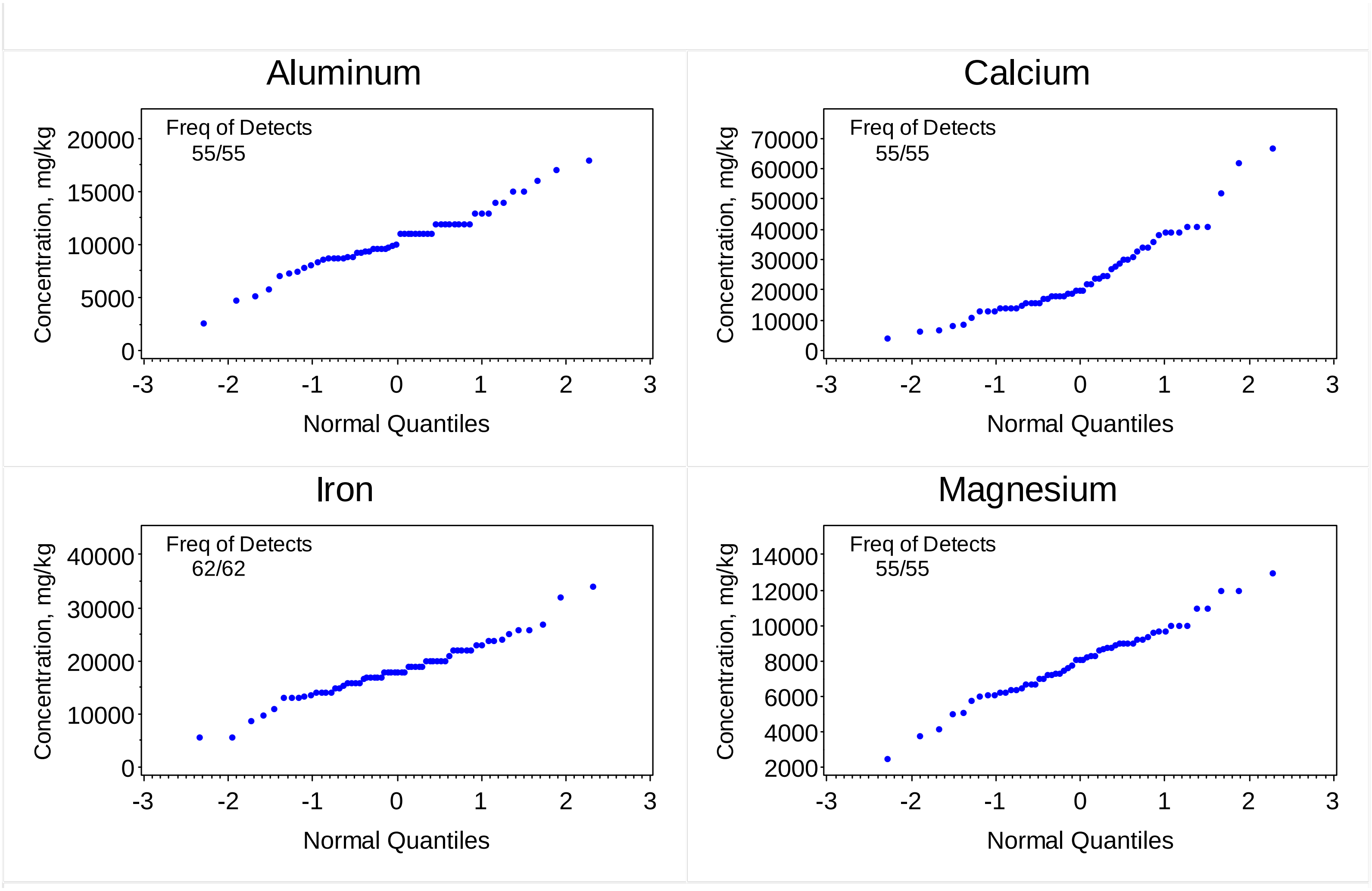
LEGEND

Qa = Quaternary Alluvium and Surficial deposits, undifferentiated
Toa = Tertiary Alluvium (Fanglomerate of Metzger and Loeltz)
Wash (Qya) = Recent wash deposits
pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value

FIGURE E-6
SCATTER PLOTS BY DEPTH

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



LEGEND

Qa = Quaternary Alluvium and Surficial deposits, undifferentiated
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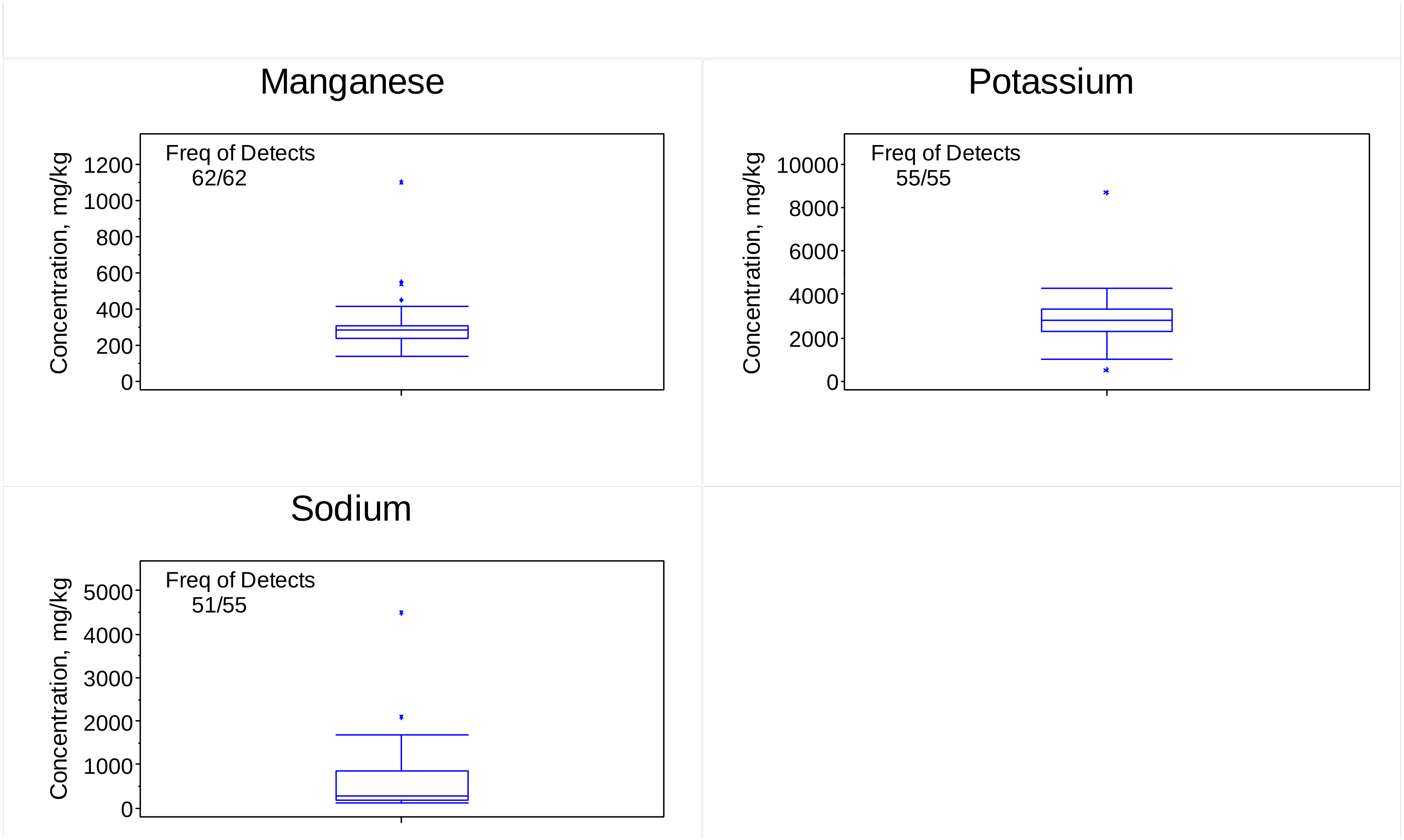
Wash (Qya) = Recent wash deposits
pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value

FIGURE E-7
PROBABILITY PLOTS OF COMBINED DATA

SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



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pTbr = Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granite Rock)
ft bgs = feet below ground surface
mg/kg = milligram per kilogram

● Detected value
○ Non-detected value

FIGURE E-8
INTERQUARTILE RANGE PLOTS
SOIL INVESTIGATION PART A, PHASE 1 DATA GAPS EVALUATION REPORT
AT THE PACIFIC GAS AND ELECTRIC COMPANY,
TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Attachment E1
Data Set

Attachment E-1

Soil Sample Results: Contract Laboratory Program Inorganics
Background Data Set
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

					Contract Laboratory Program (CLP) Inorganics (mg/kg)						
Location	**Lithologic Unit**	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**
BKG-01	Qa	09/18/08	0 - 0.5	N	9,600	41,000	13,000	6,700	260	2,900	230
BKG-01	Qa	09/18/08	2 - 3	N	8,800	24,000	17,000	7,500	220	4,100	1,100
BKG-02	Wash (Qya)	09/18/08	0 - 0.5	N	7,500	16,000	15,000	6,400	220	1,700	170
BKG-02	Wash (Qya)	09/18/08	2 - 3	N	9,900	25,000	18,000	8,600	290	2,100	180
BKG-02	Wash (Qya)	09/18/08	5 - 6	N	11,000	16,000	19,000	8,800	290	2,500	220
BKG-02	Wash (Qya)	09/18/08	9 - 10	N	11,000	13,000	20,000	8,700	310	2,500	240
BKG-03	Wash (Qya)	09/18/08	0 - 0.5	N	9,200	22,000	18,000	8,100	260	2,000	180
BKG-03	Wash (Qya)	09/18/08	2 - 3	N	11,000	20,000	22,000	9,000	300	2,500	190
BKG-03	Wash (Qya)	09/18/08	5 - 6	N	11,000	18,000	22,000	9,000	330	2,600	230
BKG-03	Wash (Qya)	09/18/08	9 - 10	N	12,000	18,000	23,000	9,400	380	2,700	220
BKG-04	Wash (Qya)	09/18/08	0 - 0.5	N	7,300	13,000	17,000	6,100	220	1,500	160
BKG-04	Wash (Qya)	09/18/08	0 - 0.5	FD	7,300	14,000	17,000	6,200	220	1,500	190
BKG-04	Wash (Qya)	09/18/08	2 - 3	N	9,200	16,000	18,000	7,200	260	1,800	180
BKG-04	Wash (Qya)	09/18/08	5 - 6	N	8,600	18,000	16,000	6,400	250	2,000	190
BKG-04	Wash (Qya)	09/18/08	9 - 10	N	8,800	13,000	19,000	6,500	240	1,800	190
BKG-05	Toa	09/19/08	0 - 0.5	N	11,000	39,000	17,000	9,000	300	2,800	4,500
BKG-05	Toa	09/19/08	2 - 3	N	2,600	14,000	5,700	2,500	140	540	1,400
BKG-05	Toa	09/19/08	5 - 6	N	7,100	19,000	14,000	6,700	190	2,500	800
BKG-06	Toa	09/19/08	0 - 0.5	N	11,000	41,000	17,000	9,000	280	2,700	250
BKG-06	Toa	09/19/08	2 - 3	N	13,000	34,000	25,000	9,700	260	3,000	650
BKG-06	Toa	09/19/08	5 - 6	N	13,000	29,000	27,000	10,000	270	3,000	950
BKG-06	Toa	09/19/08	9 - 10	N	17,000	27,000	34,000	12,000	350	2,900	1,500
BKG-07	Toa	09/19/08	0 - 0.5	N	9,500	38,000	14,000	7,200	260	2,500	230
BKG-07	Toa	09/19/08	0 - 0.5	FD	9,600	41,000	13,000	7,100	270	2,200	200
BKG-07	Toa	09/19/08	2 - 3	N	15,000	38,000	26,000	11,000	310	2,900	280
BKG-07	Toa	09/19/08	5 - 6	N	16,000	39,000	26,000	12,000	380	2,900	840
BKG-07	Toa	09/19/08	9 - 10	N	18,000	62,000	32,000	13,000	360	2,900	460
BKG-08	Wash (Qya)	08/23/08	0 - 0.5	N	12,000	36,000	24,000	11,000	540 ^	8,700 ^	410
BKG-08	Wash (Qya)	08/23/08	1 - 2	N	12,000	25,000	23,000	9,700	450	3,900	200

Attachment E-1
Soil Sample Results: Contract Laboratory Program Inorganics
Background Data Set
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

					Contract Laboratory Program (CLP) Inorganics (mg/kg)						
Location	**Lithologic Unit**	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**
BKG-09	Wash (Qya)	08/23/08	0 - 0.5	N	4,800	8,600	9,700	3,800	170	3,900	190
BKG-10	pTbr	09/19/08	0 - 0.5	N	8,800	22,000	13,000	5,000	230	2,200	210
BKG-10	pTbr	09/19/08	1 - 2	N	8,900	30,000	15,000	6,100	270	2,400	190
BKG-11	pTbr	09/19/08	0 - 0.5	N	15,000	31,000	20,000	8,300	360	3,800	230
BKG-11	pTbr	09/19/08	0 - 0.5	FD	15,000	31,000	20,000	8,300	350	3,900	230
BKG-11	pTbr	09/19/08	1 - 2	N	9,400	18,000	18,000	6,100	260	3,400	290
BKG-12	pTbr	08/23/08	0 - 0.5	N	8,900	19,000	18,000	7,300	320	2,900	180
BKG-12	pTbr	08/23/08	2 - 3	N	11,000	24,000	19,000	9,200	390	4,300	250
BKG-12	pTbr	08/23/08	5 - 6	N	9,400	20,000	17,000	7,600	310	3,100	210
BKG-13	Qa	09/20/08	0 - 0.5	N	12,000	67,000	14,000	10,000	290	2,300	300
BKG-13	Qa	09/20/08	2 - 3	N	11,000	17,000	18,000	7,800	250	3,100	1,700
BKG-13	Qa	09/20/08	5 - 6	N	12,000	6,900	20,000	8,900	280	3,200	1,700
BKG-13	Qa	09/20/08	9 - 10	N	14,000	52,000	20,000	8,100	1,100 ^	3,300	1,400
BKG-14	Qa	09/20/08	0 - 0.5	N	9,800	39,000	13,000	5,800	220	1,700	200
BKG-14	Qa	09/20/08	0 - 0.5	FD	9,700	36,000	13,000	5,600	210	2,000	200
BKG-14	Qa	09/20/08	2 - 3	N	9,600	11,000	16,000	6,700	220	2,700	760
BKG-14	Qa	09/20/08	5 - 6	N	12,000	8,200	20,000	9,200	320	3,400	780
BKG-14	Qa	09/20/08	9 - 10	N	13,000	6,300	21,000	9,600	310	3,900	630
BKG-15	Qa	09/20/08	0 - 0.5	N	5,200	20,000	11,000	5,100	210	1,100	290
BKG-15	Qa	09/20/08	2 - 3	N	8,100	14,000	18,000	6,200	260	2,500	380
BKG-15	Qa	09/20/08	5 - 6	N	10,000	15,000	20,000	7,300	300	4,100	850
BKG-15	Qa	09/20/08	9 - 10	N	12,000	34,000	22,000	8,300	340	3,300	890
BKG-16	Qa	09/23/08	0 - 0.5	N	8,400	33,000	14,000	8,100	290	2,700	ND (240)
BKG-16	Qa	09/23/08	2 - 3	N	8,700	28,000	16,000	7,000	260	2,700	ND (700)
BKG-16	Qa	09/23/08	5 - 6	N	7,800	17,000	16,000	6,000	240	2,800	ND (1,100)
BKG-16	Qa	09/23/08	9 - 10	N	9,700	13,000	19,000	7,000	290	3,900	ND (850)
BKG-17	Qa	09/20/08	0 - 0.5	N	5,800	16,000	8,800	4,200	150	1,000	170
BKG-17	Qa	09/20/08	2 - 3	N	14,000	14,000	22,000	10,000	290	3,700	2,100
BKG-17	Qa	09/20/08	5 - 6	N	11,000	30,000	19,000	8,200	290	2,000	1,200

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Background Data Set
Soil Investigation Part A, Phase 1 Data Gaps Evaluation Report
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

					Contract Laboratory Program (CLP) Inorganics (mg/kg)						
Location	**Lithologic Unit**	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**
BKG-17	Qa	09/20/08	9 - 10	N	12,000	4,100	22,000	8,800	290	3,300	1,200
EE-BG-1	pTbr	04/13/99	0	N	---	---	23,800	---	281	---	---
EE-BG-2	Toa	04/14/99	0	N	---	---	13,700	---	260	---	---
EE-BG-3	Wash (Qya)	04/14/99	0	N	---	---	23,900	---	413	---	---
MW-15	Qa	07/10/97	10	N	---	---	5,570	---	180	---	---

Notes:

mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
^	This concentration was removed from the background dataset because it is considered an outlier
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation
Qa	Quaternary Alluvium and surficial deposits undifferentiated
Toa	Tertiary Alluvium (Fanglomerate of Metzger and Loeltz)
pTbr	Pre-Tertiary Bedrock (Metadiorite, Gneiss, Granitic Rock)
Wash (Qya)	Recent wash deposits

Appendix F
Documentation of Compliance and Response to California Department of Toxic Substances Control (DTSC) and United States Department of the Interior (DOI) Comments

TABLE F-1

Documentation of Compliance and Response to California Department of Toxic Substances Control (DTSC) and United States Department of the Interior (DOI) Comments

Topock RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A
Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
California Department of Toxic Substances Control (DTSC). 2007. *Comments and Conditional Approval of the RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part A, Pacific Gas and Electric Company (PG&E), Topock Compressor Station, Needles, California (EPA ID No. CAT080011729)*. August 10.				
Conditions of Approval Included in Cover Letter				
		Condition #1	PG&E shall begin Phase 1 field work within 30 days of receiving all applicable permits associated with the approved portion of the Part A Work Plan.	Comment noted. PG&E completed mobilization within the required time frame.
		Condition #2	Per request of FMIT, PG&E shall prepare a site map depicting all study areas proposed in both Part A (outside the compressor station fence line) and Part B (inside the compressor station fence line) for reference. This site map shall be made available to interested parties upon their requests.	As agreed during the August 29, 2007 conference call, the existing figure in the RFI is adequate. The revised figure was included in the Part B work plan.
		Condition #3	PG&E shall issue a Phase 1 Part A Soil Sampling Data Gaps Evaluation Report within 60 days of completion of the field activities.	Comment noted. PG&E could not provide this report within 60 days of completion of the final field activities (data validation) since DTSC and DOI concurrence was not received on the Data Quality Objectives Technical Memorandum until March 2010. The Data Quality Objectives Technical Memorandum was required to provide a basis for the data evaluation**.**
		Condition #4	PG&E shall prepare a Phase 2 Part A Soil Sampling Work Plan when directed by DTSC after the evaluation of the Phase 1 Part A Soil Sampling Data Gaps Evaluation Report. The Phase 2 Part A Soil Sampling Work Plan shall address, at minimum, the remaining issues deferred to the Phase 2 investigation as specified in the attached GSU comments, as well as discussions and evaluation pertinent to the rejected sections of the Phase 1 Part A Work Plan.	Comment noted. PG&E will provide the Phase 2 Part A Soil Sampling Work Plan within 90 days of being directed by DTSC, provided that this Part A Phase 1 Data Gaps Evaluation Report has been approved by DTSC and DOI prior to the start of the 90-day period.

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Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
		Condition #5	PG&E shall make a reasonable attempt to work with the interested tribes to establish a tribal monitor during the site investigation field work.	PG&E invited Native American monitors to be present every day that work was performed. However, because PG&E can not require the Native American monitors to come to the site for this work, PG&E did not stop work when monitors were not present.
		Condition #6	PG&E shall ensure that all personnel associated with the field work be oriented on tribal sensitivity issues and to reasonably avoid unnecessary disturbance of the sensitive landscape.	Qualified PG&E staff provided this training to all PG&E personnel and contractors involved in the field investigation effort. Each person involved in this effort received the training prior to beginning their assigned work.
		Condition #7	At the request of the Fort Mojave Indian Tribe, DTSC requests that PG&E engage in discussions with the land owner/manager and interested tribes to explore options in managing non-contaminated investigation-derived wastes. PG&E must, however, properly characterize and manage hazardous waste pursuant to the California Code of Regulations, Title 22, Division 4.5, Chapter 12.	This issue was discussed during implementation of the field investigation program. However, direct-push borings are only 1.5 inches in diameter, and it is physically infeasible to put the drill cuttings back into such a narrow hole. Attempting to backfill the hole with native materials also compromises the ability to grout the hole in accordance with regulatory requirements. However, most shallow samples (0.5 foot bgs and 3.0 feet bgs) were collected using hand sampling equipment, and excess soil was backfilled into the sampling hole. Similarly, materials excavated from trenches were placed back into the trenches.
General Comments				
DTSC—The Geologic Services Unit (GSU)	1		The constituents of potential concern (COPCs) for each of the solid waste management units (SWMUs) and areas of concern (AOCs) have been previously identified in a GSU memorandum dated March 29, 2006. COPCs should not be reduced or eliminated without sampling analytical data at this point of the RCRA Facility Investigation (RFI) program. PG&E may provide past analytical data to demonstrate the absence of COPCs as identified in the GSU memorandum in support of a reduced laboratory analytical program which does not include all COPCs. However, in the absence of such information, all COPCs identified for each SWMU or AOC must be evaluated.	All COPCs listed for each unit in the March 29, 2006 comments were included in the analytical suites for each unit. It should be noted that the March 29, 2006 comments did not require analysis of all classes of compounds at all units. The analytical parameters evaluated in the Part A Phase 1 field investigation program, in many cases, exceeded the requirements defined in the March 29, 2006 letter.

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Topock RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A
Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
	2		Due to the sensitive landscape in which the proposed soil sampling will take place, any modifications to the proposed sampling locations identified in the Workplan should only be conducted with prior DTSC approval.	Comment noted. All sampling locations were reviewed by DTSC. One boring (BKG-1) was relocated slightly; the new location was cleared by the agencies, the tribal monitor, and PG&E prior to installation of the boring. At the request of the tribal monitor and archeologist, no borings or trenches were installed and no samples were collected in UA-1.
	3	Section 6.2.4 on page 6-4	The third bullet in Section 6.2.4 on page 6-4 of the Workplan discusses an approach for analyzing Total Petroleum Hydrocarbons, Polycyclic Aromatic Hydrocarbons, and Volatile Organic Compounds (TPH, PAHs, and VOCs respectively). It states that if elevated organics are detected in lower yard samples, then they will be added to the COPCs at each AOC that is hydrologically connected to the compressor station. This approach, however, is not applicable to those AOCs that are not hydrologically connected to the lower yard, but may still be connected to the compressor station. DTSC notes that this lower yard organic screening approach could only be applied to AOC 1 and possibly to AOCs 4 and 14.	The approach to addressing organics was changed as a result of discussions with DTSC and DOI. Samples from all units were analyzed for VOCs, TPH (extractable and purgeable), PAHs, and SVOCs. Ten percent of all samples from each AOC were also analyzed for chemicals on the United States Environmental Protection Agency Contract Laboratory Program Target Analyte List/Target Compound List (TAL/TCL). All samples from the Former 300B Pipeline Liquids Tank area were analyzed for polychlorinated biphenyls (PCBs) using the Contract Laboratory Program protocol.
	4		For all AOCs and solid waste management unit (SWMUs), where potential asbestos-containing materials (ACM) are identified, the materials should be appropriately characterized to determine if the material does not indeed contain asbestos and if the asbestos is friable. Otherwise, the material should be assumed to contain friable asbestos and handled accordingly.	ACM was observed in soil in AOCs 4, 9, and 14. Soil samples collected from AOCs 4, 9, and 14 were analyzed for asbestos. Debris removal was not conducted during the Part A Phase 1 field investigation. Debris removal has occurred in AOC 4 as part of the time-critical removal action (TCRA) that is currently being conducted. In each case, the material will be handled as directed in the comment. Specifically during the AOC removal ACM was segregated from other removed materials for disposal as appropriate.
	5		The proposed soil sampling locations depicted on Workplan figures (6-7, 6-12, 6-16, 6-18, and 6-23) are differentiated into groups representing “Risk/Remediation/Characterization and “To/Toward Background”. In most cases this differentiation appears unfounded and arbitrary. The DTSC toxicologist has indicated that the ecological risk evaluation requires evaluation of inorganic chemicals to background, and organic chemicals to an	Figures showing the revised proposed sampling locations were provided to DTSC and DOI on September 13, 2007, with supplemental modifications for AOCs 1, 10, and 11 provided on July 25, 2008. These figures show only existing and proposed sampling locations.

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Topock RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A
Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
			appropriate detection limit below the appropriate ecological screening levels. Therefore, no differentiation is warranted as each soil sampling location should provide the same level of information useful to the evaluation of risk and environmental conditions at the site. The GSU recommends that all future figures and text be prepared and/or revised to acknowledge this issue.	
	6		In order to facilitate an adequate review of the historical activities within the area of potential effect, please provide true photographic enlargements (at a scale which appropriately depicts the investigation area) of all historical aerial photographs. The electronic copies provided with the first draft of Volume 1 of the RFI are useful; however, magnification to a useful scale distorts the image. An alternative to photographic reprints would be to provide electronic images at a resolution which would allow detail to be preserved during magnification. Additionally, pertinent photographs of the PG&E Compressor Station (e.g., those photos kept at the site or at other PG&E offices) should be copied and provided to DTSC.	Additional high-resolution photographs were provided to DTSC on May 11, 2007. DTSC indicated that at the August 29, 2007 conference call that these photographs satisfied its needs. PG&E (via Glenn Caruso) provided construction photos of the Topock Compressor Station. DTSC later requested several pages of photographs that appeared to be missing (letter dated March 20, 2008), and PG&E confirmed that there were no pages of missing photographs.
	7		Two concerns exist regarding the perimeter of the compressor station (the fence line) that separates the Part A off-site soils investigation from the Part B on-site investigation. First, DTSC believes that sampling along historic discharge areas around the perimeter of the facility is warranted. Storm water discharge pipes (storm drains) are documented by PG&E as the suspected source of contamination at some areas of concern at the site (e.g., AOC 9—Southeast Fence Line; AOC-10a—East Ravine). Potential contamination associated with all storm drains that discharge off the site should be evaluated as part of the RFI soils investigation. It would be undesirable to have to wait for erosion channels along slopes to expose discolored, contaminated soil.	During the August 29, 2007 conference call it was agreed that perimeter and storm drain sampling could be conducted during the Part B investigation. Fifteen perimeter and storm drain sampling locations were identified during a site walk with DTSC and DOI on October 18, 2007. These locations are shown on Figure 1 of the Part B Phase 1 proposal, dated September 30, 2008. These sampling locations will be considered during the preparation of the upcoming Final Part B Work Plan (target for mid 2010).

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Topock RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A
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Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
			Historic releases from the facility to offsite areas should also be investigated near the fence line where contaminant concentrations would be expected to be higher and/or detectable closer to the source of contamination. The Workplan discusses a historic release from Cooling Tower B to the northeast ravine yet sampling along the perimeter of the site to evaluate this release is not proposed. At another area, debris (including apparent transite) is located outside the fence line along the perimeter of the site (see Figure 1). This type of waste is considered significant at other AOCs and should be addressed by PG&E. PG&E should submit a plan to DTSC to evaluate the perimeter of the site. A site survey of the perimeter of the station should be conducted to identify obvious areas requiring characterization. Concern also exists regarding the transition of the on-site area to the off-site area. Contaminant concentrations within an on-site area may be protective for industrial scenarios, but might cause excessive human or ecological risk at off-site areas if contaminated on-site soil is released offsite (via storm drains, wind storms, or storm water run off). Figure 2 illustrates this issue. PG&E's plan to evaluate the perimeter of the site should address this issue.	
Specific Comments				
	1	Section 4.2.2.5	**Calculation of Groundwater Leaching Screening Levels for Metals in Soil** Two documents referenced in this section (Hevesi et al., 2003 and Ronan et al., 1998) do not appear in the full references in Section 11. Please provide the full references so DTSC can evaluate the appropriateness of each document to the current investigation.	PG&E e-mailed DTSC and DOI the full references for the two documents for evaluation in 2007. The Hevesi et al., 2003 reference was also included in the June 23, 2008 *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station* Technical Memorandum.

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Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
			It is also recommended that preliminary calculations be provided for each metal to allow DTSC and other stakeholders to clearly understand the methodology.	Section 4.0 of the Part A work plan provides a detailed description of how the groundwater leaching screening levels will be calculated and the assumptions of the approach. Further, the *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station* Technical Memorandum, submitted to the agencies on August 1, 2008, provided additional information on the proposed methodology for calculation of site-specific soil screening levels for the protection of groundwater (GPL). Please note also that, per this Technical Memorandum, the term GPL has been changed to soil screening level protective of groundwater and is now abbreviated SSL. A key variable in calculating the groundwater leaching screening levels is the areal extent of impacted soils. The screening levels cannot be calculated until the first phase of data are available. As agreed during the August 29, 2007 conference call, the GPL for each AOC will be calculated and included in the Part A Phase 1 Data Gaps Evaluation and Part A Phase 2 Soil Sampling Work Plan.
	2	Section 5.3.1	**Outlier Analysis** Based upon descriptions in the USEPA Data Quality Assessment document (USEPA QA/G9S), it appears that the proposed mathematical outlier tests (Rosner's test and Dixon's Extreme Value test) assume a normal distribution of the dataset. At the point in the dataset evaluation that the outlier test is conducted, a determination of normality has not been conducted. Utilization of a test which assumes normality would be inappropriate. The DTSC recommends identifying outliers as those data points which exceed 1.5 times the inter-quartile range of the dataset above the third quartile [i.e., Q3 + 1.5 (IRQ)] as a simpler evaluation capable of identifying multiple outliers with each calculation.	According to the USEPA guidance *Data Quality Assessment: Statistical Methods for Practitioners* (USEPA, 2006), the outlier analysis approach presented in the work plan is preferable to the box and whisker approach suggested by DTSC. Consequently, the proposed approach was used in the outlier analysis provided in the *Soil Background Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California*, submitted to DTSC and DOI December 12, 2008. However, in response to this comment, PG&E also performed the inter-quartile range analysis, as requested by DTSC. This information is also presented in the December 12 technical memorandum.

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Topock RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A
Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
	3	Section 6	**Investigation Area Soil Sampling Plan** Comments regarding AOCs and SWMUs are presented below in the AOC/SWMU Specific Comments.	Comment noted.
	4	Section 7	**Soil Sampling Methods** In order to provide completeness of the description of the scope of work, relevant standard operating procedures (SOPs) should be included as attachments to all future workplans rather than inclusion only by reference.	Comment noted. SOPs were included in Appendix E for the Part B investigation work plan and will also be included in the Part A Phase 2 Soil Sampling Work Plan.
	5	Section 7.6	**Trenching** Each exploratory trench should extend no less than six feet below ground surface (bgs) in order to evaluate potential environmental conditions to the depths previously agreed to (see also Specific Comments for AOC12).	Trench depths were increased to ensure that native material would be encountered, where possible. Trench depths in AOC 12 ranged from 3 feet (impenetrable hardpan was encountered at 3.5 feet below ground surface [bgs]) to 11 feet bgs. Trench 12c-T1 apparently did not encounter native material and was terminated at 11 feet bgs. Two samples were typically collected at or near the bottom of each trench. Sidewall samples were also collected in trenches 12a-T1 and 12c-T1a. Trench depths in AOC 4 ranged from 3 to 6 feet bgs; this corresponded to bedrock in trenches AOC4-T1 through AOC4–T3. Samples were typically collected at the bottom of the trenches; surface soil samples (0.5 foot bgs) were also collected at AOC4-T1 and AOC4-T2. Trenches in SWMU 1 ranged from 8 to 22 feet bgs and penetrated from 6 to 20 feet into the slope. Samples were collected at the surface, from intermediate depths, and near the bottom, where feasible.
AOC/SWMU Specific Comments				
	1	Section 6.3	**SWMU 1/AOC 1—Former Percolation Bed** During a site walk of AOC 1 conducted on December 11, 2006, it appeared that excessive sampling density was employed at three soil sampling locations that had been staked out by PG&E. Two of the samples (one identified as WP-NEW-2) were staked in recently discovered white powdery material near the toe of	In accordance with DTSC's recommendation, the sampling plan was revised to provide more even coverage of the newly-discovered white powdery material, and sample locations were adjusted as recommended. Seven trenches were installed to explore the extent of the white powdery material in the bank, and 27 samples were collected for

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			the slope on the east side of the wash. The third stake was located just to the west in the wash. PG&E should indicate why such a tight sampling grid is needed. If sufficient rationale does not exist for each sample, DTSC suggests that one of the borings characterizing the white powder be dropped from the investigation and that third boring be moved 10 to 20 feet to the west away from the remaining boring. An additional sample location is suggested near a 55 gallon drum discovered in Bat Cave Wash (see Figure 3). The drum suggests a depositional environment within that specific portion of the wash and is located near boring SSB-8 that detected total chromium above background and Ecological Comparison Values as described in the Workplan. PG&E should locate the drum and determine if it contains waste that would require characterization and disposal. (Figure 3. Easterly view of a 55 gallon drum within Bat Cave Wash in the general vicinity of borings SSB-8 and MW-13.) The fourth bullet on page 6-7 of the workplan discusses elevated iron in well MW-17. Since well MW-17 is not associated with AOC 1, PG&E should clarify or amend the iron discussion.	laboratory analysis. See also discussion in response to General Comment 5. In response to this comment, sample location BCW-1 was added slightly to the north of boring SSB-8 at the location of the drum. The drum did not contain any waste, and was removed from Bat Cave Wash and properly disposed. Well MW-17 was erroneously included in the data table and discussion for AOC 1. Also, the screening level used in the work plan (23,000 mg/kg) was then the current residential PRG. The current soil RSL for iron is 55,000 mg/kg; no soil samples from any monitoring well exceed the current iron RSL.
	2	Section 6.4	**AOC 4 - Debris Ravine** Significant waste has been pushed off the northern edge of the ravine (See Figures 4 to 6). The AOC 4 area delineated on Figure 6-12 of the Workplan should be thoroughly walked and all debris carefully documented and mapped so the distribution of the debris and potential contamination associated with it can be established. The map generated should be provided to DTSC prior to the sampling effort. (Figure 4. Northwesterly view of the north side of the Debris Ravine. Green stained soil visible in Figure 7 within the erosion channel is located within the erosion channel below the black	On June 24, 2009, DOI issued an Action Memorandum entitled *Request for Time-Critical Removal Action Number 4 at AOC 4 Debris Ravine, Pacific Gas and Electric Topock Compressor Station* (DOI, 2009). DOI's Action Memorandum directed PG&E to implement a TCRA at AOC 4. The TCRA is intended to stabilize and mitigate the threat of release of contaminated material and is not intended to substitute for any investigative or remedial activities that may be required under RCRA or to be the final remedy for AOC 4. Debris within AOC 4 is also being removed as part of the TCRA.

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			tank on the bench road to the right of the picture. Figure 5. Northerly view of waste that has traveled down the north side of the ravine. Figure 6. Easterly view of waste that has traveled down the north side of the ravine to the floor of the ravine. Wood slats may be from cooling towers.) Borings are needed throughout fill areas to identify the thickness of fill and potentially contaminated soils/wastes. These data are needed to assist in evaluating remedial alternatives during the Corrective Measures Study. PG&E should consider ways to assess the thickness of fill areas and obtain samples along the slope. PG&E may be able to bench slopes or create small pads so that mechanized tools, such as small power augers, could be used to place borings and reach appropriate depths. PG&E might also be able to use an excavator bucket to reach out over the slope and bring soil/fill/waste to the road for evaluation and sampling. Soils that are identified as containing debris should be sampled if the debris is removed during implementation of this phase of the workplan. A DTSC site walk of the site resulted in the addition of sample locations AOC4-14 and 15 as pictured in revised workplan Figure 6-12. Figures 8 and 9 below illustrate the debris (metal, glass, red clay pipe, transite shingles, etc.) that was not originally planned to be sampled in the Workplan. A pile of wood slats (possibly from cooling towers) similar to those in Figure 6 was also identified near the AOC4-14/15 location. Some of the slats were encrusted with scale of unknown composition and toxicity. This wood and scale, and soil from the immediate area should be sampled and analyzed for all COPCs. Concern exists that slope materials will continue to erode and potentially contribute contaminants to the ravine and Bat Cave Wash/Havasu National Wildlife Refuge. (Figure 8. Northwesterly view of debris in foreground placed along old road within the central portion of AOC 4 (Debris Ravine). Figure 9. Southwesterly view of debris in foreground	

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			placed along old road within the central portion of AOC 4 (Debris Ravine).)	
			Section 6.4.4 on Page 6-12 of the Workplan appropriately indicates that additional samples will be collected if stained soils are found. Green stained soils have been identified on the northern slope exposed within an erosion channel below a black tank (see Figure 7 below). This stained area should be sampled and analyzed for all COPCs. (Figure 7. Northerly view from the floor of the ravine of green stained soil visible from an erosion channel on the north side of the ravine.)	Comment noted. A sample of the green stained soil was collected (AOC4-STAINED). Sample locations AOC4-GH10 and AOC4-GH30 were collected from the green stained soil area.
	3	Section 6.5	**AOC 9 – Southeast Fence Line** Historical aerial photographs (particularly the oblique images from 1955) identify the presence of a structure (potentially a historic wash rack) near the head of slope. Therefore, the limits of AOC 9 should be expanded approximately 50 feet to the southwest along the slope. Soil sampling shall be expanded in this area. Dark marks in the face of the slope, potentially indicating liquid migration, are also identified in the 1955 aerial photograph and shall be sampled as part of AOC 10.	The limits of AOC 9 were expanded to the southwest to include four samples (AOC9-10 through AOC9-13).
			Sufficient sampling and analysis is not proposed for AOC 9. Sample locations should be included in the former area where visibly contaminated soil had been noted (e.g., area where samples No. 4 to 9 were collected) and where elevated contaminant levels have already been identified (e.g., Sample No. 10). This will provide data on the nature of the contamination and assist in identifying specific constituents of concern for AOC 9. Sampling in potentially clean areas elsewhere will not meet this objective. Sampling for VOCs and SVOCs in these two areas is suggested as the source of contamination emanated from a storm water drainage pipe that has been characterized as possibly draining the facility's steam-cleaning wash rack area. Deeper samples (greater than 3 feet below ground surface) should also be collected from these two areas to determine the vertical extent of contamination. If	In addition to the seven samples originally proposed to delineate the extent of AOC 9, two samples were added near the former elevated detections at borings #4 and #9 (AOC9-8), and boring #10 (AOC9-9). Furthermore, as discussed above, four samples were added to assess potential impacts from the former structure near the top of the slope.

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			necessary, PG&E should develop ways to obtain samples along slope. PG&E may be able to bench slopes or create small pads so that mechanized tools, such as small power augers, could be used to obtain samples from appropriate depths. PG&E might also be able to use an excavator bucket to reach out over the slope and bring soil/fill to the road for evaluation and sampling. PG&E must evaluate field conditions and sampling logistics well in advance to minimize amendments to the sampling program just prior to the field effort.	
			Section 6.5.3, Page 6-14, Line 4 of the Workplan refers to a nonexistent Table 3-3 and a total number of samples (49) that does not correlate with the total number of proposed samples (47) contained in Table 3-2 of the Workplan. Table 3-2 should be checked for accuracy for all investigative areas and updated as necessary.	Comment noted. A table showing the number of samples collected at each unit is included in Appendix B of this Part A Phase 1 Data Gaps Evaluation Report. PG&E also understands that DTSC did not require a revised copy of Table 3-2.
	4	Section 6.6	**AOC 10 – East Ravine** During a site visit in July 2006, GSU staff observed small amounts of metal debris in either subarea 10b or subarea 10c. The debris identifies depositional areas in the wash that have been affected by former operations. The location of the metal debris should be confirmed, documented and mapped.	As agreed during the August 29, 2007 conference call, PG&E will conduct the requested mapping was conducted on May 2009, results of the mapping are presented in this Part A Phase 1 Data Gaps Evaluation Report. .
			Page 6-15 of the Workplan describes a white waste layer occurring in subarea 10c. However, the Workplan does not address sample collection, characterization, and delineation of this white layer. Additional sampling and analyses are required to characterize the waste layers (see Phase 2 Recommendations Section).	Five borings were installed in subarea 10c. The referenced white waste layer was not encountered in any of those borings. The data from the three samples collected by DTSC on January 18, 2008 were incorporated into the data gaps evaluation for AOC 10.
			The conceptual model for the East Ravine wash should be updated. The Workplan should acknowledge that prior to the construction of the dams, run off from the site, including potential contaminants, could have moved more freely down the wash during rain events or releases to the drainage. The fourth paragraph on page 6-15 of the Workplan indicates that the	As agreed during the August 29, 2007 conference call, an updated conceptual model for the East Ravine will be included in the Part A Phase 2 Soil Sampling Work Plan.

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			easternmost road/dam is not eroded suggesting water has not flowed over it. It is assumed that water could have overtopped this dam in the past as it is assumed that the road/dam is periodically maintained. PG&E has indicated that PG&E personnel have conducted training on earth moving equipment in this general area.	
			VOCs and SVOCs are recommended to be analyzed at location AOC-10a-1 due to the presence of stained soil, possibly old hydrocarbon staining, and at the storm drain discharge location discussed in the preceding paragraph.	As discussed in response to General Comment #3, VOCs, SVOCs, PAH, and TPH-extractable and -purgable were analyzed at all units.
			Samples AOC10-1 and 2 pictured in the original Figure 6-16 of the Workplan were removed in the revised figure. These sample locations should be reinstated because the Workplan indicates, “Because runoff from larger spills near the station access road could have entered the East Ravine, additional sampling along the slope leading into the East Ravine is also required.”	The two samples were reinstated and are shown on the revised Figure 6-16 provided to DTSC and DOI on September 25, 2008.
			Sample AOC-10a-2 appears redundant with sample AOC-10a-1 and should be eliminated unless PG&E has selected it for a specific purpose (e.g., contaminant delineation) or the stained area downslope from AOC 9 is difficult to locate.	Sample AOC-10a-2 was removed from the sampling plan (see revised Figure 6-16 provided to DTSC and DOI on September 25, 2008).
			Additional soil borings seem necessary to evaluate specific potential contaminant pathways and further define the lateral extent of previously identified contamination. DTSC believes these locations should be further evaluated with additional soil borings: • within the defined area of AOC 10c to provide additional data in the area of former sample location L-2-2 (north of previous sample location) for further definition of elevated contaminant concentrations • approximately 60 feet downstream of area AOC 10c on outside of the wash meander to ensure sufficient sample coverage	In response to this comment, the following sampling locations were added to the investigation program (see revised Figure 6-16 provided to DTSC and DOI on September 25, 2008): • Sample AOC10c-5 was added within the defined area of AOC 10c to provide additional data in the area of former sample location L-2-2. • Sample AOC10-3 was added approximately 150 feet downstream of area AOC 10c on outside of the wash meander to ensure sufficient sample coverage. (The sample location formerly named AOC10-3 was relocated slightly and renamed AOC10-6; see discussion in fourth bullet, below.)

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			• approximately 20 feet upstream of area AOC 10d on the outside of the wash meander to ensure sufficient sample coverage • one to three samples in depositional areas downstream of AOC10-3 and before the Colorado River to ensure sufficient sample coverage	• Sample AOC10-4 was added approximately 30 feet upstream of area AOC 10d on the outside of the wash meander to ensure sufficient sample coverage. • Two samples were added to the area downstream of the road/dam forming the downstream end of AOC 10d, resulting in a total of three sample locations for this subarea. The sample locations were renumbered for consistency with the numbering of samples in the rest of AOC 10. Two sample locations (AOC10-6 and AOC10-7) are downstream of the former location of AOC10-3 and before the Colorado River to ensure sufficient sample coverage. One sample location (AOC10-5) is south (upstream) of the former location of AOC10-3.
	5	Section 6.7	**AOC 11 – Topographic Low Areas** Section 6.7.4 of the Workplan indicates that samples from subarea 11b and supplemental samples northwest of 11a can only be collected by hand and that only the top two samples will be collected. However, a track mounted limited access rig or equivalent should be utilized to obtain deeper samples.	As requested, PG&E set a target of collecting samples from the 6- and 10-foot-bgs intervals for all samples from AOC 11. Refusal was encountered 3.5 feet bgs in boring AOC11-SS-2; samples were collected from 5 to 6 feet bgs and 9 to 10 feet bgs from all other borings in this AOC.
			It is also recommended that all AOC 11 samples be analyzed for TPH and PAHs and not be held contingent on results from subarea 11a.	All samples from AOC 11, including supplemental samples, were analyzed for TPH and PAHs.
			PG&E has inadvertently eliminated boring location AOC11b-2 from the revised Figure 6-18 dated December 2006. DTSC believes that this boring is warranted to ensure sufficient sample coverage within the depositional area.	As shown in revised Figure 6-18, provided to DTSC and DOI on September 25, 2008, boring location AOC11b-2 was reinstated as requested.
			Figure 6-18 should be expanded to the south and southwest to depict the fence line of the compressor station. This visual depiction will provide assistance with evaluation of potential surface water flow pathways from the compressor station.	As shown in revised Figure 6-18, provided to DTSC and DOI on September 25, 2008, the figure was expanded as requested.

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			DTSC staff observed an area south of PG&E's staging area along the access road that should be added to the topographic low area. This area, pictured in Figures 10 and 11, has accepted waste (cement and debris) from PG&E operations and, therefore, warrants investigation similar to other AOC 11 subareas (see Phase 2 Recommendations Section). Figure 6-19 of the Workplan also includes an aerial view of the area. (Figure 10. Easterly view of topographic low area containing cement spoils and debris south of PG&E's staging area along the access road. Figure 11. Easterly view of topographic low area south of PG&E's staging area.)	Comment noted. As requested by DTSC, this area will be addressed in the Part A Phase 2 Soil Sampling Work Plan. It is included as a newly identified area in the discussion of AOC 11 (a portion of subarea AOC-11f).
	6	Section 6.8	**AOC 12 – Fill Area** Section 6.8.1 of the Workplan discusses the history of potential areas filled with waste materials. A detailed evaluation of aerial photographs and topographic maps should be conducted to search for soil disturbance in the area over time to better locate the disposal and fill areas.	As agreed during the August 29, 2007 conference call, this evaluation will be included in the Part A Phase 2 Soil Sampling Work Plan.
			Trenches should encounter native soil unless depth limitations for the selected trenching method are met (e.g., 15 to 20 feet bgs.). Trench logs should be prepared and included in the RFI report.	As requested, the objective in the trenching effort was to ensure that native soil was encountered in each trench. Trench depths in AOC 12 ranged from 3 feet bgs (impenetrable hardpan (native soil) was encountered at 3.5 feet bgs) to 11 feet bgs.
			During the trenching activities associated with AOC 12, soil samples shall be collected and analyzed from within each trench. Samples should be collected at the bottom of each trench at an approximate interval of one sample per 20 feet of trench length and at other areas identified in the field (e.g., debris or discoloration). Trenching without sampling and analysis as proposed in the Work Plan would require an unnecessary return to AOC 12 to conduct sampling. Sampling and analysis is required to assess potential impacts from documented disposal activities. The absence of buried debris and laboratory analytical data indicating no residual chemical contamination would provide the basis for a no further	Soil samples were added at the proposed trench locations. Samples were collected at the bottom of the trench**.** Two samples were collected at the bottom of each trench. In addition, sidewall samples were collected from AOC 12a-T1 and AOC 12c-T1.

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			investigation determination for this AOC. As indicated in General Comment 1 above, laboratory analytes shall consist of those previously identified in the GSU memorandum dated March 29, 2006.	
	7	Section 6.9	**AOC 14 – Railroad Debris Site** The GSU is unclear how the Railroad Debris Site Boundary pictured in Workplan figures (e.g., Figure 6-23) was derived and the rationale for indenting the northwest boundary.	The northwest boundary of this unit was defined by topography. There is a considerable (6 to 10 foot), abrupt rise in elevation in this area and it is difficult to access, even on foot.
			Text and illustrations should be prepared in sufficient detail with respect to the white powdery waste observed from old aerial photographs (circa 1950's and 1960's) to demonstrate that it has been accurately delineated on current site figures.	As agreed during the August 29, 2007 conference call, PG&E will provide an updated delineation of the white powdery material as part of the Part A Phase 2 Soil Sampling Work Plan. This updated delineation will include the expanded discussion of 1950s and 1960s information requested here, the mapping of visible powdery material and 1999 trench logs referenced below, and the relevant information collected during the Part A Phase 1 investigation.
			The May 18, 1964 aerial photograph (Figure 3-18) from the Volume I RFI Report (CH2MHill, 2006) suggests that the white waste is located further south from the railroad tracks than the current Railroad Debris Site Boundary (Figure 6-23) would suggest.	The more northerly boundary (closer to the railroad tracks) for AOC 14 was retained because there was minor surface debris in this area, and it is uncertain whether grading activities could have resulted in impacts beyond the area shown in the 1964 aerial photograph. The samples (ACO14-5 and AOC 14-7) from this area help define the northerly boundary of impacts for this unit.
			The first paragraph of Section 6.9.3 of the Workplan suggests that SVOC, TPH, and PAH results only correlated with the railroad ties and black sandy waste when in fact these analyses were only conducted and detected at the three railroad tie/black sandy waste sample locations. As SVOC, TPH, and PAH analyses have not been conducted within any soils from the Railroad Debris Site, it is recommended that these analytes be evaluated as a COPC for several more (e.g., 10 samples) of the proposed samples to provide sufficient coverage across the site. The SVOC, TPH, and PAH analyses should not just be limited	All soil samples from AOC 14 were analyzed for TPH (extractable and purgeable), PAHs, and SVOCs. In addition, all samples were analyzed for asbestos.

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			to sampling under the same three previous waste areas where they were detected. The section also states friable ACM encountered in past sampling events had been removed. A site visit conducted by DTSC in 2006 still observed apparent ACM material (transite) at the surface at AOC 14 supporting the asbestos analyses proposed in the Workplan.	
			Section 6.9.3 of the Workplan indicates that the extent of the white powdery residue will be defined by additional sampling. However, visible white powdery material (see Figure 12 on the following page) should be mapped and documented in figures. Additionally, previous investigations (e.g., PG&E, 1999) for this AOC need to be better summarized to ensure samples are being collected at appropriate locations. Trench logs from previous investigations should be utilized to delineate the known extent of the white material (as well as debris and encountered soils) in map and cross-sectional views. This framework should be developed to ensure the sampling program will meet its objectives. PG&E should identify additional sampling and analysis locations based on the preceding tasks. (Figure 12. Northerly view of AOC 14. White layer visible in the freeway cut on the north side of the I-40 and in the background.)	As agreed during the August 29, 2007 conference call, PG&E will provide an updated delineation of the white powdery material as part of the Part A Phase 2 Soil Sampling Work Plan. This updated delineation will include the expanded discussion of 1950s and 1960s information requested above, the mapping of visible powdery material and 1999 trench logs, and the relevant information collected during the Phase 1 investigation.
			Currently, tables and figures in the Workplan do not indicate which samples encountered soil and which samples were obtained from the white material in the past.	This information will be provided as part of the overall discussion of the white powdery material in this Part A Phase 1 Data Gaps Evaluation Report.
			Several samples of the white material should be collected and analyzed for the complete suite of COPCs to characterize this material. This characterization objective is not clearly stated in the Workplan which focuses on the extent of the white powdery material.	White powdery material was only encountered in two of the samples collected from this unit. Where it was encountered, the interval containing the white powdery material was specifically sampled and analyzed for the full suite of COPCs for this unit.

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			In PG&E's 1999 document regarding the Railroad Debris Site, black material is identified on maps, cross-sections and tables as "Black Material" or "Sandy Black Material". The Workplan identifies the Black Material as "Asphalt Material". The GSU is uncertain if the "Black Material" is actually asphalt and requests that PG&E clarify this issue. The black waste should be clearly defined in the Workplan report and associated boring logs.	As agreed during the August 29, 2007 conference call, this information is provided in this Part A Phase 1 Data Gaps Evaluation Report.
			Table 6-22, AOC 14 Proposed Sampling Plan, Footnotes: Footnote 1 from Table 6-22 indicates that "mechanical equipment" access may be an issue at the site. This does not appear to be a significant concern due to generally flat lying topography (see Figure 12). Unless PG&E obtains prior approval from DTSC, PG&E should utilize mechanical equipment (e.g., a drill rig) to collect samples from the proposed depths specified in the Workplan.	The presence of the railroad tracks to the north and Interstate 40 to the south makes bringing mechanical equipment to this unit difficult. Either location requires a permit to allow access for mechanical equipment. Due to the extreme difficulty of obtaining a permit to cross the railroad tracks, PG&E negotiated a permit with CalTrans to allow mechanical equipment to be lifted onto the site by crane from Interstate 40.
			Footnote 2 indicates that debris and white waste material "may" be sampled and analyzed. DTSC is uncertain of the rationale for not sampling and analyzing debris and waste material.	The white powdery material has already been sampled extensively, and prior comments from DTSC focused on concerns relating to underlying impacts to soil. Because the purpose of this stage of work was to delineate the boundaries of the affected area, it was not certain that any white powdery material or debris would be encountered. As described above, white powdery material was encountered in two locations and was sampled. Apparent ACM was encountered in two boring locations (AOC14-2 and AOC14-13). Samples of this suspect material were sent for asbestos analysis. Consistent with the approach to debris at other locations, surface debris was mapped and the mapping result is included in this Part A Phase 1 Data Gaps Evaluation Report.

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	8	Section 6.10	**Undesignated Area 1 – Potential Pipeline Disposal Area** The following additional information should be added to the investigation:	
			• The evaluation of the presence of buried pipes should not be limited to metallic pipes. The geophysical method utilized should evaluate the presence of any buried material with subsequent confirmation of the composition.	The geophysical investigation program for UA-1 included vertical magnetic gradient, electromagnetic, metal detection electromagnetic line locating, and ground-penetrating radar methods to identify buried debris, undifferentiated utilities, and pipelines. Two undifferentiated utilities were identified in UA-1.
			• The suspected dates of disposal should be identified so appropriate aerial photographs can be carefully examined to look for disturbed surface soil where potential burial could have taken place.	A former employee indicated that the suspected time of disposal was in the late 1960s or early 1970s; the exact dates are unknown. Historic photographs from the 1960s through the 1980s were examined; however, areas of disturbed soil were not apparent on the photographs.
			• The facility process from which the asbestos-covered pipes originated should be disclosed to determine if other COPCs should be included in the assessment. With the limited information currently provided, it is recommended that a larger list of COPCs be included in the investigation (currently the only COPC is asbestos). This would require soil sampling that is not proposed in the Workplan.	All available information was provided in the work plan. The potential source of the piping is not known. In accordance with DTSC's request, soil sampling was planned for this unit, and soil samples were to be analyzed for the full suite of COPCs, including ACM. However, as discussed in this Part A Phase 1 Data Gaps Evaluation Report, intrusive sampling was suspended at the request of the DOI.
			• Sampling soil from the trenches is not included in the Workplan. Soil associated with the pipe disposal should be sampled for related COPCs. Additional analyses may be required if soil discoloration, odors, etc. are observed during trenching.	See above response.

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			• If the geophysical survey does not locate the pipelines, then the geophysical survey should be expanded and include information obtained from examination of aerial photographs and site reconnaissance. The geophysical search would terminate if the expanded search did not locate geophysical anomalies. Should geophysics not provide valuable information, trenching in the most likely disposal area (disturbed area) is still suggested to confirm the results of the geophysical survey.	Five trenches were proposed in the vicinity of UA-1 These trenches were to be located as appropriate based on the geophysical results. However, as described above, intrusive investigation was suspended at this unit until another geophysical survey is performed at the new suspected disposal area shown on Figure B-5 in Appendix B.
	9	Section 6.11	**Undesignated Area 2 – Former 300B Pipeline Liquids Tank** CH2M Hill, on behalf of PG&E, submitted a technical memorandum, dated April 27, 2007, which summarizes information pertaining to the closure of the Former 300B Pipeline Liquids Tank (Unit). Additional historic information about the Unit has been obtained since the Workplan was prepared. The Tech Memo concludes that the site investigation and closure process at the Former 300B Pipeline Liquids Tank is complete and no further investigation is proposed for this location. However, the GSU's review of the Tech Memo has found that the historic data are insufficient to characterize the nature and extent of the contamination and, therefore, insufficient to asses risk. Only one sample was collected on April 16, 1996 to assess COPCs. Unfortunately, the sample collected was a composite sample from a depth of 0 to four inches bgs and was placed in a glass jar. The composite sample is not appropriate to assess COPCs and the VOC data are invalid due to the poor sampling methodology employed. Reporting limits for PAHs were also significantly elevated (8 mg/kg) and would not be appropriate for risk purposes. It is therefore recommended that the sampling proposed in the Workplan be conducted for the Unit for the COPCs originally established in the 1990's (i.e., TPH, Metals, SVOCs, VOCs, PAHs, and polychlorinated biphenyls).	As shown on Figure 6-25 for the Former 300B Pipeline Liquids Tank area, provided to DTSC and DOI on September 13, 2007, five boring locations were proposed in this area. Samples were to be collected from 0.5., 1, 3, and 6 feet bgs; refusal (bedrock) was encountered in Borings 300B-2, 300B-4, and 300B-5. All samples were analyzed for Cr(VI), cyanide, TPH-extractable and -purgable, Title 22 metals, VOCs, PAHs, SVOCs, and PCBs. Ten percent of the soil samples collected at Former 300B Pipeline Liquids Tank area were also analyzed for TAL metals and pesticides.

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	10	Section 6.12	**Identification of Existing White Powdery Residue** Section 6.12.1 of the Workplan should also identify the white powdery material described in the Workplan for AOC 10 – East Ravine. Characterization of this white material is requested as a Phase 2 activity (see Phase 2 Recommendations Section).	As requested, characterization of this material was conducted in AOC10 – East Ravine in May 2009 and results of this characterization are presented in this Part A Phase 1 Data Gaps Evaluation Report, Appendix C Attachment 4 Section 2.5.
Phase 2 AOC/SWMU Sampling Recommendations				
	1		The following comments capture issues which the GSU believes are best addressed during a second round of sampling (Phase 2 sampling) after the Phase 1 data are collected and reviewed and/or after PG&E has developed acceptable workplans to implement the activities identified below. **Phase 2 SWMU 1/AOC 1 Former Percolation Bed** In addition to the sampling proposed for the white powdery material, shallow trenching or potholing combined with careful and precise documentation is recommended to quickly determine and document the extent of the white material based on visual observation. The easterly extent of the white powdery material for this AOC should be delineated to evaluate how far back it extends within the slope leading up to facility operations. Concerns exist that either the material or potentially contaminated soil within this slope could continue to impact the wash over time.	As described in this report, PG&E performed trenching and sampling in this area (see discussion in Attachment 1 of Appendix C). Eight trenches were dug in the eastern side of SWMU 1 to evaluate the extent of white powder on the hillside, as shown in the inset of Figures A1-1 to A1-7 of Attachment 1 to Appendix C. The lateral extent of the white powder material within the hillside of SWMU 1 ***has been*** defined. Trench SWMU1-WP-2h defines the northern extent of the white powder, and the southern extent is defined by Trench SWMU1-WP-10 and the topography and native material outcrop just south of trench SWMU1 –WP-10. Additional sampling near and into the sidewall of Bat Cave Wash is not warranted and additional data would not significantly improve data quality, or risk assessment or site remediation decisions. No additional sample locations for evaluating the extent of white powder material are proposed in the Part A, Phase 2 Soil Investigation.
	2		**Phase 2 AOC 4 Debris Ravine** DTSC believes that one or two additional sampling locations should be added to the Bat Cave Wash where the Debris Ravine discharges to the wash on the Havasu National Wildlife Refuge. This outfall area appears to be visible in the wash as	As shown in the revised sample location figures provided to DTSC and DOI on September 13, 2007, sample AOC4-1 was relocated to the mouth of the Debris Ravine to assess whether AOC 4 may be contributing COPCs to Bat Cave

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			seen in the aerial view pictured in Figure 6-12 of the Workplan. The data from these locations will assess potential contaminant transport and deposition that would occur as the ravine discharges to the wash during storm events. GSU staff have noted limited amounts of visible debris material (metal, rubber, concrete) emanating from this outfall area in the wash. Plans for sampling soils that are identified as containing debris should be developed based on the debris mapping to be conducted as part of the Workplan.	Wash.
	3		**Phase 2 AOC 10 East Ravine** During a site visit in July 2006, GSU staff observed small amounts of metal debris in either subarea 10b or subarea 10c. The debris identifies depositional areas in the wash that have been affected by former operations. The location of the metal debris should be confirmed, documented and mapped. Samples and analyses of the soil from this debris area should be conducted during Phase 2.	See response to AOC 10 Specific Comment 4.
			Additional sampling and analysis is required to characterize the white layer occurring in subarea 10c. Shallow trenching or potholing is recommended to quickly determine the extent of the white waste layer. PG&E should indicate exactly where the white waste layer was found in the past and if it was sampled and analyzed. The same requirements apply to the greenish gray layer identified in subarea 10b (CH2MHill, 2006).	See response to AOC 10 Specific Comment 4.

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			The Workplan documents that the history of the two small dams in the East Ravine wash located on the Havasu National Wildlife Refuge is uncertain. Furthermore, the source of the soil used to construct the dams is also of unknown origin. DTSC believes that the dams should be investigated since the dams could contain contaminated materials or buried contaminated soils or wastes when they were constructed. DTSC speculates that the dams may have incorporated contaminated soil from the East Ravine wash.	In response to this comment and DOI Condition 3 in DOI's June 4, 2008 letter, PG&E conducted XRF analysis, followed by confirmatory laboratory analysis, of soil samples collected from the embankment area downstream of subarea AOC 10c. This analysis required modification for accessing subareas AOC 10b and 10c. XRF and laboratory analytical data were correlated before the modifications began to provide a threshold value for future laboratory confirmation samples. Cr(VI) was non-detect in all 10 samples, and the maximum Cr(T) concentration detect in 10 samples submitted to the laboratory was 26 mg/kg, indicating that the embankment was not impacted by Cr(T) or Cr(VI). Additional sampling needs for AOC 10 have been identified in this data gaps evaluation report.
			Since there is a storm drain that discharges and feeds the East Ravine from the west, DTSC believes an additional sample point is needed at the storm drain outfall. This area is located in a vegetated area near the intersection of the access road and visitor parking lot. This particular storm drain has existed since at least 1955 as illustrated by visible discharges in oblique aerial photographs of the site dated May 19, 1955. Contaminant concentrations may be concentrated near the storm drain outfalls similar to releases identified at AOC-9 and AOC-10a.	As requested by DTSC, sampling of this area will be addressed in the Part B Soil Sampling Work Plan as part of the perimeter sampling effort.
	4		**Phase 2 AOC 11 Topographic Low Areas** The first paragraph of Section 6.7.1 of the Workplan indicates that the topographic low area designated L6 was separated from AOC 11 and incorporated into AOC1 – Former Percolation Bed. However, review of the AOC 1 section of the Workplan reveals that no investigation of the L6 area is proposed as part of AOC-1. DTSC is puzzled over this oversight and recommends that at least two borings be installed at the L6 area and that the samples be analyzed for the AOC 11 COPCs.	L6 is not a true topographic low area; rather, it is an area at the bottom of the slope roughly in line with sample location AOC1-T1c. Because of the changeable depositional environment in Bat Cave Wash, the cross-wash transect sampling points of AOC1-T1a, -T1b, and -T1c, combined with the proposed Phase 2 perimeter sampling, was determined to be a more effective means of assessing potential discharges from the compressor station. Samples collected from this area were analyzed for the AOC 1 COPCs, as there is no connection between this area and AOC 11.

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				As described in Attachment 2 of Appendix C, further sampling is proposed in the vicinity of AOC1-T1c (proposed locations AOC1-T1e and AOC1-T1h), as well as north of this area in another location that could receive run-off from the compressor station (proposed location AOC1-T2g).
			The second paragraph of Section 6.7.1 on page 6-18 of the Workplan indicates that a release from Cooling Tower B had entered the drainage to the east as do storm drain discharges. Storm drains and potential soil discoloration are observed along the slope above the AOC 11 ravine in the May 19, 1955 oblique aerial photograph of the site. Therefore, sampling along the top of the ravine outside the northeast facility fence line should be conducted. Furthermore, sampling at the base of the storm drain outlets in the area should also be considered as contaminants may be concentrated near the source of releases as observed at AOC-9 and AOC-10a. TPH, PAHs, and possibly VOCs should also be analyzed from these “source” areas. Approximately four locations are suggested for sample collection and analyses to characterize the topographic low area pictured in Figures 10 and 11 of this memorandum.	Phase 1 sample collection at AOC11e was at the maximum feasible upslope location (the rig cannot climb any further up the slope in this area; the slope becomes very steep). Perimeter sampling will be conducted at the top of the slope during the Part B sampling effort. Data from AOC11e and AOC11c were used to evaluate the need to sample on the upper slope of this area, which is very steep and/or directly below the outfall (also located high on the steep slope). Limited (physically feasible) additional sampling is proposed in this area and presented in this Part A Phase 1 Data Gaps Evaluation Report. See response to Specific Comment 5
	5		**Phase 2 AOC 14 Railroad Debris Site** Additional samples are requested to assess contaminant transport via surface run off from the Railroad Debris Site. Current and historic transport should be considered and assessed. PG&E should submit sample locations for DTSC review and approval. DTSC believes the site currently drains to Bat Cave Wash to the west and, therefore, requests that samples from the wash also be obtained at known outfall locations. Metal debris has been observed entering Bat Cave Wash from the Railroad Debris Site area near the northwest corner of the site.	An additional cross-wash transect (AOC1-T6) was added in Bat Cave Wash immediately below AOC 14. Also AOC14 samples AOC14-SS-3 and AOC14-SS-4 were located west of AOC 14 to assess impacts west of the AOC boundary.

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	6		**Phase 2 Identification of Existing White Powdery Residue** The workplan indicates that no sampling program is proposed unless additional white material is identified. It is necessary to provide a general description of a sampling program to guide sampling of white material (e.g., AOC - 10) and any new areas of white material that may also be identified. PG&E should prepare procedures of the investigation program for DTSC review and approval. It should be noted that areas of white residue have been recently identified within Bat Cave Wash and at the Railroad Debris Site.	As noted in the work plan, there is a difference in the two types of white powdery material likely to be present in the Railroad Debris Site and Bat Cave Wash. The material present in the Railroad Debris site is most likely lime sludge from the former water treatment system; this is supported by the relatively low levels of chromium detected in this material in extensive previous investigation. The white powdery material in Bat Cave Wash is more likely due to mineral deposition from former cooling water discharges. Both of these locations were investigated extensively as part of the Phase 1 investigation, and a map of the white powdery material in the two areas is included in this report. The data from the recent DTSC sampling in SWMU 1 and AOC 14 are consistent with the prior data, indicating again that levels of chromium (and all other metals) are low in the white powdery material in AOC 14 and slightly elevated in SWMU 1. No white powdery material was encountered in any borings in the East Ravine. The potential source of the white powdery material in the East Ravine has not been determined. Evaluation of this material will be conducted as described for AOC 10 Specific Comment 4
	7		**Phase 2 Site Perimeter and Storm Drain Sampling** PG&E should prepare a sampling plan for the site perimeter/fence line area and areas associated with historic releases and historic storm drain discharges to address concerns described in General Comment 7 of this memorandum.	See response to General Comment 7.

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United States Department of the Interior (DOI). 2008. *PG&E Topock Compressor Station Remediation Site – DOI Direction to PG&E on the RFI/RI Soil Investigation Work Plan Part A.* April 24.				
	1		The Federal Agencies are providing the following information for incorporation into the draft RFI/RI Soil Investigation Work Plan Part A (Work Plan). Once these changes have been made, we will review the revised document in order to determine if we can approve it. We look forward to discussing this information further at the planned meeting on May 6th, 2008, in Oakland, CA. 1. Please revise the Work Plan to indicate that PG&E will perform analysis for chemicals on the Target Analyte List/Target Compound List (TAL/TCL) on 10% of all samples in each AOC to be sampled. The chemicals on all four lists must be included. The lists can be found at: http://www.epa.gov/superfund/programs/clp/target.htm. This analysis must include samples collected vertically and horizontally. When the total number of samples in an individual AOC is less than 10, then a minimum of one sample for this suite of analyses must be collected from the AOC to satisfy the 10% requirement. The Federal Agencies will work with PG&E to determine locations where samples for the TAL/TCL scan should be collected.	Comment noted. The requested change to the planned sampling program was made. A list of samples to be analyzed for the complete TAL/TCL list was developed in collaboration with DOI, and the proposed samples were analyzed as proposed.
	2		2. IM-3 Baseline Soil Sampling proposed as part of Part A – The four samples proposed near the effluent pipeline do not appear to satisfy the criteria for background or baseline samples because the pipeline has been in place and operating for over two years. However, these samples could possibly be used to bolster the Category 2 data gaps, if collected from locations that have had no anthropogenic impact. Our understanding is that DTSC personnel will be on site during the Part A Soil Sampling to assist in selecting sampling locations.	The proposed sample locations along the IM No. 3 pipeline were added to replace several data quality Category 2 samples formerly contained in the background data set. As noted in the June 12, 2008 email from Keith Sheets/CH2M HILL to DOI, five potential sampling locations near the IM No. 3 effluent pipeline (Locations Q, R, and S) and IM No. 3 treatment plant (Locations K and N) were selected jointly by representatives from DTSC, PG&E, and the federal agencies during a site visit on May 21, 2008. During the site walk, it was confirmed that there was no evidence of anthropogenic influence on these sample locations, and DOI approved these background sampling locations in its June 4, 2008 letter.

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	3		3. Please revise the Work Plan to indicate that PG&E will evaluate surface soils in order to asses the nature and extent of potential windborne contaminants to determine whether or not contamination has been deposited on Federal property. Please indicate proposed sampling techniques to be utilized. The Federal Agencies will work with PG&E to determine suitable sampling sites and consultation requirements.	A surface soil sample was collected at each proposed boring location, including all background sampling locations. As expressed at the May 7, 2008 RCRA/CERCLA meeting, PG&E believes that the proposed Part A soil sampling program will adequately address the nature and extent of contaminants via the potential windborne pathway. See also response to Condition 4 in the June 4, 2008 letter below.
	4		4. The BLM completed consultation requirements with respect to the Work Plan and received concurrence from the California State Historic Preservation Officer on the determination that the undertaking will not adversely affect historic properties (see attachment 1). The stipulations that are required in the Work Plan to avoid effects to known historic properties are as follows: - All routes of travel must be clearly identified prior to initiation of the undertaking; - All project participants must be given a pre-implementation briefing; and - Archeological and Native American monitors will be present during implementation of the testing.	The routes of travel were identified on the planned sampling figures provided to DTSC and DOI on September 13, 2007. Pre-project briefings were provided by qualified PG&E staff to all personnel participating in the field work effort. PG&E invited Native American monitors to be present every day that work was performed. However, because PG&E cannot require the Native American monitors to come to the site for this work, PG&E did not stop work when tribal monitors were not present.
	5		5. Tribal Consultation on the Work Plan was completed in December of 2007, and the package was sent to the CA SHPO on January 11th, before the added level of detail about the grading at AOC-10 and AOC-11 was discussed. The grading is an added level of detail that was not specifically described in PG&E's September 13, 2007, letter, or in the Part A Soil Investigation Work Plan submitted for consultation. As a result of the most recent site visit by PG&E and DOI personnel on April 17th, 2008, please revise the Work Plan to incorporate the final decisions made for access pathways to be utilized for AOCs 10 and 11 and sampling locations in Bat Cave Wash. Include design details and	Please see response to Condition 2 in DOI's Conditional Approval Letter for the Phase 1 investigation, below.

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			updated figures that describe your latest proposal as to how and where to access sampling locations on Federal property. Upon receipt of the updated information, the Federal Agencies will determine if the Work Plan will require additional consultation.	
	6		6. The Federal Agencies had previously agreed to allow the Part A Soil Investigation to proceed if the information and analytical results from the investigation would be used to develop DQOs for subsequent sampling efforts. Please state in the Work Plan that the results from Part A will be used to develop DQOs for subsequent sampling efforts in AOCs outside the Compressor Station fence line. This will be necessary to support risk assessment and closure efforts. Please note that the Federal Agencies are preparing a letter that outlines several issues that are broader in scope than just the Part A Soil Sampling Plan. The identified issues will need to be fully addressed and resolved to the satisfaction of the Federal Agencies in order to ensure that the project can move forward expeditiously. The letter will also propose a Senior Managers Meeting between PG&E and the Federal Agencies on June 26, 2008, from 1:00 to 3:00 pm, in Phoenix, AZ, at the BLM State Office.	DQOs were drafted as a result of meetings held between June and September 2008 with representatives from DOI, DTSC, and PG&E to discuss and agree upon DQO Steps 1 through 5. Data from the Phase 1 investigation were required to complete Steps 6 and 7, as outlined in this Report; Step 7 provided the sampling requirements for the Phase 2 investigation. Comment noted.
United States Department of the Interior (DOI). 2008. *PG&E Topock Compressor Station Remediation Site – DOI Conditional Approval of Phase 1 of the Topock RFI/RI Soil Investigation Work Plan Part A, November 16, 2006.* June 4.				
DOI	1		The Bureau of Land Management completed Section 106 consultation requirements with respect to the Work Plan and received concurrence from the California State Historic Preservation Officer on the determination that the undertaking will not adversely affect historic properties (see attachment 1). PG&E will be required to adhere to the following stipulations in order to avoid effects to known historic properties: - All routes of travel must be clearly identified prior to initiation	See response to Comment 4 in April 24, 2008 letter from DOI to PG&E regarding *DOI Direction to PG&E on the RFI/RI Soil Investigation Work Plan Part A* above.

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			of the undertaking; - All project participants must be given a pre-implementation briefing - Archeological and Native American monitors will be present during implementation of the testing.	
DOI	2		PG&E will provide updated figures reflecting final decisions made during the May 21st, 2008, site visit for access pathways and sampling locations for AOCs 10 and 11 and Bat Cave Wash. All approved access pathways and sampling locations agreed during the site visit have undergone Section 106 consultation.	The requirements of this condition were addressed in an email from Mike Cavaliere/CH2M HILL sent to DOI and DTSC July 25, 2008. This response (reiterated below) served as the basis for field implementation of the Phase 1 sampling program. “The revised figures for AOC-1 (northern area including Bat Cave Wash), AOC-10, and AOC-11 are attached to this email. The revised access pathways and sampling locations shown on each figure were discussed in the May 21, 2008 site walk with Federal Agencies. In addition, the sampling locations for AOC-1 near the mouth of Bat Cave Wash were revised at the direction of Dawn Arnold/SAIC during a July 15, 2008 phone call and a July 17, 2008 email. Based on direction received on the phone call and the email, one existing sample (BCW-3) was moved and three new samples were added (BCW-4, BCW-5, BCW-6).” In addition, background sample locations BKG-12 through BKG-16 were added during the May 21, 2008 site walk. A revised figure including the background sampling locations was also attached to the July 25, 2008 email.
DOI	3		PG&E will provide construction information related to gain access for soil sampling in the East Ravine including; design specifications for any earth work required on the largest embankment, flood event mitigation measures and a restoration plan.	The requirements of Condition 3 were addressed in a series of conference calls, the results of which were subsequently provided in an email from Mike Cavaliere/CH2M HILL sent to DOI and DTSC July 25, 2008. The content of the email is summarized below and served as the basis for field implementation.

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				A drawing with specifications for earthwork required to modify the upper embankment in the East Ravine for access to soil sampling locations within East Ravine (AOC-10) was transmitted to DOI and DTSC on June 12, 2008 via email from Keith Sheets/CH2M HILL. The details provided in these documents were discussed between Mike Cavaliere/CH2M HILL and Bernard Freeman/USFWS, Chief of Division of Engineering on May 28, 2008. PG&E conducted the embankment construction in accordance with the drawing and specifications. Flood water mitigation and embankment restoration were discussed during a June 5, 2008 telephone call between Mike Cavaliere/CH2M HILL and Cindi Hall/USFWS. Soils displaced for embankment modification were compacted using a combination of potable water (which was also used for dust control) and mechanical compaction. Temporary silt fences were installed during investigation activities. It is not anticipated that stormwater will flow over the embankment; observations by PG&E indicate that no more than 1 to 2 feet of standing water have been noted in the past, and the embankment modification leaves the embankment approximately 4 feet in height. No danger of flooding was noted during the Phase 1 investigation. Nonetheless, during storm events, onsite staff will periodically check for standing water in the impoundment behind the embankment. If, based on these observations, standing water may rise to levels near the height of the lowered embankment, PG&E is prepared to raise the effective height of the embankment by either using sandbags and plastic sheeting or by replacing some or all of the material displaced to construct the access pathway, whichever can be implemented most quickly. The access route will remain intact until soil and groundwater investigation activities in the East Ravine are complete, at which time PG&E will develop embankment restoration details in consultation with USFWS, as required.

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			In addition, PG&E will work with the Fish and Wildlife Service about how to screen and/or sample the soil that will be disturbed for construction purposes in the embankment for elevated Cr VI and Cr III concentrations. In addition, PG&E will work with the Fish and Wildlife Service regarding how to satisfactorily manage any chromium contaminated soil encountered in the embankment.	Screening/sampling of embankment soil disturbed during embankment modification was discussed during a June 19, 2008 conference call including Mike Cavaliere/CH2M HILL, Keith Sheets/CH2M HILL, Shawn Duffy/CH2M HILL, Curt Russell/PG&E, Cindi Hall/USFWS, and Carrie Marr/USFWS. A technical memorandum describing the initial screening process and proposed screening process during field construction was submitted to DOI on September 17, 2008. Screening and sampling in the field were performed in accordance with the procedures outlined in the technical memorandum. A summary of the embankment modification data is included in Appendix B of this Part A Phase 1 Data Gaps Evaluation Report.
DOI	4		PG&E will perform analysis for chemicals on the Target Analyte List/Target Compound List (TAL/TCL) on 10% of all samples in each AOC to be sampled. The chemicals on all four lists must be included. The lists can be found at http://www.epa.gov/superfund/programs/clp/target.htm This analysis will include samples collected vertically and horizontally. When the total number of samples in an individual AOC is less than 10, then a minimum of one sample for this suite of analyses must be collected from the AOC to satisfy the 10% requirement. The Federal Agencies will work with PG&E to determine locations where samples for the TAL/TCL scan should be collected.	PG&E conducted the required analysis as outlined in this condition. The chemical lists found at http://www.epa.gov/superfund/programs/clp/target.htm were used to ensure that the full range of chemical parameters required was analyzed. Sixty-six samples were analyzed for the full TAL/TCL suite of parameters. This included 28 samples from AOC/SWMU-1, seven samples from AOC 4, three samples from AOC 9, nine samples from AOC 10, seven samples from AOC 11, two samples from AOC 12, eight samples from AOC 14, and two samples from UA-2 (the Former 300B Pipeline Liquids Tank). The specific sample locations were identified in concert with DOI and were confirmed in the August 14, 2008 email from Mike Cavaliere/CH2M HILL to Kris Doebbler and other DOI staff. The August 14 email included one modification. Locations AOC14-7 and AOC14-10 were added to the list of locations to be analyzed for the full suite of TAL/TCL parameters in place of locations AOC14-11 and AOC14-13 because it was determined that surface soil samples were not scheduled to be collected at AOC14-11 and AOC14-13.

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Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
DOI	5		Four potential sampling locations near the IM-3 effluent pipeline were selected jointly by representatives from CA DTSC, PG&E and the Federal Agencies during the site visit on May 21, 2008. These soil samples will be collected during the Part A Soil Investigation and have already undergone required consultation as part of the IM-3 Baseline project. Soil samples will be taken at multiple depths, including the same lithologic unit from which some previous samples identified as Category 2 data were taken. These samples may be utilized by PG&E to supplement the existing Category 2 dataset. DTSC personnel will be on site during the Part A Soil Sampling field work to assist in selecting sampling locations.	As noted in the June 12, 2008 email from Keith Sheets/CH2M HILL to DOI, five potential sampling locations near the IM No. 3 effluent pipeline (Locations Q, R, and S) and IM No. 3 treatment plant (Locations K and N) were selected jointly by representatives from DTSC, PG&E, and the federal agencies at a site visit on May 21, 2008. During the site walk, it was confirmed that there was no evidence of anthropogenic influence on these sample locations. The resulting background data set therefore consists of Category 1 data only. The five sample locations were used to supplement the existing data set and replaced the Mittelhauser Category 2 data within the background data set. It should be noted that the intention was to supplement the Category 1 background data set, not the Category 2 data set as stated here.
DOI	6		The Federal Agencies had previously agreed to allow the Part A Soil Investigation to proceed if the information and analytical results from the investigation would be used to develop DQOs for subsequent sampling efforts. Please state in the Work Plan that the results from Part A will be used to develop DQOs for subsequent sampling efforts in AOCs outside the Compressor Station fence line. This will be necessary to support risk assessment and closure efforts.	As discussed on June 4, 2008, DOI did not require revision to the RCRA Facility Investigation/Remedial Investigation Work Plan Part A. The reference to a work plan in this condition is any written communication from PG&E to DOI. As required by this condition and as confirmed in the June 12, 2008 email from Keith Sheets/CH2M HILL, the results from Part A Phase 1 will be used to develop DQOs for subsequent sampling efforts at AOCs outside the compressor station fence line. It should be noted that Steps 1 through 5 of the DQO process have already been completed through joint meetings between PG&E, DOI, and DTSC and that it is anticipated that Steps 6 and 7 will be completed in joint meetings, including these and other stakeholders, following completion of the data evaluation process for the Phase 1 sampling.

TABLE F-1

Documentation of Compliance and Response to California Department of Toxic Substances Control (DTSC) and United States Department of the Interior (DOI) Comments

Topock RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A
Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Agency	Comment Number	Section	Comment	Documentation of Compliance or Response to Comments
DOI	7		PG&E will begin implementation of a risk assessment data specification and data gap process using a management tool such as the “Risk Assessors Data Usability Specification Matrix” (or a functional equivalent) provided by DOI via email on May 21. By completing this process and utilizing such a tool, PG&E will be able to identify shortcomings and data gaps upon completion of Phase 1 which can be addressed in the Phase 2 DQOs.	As discussed during the June 4, 2008 RCRA/CERCLA meeting, the matrix outline provided by DOI via email on May 21 is an example of a management tool and not a requirement. There is flexibility in the type and amount of information to be incorporated into the tool. This management tool did not need to be completed or approved prior to the start of field work for the Part A Phase 1 investigation.
			<u>Additional Information for Upcoming Part A Phase 2</u>: 1. PG&E will evaluate surface soils in order to asses the nature and extent of potential windborne contaminants to determine the possibility that contamination originating from the Topock Compressor Station has been deposited on Federal property. The Federal agencies will work with PG&E to determine proposed sampling techniques, analytical suites, suitable sampling sites and consultation requirements	A surface soil sample was collected at each proposed boring location, including all background sampling locations. As expressed at the May 7, 2008 RCRA/CERCLA meeting, PG&E believes that the proposed Part A soil sampling program will adequately address the nature and extent of contaminants via the potential windborne pathway.
			2. PG&E, with input from the Federal agencies, will identify Bat Cave Wash sediment sampling needs within the interior of the tamarisk habitat during the Phase 2 DQO process. Additional Section 106 Consultation will be conducted to address proposed routes and mechanical means to access the interior of the habit to facilitate collection of additional sediment samples.	Comment noted. Sediment sampling needs within the tamarisk habitat will be evaluated during the Phase 2 DQO process.

Appendix B
Part B Data Gaps Investigation Program

Draft Final Report

Soil Investigation Part B Phase 1 Work Plan

PG&E Topock Compressor Station, Needles, California

Prepared for

California Environmental Protection Agency,
Department of Toxic Substances Control
and
United States Department of the Interior

On Behalf of

Pacific Gas and Electric Company

May 2011

CH2MHILL
155 Grand Avenue, Suite 800
Oakland, CA 94612

Soil Investigation Part B Phase 1 Work Plan

PG&E Topock Compressor Station, Needles, California

Prepared for

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May 2011

This report was prepared under the supervision of a
California Professional Geologist

K Sheets

Keith Sheets, P.G. No. 6888
Senior Hydrogeologist

Jamie J Eby

Jamie Eby
Project Manager

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Acronyms and Abbreviations

95%UCL	95 percent upper confidence limit of the mean
AOC	Area of Concern
B(a)P	benzo(a)pyrene
bgs	below ground surface
BTV	background threshold value
CERCLA	Comprehensive Environmental Response, Compensation, Liability Act of 1980
CHHSL	California human health screening level
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CMS/FS	corrective measures study/feasibility study
CSM	conceptual site model
DOI	United States Department of the Interior
DQO	data quality objective
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ECV	ecological comparison value
EPC	exposure point concentration
HERD	Department of Toxic Substances Control Human and Ecological Risk Division
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RAWP	risk assessment work plan
RCRA	Resource Conservation and Recovery Act of 1976
RFI/RI	RCRA facility investigation/remedial investigation
RSL	regional screening level
SSL	soil screening level

STLC	soluble threshold limit concentrations
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TEQ	dioxin toxicity equivalence quotients
TTLC	total threshold limit concentration
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region

1.0 Introduction

As described in the main text of this Soil Investigation Work Plan, Pacific Gas and Electric Company (PG&E) is conducting investigative and remedial activities at the Topock Compressor Station in Needles, California. The soil investigation is divided into four components: Part A (the areas outside the compressor station fence line), Part B (the area within the fence line), the Perimeter Investigation Area, and the Storm Drain Investigation Area. This appendix presents the proposed Part B investigation program. The proposed investigation program is based on information regarding historical site usage, the conceptual site models for each investigation area, and the available existing data.

This Soil Part B Work Plan addresses Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and oily water treatment system units identified in the *Revised Final RCRA Facility Investigation/Remedial Investigation Report, Volume 1 – Site Background and History* (referred to as the RFI/RI Volume 1) (CH2M HILL, 2007a). In addition to the four SWMUs, 10 AOCs, and three units (Units 4.3, 4.4, and 4.5) identified in the RFI/RI Volume 1, this appendix addresses one newly identified SWMU and seven newly identified AOCs, for a total of 25 units. It also addresses the investigation of a recently identified potential burn area; this area will be addressed as part of AOC 13. Each unit is addressed in a separate sub-appendix to this appendix. Investigation areas outside the compressor station fence line are addressed in the *Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A, PG&E Topock Compressor Station, Needles California* (CH2M HILL, 2006a), referred to as the Soil Part A Work Plan. The perimeter areas adjacent to the compressor station fence line and the storm drains leading from the compressor station to areas outside the fence line are also included in Appendix C and D, respectively, of the Soil RFI/RI Work Plan.

A Draft Soil Part B Work Plan was previously submitted to the DTSC and DOI in November 2007 (CH2M HILL, 2007b). Comments on the Draft Soil Part B Work Plan were received from the following:

1. DTSC Geological Services Unit: "Comments on *RCRA Facility Investigation/Remedial Investigation, Soil Investigation Work Plan Part B, PG&E Topock Compressor Station, Needles, California*" (March 25, 2008b)
2. DTSC Human and Ecological Risk Division (HERD): *Draft RCRA Facility Investigation Soil Investigation Work Plan Part B, PG&E Topock Compressor Station, Needles, California* (January 22, 2008)
3. DOI: *Topock Compressor Station RFI/RI Project Document Review Sheet; RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part B* (DOI, 2008)
4. Fort Mojave Indian Tribe: "Fort Mojave Indian Tribe Comments on Pacific Gas & Electric Co. December 2007 document titled *RCRA Facility Investigation Soil Investigation Work plan, Part B, PG&E Topock Compressor Station, Needles, California*" (January 23, 2008)

5. Colorado River Indian Tribes: *RCRA Facility Investigation/Remedial Investigation Work Plan, Part B, PG&E Topock Compressor Station, Needles, CA* (January 18, 2008)

DTSC withdrew its comments on Sections 3.0 and 4.0 (Data Quality Objectives [DQOs] and Data Evaluation) of the Draft Soil Part B Work Plan (all HERD comments and a portion of the DTSC Geological Services Unit comments). DOI withdrew all of their DQO-related comments. The agencies directed PG&E to prepare a separate DQO technical memorandum for the Soil Part B investigation similar to those developed for the Soil Part A investigation.

The Soil Part B DQO Steps 1 through 5 are presented in the technical memorandum *Data Quality Objectives – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2011) (referred to as the Soil Part B DQO Tech Memo). The Soil Part B DQO Tech Memo is provided in Appendix B1. Steps 6 and 7 will be completed once the initial Part B data have been collected, similar to the process used for the Soil Part A investigation program.

In addition to comments directly on the Draft Part B Work Plan, DTSC also provided comments on compressor station construction-related photographs (*1950s Photographs of the Pacific Gas and Electric Company (PG&E) Topock Compressor Station, Needles, California* (February 12, 2008) (DTSC, 2008b). These comments led to the addition to six new AOCs and one new SWMU.

The units addressed by this Soil Part B Work Plan are as follows:

- SWMU 5 – Sludge-drying Beds (Appendix B2)
- SWMU 6 – Chromate Reduction Tank (Appendix B3)
- SWMU 8 – Process Pump Tank (Appendix B4)
- SWMU 9 – Transfer Sump (Appendix B5)
- SWMU 11 – Sulfuric Acid Tanks (Appendix B6)
- AOC 5 – Cooling Tower A (Appendix B7)
- AOC 6 – Cooling Tower B (Appendix B8)
- AOC 7– Hazardous Materials Storage Area (Appendix B9
- AOC 8 – Paint Locker (Appendix B.10)
- AOC 13 – Unpaved Areas within the Compressor Station (Appendix B11)
- AOC 15 – Auxiliary Jacket Cooling Water Pumps (Appendix B12)
- AOC 16 – Sandblast Shelter (Appendix B13)
- AOC 17 – Onsite Septic System (Appendix B14)
- AOC 18 – Combined Wastewater Transference Pipelines (Appendix B15)
- AOC 19 – Former Hotwell (Appendix B16)
- AOC 20 – Industrial Floor Drains (Appendix B17)
- AOC 21 – Unidentified Round Impoundment in Lower Yard (Appendix B18)
- AOC 22 – Three-sided Structure in Upper Yard (Appendix B19)
- AOC 23 – Former Water Conditioning Building (Appendix B20)
- AOC 24 – Staining and Potential Former API Oil/Water Separator (Appendix B21)
- AOC 25 – Compressor and Generator Engines and Basements (Appendix B22)
- AOC 26 – Former Scrubber Sump (Appendix B23)
- Unit 4.3 – Oily Water Holding Tank, Unit 4.4 – Oil/Water Separator, and Unit 4.5 – Portable Waste Oil Holding Tank (Appendix B24)

In addition, this Work Plan will address two new areas of potential concern that were identified recently based on employee interviews. These new investigation areas are the Teapot Dome Restaurant oil pit and a potential burn area near AOC 17. These units are shown on Figure B-1.

To minimize the number of samples and disturbances to sensitive resources, the Part B supplemental soil investigation program may be conducted in two phases, if needed. Proposed sampling for Phase 1 is described in this work plan. The proposed sampling is designed to collect sufficient information to address Decisions 1 through 5 as defined in the Part B Data Quality Objectives Tech Memo (CH2M HILL 2010a). Following completion of Phase 1 sampling, the newly collected and existing data will be combined and evaluated to determine the need for any further (Phase 2) sampling. Phase 2 sampling will only be necessary where data gaps are identified after evaluation of the combined soil data set (existing data and supplemental Phase 1 data).

1.1 Historical Soil Investigations within the Compressor Station Fence Line

Several rounds of investigation have previously been completed within the fence line of the compressor station. These included closure-related investigations (at SWMUs 5, 6, 8, and 9; AOCs 18 and 26; and Units 4.3–4.5) and investigations conducted relative to potential or suspected past releases (at AOCs 5, 6, 13, 15, and 19). In addition, PG&E has conducted limited sampling to address spills and in coordination with miscellaneous subsurface construction activities (within AOC 13).

Previous investigation activities include soil boring installation and surface soil sampling. The majority of samples were surface soil samples collected by hand; some samples were collected as confirmation samples following soil excavation. Access constraints and safety considerations limited sampling in most areas. Two-hundred-thirty-five soil samples were collected (sample counts do not include duplicate samples collected for quality control purposes). The available data span a wide range of dates, analytical parameters, and data quality. The data quality of all existing data has been evaluated in the *Data Usability Assessment Technical Memorandum, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2006b); the majority of the existing data (65 percent) has been classified as data quality Category 1 or 2. Data classified as data quality Category 1 are suitable for all uses, including risk assessment and remedial action decisions. Data quality Category 2 data are suitable for use in characterization of the chemicals of potential concern (COPCs) at the facility and to help define the nature and extent of contamination. Data quality Category 3 data are suitable only for use in qualitative characterization of the nature and extent of contamination.

1.2 Newly Identified Burn Area

In 2009, at DTSC's direction, PG&E conducted additional interviews with current and former employees to collect new anecdotal information pertaining to historical compressor station practices. To confirm the new anecdotal information collected, additional site walks, including debris mapping, were conducted. The information gathered was provided in letters dated August 14, 2009 (PG&E, 2009a), October 15, 2009 (PG&E, 2009b), January 15, 2010 (PG&E 2010a), and January 29, 2010 (PG&E 2010b). A potential new burn area in AOC 13 was identified as a result of the additional interview and was discussed with the agencies in e-mails dated February 22, 2010 and February 24, 2010.

At the agencies' direction, this new area has been incorporated into this Soil Part B Work Plan and is addressed as part of AOC 13. Available information regarding this new area is provided in Appendix B11.

1.3 Purpose of Soil Part B Phase 1 Investigation Work Plan

This Soil Part B Work Plan has been prepared to:

- Present the combined soil data collected to date for the identified SWMUs, AOCs, and units within the fence line of the compressor station.
- Present the results of the data gaps evaluation using the decision and criteria described in the Soil Part B DQO Steps 1 through 5.
- Present proposed Phase 1 sampling recommendations.

This document identifies potential sample locations based on specific DQO rules as developed at the direction of DTSC and DOI. These potential locations are PG&E's initial assessment of candidate locations for additional characterization. The proposed sampling location figures and tables are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and make further progress toward decision-making for soil remediation. PG&E anticipates that all candidate locations identified may not be necessary for such purposes.

1.4 Work Plan Organization

This Soil Part B Work Plan is organized into three sections, as follows:

- **Section 1.0, Introduction**, contains background information, objectives, and report organization.
- **Section 2.0, Overview of Data Gaps Evaluation Process**, provides an overview of the data gaps evaluation process and the four DQO decisions applicable to the Soil Part A investigation.
- **Section 3.0, Accessibility Evaluation for Areas within the Fence Line**, describes the evaluation conducted to more specifically define accessibility constraints associated with surface and subsurface utilities.
- **Section 4.0, Integration of Perimeter Area and Storm Drain Investigation Data,** summarizes how relevant data collected from these two investigation programs will be integrated into the Part B data evaluation process.
- **Section 5.0, References,** presents a list of works cited when preparing this document.
- **Appendix B1,** provides the Soil Part B DQO Tech Memo.

- **Appendices B2 through B24,** contain the soil investigation programs for the 25 units addressed by this Work Plan.
- **Appendix B25,** provides the accessibility evaluation photograph log.
- **Appendix B26,** provides the response to comments on the 2007 Draft Part B Work Plan.

2.0 Overview of Data Gaps Evaluation Process

The development of the Soil Part B investigation program was based on the DQOs developed for the Soil Part B investigation to ensure that data collected at each stage of the investigation process are of sufficient quantity and quality to enable the specified decisions to be made. The DQO process is a recognized procedure for defining project objectives and decisions and for optimizing sampling and other information-gathering programs to balance uncertainty, site disturbances, and cost in an acceptable manner. The United States Environmental Protection Agency (USEPA) has issued detailed guidance for the seven-step DQO process (USEPA, 2000, 2006a-b):

- Step 1 – State the Problem
- Step 2 – Identify the Decision(s)
- Step 3 – Identify the Inputs to the Decision
- Step 4 – Define the Study Boundaries
- Step 5 – Develop a Decision Rule
- Step 6 – Specify Tolerable Limits on Decision Errors
- Step 7 – Optimize the Design

Below are the five Part B DQO decisions to be made using the combined existing soil data collected to date and the data proposed to be collected:

- **Decision 1:** Determine the nature and extent of residual soil concentrations resulting from historical compressor station practices. If determination of the nature and extent of contamination based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment and/or the corrective measures study/feasibility study (CMS/FS) or interim measures.

- **Decision 2 (Data Sufficiency Evaluation):** Determine representative exposure point concentrations (EPCs) for residual soil contamination resulting from historical compressor station practices. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment.

- **Decision 3:** Determine whether residual soil concentrations resulting from historical compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat[1] or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address threat to groundwater

- **Decision 4.** Determine if residual soil concentrations inside the compressor station fence line resulting from historical compressor station practices pose a potentially unacceptable risk to receptors outside the compressor station fence line via a surface migration pathway. If a potentially unacceptable risk to receptors outside the fence line exists, or if determination of potential risk to receptors outside the fence line based on

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[1] The forthcoming Topock Compressor Station/East Ravine Groundwater Investigation will aid in assessing potential threats to groundwater from potential source areas within the compressor station as well as evaluating current impacts to groundwater

sample data is not feasible, develop controls to eliminate migration pathways or remove contaminated soil.

- **Decision 5 (Data Sufficiency Evaluation):** Determine the site-specific soil property, contaminant distribution, and transport pathway information necessary to support the CMS/FS, remedial design, and/or interim measures, if required. If full determination of site-specific soil property, contaminant distribution, and transport pathway information based on sample data is not feasible, document impediments and uncertainties in the risk assessment and/or CMS/FS or interim measures.

The DQO process was also used to develop the proposed sampling effort described in this work plan. Although available data are limited, the following evaluations were completed for each of the five DQO decisions to the degree feasible.

- **Decision 1**: The nature and extent of contamination at units with existing Category 1 or 2 data are described and evaluated to determine whether the nature and extent of contamination are adequately understood. The evaluation followed the Decision 1 rules outlined in Figure 2 of the Part B Tech Memo included as Appendix B1.
- **Decision 2**: A data sufficiency evaluation was conducted to determine if sufficient data exist for the entire area within the fence line to calculate representative EPCs for each applicable exposure interval for human receptors. The evaluation followed the Decision 2 Rules outlined in Figure 3 of the Part B Tech Memo included as Appendix B1.
- **Decision 3**: Soil screening levels (SSLs) will be calculated for any metal exceeding background concentrations at one or more locations within the individual Part B investigation areas. Because of the limited existing soil data, this evaluation will occur after the first phase of the Part B investigation. For constituents where the detected concentrations exceed the SSLs, vadose zone modeling will be conducted to further evaluate the potential threat to groundwater. If organic compounds are detected in one or more locations within the investigation areas, vadose zone modeling will be conducted to evaluate the potential threat to groundwater from detected organic compounds. The evaluation will follow the Decision 3 rules outlined in Figure 4 of the Part B Tech Memo included as Appendix B1.
- **Decision 4**: A data sufficiency evaluation will be conducted to determine whether sufficient information regarding surface migration pathways and soil chemical data exist for units with existing Category 1 data to assess whether these areas pose a potential risk to offsite receptors via the surface migration pathway. The evaluation will follow the Decision 4 rules outlined in Figure 5 of the Part B Tech Memo included as Appendix B1.
- **Decision 5**: A data sufficiency evaluation was conducted to determine whether sufficient data exist at units with existing Category 1 or 2 data to support the CMS/FS (specifically, remedial technology feasibility assessment and estimation of soil and debris volumes potentially requiring remediation) and/or interim measures. The evaluation followed the Decision 5 rules outlined in Figure 6 of the Part B Tech Memo included as Appendix B1.

The following subsections describe the process that will be used to evaluate the combined data set and the process that was used to evaluate the five DQO decisions. Due to the limited set available at this stage, the evaluations for Decisions 2, and 5 were conducted for the area within the fence line as a whole; the individual evaluations for Decision 1 are provided in Appendices B2 through B24. Decisions 3 and 4 evaluation will be performed after the Phase 1 investigation.

Once the data to be collected pursuant to this work plan are available, the combined existing and new data will be evaluated using the same process outlined below. Decision 2 will continue to be evaluated for the entire area within the fence line; Decisions 1, 3, 4, and 5 will be evaluated for individual units or groups of units, as appropriate based on combined data set.

2.1 Decision 1 – Nature and Extent

This section presents the inputs and process used and to be used to evaluate Decision 1 – Nature and Extent. Results of the Decision 1 – Nature and Extent evaluation for each unit, including proposed sample locations, are provided in Appendices B2 through B24.

2.1.1 Inputs to Decision 1

The following three types of information are needed and considered when assessing whether the nature and extent of contamination at a site are adequately understood: (1) usable COPCs concentration data, (2) potential fate and transport mechanisms, and (3) screening and comparison values, as described in the Soil Part B DQO Tech Memo provided in Appendix B1. The following subsections describe the inputs required to evaluate Decision 1 – Nature and Extent.

Data Usability

Existing data were evaluated in the *Final Soil and Sediment Data Usability Technical Memorandum, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2008a). All data meeting Category 1 and 2 data quality standards were included in the data set for Decision 1. New data will be validated, and only data meeting Category 1 data quality standards will be included in the combined data set.

The existing Category 1 and 2 data were also reviewed to assess whether they are still considered reliable due to changing site conditions. If site conditions had changed or construction may have affected the samples, the data were assessed to determine whether it is likely that the changes have altered the conditions at particular locations. This data assessment process was limited to surface and near-surface samples, as deeper samples would not be expected to be affected by storm event erosion and deposition or construction projects.

Potential Fate and Transport Mechanisms

A conceptual site model (CSM) for the entire area within the fence line was developed for the *Human Health and Ecological Risk Assessment Work Plan* [RAWP], *Topock Compressor Station, Needles, California* (ARCADIS, 2008a) and RAWP Addendum (ARCADIS, 2009a). The CSM is shown in Figure 7 of the Soil Part B DQO Tech Memo in Appendix B1. The CSM focuses on evaluation of potential exposure pathways to human receptors. Site-specific CSMs, providing a more detailed assessment of contaminant fate and transport mechanisms at each unit, were also developed and are presented in Appendices B2 through B24.

The CSMs rely on the detailed information on the physical characteristics and setting of each unit, including surface features, topography, meteorology, site geology, surface water hydrology, site hydrogeology, and land use. Potential transport mechanisms and fate of COPCs released into the environment within the fence line of Topock Compressor Station are presented in the CSMs; the CSMs also identify potential transport and migration pathways to areas outside the fence line.

Comparison Values

Comparison values were used to screen the existing data and will be used to screen the combined data for the areas within the fence line. Four types of comparison values identified for the Decision 1 evaluation include:

- Soil background threshold values (BTVs) for metals and inorganic compounds, which are discussed in the *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2009a).
- DTSC California human health screening levels (CHHSLs) for commercial use (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, 2005).
- USEPA regional screening levels (RSLs) for commercial use for those compounds for which CHHSLs are unavailable or for which the existing CHHSLs are based on outdated toxicity factors (USEPA, 2010).
- California Regional Water Quality Control Board, San Francisco Bay Region (Water Board, 2008) environmental screening levels for total petroleum hydrocarbons in the gasoline, diesel, and motor oil ranges for a residential exposure scenario for human health based on a hazard index of 1.0.
- Project-specific screening levels developed for COPCs identified from Target Analyte List/Target Compound List (TAL/TCL) data (ARCADIS, 2009b)

The comparison values were used to assess the extent of contamination based on the existing data and will be used to evaluate the extent of contamination using the combined data set. The extent of contamination was defined to the commercial comparison values, defined as the commercial screening level. In addition, metals concentrations were compared to the BTV, where available. The comparison values are shown in Tables B-1 through B-8. Exceedance of any comparison values does not indicate the presence or absence of unacceptable risk (potential site-related risks will be evaluated in the baseline risk assessment).

To assess dioxin/furan results dioxin toxicity equivalence quotients (TEQs) were calculated and compared to the DTSC/HERD dioxin TEQs remedial goals instead of the more conservative/outdated 2005 CHHSLs. The DTSC/HERD guidance provides the following dioxin TEQ remedial goals for sites in California (DTSC, 2009):

- 50 nanograms per kilogram: residential exposure scenario (based on 10^{-6} risk level and adjusted by a factor of 10 to account for minimal contribution of soil and dust to dioxin body burden in a University of Michigan dioxin study).

- 200 to 1,000 nanograms per kilogram: commercial/industrial exposure scenario (a range is proposed from a concentration based on 10^{-6} cancer risk [adjusted by a factor of 10 as with the residential value] to a concentration based on a hazard index of 1).

2.1.2 Nature and Extent Evaluation

As outlined in the decision process for Decision 1 in the Soil Part B DQO Tech Memo, the nature and extent evaluation for the combined data set will consist of:

- Identifying newly detected compounds, if any.
- Conducting a point-by-point comparison of all detected compounds to the comparison values.
- Assessing lateral and vertical extent of detected compounds, as well as spatial concentration trends of detected compounds (i.e., changes in concentration laterally and vertically).
- Conducting a central tendency comparison between site and background data sets.

To the degree feasible, these same steps were used to screen the existing data; however, due to the limited nature of the existing data set, a central tendency comparison to background was not conducted. Also, vertical extent data were typically limited due to access challenges encountered within the fence line, and assessment of vertical extent was generally not feasible. The complete Decision 1 data evaluation steps are discussed in more detail below.

If the nature and extent evaluation concludes that additional sampling is not warranted, then no further sampling is required and no further sampling is required to resolve Decision 1. If data gaps are identified and data collection is desirable, the feasibility of collecting the additional samples under current operating conditions were evaluated. The evaluation relied primarily on the accessibility evaluation presented in Section 3.0 of this report. The agencies will have to concur that additional sampling is not feasible or warranted. However, PG&E retains the right to make the final determination regarding the safety of the proposed sampling. If some sampling cannot be performed in a manner that is deemed safe by PG&E, that sampling will be considered infeasible.

2.1.3 Identification of Newly Detected Compounds

The full inorganic and organic suite of analyses included in the Comprehensive Environmental Response, Compensation, Liability Act of 1980 (CERCLA) TAL/TCL includes compounds that have not typically been included in analytical suites for the areas inside the fence line. At the request of DOI, 10 percent of all samples collected during the Soil Part B Phase 1 investigation will be analyzed for the full TAL/TCL suite. TAL/TCL analyses were conducted for the Part A Phase 1 investigation (see Appendix A to the Soil RFI/RI Work Plan), and the results of that evaluation were considered in the development of the Part B sampling program. As a result of the TAL/TCL analyses for areas outside the fence line, polychlorinated biphenyls (PCBs) were added as an analytical suite for most locations within the fence line.

The Part B Phase 1 data and existing data will be combined and reviewed to assess whether, as a result of the full TAL/TCL analysis, any new compounds that qualify as COPCs have been identified in the areas within the compressor station fence line. While a few existing samples were analyzed for one or more constituents on the TAL/TCL, there are too few analyses in the existing data set to assess whether any newly identified compounds may be present.

2.1.4 Point-by-point Comparison with Comparison Values

The initial comparison of COPCs was conducted on a point-by-point basis for all depths (i.e., a simultaneous lateral and vertical assessment). All data for a given area were compared to the comparison values described in Section 2.1.2. (Data tables by constituent group and by individual unit are included in Appendices B2 through B24.) Detected concentrations of a given chemical were flagged for each occurrence of a COPC exceeding the commercial screening level or BTV for metals. The results from the point-by-point comparison were used in conjunction with the spatial trends analysis to assess whether a data gap existed at locations with one or more constituents exceeding the applicable BTV or risk-based comparison value. Other considerations included:

- The frequency and extent to which the commercial screening value was exceeded and, in the case of metals, the frequency of exceedances of the BTVs.
- The influence of topography on both the likely direction of COPC movement and the ability to collect additional samples.
- The proximity of other relevant sample locations to the sample location exceeding the commercial screening level and/or BTV.

The same point-by-point comparison will be completed for the combined data set, and the results from the point-by-point comparison will be used in conjunction with both the spatial trends analysis and the central tendency comparison to assess whether a data gap exists at locations with one or more constituents exceeding the applicable BTV or risk-based comparison value.

Statistical summary tables were also created for each area with existing data and are included in Appendices B2 through B24. The statistical summary tables present the frequency of detection for each COPC detected in soil, the maximum detected concentration, and the number of exceedances of the comparison values described in Section 2.1.2, as well as the comparison values used for Decision 4 (comparison values for Decision 4 must consider potential receptors outside the fence line). Consequently, comparison values for Decision 4 are the same as for the Part A soil investigation program. Soil sample counts presented in the statistical summary tables do not include duplicate (quality control) soil samples. At locations where duplicate samples were collected, the higher of the two values were included in the statistical summary tables. The number of exceedances is the number of detections that are equal to or exceed the respective screening/comparison values. For the BTV, exceedances are the number of detections exceeding the BTV (i.e., if a detected concentration is equal to the BTV, it is considered to be within background).

2.1.5 Evaluation of Lateral and Vertical Extents and Spatial Trends

The lateral and vertical extents of each COPC were evaluated by assessing whether constituent concentrations in the samples were below the applicable commercial screening level or BTV toward the edge of the unit or affected area. Potential hot spots, if any, were identified through the presence of clusters of elevated concentrations of COPCs. In addition, spatial trends were evaluated for those COPCs identified by the point-by-point comparison as having concentrations exceeding the commercial screening level or BTV. Figures showing detected concentrations of compounds were created for all units with existing data and are included in Appendices B2 through B24. For smaller units in close proximity, all data for a given area are presented on one figure (e.g., existing data for SWMUs 5, 6, and 9, and the Units 4.3, 4.4, and 4.5 are shown on one figure). All data for compounds detected at that unit are shown in the figures. Following completion of the Part B Phase 1 investigation, figures will be prepared for individual constituents that are detected multiple times above the commercial screening level and/or BTV.

Where feasible, spatial trends in the existing data set were evaluated both laterally and vertically. For lateral delineation, concentration trends toward the perimeter of each area were reviewed to ensure that concentrations are generally decreasing toward the perimeter. Vertical concentration trends were also reviewed where subsurface samples were available. As noted above, vertical extent data were limited. Evaluation of spatial trends included:

- Lateral concentration trends toward the edge of a unit or affected area (i.e., potential hot spot) within a unit.
- Vertical concentration trends in each boring and throughout a given unit or area.
- Distribution of detections and non-detections of each constituent within a unit or area.
- Where applicable, concentrations trends at an upslope unit or area.

The specific areas where COPC lateral or vertical boundaries are not adequately defined or where concentration trends are not decreasing were identified as locations where data gaps exist. The identified data gaps in the existing data provided the basis for further sampling recommendations for Decision 1. If additional data collection was feasible (i.e., no structures, utilities, topography, or cultural resources preventing step-out sampling or deeper sampling vertically), then additional sampling locations, depths, and/or analytical suites were proposed 1 for the Part B Phase 1 investigation. The evaluation of access constraints is described in Section 3.0. The additional sampling recommendations for each unit are included in Appendices B2 through B24; specific access constraints for each unit are also described in these appendices.

The same data gaps evaluation process will be used to evaluate the combined data set once the Part B Phase 1 investigation data have been collected and the newly validated Part B Phase 1 data have been combined with the existing data.

2.1.6 Central Tendency Comparison

A population (central tendency) comparison will be conducted for those metals detected in soil at concentrations exceeding the respective BTVs. The central tendency comparison assesses whether there is an overall shift of concentrations between the site data versus the background data (i.e., if the site concentrations are higher relative to the background concentrations than random variability could explain). The comparison helps to determine whether an overall shift exists between the background and the combined soil data set for each area.

The comparison will be conducted using the approved *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California Technical Memorandum* (CH2M HILL, 2009a). Because comparison to the BTV offers information only on the upper tail of the site concentration distribution, in cases where single-point exceedances of the BTV exist, the central tendency comparison offers an opportunity to statistically address whether there is an overall shift of site concentrations relative to background concentrations. This overall shift may be identified as a data gap, and additional sampling may be proposed, if appropriate.

The Gehan test and Wilcoxon Rank Sum test are commonly used to conduct central tendency comparisons. These central tendency tests are discussed both in USEPA and Navy literature (USEPA, 2009; Navy, 2002). These central tendency tests provide a calculated probability, which will be compared to a significance level of 0.05. If the probability is below 0.05, a significant exceedance over background may be present.

Both tests are nonparametric approaches based upon the ranks of the data; however, they handle ties in these ranks differently. For that reason, the Gehan test is recommended when the percent of nondetects is greater than 40 percent or when multiple detection limits exist for a given metal, both of which are expected to be case based on the experience with the Part A investigation. The Gehan test was used for all comparisons conducted for the Part A investigation and will most likely be used to evaluate the combined Part B data set.

The central tendency test will not be performed if a compound is infrequently detected (less than five detects) in either the unit/area data or background data set or has a limited number of results (less than eight) for a unit/area. Using these rules, a central tendency comparison for hexavalent chromium cannot be conducted at any unit because there are insufficient detections of hexavalent chromium in the background data set.

2.2 Decision 2 – Data Sufficiency to Estimate Representative Exposure Point Concentrations

This section presents the process used to evaluate Decision 2 – Data Sufficiency to Estimate Exposure Point Concentrations for the entire area within the fence line. Results of the Decision 2 – Data Sufficiency to Estimate Exposure Point Concentrations, including proposed Part B Phase 1 sample locations if recommended, are presented below.

2.2.1 Inputs to Decision 2

The inputs required for Decision 2 include COPC concentrations in soil inside the fence line of the Topock Compressor Station and depth categories defined in the RAWP (ARCADIS, 2008a). Only COPC data meeting data quality Category 1 standards will be used for the risk assessment. The inputs to Decision 2 also include comparison values described in Section 2.1.2.

2.2.2 Data Sufficiency Evaluation to Estimate Representative Exposure Point Concentrations

Existing soil data were evaluated for sufficiency to estimate a representative EPC by detected compound and exposure depth interval. The evaluation assumes the existing data adequately represent the nature and extent of contamination; this assumption will be verified after Part B Phase 1 data have been collected. Additional sampling was recommended if existing data were insufficient estimate a representative EPC for any constituent in any defined exposure interval within the fence line. The technical approach used to evaluate the data to address Decision 2 is described below.

All soil Category 1 data were evaluated for each of the exposure intervals defined in the RAWP (ARCADIS, 2008a) for potential contact by human populations. Data for each detected compound in each exposure interval were evaluated for:

- Frequency of detection.
- Maximum result.
- Number of detections above comparison values.
- Human health comparison values—commercial criteria.

Frequency of detections and maximum results were evaluated to understand whether the minimum data necessary are available to calculate a representative EPC to be used in the human health risk assessment. A representative EPC could be either: (1) a 95 percent upper confidence limit of the mean (95%UCL) where at least eight results were reported with a minimum of five detections or (2) the maximum concentration reported, if data were not adequate for a 95%UCL and the following criteria were met:

- The maximum was less than or equal to approximately two times the comparison value for human health risk screening, and/or

- Additional data collection appeared unlikely to yield additional detections to support the calculation of a 95%UCL.

Table B-9 summarizes the results of the evaluation to determine whether data are sufficient to estimate a representative EPC. Data were reviewed for all chemicals that were detected in at least one sample and exceeded at least one comparison value. For each compound, the table indicates, for each relevant exposure depth interval, the total number of samples collected, the number of detections, the maximum detected value, and whether there is sufficient information to calculate a representative EPC for that particular compound for the specific exposure interval.

The Decision 2 data evaluation performed using the existing data will be expanded to include the combined data set once the Part B Phase 1 investigation has been completed.

In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support EPC development for detected chemicals that exceeded one or more comparison values, as described below.

Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for total chromium, hexavalent chromium, and lead using ProUCL.

Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene toxicity equivalents (B[a]P TEQs) using ProUCL with the exception of the surface soil exposure depth interval (0 to 0.5 foot below ground surface [bgs]). For the surface soil exposure depth interval, there are insufficient samples to calculate an EPC for the B(a)P TEQs (i.e., a total of nine samples, with detectable concentrations of the PAHs in four of the nine samples).

2.3 Decision 3 – Threat to Groundwater from Residual Soil Concentrations

This section presents the inputs and process used to evaluate Decision 3 – Threat to Groundwater from Residual Soil Concentrations and the process that will be used once the Part B, Phase 1 data are available. Results of the Decision 3 evaluation, including proposed Part B Phase 1 sample locations if recommended, are provided below.

2.3.1 Inputs to Decision 3

The inputs required for Decision 3 consist of the nature and extent of soil data from Decision 1, site-specific information required to calculate SSLs protective of groundwater, and screening-level groundwater modeling results, where necessary.

Due to the limited amount of existing soil data the Decision 3 evaluation will be completed after the implementation of the Part B Phase 1 investigation, using the combined existing and new soil data. Key site-specific information required to calculate the SSLs includes:

- Soil BTVs for metals and inorganic compounds, discussed in the *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2009a) and in Appendix E of the *Draft Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2010).
- Groundwater background values for inorganics, calculated as 95%UCL and presented in *Groundwater Background Study Steps 3 and 4: Revised Final Report of Results, PG&E Topock Compressor Station* (CH2M HILL, 2009b). For organics, groundwater maximum contaminant levels and/or applicable drinking water standards were used.
- Volume and cross-sectional area of the potential source (i.e., unit or area).
- Site-specific recharge and groundwater flow characteristics at each unit.
- Depth to groundwater, geochemical, and hydraulic characteristics of the vadose zone soil.

Inputs required for the screening-level groundwater modeling are the same as those for the SSL calculation, with the addition of transport parameters (dispersion, soil-water partition coefficients). USEPA literature and other technical literature served as the source for these parameters (USEPA, 2005; Xu and Eckstein, 1995).

2.3.2 Threat to Groundwater from Residual Soil Concentrations Evaluation

A conservative, three-tiered approach will be used in the evaluation to assess which units may present a potential current or future threat to groundwater from COPCs in the vadose zone. The approach was presented in technical memorandum entitled *Calculation of Soil*

Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station (CH2M HILL, 2008b) and includes:

- **Step 1:** The initial step in the evaluation process will be to compare the metals concentrations in soil samples from each investigation unit/area to the soil BTV to assess whether the concentrations are at or below background. If no individual COPC concentration from samples collected within a unit is greater than the BTV, then no further analysis is required to assess the potential for leaching into groundwater for that COPC within the unit/area.

  A central tendency comparison will also be performed (as described for Decision 1). The comparison to background levels in Step 1 will also consider the results of the central tendency comparison. If there are any COPCs that are present above the BTV, but the central tendency comparison evaluation concludes that the COPC concentration in the sample population within a unit is not statistically greater than the COPC concentration in the background population, then no further evaluation will be required for that COPC to satisfy Decision 3.

  This evaluation was completed for all metals detected in a given unit/area.

  Because organic compounds (PCBs, pesticides, volatile organic compounds [VOCs], and semivolatile organic compounds [SVOCs]) do not have a soil BTV to compare to, organic compounds will be evaluated in Step 3.

- **Step 2:** For detected COPCs with concentrations above BTVs, the detected concentrations will be compared to the unit- or area-specific SSL. The SSLs will be calculated in accordance with USEPA (1996) and New Mexico Environment Department (2006) guidance, among others. A detailed example SSL calculation was provided in the technical memorandum entitled *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station* (CH2M HILL, 2008b). The SSLs are calculated using highly conservative assumptions so that COPCs that are eliminated from further consideration in this step are eliminated with high confidence. If sample concentrations are at or below the SSL, then no further analysis is required to assess the potential for leaching into groundwater for those COPCs.

  If samples concentrations are above SSLs, the data will be evaluated to assess whether the sample results indicated a potential current threat to groundwater. A potential current threat to groundwater exists if one or both of the following conditions are present:

  - Vertical concentration trends of COPC increase with depth.
  - Soil data indicate elevated concentrations of compounds (as compared to the BTVs) in samples throughout the boring <u>*and*</u> at the depth of the soil/groundwater interface.

  If there are insufficient data to complete this step, a data gap will be identified, and additional proposed sampling locations to collect the needed vertical concentration data will be included in the Part B Phase 2 sampling program. If the evaluation does not indicate a potential current threat to groundwater, then the evaluation will continue with Step 3.

- **Step 3:** If sample concentrations exceeded the SSL but did not indicate a potential current threat to groundwater, a vadose zone flow and transport model will be used to evaluate the potential for leaching into groundwater. Modeling will be performed using the HYDRUS-1D software package (Simunek et al., 1998) and initially is intended as a screening process using highly conservative assumptions. If the modeling results showed no exceedance of the groundwater background values, then no further evaluation will be performed. If the modeling results in a COPC in groundwater at a concentration exceeding groundwater background values, the need for model refinement and possible additional data collection and/or development of a plan for a groundwater assessment will be evaluated. If the deepest sample(s) in a boring or area exceeded the BTV, a data gap may have been identified for Decision 3.[2]

The Step 3 modeling approach and model inputs, and assumptions will be further refined after the implementation of this work plan.

2.4 Decision 4 – Potential Migration to Areas Outside the Fence Line

This section presents the inputs and process to be used to evaluate Decision 4 – Potential Migration to Areas Outside the Fence Line. Due to the limited amount of existing soil data the Decision 4 evaluation will be completed after the implementation of the Part B Phase 1 investigation, using the combined existing and new soil data. The combined data set will be used to complete the Decision 4 evaluation for each unit/area, as applicable.

2.4.1 Inputs to Decision 4

The following three types of information are needed and considered when assessing whether COPCs present within at a site are adequately understood: (1) usable and appropriate COPC concentration data for surface soils, (2) potential transport mechanisms and pathways, and (3) screening comparison values, as described in the Soil Part B DQO Tech Memo provided in Appendix B1 and summarized below. Because Decision 4 pertains to potential migration of constituents in soil from areas within the fence line to areas outside the fence line, only exposed surface soil data are evaluated because only exposed surface soil would be mobilized. Potential groundwater concerns are addressed by Decision 3.

The following subsections describe the inputs required to evaluate Decision 4.

Data Usability

Existing data were evaluated in the *Final Soil and Sediment Data Usability Technical Memorandum, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2008a). All existing surface soil data meeting Category 1 data quality standards will be included in the data set for the Decision 4 evaluation. New data will be validated, and only data meeting Category 1 data quality standards will be included in the combined data set.

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[2] Note that this may also represent a data gap for Decision 1. However, if concentrations are declining with depth and/or the concentration detected in the lowest sample collected is near the BTV, the available data may be considered adequate for Decision 1.

Potential Transport Mechanisms and Pathways

As described in Section 2.1, a CSM for the entire area within the fence line was developed for the *Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California* (ARCADIS, 2008a) and RAWP Addendum (ARCADIS, 2009a). Site-specific CSMs providing a more detailed assessment of contaminant fate and transport mechanisms at each unit were also developed and are presented in Appendices B2 through B24. The site-specific fate and transport mechanism address potential transport and migration pathways to areas outside the fence line.

However, while the CSMs provide general information on the types of transport mechanisms and pathways that may be applicable to a specific unit, Decision 4 requires detailed, on-the-ground information regarding specific potential transport pathways from areas with COPC concentrations above screening levels. For example, constituents contained in surface soils in unpaved areas may be transported to areas outside the fence line through runoff via sheet flow or storm drains. To determine whether constituents in surface soil in a specific unpaved area could be transported from areas inside the fence line to areas outside the fence line, the following information would have to be known:

- Surface water flow paths (in which direction(s) would surface water flow from the affected area?).
- Presence of storm drain catch basins, if any, along the surface water flow path(s).
- Presence of berms or other features that would redirect the surface water flow and prevent direct flow to areas outside the fence line.

To know which specific areas outside the fence line could be impacted by the specific affected area inside the fence line, discharge point(s) for any catch basin(s) along the surface water flow path(s) and the direct discharge location for any sheet flow runoff also need to be known.

Comparison Values

Comparison values for Decision 4 must consider potential receptors outside the fence line. Consequently, comparison values for Decision 4 are the same as for the Part A soil investigation program. The six types of comparison values identified for the Decision 4 evaluation are:

- Soil BTVs for metals and inorganic compounds, which are discussed in the *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2009a) and in Appendix E of the *Draft Soil Investigation Part A Phase 1 Data Gaps Evaluation Report, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2010).
- Ecological comparison values (ECVs), which are calculated to be protective of the species potentially present in the area outside the fence line (ARCADIS, 2008b, 2009a-b).
- DTSC CHHSLs for residential use (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, 2005).

- USEPA RSLs for residential use for those compounds for which CHHSLs are unavailable or for which the existing CHHSLs are based on outdated toxicity factors (USEPA, 2009).
- Water Board 2008 environmental screening levels for total petroleum hydrocarbons in the gasoline, diesel, and motor oil ranges for a residential exposure scenario for human health based on a hazard index of 1.0.
- Project-specific screening levels developed for COPCs and below ground surface (COPECs) identified from CERCLA TAL/TCL data, to be developed as needed.

2.4.2 Decision 4 Evaluation Process

The comparison values will be used to assess whether COPCs and COPECs present in surface soil in unpaved portions at any of the units/areas within the fence line could potentially pose a threat to receptors outside the fence line, if released to areas outside the fence line. The COPC/COPEC concentrations in the unpaved portion of each unit/area will be compared to the lowest of the applicable comparison values, defined as the interim screening level. The soil interim screening level for most metals is equal to the corresponding BTV. Certain ECVs, USEPA RSLs, or DTSC CHHSLs for metals are lower than the BTV; in these cases, the BTV will be used in lieu of the ECVs, USEPA RSLs, or DTSC CHHSLs when determining whether delineation is adequate. If a BTV is not available, then the interim screening value is usually the lesser of the DTSC CHHSLs or soil ECVs. As stated above, the USEPA RSL is used instead of the CHHSL in those instances where a CHHSL does not exist or where the toxicity values used in the CHHSL are outdated. The comparison values are shown in Tables B-1 through B-8.

The first step in the data evaluation process for Decision 4 is to determine the paved and unpaved areas of the compressor station. Figure B-2 provides an overview of the paved and unpaved areas. Gravel covered areas were considered unpaved, as there is some potential for constituents in soil to be released to stormwater run-off. The next step in data evaluation for these unpaved areas will then follow the same process as for Decision 1. Once the unpaved areas containing COPCs/COPECs above interim screening levels are identified, potential migration pathways from these areas to areas outside the fence line will be evaluated. It should be noted that exceedances of any comparison values does not indicate the presence or absence of unacceptable risk (potential site-related risks will be evaluated in the baseline risk assessment).

2.5 Decision 5 – Data Sufficiency to Support Corrective Measures Study/Feasibility Study and/or Interim Measures

2.5.1 Inputs to Decision 5

Inputs to Decision 5 consist of soil property and contaminant distribution data (existing data for the evaluation conducted during the preparation of this work plan and the combined existing and validated Phase 1 data) and other information needed to support the CMS/FS decisions and remedial design and/or interim measures. Decision 5 was initially evaluated using Category 1 and 2 existing data; only Category 1 will be used in the combined data set. Inputs to Decision 5 include volumes of soil potentially requiring remediation; specific soil physical and chemical properties that could influence the performance of certain remedial technologies (e.g., porosity, grain size, density, organic carbon content, soil chemical properties); waste characterization parameters for any soils that may need to be transported and disposed of offsite; available migration control options; and potential physical limitations on implementation of various technologies (surface or subsurface structures).

2.5.2 Data Sufficiency to Support Corrective Measures Study/Feasibility Study Evaluation

A preliminary assessment of potential remedial technologies and presumptive remedies guided identification of the data needs to support the CMS/FS and remedial design and/or interim measures. An initial list of suitable remedial technologies was presented in the approved *Final Corrective Measures/Feasibility Study Work Plan, Topock Compressor Station, Needles, California* (CH2M HILL, 2008c), referred to as the CMS/FS Work Plan. The following is a summary of the initial technologies presented in the CMS/FS Work Plan:

- **Excavation and Offsite Disposal:** involves excavation, transportation, and disposal of contaminated material from the Topock site to a permitted offsite disposal facility. Pretreatment may be required to meet disposal requirements of the offsite facility.

- **Excavation and Onsite Treatment:** is an *ex-situ* method that involves excavation of contaminated soil and treatment onsite by either soil washing or chemical reduction.

- **Soil Flushing:** is an *in-situ* method that involves application of water or additive-containing water to soil to enhance contaminant solubility. Soil flushing is used in combination with a groundwater remedial method. Contaminants are leached from soil into the groundwater, which is then remediated.

- **Solidification/Stabilization:** can be either *ex-situ* or *in-situ* and involves use of various chemical additives to physically bind or enclose contaminants within a stabilized mass (solidification) or to chemically reduce the contaminants' mobility by inducing chemical reaction between the stabilizing agent and the contaminants (stabilization).

- ***In-Situ* Chemical Reduction:** involves addition of reagents to react with targeted constituents in soil to chemically convert hazardous contaminants to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. Reductants could be applied to soil by infiltrating a liquid reductant from the surface, injecting a liquid reductant through wells, or injecting a gaseous reductant through wells.

- **Capping in Place:** involves construction of a capping system on top of the contaminated area to contain and minimize exposure of the contaminants to the environment.

- **Soil Vapor Extraction:** involves application of a vacuum through a network of wells to remove contaminated vapor from the soil. Volatile contaminants are removed with the vapor stream. A treatment system is typically incorporated to remove the contaminants before the soil vapor is vented to the atmosphere.

- **Thermal Desorption:** involves heating the subsurface to accelerate the movement of contaminants from the soil into the soil vapor. It is typically combined with soil vapor extraction to remove the contaminants from the subsurface. By heating the subsurface, soil vapor extraction can be used for a wider range of contaminants with lower volatility. Heating can also speed up the removal of volatile contaminants, particularly if contaminants are present in the form of non-aqueous phase liquids. Heating can be accomplished by injection of hot air or steam, or through use of electric current.

- ***In-situ* Vitrification**: involves intensive heating of the subsurface to completely melt the soil, which then cools into a glassy, vitrified block. Most organic contaminants are driven off or broken down during the heating. Inorganic contaminants are driven off or incorporated into the vitrified block and sequestered from the surrounding soil or groundwater.
- **Incineration:** involves burning excavated soil at high temperatures in a kiln or furnace. Incinerators are carefully designed to capture and treat the gases generated during combustion. Due to difficulties in permitting incinerators, most incineration is accomplished in offsite hazardous waste treatment facilities rather than with onsite incinerators. Depending on the contaminants present, the ash remaining may require disposal as a hazardous waste.

Treatability studies to collect data on technologies identified during the alternative development process are conducted, as appropriate, to provide additional information for evaluating technologies during the preparation of the CMS/FS. Some of the technologies suitable for final remediation of the compressor station may also be suitable as interim measures if applied on a more limited scale. For example, excavation could be used to address surficial contaminants that have the potential to migrate to areas outside the fence line. In addition, the following migration control measures may be appropriate to the area inside the fence line:

- Paving (a subset of capping technologies). Paving impacted soils with asphalt or concrete will prevent any direct exposure and avoid potential surface migration concerns.
- Stormwater collection. Collecting and treating stormwater runoff would prevent release of elevated levels of contaminants to areas outside the fence line.
- Installing curbs or berms and/or expanding the stormwater collection system. This would allow capture and treatment of stormwater from areas that currently discharge stormwater via sheet flow.

The evaluation of data sufficiency to support Decision 5 (i.e., data requirements for the initial list of suitable remedial technologies listed above) was conducted by assessing the following for each individual unit or area:

- Lateral and vertical extents of COPCs and COPECs potentially posing an excess human health and/or potential migration concern. The lateral and vertical extent information will be used to estimate required remediation volumes to determine the most appropriate and cost-effective remedial approach and/or interim measure for each area potentially requiring remediation. This step cannot be completed until the baseline risk assessment is completed; however, if the nature and extent of contamination are sufficiently defined to satisfy Decisions 1 and 4, sufficient data would be expected to be available to allow the completion of this portion of the evaluation for Decision 5 once the risk assessment has been completed.

- Waste characterization parameters for any soils that may be transported offsite for disposal (i.e., total threshold limit concentrations [TTLC], soluble threshold limit concentrations [STLC], and toxicity characteristic leaching procedure [TCLP]). The TTLC and STLC are waste characterization criteria in the State of California. The TTLC simply requires standard chemical analysis of samples to determine total concentrations of COPCs using published USEPA methods. The detected concentrations are compared to the TTLCs to determine whether total COPC concentrations exceed the hazardous waste criteria. Total chemical concentrations are also compared to a concentration of 10 times the STLC (10 x STLC) and 20 times the TCLP (20 x TCLP) to determine whether leachability testing is required to determine if leachable concentrations of COPCs may exceed hazardous waste criteria. To evaluate COPC leachability relative to the SLTC, samples are analyzed using the Waste Extraction Test specified in the Title 26 of the California Code of Regulations. The TCLP determination is a federal criterion for Resource Conservation and Recovery Act of 1976 (RCRA) waste; leachable concentrations of COPCs determined using the TCLP are compared to applicable RCRA criteria. The Waste Extraction Test uses a tenfold dilution/extraction of the sample, and the TCLP uses a twentyfold dilution/extraction. Consequently, total sample concentrations below 10 times STLC and 20 times TLCP cannot exceed the applicable hazardous waste criteria.
- Specific soil physical properties that may affect the performance of the various technologies (i.e., porosity, grain size, density, organic carbon content). Table B-10 provides specific soil physical properties that are needed for applicable remedial technologies.
- Existing surface and subsurface features (i.e., vegetation, nearby roads and road structures, culverts, subsurface utilities, bedrock, topography) that may affect the implementability of various technologies.
- Storm drain discharge locations for the various catch basins within the compressor station.
- Stormwater flow pathways from various units to catch basins.
- Bermed/unbermed areas of the compressor station (i.e., areas where COPCs could be carried off the compressor station via sheet flow).
- Paved and unpaved areas of the compressor station.

The evaluation of data sufficiency to support Decision 5 was completed by evaluating the data summary for Decision 1 (presented in Attachments B2 through B26) and by comparing the available data to the list presented above and in Table B-10 to determine if any data gaps exist.

Based on the existing data set, the following general types of data gaps currently exist with regard to Decision 5:

- Lateral and vertical extents of COPCs and COPECs potentially posing an excess human health and/or potential migration concern.

- Waste characterization parameters for any soils that may be transported offsite for disposal.
- Specific soil physical properties that may affect the performance of the various technologies.
- Existing surface and subsurface features (i.e., surface and subsurface utilities, structures, and bedrock) that may affect the implementability of various technologies.
- Storm drain discharge locations for the various catch basins within the compressor station.
- Stormwater flow pathways from various units to catch basins.

The full Decision 5 data gaps evaluation cannot be completed until Decision 1 is satisfied. The data gaps and additional sampling recommendations for each unit are described in Section 2.7 and Table B-10.

2.6 Data Quality Objectives Steps 6 and 7

This section summarizes DQO Steps 6 and 7.

2.6.1 Step 6: Acceptable Limits on Decision Error

Step 6 is intended to define acceptable limits on decision errors. A decision error would occur if, based on the available data, the project team chooses the wrong response action in the sense that a different response action would have been chosen if the project team had access to "perfect data" or absolute truth. COPC concentrations are estimated using data that are subject to different variabilities at different stages of development, from field collection to sample analysis. The combination of all these errors is called total study error. In some cases, total study error may lead to a decision error. Total study error is composed of two main components:

- **Sampling design error**. This error (variability) is influenced by the sample collection design, the number of samples, and the actual variability of the COPC concentration over space and time. Sampling must necessarily be limited to specific locations within a potentially impacted area, and this limited sampling may miss some features of the existing variation of the constituent concentration levels. Sampling design error occurs when the data collection design does not capture the complete variability within the media to the extent appropriate for the decision of interest.
- **Measurement error**. This error (variability) is influenced by imperfections in the measurement and analysis system. Random and systematic measurement errors may be introduced in the measurement process during physical sample collection, sample handling, sample preparation, sample analysis, and data reduction.

Potential decision errors can be evaluated quantitatively or qualitatively. For sites such as Topock, where the most appropriate sampling design is non-probabilistic, potential decision errors are evaluated qualitatively. Sample design errors are controlled through use of the CSM. Measurement error is controlled to an acceptable level by implementation of the

PG&E Program Quality Assurance Project Plan (CH2M HILL, 2008d) and by rejection of data that do not meet the criteria specified in the Quality Assurance Project Plan.

Limits on decision error for the Part B soil investigation will be reduced by ensuring with the highest level of confidence feasible that the sample locations are located in the appropriate areas. Appropriate areas consist of areas with known impacts or areas likely to have been impacted. These areas were identified based on site history information and current site conditions (i.e., to identify the release point) and transport pathways (to identify likely contaminant locations). Site-specific CSMs were developed for each of the SWMUs, AOCs, and Units 4.3, 4.4, and 4.5 to assess whether or not the existing and proposed Part B soil investigation samples are located in the areas of impact or likely to have been impacted. During the development of the CSMs and completion of Step 6, uncertainties at each individual unit were assessed for:

- Source of contamination, including release point.
- Potential release mechanisms and transport pathways.
- Topographic conditions and constraints.

As discussed previously, limited information is available regarding the storm drain system and specific stormwater flow pathways in certain portions of the compressor station. These data gaps may affect the evaluation of potential migration to areas outside the fence line and will be addressed as part of the Part B Phase 1 investigation (see discussion in Section 2.4 of this appendix and the storm drain system investigation program discussed in Appendix D of the Soil RFI/RI Work Plan).

2.6.2 Step 7: Optimize the Sampling Design for Obtaining Data

The purpose of Step 7 is to "identify a resource-effective data collection design for generating data that are expected to satisfy the DQOs" (USEPA, 2000) in the context of site-specific constraints. The output of this step is the Phase 1 sampling design presented in this work plan. If necessary, Step 7 will be completed again following the completion of the Part B Phase 1 investigation.

Step 7 for the Part B Phase 1 investigation consisted of documenting the applicable activities of the sample design process to describe the reasons for selecting a sampling scheme, the reasons for selecting specific sampling locations, and the expected performance of the data collection design with respect to qualitative DQOs only, as was done for the Part A Phase 1 soil investigation. In addition, given the many access constraints within the compressor station fence line, access constraints were specifically considered as a final phase in completing Step 7. Access constraints associated with each unit and the resulting effects on the sample design are described for each individual unit in Appendices B2 through B24.

As with done with Part A Phase 1, PG&E has performed an initial assessment of candidate locations for additional characterization. These locations are presented in Appendices B2 through B24 and are summarized in Section 2.7 and Table B-11 of this appendix. PG&E anticipates that all candidate locations identified may not be necessary.

2.7 Data Gaps Evaluation Summary for Part B, Phase 1

This section presents a summary of the data gaps evaluation described in Section 2.0 and in Appendices B2 through B24. As described above, the existing data were used in evaluating whether sufficient data exist to make each of the five decisions. The data gaps evaluation concluded:

- **Decision 1**: Additional sampling to more precisely delineate the nature and extent of COPCs/COPECs is proposed at 24 of the 25 SWMUs, AOCs, and units included in this work plan. No additional sampling is proposed at AOC 25 – Compressor and Generator Engines and Basements because of access restrictions. In addition, sampling is proposed to characterize the newly identified burn area in AOC 13.
- **Decision 2**: In general, with the exception of PAHs in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since SVOC analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3**: As described in Section 2.3, additional information is needed to define the nature and extent of soil data from Decision 1, site-specific information is also required to calculate SSLs protective of groundwater, and screening-level groundwater modeling results, where necessary.
- **Decision 4**: As described in Section 2.4, additional information is needed to characterize migration pathways, and define the nature and extent of COPCs/COPECs in surface soil that have the potential to migrate outside the fence line.
- **Decision 5**: As described in Section 2.5, certain waste characterization data and soil physical properties data are needed at all units. To minimize additional borings, soil physical property data are proposed to be collected only at those locations where borings are proposed for other purposes. The remaining information will be collected after the risk assessment has been completed, and the precise areas potentially requiring remediation have been defined.

Table B-12 provides a summary of the proposed additional sampling to address the data gaps identified during this evaluation. These potential locations are PG&E's initial assessment of candidate locations for additional characterization. PG&E anticipates that all candidate locations identified may not be necessary.

3.0 Accessibility Evaluation for Areas within the Fence Line

The Topock Compressor Station is an active industrial facility designed to handle dangerous compressed natural gas, other compressed gases, other fluids with elevated temperatures or hazardous characteristics, and underground electrical systems. Any soil investigation conducted within the fence line must address the many constraints on subsurface intrusion. To further characterize access constraints within the fence line of the compressor station for planning purposes, PG&E conducted an initial assessment of subsurface utilities and aboveground obstructions and also documented access to the various investigation units photographically. Photographs for each of the units are provided in Appendix B25.

3.1 Access and Sampling Feasibility Assessment

To assess accessibility and feasibility of sampling within the fence line of the compressor station, the station was divided into 16 areas shown in Figure B-2. Each of the areas was characterized to define the surface access available within the areas. The primary factors considered in determining the feasibility of sampling in each of the areas included the presence of buildings or other operational aboveground infrastructure, the presence and thickness of paving and/or foundations, and the presence of subsurface utilities (see discussion in Section 3.2, below). Five levels of surface access were identified:

- Level 1 (color code blue; Figure B-2): Away from aboveground operational infrastructure without asphalt or concrete cover.
- Level 2 (color code yellow; Figure B-2): Asphalt or thin concrete cover away from aboveground infrastructure or known dense underground utilities.
- Level 3 (color code purple; Figure B-2): Proximate to aboveground operational infrastructure without asphalt or concrete cover.
- Level 4 (color code orange; Figure B-2): Covered operational structure or area of thick concrete located in proximity to dense underground utilities.
- Level 5 (color code red; Figure B-2): Operational compressor station building or element of operation infrastructure (e.g., aboveground storage tanks)

Feasibility of access also depends on whether only hand sampling is required or whether equipment is required. Potential access for sampling was divided into access for surface (up to 1 foot bgs) and subsurface sampling. Surface sampling in this context refers to samples that can likely be collected using hand tools (such as trowels) only. Some areas may allow use of shovels. In some areas that were rated as accessible for surface sampling (e.g., underneath aboveground pipelines), the soil may be too hard-packed to allow collection of a soil sample or may limit soil collection to a depth of a few inches.

3.2 Initial Assessment of Subsurface Utilities

Because drawings do not exist that show the locations of all underground infrastructure, the initial, partial assessment of subsurface utilities was conducted by identifying the types and total number of utility risers (i.e., utilities penetrating the ground surface) within the 16 major areas within the compressor station. Table B-13 contains a summary of the number and types of risers within each area. As discussed previously, it is Topock Compressor Station policy to minimize operational and safety risks by limiting subsurface intrusion as much as possible. Thus, abandoned utilities are typically left in place. Consequently, it is likely that not all risers lead to active lines; however, given the large number of underground lines in most areas of the compressor station and the difficulty of tracing each line, PG&E did not define which utility risers likely led to active lines and which are associated within inactive lines. Many locations contained electrical conduit containing multiple electrical lines; each conduit was counted as a riser. PG&E did not determine the number of electrical lines associated with each conduit.

For this initial assessment, PG&E also did not define the path of each specific utility associated with a riser. The large number of utilities makes such an assessment infeasible based only on a review of risers.

3.3 Safety Assessment for Sampling within the Compressor Station Fence Line

As the last step in the evaluation, potential access for each of the five types of access was assessed with regard to safety, as shown in Table B-14. Surface sampling in unpaved areas (Level 1 and Level 2) is generally considered to be safe. Surface sampling in paved areas (i.e., immediately below the pavement) away from aboveground structures and dense subsurface utilities may also be safe, provided adequate utility clearance is performed (some risk of damaging unknown utilities would exist simply due to the need to remove the paving material in the area to be sampled). Subsurface intrusion and sampling is considered potentially unsafe in all areas including unpaved open areas or paved open areas, buildings and structures, underneath thick concrete (e.g., thick foundations, loading docks), in the vicinity of buildings and aboveground operational infrastructure, and in areas with dense underground utilities. Table B-14 summarizes the initial safety classifications for the five access types.

4.0 Integration of Perimeter and Storm Drain Investigation Data

As described in Appendices C and D of the Soil RFI/RI Work Plan, soil data will also be collected during the Storm Drain System and Perimeter Area investigation programs. These data will be integrated with the individual SWMU/AOC soil investigation programs, as appropriate. The data evaluation processes described for the Storm Drain System and Perimeter Area investigation programs will be completed before data from these programs are assigned to individual SWMUs/AOCs investigation programs. Typically, data pertaining to potential sources of contamination and migration of contaminants near the facility fence line would be assigned to the Part B program SWMUs/AOCs.

Once a determination has been made regarding the appropriate assignments of the various sample locations in the Storm Drain System and Perimeter Area investigation programs, the appropriate data from these programs will be integrated into the Part B data set. Data gaps evaluation for all five DQO decisions for the Part B investigation will be conducted after the appropriate data from these two investigation programs have been merged into the overall Part B data set. Inclusion of these data in the Part B data set may require adjusting the boundaries of one or more SWMUs/AOCs in the Part B program.

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Tables

TABLE B-1

Soil Analyte Comparison Table - Metals and Cyanide

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (mg/kg)	DTSC CHHSL		EPA Regional SL (December 2009)		Background Levels (mg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (mg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
				Residential (mg/kg)	Commercial (mg/kg)	Residential (mg/kg)	Commercial (mg/kg)				
x	Aluminum	7429-90-5	10	NE	NE	77,000	990,000	16,400	NC	---	No
	Antimony	7440-36-0	2	30	380	31	410	---	0.285	Yes	Yes
	Arsenic	7440-38-2	0.5	0.07	0.24	0.062 *	0.25 *	11	11.4	No	No
	Barium	7440-39-3	1	5,200	63,000	15,000	190,000	410	330	No	No
	Beryllium	7440-41-7	0.5	16	190	160	2,000	0.672	23.3	No	No
	Cadmium	7440-43-9	0.5	39	500	70	800	1.1	0.0151	Yes	No
x	Calcium	7440-70-2	100	NE	NE	NE	NE	66,500	NC	---	No
1	Chromium	7440-47-3	1	NE	NE	280	1,400	39.8	36.3	No	No
1	Chromium, Hexavalent	18540-29-9	0.4	17	37	230	1,400	0.83	139.6	No	No
	Cobalt	7440-48-4	1	660	3,200	23	300	12.7	13	No	No
	Copper	7440-50-8	1	3,000	38,000	3,100	41,000	16.8	20.6	No	No
x	Cyanide	57-12-5	0.25	NE	NE	1,600	20,000	---	0.9	No	No
x	Iron	7439-89-6	10	NE	NE	55,000	720,000	---	NC	---	No
	Lead	7439-92-1	1	80	320	400	800	8.39	0.0166	Yes	No
x	Magnesium	7439-95-4	100	NE	NE	NE	NE	12,100	NC	---	No
x	Manganese	7439-96-5	1	NE	NE	1,800	23,000	402	220	No	No
2	Mercury	NA	0.1	18	180	23	310	---	0.0125	Yes	Yes
	Molybdenum	7439-98-7	1	380	4,800	390	5,100	1.37	2.25	No	No
	Nickel	7440-02-0	1	1,600	16,000	1,500	20,000	27.3	0.607	Yes	No
x	Potassium	7440-09-7	100	NE	NE	NE	NE	4,400	NC	---	No
	Selenium	7782-49-2	1	380	4,800	390	5,100	1.47	0.177	Yes	No
	Silver	7440-22-4	1	380	4,800	390	5,100	---	5.15	No	No
x	Sodium	7440-23-5	100	NE	NE	NE	NE	2,070	NC	---	No
1	Thallium	7440-28-0	2	5.0	63	5.1	66	---	2.32	No	No
3	Vanadium	NA	1	530	6,700	390	5,200	52.2	13.9	No	No
	Zinc	7440-66-6	2	23,000	100,000	23,000	310,000	58	0.164	Yes	No

Notes:

1 USEPA residential regional screening level from April 2009 is used.

2 Mercury: mercury, inorganic salts

3 The oral reference dose (RfD) used for the vanadium screening level is derived from the IRIS oral RfD for vanadium pentoxide by factoring out the molecular weight of the oxide ion.

QAPP RL = quality assurance procedures plan reporting limit
DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)
Background = CH2M HILL. 2009. "Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.
--- = data not collected, available or applicable
x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)
USEPA = United States Environmental Protection Agency

SL = USEPA regional screening level (USEPA, December 2009)
mg/kg = milligrams per kilogram
NE = regulatory standard not established
NC = not calculated
NA = not available
* = California modified preliminary remediation goal (USEPA 2004)

TABLE B-2

Sediment Analyte Comparison Table - Metals

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

Analyte	CAS	QAPP RL (mg/kg)	Soil Background Levels (mg/kg)	Consensus-based Concentration		Does RL Exceed Screening Level?
				Threshold (mg/kg)	Probable (mg/kg)	
Antimony	7440-36-0	2	---	NE	NE	---
Arsenic	7440-38-2	0.5	11	9.79	33	No
Barium	7440-39-3	1	410	NE	NE	No
Beryllium	7440-41-7	0.5	0.672	NE	NE	No
Cadmium	7440-43-9	0.5	1.1	0.99	4.98	No
[1] Chromium	7440-47-3	1	39.8	43.4	111	No
[1] Chromium, Hexavalent	18540-29-9	0.4	0.83	NE	NE	No
Cobalt	7440-48-4	1	12.7	NE	NE	No
Copper	7440-50-8	1	16.8	31.6	149	No
Lead	7439-92-1	1	8.39	35.8	128	No
[2] Mercury	NA	0.1	---	0.18	1.06	No
Molybdenum	7439-98-7	1	1.37	NE	NE	No
Nickel	7440-02-0	1	27.3	22.7	48.6	No
Selenium	7782-49-2	1	1.47	NE	NE	No
Silver	7440-22-4	1	---	NE	NE	---
[1] Thallium	7440-28-0	2	---	NE	NE	---
[3] Vanadium	NA	1	52.2	NE	NE	No
Zinc	7440-66-6	2	58	121	459	No

Notes:

[1] Mercury: mercury, inorganic salts

[2] The oral reference dose (RfD) used for the thallium screening level is derived from the IRIS oral RfD for thallium sulfate by factoring out the molecular weight of the sulfate ion.

[3] The oral reference dose (RfD) used for the vanadium screening level is derived from the IRIS oral RfD for vanadium pentoxide by factoring out the molecular weight of the oxide ion.

QAPP RL = quality assurance procedures plan reporting limit
Background = CH2M HILL. 2009. "Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California". May.
--- = data not collected, available or applicable
USEPA = United States Environmental Protection Agency

mg/kg = milligrams per kilogram
NE = regulatory standard not established
NA = not available

TABLE B-3
Soil Analyte Comparison Table - Polycyclic Aromatic Hydrocarbon (PAH) - SW8270SIM
Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)					
	Analyte	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Background Levels (µg/kg)**	**Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)**	**Does RL Exceed ECV Level?**	**Does RL Exceed Screening Level?**
	1-Methyl naphthalene	90-12-0	5	NE	NE	22,000	99,000	---	NE	No	No
	2-Methyl naphthalene	91-57-6	5	NE	NE	310,000	4,100,000 (sat)	---	NE	No	No
s	Acena phthylene	208-96-8	5	NE	NE	1,700,000	17,000,000	---	NE	No	No
	Acenaphthene	83-32-9	5	NE	NE	3,400,000	33,000,000	---	NE	No	No
	Anthracene	120-12-7	5	NE	NE	17,000,000	170,000,000	---	NE	No	No
1	Benzo (a) anthracene	56-55-3	5	NE	NE	380	1,300	---	NE	No	No
	Benzo (a) pyrene	50-32-8	5	38	130	15	210	---	NE	No	No
1	Benzo (b) fluoranthene	205-99-2	5	NE	NE	380	1,300	---	NE	No	No
s	Benzo (ghi) perylene	191-24-2	5	NE	NE	1,700,000	17,000,000	---	NE	No	No
	Benzo (k) fluoranthene	207-08-9	5	NE	NE	380 *	1,300 *	---	NE	No	No
	Chrysene	218-01-9	5	NE	NE	3,800 *	13,000 *	---	NE	No	No
1	Dibenzo (a,h) anthracene	53-70-3	5	NE	NE	110	380	---	NE	No	No
	Fluoranthene	206-44-0	5	NE	NE	2,300,000	22,000,000	---	NE	No	No
	Fluorene	86-73-7	5	NE	NE	2,300,000	22,000,000	---	NE	No	No
1	Indeno (1,2,3-cd) pyrene	193-39-5	5	NE	NE	380	1,300	---	NE	No	No
	Naphthalene	91-20-3	5	NE	NE	3,600	18,000	---	NE	No	No
s	Phenanthrene	85-01-8	5	NE	NE	1,700,000	17,000,000	---	NE	No	No
	Pyrene	129-00-0	5	NE	NE	1,700,000	17,000,000	---	NE	No	No
	PAH Low molecular weight	NA	5	NE	NE	NE	NE	---	10,000	No	No
	PAH High molecular weight	NA	5	NE	NE	NE	NE	---	1,160	No	No
	B(a)P Equivalent	50-32-8	5	38	130	15	210	---	NE	No	No

Notes:

[1] Calculated using California toxicity values. The EPA Regional SL for Benzo(a)anthracene, Benzo(b)fluoranthene and Indeno (1,2,3-c,d)pyrene residential is 150 µg/kg, commercial is 2100 µg/kg; Dibenzo(a,h)anthracene residential is 15 µg/kg, commercial is 210 µg/kg.

[S] Pyrene is used as a surrogate

QAPP RL = quality assurance procedures plan reporting limit
DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)
SL = USEPA regional screening level, (USEPA, December 2009)
µg/kg = micrograms per kilogram
NE = regulatory standard not established
--- = background concentration could not be established because all background samples were non-detect for this constituent
(sat) = concentration may exceed saturation value
* = California modified preliminary remediation goal (USEPA 2004)
NA = not available
USEPA = United States Environmental Protection Agency

TABLE B-4

Soil Analyte Comparison Table - Semivolatile Organic Compounds - SW8270C

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (µg/kg)	DTSC CHHSL		EPA Regional SL (December 2009)		Background Levels (µg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
				Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)				
x	1,1´-Biphenyl	92-52-4	700	NE	NE	3,900,000 (sat)	51,000,000 (sat)	---	See note 2	No	No
x	1,2,4,5-Tetrachlorobenzene	95-94-3	700	NE	NE	18,000	180,000	---	See note 2	No	No
	1,2,4-Trichlorobenzene	120-82-1	330	NE	NE	22,000	99,000	---	See note 2	No	No
	1,2-Dichlorobenzene	95-50-1	330	NE	NE	1,900,000 (sat)	9,800,000 (sat)	---	See note 2	No	No
	1,3-Dichlorobenzene	541-73-1	330	NE	NE	530,000 ^	600,000 ^	---	See note 2	No	No
	1,4-Dichlorobenzene	106-46-7	330	NE	NE	2,400	12,000	---	See note 2	No	No
x	1,4-Dioxane	123-91-1	500	18,000	64,000	44,000	160,000	---	See note 2	No	No
x	2,3,4,6-Tetrachlorophenol	58-90-2	700	NE	NE	1,800,000	18,000,000	---	See note 2	No	No
	2,4,5-Trichlorophenol	95-95-4	700	NE	NE	6,100,000	62,000,000	---	See note 2	No	No
	2,4,6-Trichlorophenol	88-06-2	330	NE	NE	6,900 *	25,000 *	---	See note 2	No	No
	2,4-Dichlorophenol	120-83-2	330	NE	NE	180,000	1,800,000	---	See note 2	No	No
	2,4-Dimethylphenol	105-67-9	330	NE	NE	1,200,000	12,000,000	---	See note 2	No	No
	2,4-Dinitrophenol	51-28-5	330	NE	NE	120,000	1,200,000	---	See note 2	No	No
	2,4-Dinitrotoluene	121-14-2	330	NE	NE	1,600	5,500	---	See note 2	No	No
	2,6-Dinitrotoluene	606-20-2	330	NE	NE	61,000	620,000	---	See note 2	No	No
	2-Chloro naphthalene	91-58-7	330	NE	NE	6,300,000 (sat)	82,000,000 (sat)	---	See note 2	No	No
	2-Chlorophenol	95-57-8	330	NE	NE	63,000 ^	240,000 ^	---	See note 2	No	No
	2-Methyl naphthalene	91-57-6	330 [2]	NE	NE	310,000	4,100,000 (sat)	---	See note 2	No	No
	2-Methylphenol	95-48-7	330	NE	NE	3,100,000	31,000,000	---	See note 2	No	No
	2-Nitroaniline	88-74-4	700	NE	NE	180,000 ^	1,800,000 ^	---	See note 2	No	No
	2-Nitrophenol	88-75-5	700	NE	NE	NE	NE	---	See note 2	No	---
	3,3-Dichlorobenzidene	91-94-1	1,300	NE	NE	1,100	3,800	---	See note 2	No	Yes
	3-Nitroaniline	99-09-2	700	NE	NE	18,000 ^	82,000 ^	---	See note 2	No	No
	4,6-Dinitro-2-methylphenol	534-52-1	1,600	NE	NE	6,100	62,000	---	See note 2	No	No
	4-Bromophenyl phenyl ether	101-55-3	330	NE	NE	NE	NE	---	See note 2	No	---
	4-Chloro-3-methylphenol	59-50-7	600	NE	NE	6,100,000	62,000,000	---	See note 2	No	No
	4-Chloroaniline	106-47-8	700	NE	NE	2,400	8,600	---	See note 2	No	No
	4-Chlorophenyl phenyl ether	7005-72-3	330	NE	NE	NE	NE	---	See note 2	No	---
	4-Methylphenol	106-44-5	330	NE	NE	310,000	3,100,000	---	500	No	No
	4-Nitroaniline	100-01-6	700	NE	NE	24,000	86,000	---	See note 2	No	No
	4-Nitrophenol	100-02-7	700	NE	NE	NE	NE	---	See note 2	No	---
s1	Acena phthylene	208-96-8	330 [2]	NE	NE	1,700,000	17,000,000	---	See note 2	No	No

TABLE B-4

Soil Analyte Comparison Table - Semivolatile Organic Compounds - SW8270C

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (µg/kg)	DTSC CHHSL Residential (µg/kg)	DTSC CHHSL Commercial (µg/kg)	EPA Regional SL (December 2009) Residential (µg/kg)	EPA Regional SL (December 2009) Commercial (µg/kg)	Background Levels (µg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
	Acenaphthene	83-32-9	330 [2]	NE	NE	3,400,000	33,000,000	---	See note 2	No	No
x	Acetophenone	98-86-2	700	NE	NE	7,800,000 (sat)	100,000,000 (sat)	---	See note 2	No	No
	Anthracene	120-12-7	330 [2]	NE	NE	17,000,000	170,000,000	---	See note 2	No	No
x	Atrazine	1912-24-9	700	NE	NE	2,100	7,500	---	See note 2	No	No
x	Benzaldehyde	100-52-7	700	NE	NE	7,800,000 (sat)	100,000,000 (sat)	---	See note 2	No	No
3	Benzo (a) anthracene	56-55-3	330 [2]	NE	NE	380	1,300	---	See note 2	No	No
	Benzo (a) pyrene	50-32-8	330 [2]	38	130	15	210	---	See note 2	No	Yes
3	Benzo (b) fluoranthene	205-99-2	330 [2]	NE	NE	380	1,300	---	See note 2	No	No
s1	Benzo (ghi) perylene	191-24-2	330 [2]	NE	NE	1,700,000	17,000,000	---	See note 2	No	No
	Benzo (k) fluoranthene	207-08-9	330 [2]	NE	NE	380 *	1,300 *	---	See note 2	No	No
	Benzoic acid	65-85-0	5,000	NE	NE	240,000,000	2,500,000,000	---	See note 2	No	No
	Benzyl alcohol	100516	600	NE	NE	6,100,000	62,000,000	---	See note 2	No	No
	Bis (2-chloroethoxy) methane	111-91-1	330	NE	NE	180,000	1,800,000	---	See note 2	No	No
	Bis (2-chloroethyl) ether	111-44-4	330	NE	NE	210	1,000	---	See note 2	No	Yes
	Bis (2-chloroisopropyl) ether	108-60-1	330	NE	NE	4,600	22,000	---	See note 2	No	No
	Bis (2-ethylhexyl) phthalate	117-81-7	700	NE	NE	35,000	120,000	---	2900	No	No
	Butyl benzyl phthalate	85-68-7	1,000	NE	NE	260,000	910,000	---	See note 2	No	No
x	Caprolactam	105-60-2	700	NE	NE	31,000,000	310,000,000	---	See note 2	No	No
x	Carbazole	86-74-8	700	NE	NE	24,000 ^	86,000 ^	---	2800000	No	No
	Chrysene	218-01-9	330 [2]	NE	NE	3,800 *	13,000 *	---	See note 2	No	No
3	Dibenzo (a,h) anthracene	53-70-3	330 [2]	NE	NE	110	380	---	See note 2	No	Yes
	Dibenzofuran	132-64-9	330	NE	NE	150,000 ^	1,600,000 ^	---	See note 2	No	No
	Diethyl phthalate	84-66-2	330	NE	NE	49,000,000	490,000,000	---	See note 2	No	No
	Dimethyl phthalate	131-11-3	330	NE	NE	100,000,000 ^(max)	100,000,000 ^(max)	---	See note 2	No	No
	Di-N-butyl phthalate	84-74-2	330	NE	NE	6,100,000	62,000,000	---	47	Yes	Yes
	Di-N-octyl phthalate	117-84-0	1,000	NE	NE	2,400,000 ^	25,000,000 ^	---	See note 2	No	No
	Fluoranthene	206-44-0	330 [2]	NE	NE	2,300,000	22,000,000	---	See note 2	No	No
	Fluorene	86-73-7	330 [2]	NE	NE	2,300,000	22,000,000	---	See note 2	No	No
	Hexachlorobenzene	118-74-1	330	NE	NE	300	1,100	---	See note 2	No	Yes
	Hexachlorobutadiene	87-68-3	330	NE	NE	6,200	22,000	---	See note 2	No	No
x	Hexachlorocyclopentadiene	77-47-4	700	NE	NE	370,000	3,700,000	---	See note 2	No	No
	Hexachloroethane	67-72-1	330	NE	NE	35,000	120,000	---	See note 2	No	No

TABLE B-4

Soil Analyte Comparison Table - Semivolatile Organic Compounds - SW8270C

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (µg/kg)		DTSC CHHSL		EPA Regional SL (December 2009)		Background Levels (µg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
					Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)				
3	Indeno (1,2,3-cd) pyrene	193-39-5	330	2	NE	NE	380	1,300	---	See note 2	No	No
	Isophorone	78-59-1	330		NE	NE	510,000	1,800,000	---	See note 2	No	No
	Naphthalene	91-20-3	330		NE	NE	3,600	18,000	---	See note 2	No	No
	Nitrobenzene	98-95-3	330		NE	NE	4,800	24,000	---	See note 2	No	No
	N-Nitroso-di-n-propylamine	621-64-7	330		NE	NE	69	250	---	See note 2	No	Yes
	N-nitrosodiphenylamine	86-30-6	330		NE	NE	99,000	350,000	---	See note 2	No	No
	Pentachloro phenol	87-86-5	700		4,400	13,000	3,000	9,000	---	2500	No	No
s1	Phenanthrene	85-01-8	330	2	NE	NE	1,700,000	17,000,000	---	See note 2	No	No
	Phenol	108-95-2	330		NE	NE	18,000,000	180,000,000	---	See note 2	No	No
	Pyrene	129-00-0	330	2	NE	NE	1,700,000	17,000,000	---	See note 2	No	No

Notes:

All soil sample results will be reported in dry weight unless otherwise specified in the SAP.

[1] ECVs were calculated as needed for constituents detected during the Part A Phase 1 sampling.

[2] Analytes were analyzed by SW8270SIM to achieve a lower reporting limit.

[3] Calculated using California toxicity values. The EPA Regional SL for Benzo(a)anthracene, Benzo(b)fluoranthene and Indeno (1,2,3-c,d)pyrene residential is 150 µg/kg, commercial is 2100 µg/kg; Dibenzo(a,h)anthracene residential is 15 µg/kg, commercial is 210 µg/kg.

QAPP RL	= quality assurance procedures plan reporting limit
DTSC CHHSL	= California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)
µg/kg	= micrograms per kilogram
SL	= USEPA regional screening level, (USEPA, December 2009)
NE	= regulatory standard not established
(sat)	= concentration may exceed saturation value
s1	= pyrene is used as a surrogate.
(max)	= ceiling limit, not a risk-based value
^	= preliminary remediation goal, (USEPA, 2004)
---	= data not collected, available or applicable
x	= indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)
*	= California modified preliminary remediation goal, (USEPA, 2004)
USEPA	= United States Environmental Protection Agency

TABLE B-5
Soil Analyte Comparison Table - Volatile Organic Compounds - SW8260B
Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
	Analyte	CAS	QAPP RL (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)			
	1,1,1,2-Tetrachloroethane	630-20-6	5	NE	NE	1,900	9,300	See note 2	No	No
	1,1,1-Trichloroethane	71-55-6	5	NE	NE	8,700,000 (sat)	38,000,000 (sat)	See note 2	No	No
	1,1,2,2-Tetrachloroethane	79-34-5	5	NE	NE	560	2,800	See note 2	No	No
	1,1,2-Trichloroethane	79-00-5	5	NE	NE	1,100	5,300	See note 2	No	No
	1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	5	NE	NE	43,000,000 (sat)	180,000,000 (sat)	See note 2	No	No
	1,1-Dichloroethane	75-34-3	5	NE	NE	3,300	17,000	See note 2	No	No
	1,1-Dichloroethene	75-35-4	5	NE	NE	240,000	1,100,000	See note 2	No	No
s1	1,1-Dichloropropene	563-58-6	5	NE	NE	1,700	8,100	See note 2	No	No
	1,2,3-Trichlorobenzene	87-61-6	5	NE	NE	49,000	490,000 (sat)	See note 2	No	No
	1,2,3-Trichloropropane	96-18-4	5	NE	NE	5.0	95	See note 2	No	No
	1,2,4-Trichlorobenzene	120-82-1	5	NE	NE	22,000	99,000	See note 2	No	No
	1,2,4-Trimethylbenzene	95-63-6	6	NE	NE	62,000	260,000 (sat)	See note 2	No	No
	1,2-Dibromo-3-chloropropane	96-12-8	5	NE	NE	5.4	69	See note 2	No	No
	1,2-Dibromoethane	106-93-4	5	NE	NE	34	170	See note 2	No	No
	1,2-Dichlorobenzene	95-50-1	5	NE	NE	1,900,000 (sat)	9,800,000 (sat)	See note 2	No	No
	1,2-Dichloroethane	107-06-2	5	NE	NE	430	2,200	See note 2	No	No
	1,2-Dichloropropane	78-87-5	5	NE	NE	890	4,500	See note 2	No	No
	1,3,5-Trimethylbenzene	108-67-8	5	NE	NE	780,000 (sat)	10,000,000 (sat)	See note 2	No	No
	1,3-Dichlorobenzene	541-73-1	5	NE	NE	530,000^	600,000^	See note 2	No	No
	1,3-Dichloropropane	142-28-9	5	NE	NE	1,600,000	20,000,000 (sat)	See note 2	No	No
	1,4-Dichlorobenzene	106-46-7	5	NE	NE	2,400	12,000	See note 2	No	No
s2	2,2-Dichloropropane	594-20-7	5	NE	NE	890	4,500	See note 2	No	No
	2-Chlorotoluene	95-49-8	5	NE	NE	160,000^	560,000^	See note 2	No	No
x	2-Hexanone	591-78-6	10	NE	NE	210,000	1,400,000	See note 2	No	No
s3	4-Isopropyltoluene	99-87-6	6	NE	NE	2,100,000 (sat)	11,000,000 (sat)	See note 2	No	No
	Acetone	67-64-1	50	NE	NE	61,000,000	630,000,000 (sat)	See note 2	No	No
	Acrolein	107-02-8	100	NE	NE	150	650	See note 2	No	No
	Acrylonitrile	107-13-1	50	NE	NE	55^	120^	See note 2	No	No
	Benzene	71-43-2	5	NE	NE	1,100	5,400	See note 2	No	No
	Bromobenzene	108-86-1	5	NE	NE	300,000	1,800,000 (sat)	See note 2	No	No
s4	Bromochloromethane	74-97-5	5	NE	NE	270	1,400	See note 2	No	No
	Bromodichloromethane	75-27-4	5	NE	NE	270	1,400	See note 2	No	No
	Bromoform	75-25-2	5	NE	NE	61,000	220,000	See note 2	No	No
	Bromomethane	74-83-9	5	NE	NE	7,300	32,000	See note 2	No	No

TABLE B-5

Soil Analyte Comparison Table - Volatile Organic Compounds - SW8260B

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
	Analyte	CAS	QAPP RL (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)			
	Carbon disulfide	75-15-0	5	NE	NE	820,000 (sat)	3,700,000 (sat)	See note 2	No	No
	Carbon tetrachloride	56-23-5	5	NE	NE	250	1,200	See note 2	No	No
	Chloro benzene	108-90-7	5	NE	NE	290,000	1,400,000 (sat)	See note 2	No	No
	Chloroethane	75-00-3	5	NE	NE	15,000,000 (sat)	61,000,000 (sat)	See note 2	No	No
	Chloroform	67-66-3	5	NE	NE	290	1,500	See note 2	No	No
	Chloromethane	74-87-3	5	NE	NE	120,000	500,000	See note 2	No	No
	cis-1,2-Dichloro ethene	156-59-2	5	NE	NE	780,000	10,000,000 (sat)	See note 2	No	No
s1	cis-1,3-Dichloropropene	10061-01-5	5	NE	NE	1,700	8,100	See note 2	No	No
x	Cyclohexane	110-82-7	5	NE	NE	7,000,000 (sat)	29,000,000 (sat)	See note 2	No	No
	Dibromochloromethane	124-48-1	3	NE	NE	680	3,300	See note 2	No	No
	Dibromomethane	74-95-3	5	NE	NE	25,000	110,000	See note 2	No	No
	Dichlorodifluoromethane	75-71-8	5	NE	NE	180,000	780,000	See note 2	No	No
	Ethylbenzene	100-41-4	5	NE	NE	5,400	27,000	See note 2	No	No
	Hexachlorobutadiene	87-68-3	5	NE	NE	6,200	22,000	See note 2	No	No
	Isopropylbenzene	98-82-8	5	NE	NE	2,100,000 (sat)	11,000,000 (sat)	See note 2	No	No
s5	m,p-Xylenes	17261-72-7	10	NE	NE	3,400,000 (sat)	17,000,000 (sat)	See note 2	No	No
x	Methyl acetate	79-20-9	5	NE	NE	22,000,000 ^	92,000,000 ^	See note 2	No	No
	Methyl ethyl ketone	78-93-3	5	NE	NE	28,000,000 (sat)	200,000,000 (sat)	See note 2	No	No
	Methyl isobutyl ketone	108-10-1	50	NE	NE	5,300,000 (sat)	53,000,000 (sat)	See note 2	No	No
	Methyl tert-butyl ether (MTBE)	1634-04-4	20	NE	NE	43,000	220,000	See note 2	No	No
x	Methylcyclohexane	108-87-2	5	NE	NE	2,600,000 ^	8,700,000 ^	See note 2	No	No
	Methylene chloride	75-09-2	5	NE	NE	11,000	53,000	See note 2	No	No
	Naphthalene	91-20-3	5	NE	NE	3,600	18,000	See note 2	No	No
	N-Butylbenzene	104-51-8	5	NE	NE	240,000 ^(sat)	240,000 ^(sat)	See note 2	No	No
	N-Propylbenzene	103-65-1	5	NE	NE	240,000 ^(sat)	240,000 ^(sat)	See note 2	No	No
	o-Xylene	95-47-6	5	NE	NE	3,800,000 (sat)	19,000,000 (sat)	See note 2	No	No
	p-Chlorotoluene	106-43-4	5	NE	NE	5,500,000 (sat)	72,000,000 (sat)	See note 2	No	No
	sec-Butylbenzene	135-98-8	5	NE	NE	220,000 ^(sat)	220,000 ^(sat)	See note 2	No	No
	Styrene	100-42-5	5	NE	NE	6,300,000 (sat)	36,000,000 (sat)	See note 2	No	No
	tert-Butylbenzene	98-06-6	5	NE	NE	390,000 ^(sat)	390,000 ^(sat)	See note 2	No	No
	Tetrachloroethene	127-18-4	5	NE	NE	550	2,600	See note 2	No	No
	Toluene	108-88-3	5	NE	NE	5,000,000 (sat)	45,000,000 (sat)	See note 2	No	No
	trans-1,2-Dichloroethene	156-60-5	5	NE	NE	150,000	690,000	See note 2	No	No
s1	trans-1,3-Dichloropropene	10061-02-6	5	NE	NE	1,700	8,100	See note 2	No	No

TABLE B-5

Soil Analyte Comparison Table - Volatile Organic Compounds - SW8260B

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
	Analyte	CAS	QAPP RL (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)			
	Trichloroethene	79-01-6	5	NE	NE	2,800	14,000	See note 2	No	No
x	Trichlorofluoromethane (Freon 11)	75-69-4	5	NE	NE	790,000	3,400,000 (sat)	See note 2	No	No
	Vinyl chloride	75-01-4	5	NE	NE	60	1,700	See note 2	No	No
	Xylenes, total	1330-20-7	15	NE	NE	630,000 (sat)	2,700,000 (sat)	See note 2	No	No

Notes:

All soil samples are reported in dry weight unless otherwise specified.

[1] ECVs to be calculated as needed based on analytical results from Part A Phase 1 soil sampling.

QAPP RL = quality assurance procedures plan reporting limit

DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)

µg/kg = micrograms per kilogram

SL = USEPA regional screening level, (USEPA, December 2009)

s1 = 1,3-dichloropropene is used as a surrogate

s2 = 1,2-dichloropropane is used as a surrogate

s3 = isoproylbenzene is used as a surrogate

s4 = bromodichloromethane is used as a surrogate

s5 = m-xylene is used as a surrogate

* = California modified preliminary remediation goal (USEPA, 2004)

x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)

NE = regulatory standard not established

(sat) = concentration may exceed saturated value

^(sat) = preliminary remediation goal, (UPEPA 2004); saturation concentration, not a risk based value

^ = preliminary remediation goal, (UPEPA 2004)

USEPA = United States Environmental Protection Agency

TABLE B-6

Soil Analyte Comparison Table - Pesticides – SW8081A

Soil Investigation Part A, Phase 1 Data Summary Report, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)		Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Interim Screening Level 1 (µg/kg)	Does RL Exceed Screening Level?
	Analyte	CAS	QAPP RL (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)	Residential (µg/kg)	Commercial (µg/kg)				
	4,4-DDD	72-54-8	4	2,300	9,000	2,000	7,200	2.1	Yes	2.1	Yes
	4,4-DDE	72-55-9	4	1,600	6,300	1,400	5,100	2.1	Yes	2.1	Yes
	4,4-DDT	50-29-3	4	1,600	6,300	1,700	7,000	2.1	Yes	2.1	Yes
	Aldrin	309-00-2	4	33	130	29	100	See note 2	No	33	No
	alpha-BHC	319-84-6	4	NE	NE	77	270	See note 2	No	77	No
s1	alpha-Chlordane	5103-71-9	4	430	1,700	1,600	6,500	470	No	430	No
	beta-BHC	319-85-7	4	NE	NE	270	960	See note 2	No	270	No
	delta-BHC	319-84-8	4	NE	NE	77	270	See note 2	No	77	No
	Dieldrin	60-57-1	4	35	130	30	110	5	No	5.0	No
s3	Endo sulfan I	959-98-8	4	NE	NE	370,000	3,700,000	See note 2	No	370,000	No
s3	Endo sulfan II	33213-65-9	4	NE	NE	370,000	3,700,000	See note 2	No	370,000	No
s3	Endosulfan sulfate	1031-07-8	4	NE	NE	370,000	3,700,000	See note 2	No	370,000	No
	Endrin	72-20-8	4	21,000	230,000	18,000	180,000	See note 2	No	21,000	No
s4	Endrin aldehyde	7421-93-4	4	21,000	230,000	18,000	180,000	See note 2	No	21,000	No
x s4	Endrin ketone	53494-70-5	4	21,000	230,000	18,000	180,000	See note 2	No	21,000	No
	gamma-BHC	58-89-9	4	500	2,000	520	2,100	See note 2	No	500	No
s1	gamma-Chlordane	5103-74-2	4	430	1,700	1,600	6,500	470	No	430	No
	Heptachlor	76-44-8	4	130	520	110	380	See note 2	No	130	No
	Heptachlor Epoxide	1024-57-3	4	NE	NE	53	190	See note 2	No	53	No
	Methoxy chlor	72-43-5	20	340,000	3,800,000	310,000	3,100,000	See note 2	No	340,000	No
	Toxaphene	8001-35-2	100	460	1,800	440	1,600	See note 2	No	460	No

Notes:

[1] Interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used.

[2] ECVs were calculated as needed for constituents detected during the Part A Phase 1 sampling.

QAPP RL = quality assurance procedures plan reporting limit
DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)
SL = USEPA regional screening level, (USEPA, December 2009)
µg/kg = micrograms per kilogram
x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)
s1 = chlordane is used as a surrogate
s2 = alpha BHC is used as a surrogate
s3 = endolsulfan is used as a surrogate
s4 = endrin is used as a surrogate
NE = regulatory standard not established
USEPA = United States Environmental Protection Agency

TABLE B-7

Soil Analyte Comparison Table - Polychlorinated Biphenyls - SW8082

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

	Analyte	CAS	QAPP RL (µg/kg)	DTSC CHHSL Residential (µg/kg)	DTSC CHHSL Commercial (µg/kg)	EPA Regional SL (December 2009) Residential (µg/kg)	EPA Regional SL (December 2009) Commercial (µg/kg)	Soil Ecological Comparison Values (ECV) (ARCADIS, 2008) (µg/kg)	Does RL Exceed ECV Level?	Does RL Exceed Screening Level?
	Aroclor 1016	12674-11-2	50	89	300	3,900	21,000	See note 2	No	No
	Aroclor 1221	11104-28-2	50	89	300	140	540	See note 2	No	No
	Aroclor 1232	11141-16-5	50	89	300	140	540	See note 2	No	No
	Aroclor 1242	53469-21-9	50	89	300	220	740	See note 2	No	No
	Aroclor 1248	12672-29-6	50	89	300	220	740	See note 2	No	No
	Aroclor 1254	11097-69-1	50	89	300	220	740	See note 2	No	No
	Aroclor 1260	11096-82-5	50	89	300	220	740	See note 2	No	No
x s	Aroclor 1262	37324-23-5	50	89	300	220	740	See note 2	No	No
x s	Aroclor 1268	11100-14-4	50	89	300	220	740	See note 2	No	No
	Total PCBs	PCBT	50	NE	NE	NE	NE	204	No	No

Notes:

[1] ECVs to be calculated as needed based on analytical results from Part A Phase 1 soil sampling.

QAPP RL = quality assurance procedures plan reporting limit

DTSC CHHSL = California Department of Toxic Substances Control; California human health screening levels (OEHHA, 2005)

SL = USEPA regional screening level, (USEPA, December 2009)

µg/kg = micrograms per kilogram

NE = not established

s = PCB 1260 is used as a surrogate

x = indicates analytes from the Contract Laboratory Program Target Compound and Target Analyte Lists (TCL/TALs)

TABLE B-8

Soil Analyte Comparison Table - Total Petroleum Hydrocarbons - SW8015M

Soil Investigation Part B Phase 1 Work Plan, PG&E Topock Compressor Station, Needles, California

Analyte	**CAS**	**QAPP RL (mg/kg)**	**RWQCB ESL (mg/kg)**	**Does RL Exceed Screening Level?**
TPH as diesel	NA	10	540	No
TPH as gasoline	NA	1	540	No
TPH as motor oil	NA	10	1,800	No

Notes:

QAPP RL = quality assurance procedures plan reporting limit

RWQCB ESL = "San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27, 2008

mg/kg = milligrams per kilogram

TPH = total petroleum hydrocarbons

TABLE B-9
Decision 2 Data Gaps Summary – Within the Topock Compressor Station Fence Line
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Compound/ Depth	**Adequate EPC?**		**Maximum Detected Value**	**> HHCV or Background as Applicable?[a]**	**Proposed Sample ID**	**Notes**
	Y or N	**Det/# Results**		**Y or N**		
Metals						
Chromium-Total				1400 mg/kg	None	
0-0.5 ft bgs	Y	47 of 47	2100 mg/kg	Y		Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	68 of 68	2100 mg/kg	Y		
0-6 ft bgs	Y	69 of 69	2100 mg/kg	Y		
0-10 ft bgs	Y	69 of 69	2100 mg/kg	Y		
Chromium, Hexavalent				37 mg/kg	None	
0-0.5 ft bgs	Y	27 of 47	53 mg/kg	Y		Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	36 of 68	53 mg/kg	Y		
0-6 ft bgs	Y	37 of 69	53 mg/kg	Y		
0-10 ft bgs	Y	37 of 69	53 mg/kg	Y		
Lead				320 mg/kg	None	
0-0.5 ft bgs	Y	16 of 16	820 mg/kg	Y		Compound exceeds HHCV. Existing data adequate for EPC.
0-3 ft bgs	Y	27 of 27	820 mg/kg	Y		
0-6 ft bgs	Y	28 of 28	820 mg/kg	Y		
0-10 ft bgs	Y	28 of 28	820 mg/kg	Y		
Polycyclic Aromatic Hydrocarbons						
PAHs (BaP TEQ)				130 µg/kg		
0-0.5 ft bgs	N	4 of 9	320 µg/kg	Y	RA-1	Compound exceeds HHCV. Existing data are insufficient to allow calculation of a 95% UCL on the mean for 0-0.5 ft exposure interval. At a minimum, one more sample with detected BaP TEQ is required to calculate an EPC
0-3 ft bgs	Y	6 of 18	320 µg/kg	Y		
0-6 ft bgs	Y	6 of 18	320 µg/kg	Y		
0-10 ft bgs	Y	6 of 18	320 µg/kg	Y		

Footnotes:

[a] The higher value of either the HHCV or background was selected as the screening criteria and is included in these columns for the respective compound in BOLDED BLUE FONT. Values based on background are indicated with "(bckg)" next to the value.

Acronyms and Abbreviations:

BaP TEQ = benzo(a)pyrene toxic equivalents
EPC = exposure point concentration
ft bgs = feet below ground surface
HHCV = human health comparison values
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
N = No
NA = not applicable
Y = yes

TABLE B-10
Additional Data Needs by Applicable Remedial Technologies
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

	Excavation and Offsite Treatment/ Disposal	**Excavation and Onsite Treatment**	**Soil Flushing**	**Solidification /Stabilization**	**In-situ Chemical Reduction**	**Phytoremediation**	**Capping in Place**
Waste Characterization, Offsite Disposal [a]	Yes	No	No	No	No	No	No
Soil Physical Properties	Soil Classification	pH Particle Size Distribution Soil Classification	pH Particle Size Distribution Soil Classification	pH Soil Classification	Alkalinity pH Cation Exchange Capacity Particle Size Distribution Soil Classification	Soil Texture	Soil Classification Relative Compaction Atterberg Limits

Notes:

[a] Waste Characterization Parameters Include:

TTLC – SW-846 6010B/7471A/7470A

STLC – Title 22, Division 4.5, Chapter 11, Article 5, Appendix II, Waste Extraction Test (WET)

TCLP for metals – SW-846 1311/SW-846 6010B/7470A

If organic compounds are suspected or “solvent like” odors are encountered additional analysis may be warranted. These may include but are not limited to or specifically required for any sample and will be determined on case-by-case basis.

TCLP SW-846 1311 (organic)

Reactivity - Title 22, Division 4.5, Chapter 11, Article 3, Section 66261.23

Ignitability - SW-846 1010/1020

Corrosivity - SW-846 9040

TABLE B-11
Data Quality Objectives – Part B Soil Investigation
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
Contaminants in soil in SWMUs/AOCs inside the compressor station fence line resulting from historical compressor station practices may pose an unacceptable risk to humans or the environment, or threaten groundwater. Adequate site-specific information is needed to: • Determine the nature and extent of soil contamination. • Estimate representative EPCs to support human health risk assessment being conducted separately from the Part B soil investigation. • Determine whether residual soil concentrations inside the compressor station fence line pose a threat to groundwater. • Determine whether migration of residual soil concentrations inside the compressor station fence line via a surface migration pathway pose a threat to receptors outside the compressor station fence line. • Determine the site-specific soil property and contaminant distribution information necessary to support the CMS/FS, remedial design, and/or interim measures.	**<u>Decision 1</u>** Determine the nature and extent of residual soil concentrations resulting from historical compressor station practices. If determination of the nature and extent of contamination based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment and/or the CMS/FS or Interim Measures.	• COPCs by AOC/SWMU • Part B and representative Category 1 and 2 historical RFI/RI COPC data grouped by AOC/SWMU • Comparison/screening values (background, risk-based, and regulatory screening values) • CSMs • Geologic/hydrogeologic/hydrologic information • Topographic information • Soil physical and chemical property information • AOC/SWMU location and use history information • Cultural and historical information by AOC/SWMU • Infrastructure information by AOC/SWMU	**Lateral Extent** *For onsite units included in the Final RFI/RI:* Initially, the same as the currently defined boundaries of each SWMU and AOC: Lateral extent will be expanded if/as necessary until COPCs concentrations fall below screening values. If samples are collected outside the fence line in areas that provide significant habitat, then data will be compared with ecological comparison values and constituents of potential ecological concern identified. The lateral extent of AOC 13 is to the fence line, where unpaved areas extend to the fence line. Onsite units included in the Final RFI/RI include SWMUs 5, 6, 8, and 9; Units 4.3, 4.4, and 4.5; and AOCs 5, 6, 7, 8, 13, 15, 16, 17, 18, 19, and 20. *For newly identified areas*: Initially, the tentative outline shown in Part B DQO Tech Memo Figure 1. Newly identified areas include SWMU 11; AOCs 21, 22, 23, 24, 25[a], and 26; the potential burn area near AOC 17; and the motor oil pit at the former Teapot Dome facility. *For the perimeter area:* initially from the facility fence line outward to the toe of the slope. Existing and former storm drain outfalls will initially be investigated during Part B investigation. *For storm drains:* Initially, the lateral extent of the storm drain alignment. **Vertical Extent** Vertical study area boundaries extend from the ground surface to the water table. **Analytical Parameters** *Chemical Parameters (COPC):* • TPH, VOCs, and SVOCs (including PAHs) for SMWUs 5, 6, 8, and 9 • Title 22 metals, Cr(VI), and pH for SWMU 11 • Title 22 metals, VOCs, SVOCs (including PAHs), and pH for Unit 4.3 • Title 22 metals, VOCs, and SVOCs (including PAHs) for Unit 4.4 • TPH, VOCs, and SVOCs (including PAHs) for Unit 4.5 • Title 22 metals, Cr(VI), and pH for AOCs 5, 6, 15, and 19 • VOCs, SVOCs including PAHs, PCBs, TPH, Cr(VI), pH, and Title 22 metals for AOC 7 • TPH, VOCs, and Title 22 metals for AOC 8 • Title 22 metals, Cr(VI), VOCs, TPH, PAHs, PCBs, SVOCs, and asbestos for AOC 13 • Title 22 metals for AOC 16 • Title 22 metals, Cr(VI), VOCs, TPH, PAHs, and SVOCs for AOC 17, and AOC 18 • Title 22 metals, Cr(VI), TPH, VOCs, and PAHs for AOC 20 • Calcium, sodium, Cr(VI), pH, and Title 22 metals for AOC 21 • VOCs and SVOCs including PAHs, PCBs, TPH, Cr(VI), pH, and Title 22 metals for AOCs 22, 23, 24, 25, and 26 • TPH, VOCs, and SVOCs including PAHs, PCBs, and Title 22 metals for the motor oil pit at the former Teapot Dome facility	See Part B DQO Tech Memo Figure 2 for the Decision 1 decision rule

TABLE B-11
Data Quality Objectives – Part B Soil Investigation
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
			• VOCs and SVOCs including PAHs, PCBs, TPH, Cr(VI), pH, Title 22 metals, and dioxins/furans for the potential burn area near AOC 17 *Other parameters:* Select samples will be analyzed to characterize the soluble fraction of compounds present at concentrations exceeding 10 x TTLC or 20 x TCLP values. SPLP will be performed on approximately two soil samples per AOC and will be analyzed for Cr(VI) and total chromium. Ten percent of samples will be analyzed for the CERCLA TAL/TCL compounds. **Temporal Boundaries** Validated Part B soil sampling data and representative Category 1 and Category 2 historical RFI/RI data (based on the final Data Usability Assessment).	
	<u>Decision 2</u> Determine representative EPCs for residual soil contamination resulting from historical compressor station practices. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment.	• Nature and extent of contamination assessment from Decision 1 • Part B and representative Category 1 historical RFI/RI COPC data grouped by exposure area and depth interval • Comparison/screening values (background, risk-based, and regulatory screening values) • Existing surface and subsurface utilities, pavement, buildings, and other structures • RAWP CSM • Geologic/hydrogeologic/hydrologic information • Topographic information • Soil physical and chemical property information • Site Worker activities and practices by AOC/SWMU, AOC/SWMU location, and use history information • Cultural and historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	**Lateral Extent** Same as for Decision 1. **Vertical Extent** Vertical study area boundaries for Decision 2 are defined by potential maximum exposure depths. *For onsite workers*: the maximum exposure depth is 3 feet bgs. *For maintenance workers*: the maximum exposure depth is defined as 0 to 10 feet bgs. *For potential receptors outside the fence line*: surface interval only (0 to 0.5 foot bgs). For areas within the fence line (i.e., soil that could potentially be transported to areas outside the compressor station fence line); Part A parameters apply in the perimeter area and to storm drain sampling along outfalls outside the fence line. **Analytical Parameters** Same as for Decision 1. **Temporal Boundaries** Validated Part B soil sampling data and representative Category 1 historical RFI/RI data (based on the final Data Usability Assessment).	See Part B DQO Tech Memo Figure 3 for the Decision 2 decision rule
	<u>Decision 3</u> Determine whether residual soil concentrations resulting from historical compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat, or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address threat to groundwater.	• Nature and extent of contamination assessment from Decision 1 • Data collected from compressor station wells installed during East Ravine Groundwater Investigation • COPCs by AOC/SWMU • Part B and representative Category 1 and 2 historical RFI/RI COPC data grouped by AOC/SWMU • Comparison/screening values (SSLs, groundwater background values, and groundwater/ drinking water ARARs, including maximum contaminant limits) • CSMs • Geologic/hydrogeologic/hydrologic information	**Lateral Extent** Those portions of each AOC/SWMU where COPC concentrations exceed SSLs. **Vertical Extent** Same as for Decision 1. **Analytical Parameters** *Chemical Parameters (COPCs):* Same as for Decision 1. *Other Parameters: Soil Characteristics* (to support modeling): Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes.	See Part B DQO Tech Memo Figure 4 for the Decision 3 decision rule

TABLE B-11
Data Quality Objectives – Part B Soil Investigation
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	STEP 2 Decision Statement	STEP 3 Inputs to the Decision	STEP 4 Study Area Boundaries	STEP 5 Decision Rules
		• Sources of recharge within the compressor station • Topographic information • Soil physical and chemical property information • AOC/SWMU location and use history information • Cultural and historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	**Temporal Boundaries** Same as for Decision 1.	
	<u>Decision 4</u> Determine if residual soil concentrations inside the compressor station fence line resulting from historical compressor station practices pose a potentially unacceptable risk to receptors outside the compressor station fence line via a surface migration pathway. If a potentially unacceptable risk to receptors outside the fence line exists, or if determination of potential risk to receptors outside the fence line based on sample data is not feasible, develop controls to eliminate migration pathways or remove contaminated soil.	• Nature and extent of contamination assessment from Decision 1 • Part B and representative Category 1 historical RFI/RI COPC data grouped by depth interval • Mechanisms, directions and rates of migration • Interim screening levels from Soil Part A Program • Existing surface and subsurface utilities, pavement, buildings, and other structures • RAWP CSM • Geologic/hydrogeologic/hydrologic information • Topographic information • Soil physical and chemical property information • AOC/SWMU location and use history information • Cultural and historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	**Lateral Extent** Same as for Decision 1. **Vertical Extent** 0 to 0.5 foot bgs, except within the perimeter area, where the vertical boundary is 1.0 foot bgs. **Analytical Parameters** *Chemical Parameters (COCs):* Same as COPCs for Decision 1. **Temporal Boundaries** Same as for Decision 1.	See Part B DQO Tech Memo Figure 5 for the Decision 4 decision rule
	<u>Decision 5</u> Determine the site-specific soil property, contaminant distribution, and transport pathway information necessary to support the CMS/FS, remedial design, and/or Interim Measures, if required. If full determination of site-specific soil property, contaminant distribution, and transport pathway information based on sample data is not feasible, document impediments and uncertainties in the risk assessment and/or CMS/FS or interim measures.	• Nature and extent of contamination assessment from Decision 1 • Constituents of concern from human health and ecological risk assessments • Remedial action objectives and ARARs • Risk-based and regulatory soil and/or sediment cleanup levels • Estimated soil areas and volumes • Waste classification testing results for soil, as required • Waste comparison/screening levels (TTLC, STLC, RCRA toxicity) • Soil physical and chemical property information • Geologic/hydrogeologic/hydrologic information • Topographic information • Location of paved/unpaved areas	**Lateral Extent** Initially, same as for Decision 1, to be refined based on results of risk assessments and threat to groundwater assessments. **Vertical Extent** Initially, same as for Decision 1, to be refined based on results of risk assessments, threat to groundwater assessments, and remedial alternative practical constraints. **Analytical Parameters** *Chemical Parameters (COCs):* Initially, same as COPCs for Decision 1, to be refined to specific COCs based on results of risk assessments and threat to groundwater assessments. *Soil Characteristics* (to support evaluation of remedial or interim measures): Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes. **Temporal Boundaries** Same as for Decision 1.	See Part B DQO Tech Memo Figure 6 for the Decision 5 decision rule

TABLE B-11
Data Quality Objectives – Part B Soil Investigation
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
		• AOC/SWMU location and use history information • Historical information by AOC/SWMU • Infrastructure information by AOC/SWMU		

Notes:

[a] This unit was identified as AOC 26 in the DTSC comments; however, AOC 25 as identified in the DTSC comments is a small, rectangular area carved out of the rock face near AOC 10 (East Ravine) that may have been used for explosives storage. Because the unit is outside the Topock Compressor Station, it will be further evaluated as needed in coordination with the Part A soil investigation.

The list of analytical parameters is based on CSM and will be refined after each round of investigation/data evaluation. COCs will be selected based on the risk assessment.

ARARs = applicable or relevant and appropriate requirements.
COC = constituent of concern.
Cr(VI) = hexavalent chromium.
TPH = total petroleum hydrocarbons.

TABLE B-12
Proposed Part B Phase 1 Sampling Summary
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

	Additional Number of Samples and Locations Proposed to Address Data Gaps[a]			
Unit	**Decision 1 – Nature and Extent**	**Decision 2 – Data Sufficiency to Calculate EPCs**	**Decision 5 – Data Sufficiency for CMS/FS**	**Other**
SWMU 5	Not applicable	Not applicable	Not applicable	Two additional locations for organics (sub-AppendixB2, Table B2-3)
SWMU 6	Not applicable	Not applicable	Not applicable	One additional locations for organics (sub-AppendixB3, Table B3-3)
SWMU 8	Not applicable	Not applicable	Not applicable	One additional locations for organics (sub-AppendixB4, Table B4-3)
SWMU 9	Not applicable	Not applicable	Not applicable	One additional locations for organics (sub-AppendixB5, Table B5-2)
SWMU 11	Seven additional borings (sub-Appendix B6, Table B6-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 5	Six additional borings (sub-Appendix B7, Table B7-5)	None	Two samples from various depths interval to evaluate soil physical properties	None
AOC 6	Six additional borings (sub-Appendix B8, Table B8-4)	None	Two samples from various depths interval to evaluate soil physical properties	None
AOC 7	Five additional borings (sub-Appendix B9, Table B9-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 8	Two additional borings (sub-Appendix B10, Table B10-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 13	Thirty-four additional borings (sub-Appendix B11, Table B11-10	None	Two sample from various depths interval to evaluate soil physical properties	None
AOC 15	Six additional borings (sub-Appendix B12, Table B12-4)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 16	Four additional borings (sub-Appendix B13, Table B13-4)	None	One sample from various depths interval to evaluate soil physical properties	None

TABLE B-12
Proposed Part B Phase 1 Sampling Summary
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

	Additional Number of Samples and Locations Proposed to Address Data Gaps[a]			
Unit	**Decision 1 – Nature and Extent**	**Decision 2 – Data Sufficiency to Calculate EPCs**	**Decision 5 – Data Sufficiency for CMS/FS**	**Other**
AOC 17	Five additional borings (sub-Appendix B14, Table B14-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 18	Not applicable	Not applicable	Not applicable	Twelve additional borings (sub-Appendix B15, Table B15-4)
AOC 19	Five additional borings (sub-Appendix B16, Table B16-5)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 20	Eight additional borings (sub-Appendix B17, Table B17-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 21	Two borings (sub-Appendix B18, Table B18-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 22	Two borings (sub-Appendix B19, Table B19-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 23	Three borings (sub-Appendix B20, Table B20-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 24	Two borings (sub-Appendix B21, Table B21-2)	None	One sample from various depths interval to evaluate soil physical properties	None
AOC 25	None; access restrictions prevent sampling	None	None; access restrictions prevent sampling	None
AOC 26	One boring (sub-Appendix B23, Table B23-2)	None	One sample from various depths interval to evaluate soil physical properties	None
Units 4.3, 4.4, and 4.5	Not applicable	Not applicable	Not applicable	Two additional locations for organics (sub-AppendixB24, Table B24-2)

Notes:

[a] Decisions 3 – Potential Threat to Ground water and Decision 4 - Potential Migration to Areas Outside the Fence Line were not assed as part of this work plan because of insufficient data. These decisions will be assessed after the implementation of this work plan.

TABLE B-13
Summary of Number and Type of Risers in Each Area
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

		Type of Risers							
Area No.	**Area Name**	**No. of Risers[a]**	**Gas**	**Elect.**	**Odor[b]**	**Water[c]**	**ESD[d]**	**WW[e]**	**Comments**
		LOWER YARD							
1A	Storage Containers and Material Storage Area	None							
1B	Small Odorant Tank, North	9	X		X				
1C	Odorant Flare	4	X	X	X				
1D	Transwestern Tie-in and Pipeline Drip	12	X		X				Main gas[f]
1E	Grit Tank	11		X				X	
1F	Chromatograph Building	12	X	X	X				
1G	North Scrubbers	40	X	X	X				Main gas
	TOTAL AREA 1	**88**	**X**	**X**	**X**			**X**	
2A	Meter Building	9	X	X	X	X			
2B	Small Odorant Tank by Meter Building	7	X	X	X				
2C	ESD by Meter Building	3	X			X	X		
2D	SCADA Cabinet near Meter Building	17	X	X					
2E	Misc. Utilities near Meter Building	5		X					Three vaults
2F	Trunk Line Valve Area South of Meter Building	10	X	X					Main gas
2G	Valve Nest West of South Scrubbers	8	X	X					
2H	South Scrubbers	34	X	X					Main gas
2I	Valve Nest South of South Scrubbers	41	X	X	X	X			Main gas, two vaults, panel, utility trench, pipe coming from upper yard
	TOTAL AREA 2	**134**	**X**	**X**	**X**	**X**	**X**		
3A	Misc. Utility Area Between Oily Water Treatment System and South Scrubbers	None	X	X	X			X	Three vaults; utility trench
3B	Misc. Utility Area East and South of Units 4.3, 4.4,	None	X	X			X		Two vaults, anode[g]

TABLE B-13
Summary of Number and Type of Risers in Each Area
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

		Type of Risers							
Area No.	**Area Name**	**No. of Risers[a]**	**Gas**	**Elect.**	**Odor[b]**	**Water[c]**	**ESD[d]**	**WW[e]**	**Comments**
	and 4.5								
3C	Units 4.3, 4.4, and 4.5	20		X				X	SCADA
3D	Old Odorant Tank near Units 4.3, 4.4, and 4.5	3	X		X				
	TOTAL AREA 3	**23**	**X**	**X**	**X**		**X**	**X**	
4A	Utilities West, Northwest, and North of Sandblast Shelter, Typical of Utilities along Fence Line	10		X		X			Old and new anode, telecom
4B	Septic Tank Area (includes Fence Line to Gate by Sandblast Area)	12		X				X	Telecom
4C	Warehouse Building, Including Fence Line to AOC 4 Gate	1		X					
	TOTAL AREA 4	**23**		**X**		**X**		**X**	
5A	South Valve Nest	78	X	X	X	X			Main gas, SCADA, six vaults, utility trench, two anodes to NW
5B	New Odorant Tank[h]	4	X	X	X	X			
	TOTAL AREA 5	**82**	**X**	**X**	**X**	**X**			
UPPER YARD									
6	Cooling Tower B (AOC 6)	91		X		X			Main gas, cooling water, sulfuric acid, telecom, plant air, instrument air
	TOTAL AREA 6	**91**		**X**		**X**			
7	New Odorant Tank and Valve Nest North of Cooling Tower B[h]	71	X	X	X	X	X		Eleven vaults, air
	TOTAL AREA 7	**71**	**X**	**X**	**X**	**X**	**X**		
8	Compressor Building	89	X	X					Main gas, air, lube oil, lube oil cooling water, jacket cooling water
	TOTAL AREA 8	**89**	**X**	**X**					

TABLE B-13
Summary of Number and Type of Risers in Each Area
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

		Type of Risers							
Area No.	**Area Name**	**No. of Risers[a]**	**Gas**	**Elect.**	**Odor[b]**	**Water[c]**	**ESD[d]**	**WW[e]**	**Comments**
9	Cooling Tower A (AOC 5)	82		X		X	X	X	Main gas, sulfuric acid, cooling water, seven vaults, two anodes, SCADA
	TOTAL AREA 9	**82**		**X**		**X**	**X**	**X**	
10A	Fuel Tank Area[h]	12		X			X		Air, one vault
10B	Office Building[h]	16		X		X			Irrigation lines
10C	Warehouse[h]	40	X	X		X			Telecom
10D	Carport[h]	9		X					Automatic shutoff for fuel tanks
	TOTAL AREA 10	**77**	**X**	**X**		**X**	**X**		
11A	Steam-cleaning Area	None							
11B	Tank Farm	25		X				X	
11C	Visitor Parking Lot including Fence Line[h]	7		X					
	TOTAL AREA 11	**32**		**X**				**X**	
12	Jacket Water Coolers	91		X		X			Air, jacket cooling water, SCADA, three vaults
	TOTAL AREA 12	**91**		**X**		**X**			
13A	Auxiliary Jacket Water Coolers and AOC 15 (Auxiliary Jacket Cooling Water Pumps)	62		X					Auxiliary cooling water, SCADA, one anode
13B	Control Building	1		X					Two large vaults
	TOTAL AREA 13	**63**		**X**					
14A	Auxiliary Building	17	X	X		X	X		Main gas, air, waste oil, auxiliary lube oil cooling water, pipe trench, one vault
14B	Emergency Generator Area (South of Auxiliary Building)	9	X	X		X			Four vaults
	TOTAL AREA 14	**26**	**X**	**X**		**X**	**X**		

TABLE B-13
Summary of Number and Type of Risers in Each Area
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

		Type of Risers							
Area No.	**Area Name**	**No. of Risers[a]**	**Gas**	**Elect.**	**Odor[b]**	**Water[c]**	**ESD[d]**	**WW[e]**	**Comments**
15	Water Conditioning Building and Fire Pump Room	35	X	X		X			SCADA, one vault, two anodes
	TOTAL AREA 15	**35**	**X**	**X**		**X**			
16A	AOC 7/8 (Hazardous Materials Storage Area and Paint Shed), Carpenter Shop, Open Structure[h]	9		X		X			
16B	Technical Maintenance Shop and Weld Building; Air Dryer Room[h]	27		X		X			
16C	Open area between Air Dryer Building and Visitor Parking Lot[h]	None							
	TOTAL AREA 16	**36**		**X**		**X**			
	Other: Light Standard, Typical[h]	1		X					

Notes:

[a] Risers are defined as utilities entering or exiting the subsurface. Other utilities may be present (e.g., stormwater lines and/or aboveground piping of various types).

[b] Odorant.

[c] Includes plant water and fire water; does not include wastewater or cooling water.

[d] Emergency shutoff device (disruption of this device triggers an automatic shutdown of the compressor station).

[e] Wastewater (water discharged to or from oily water treatment system).

[f] Main gas pipeline (typically 30- to 34-inch pipeline).

[g] Presence of active anodes indicates water lines must be present (water drip is required to keep anode wet/functioning).

[h] Utility counts for light standards and along fence line are incomplete.

TABLE B-14
Summary of Initial Safety Classifications
Soil Investigation Part B Phase 1 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

		Safety Implications of Sample Collection[a]	
Area Type	**Direct Access to Soil?**	**Surface/Shallow Soils**[b] **(≤ 1 foot bgs)**	**Subsurface (> 1 foot bgs)**
1	Yes	Safe	Unsafe
2	No	Safe[c]	Unsafe
3	Yes	Safe[d]	Unsafe
4	No	Unsafe	Unsafe
5	No	Unsafe	Unsafe

Notes:

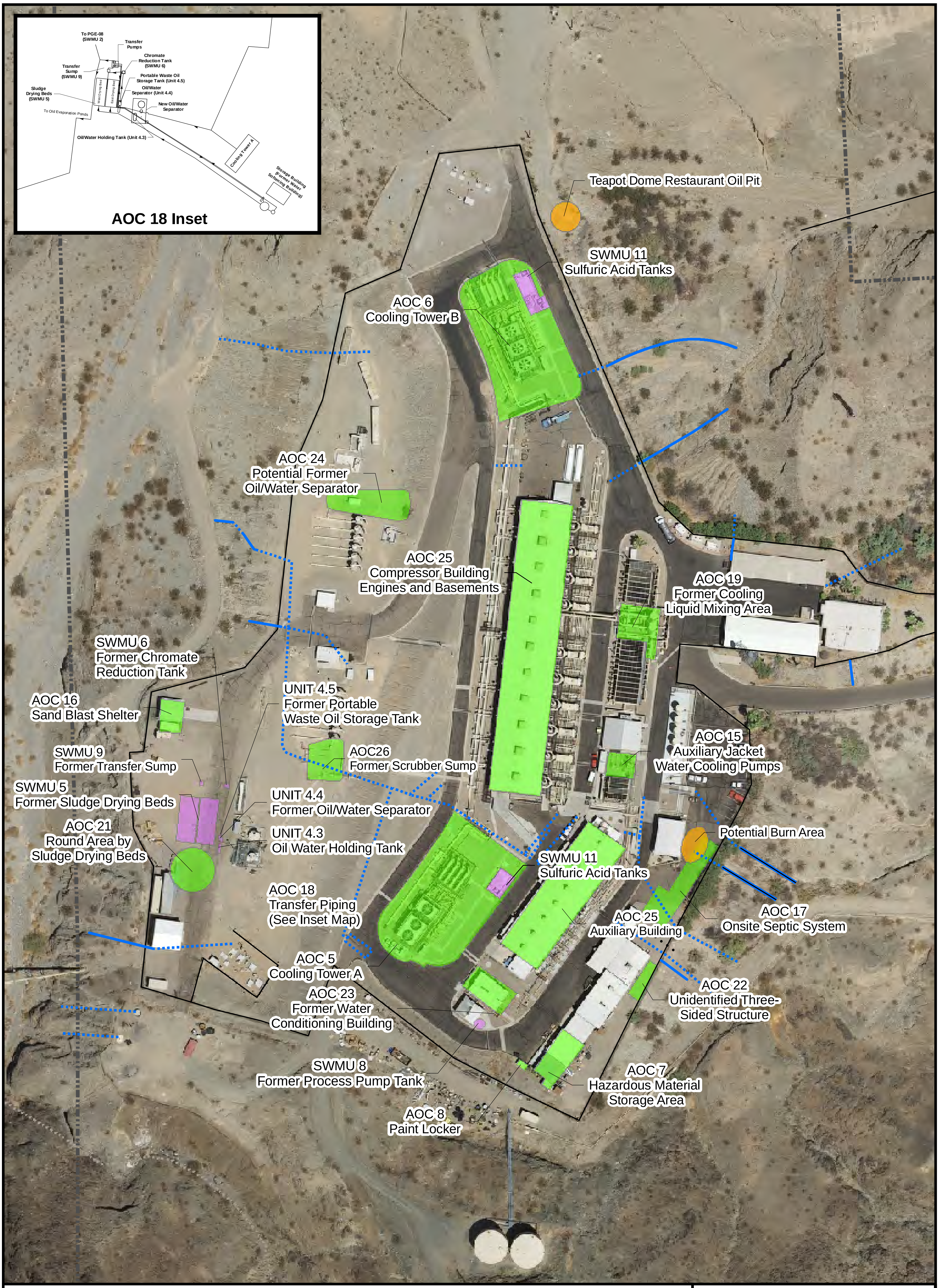
[a] The ratings presented are preliminary. Prior to any intrusive work, strict utility locating protocols must be followed.

[b] The term “surface/shallow soils” is intended to apply to depths easily sample using small hand tools. Generally, this infers a depth of 1 foot bgs or less.

[c] Given the presence of asphalt/concrete, any potential exposure/mitigation risks associated with contaminants that may be present are currently mitigated. Thus, risks associated with even shallow excavation are greater than those associated with any contaminants, and excavation is not recommended in these areas.

[d] While there is direct access to surface soils at these locations, aboveground operational structures limit workers’ abilities to collect soil samples deeper then the ground surface.

Figures



LEGEND

🟪	Soild Waste Management Unit (SWMU)
🟩	Area of Concern (AOC)
🟧	Other Areas
—	Site Fence Boundary
━	Former Stormwater Pipeline
━	Stormwater Piping Above Ground (Approximate Location)
┅	Stormwater Piping Below Ground (Approximate Location)
• • • •	Alternate Stormwater Piping Below Ground (Approximate Location)

Notes:
1) AOC 13 is not depicted on this figure. It consists of the unpaved areas within the compressor station.

2) AOC 20 is not depicted on this figure. It consists of industrial floor drains within the compressor station.

3) Boundaries of all SWMUs, AOCs, and Other Areas are approximate.

N

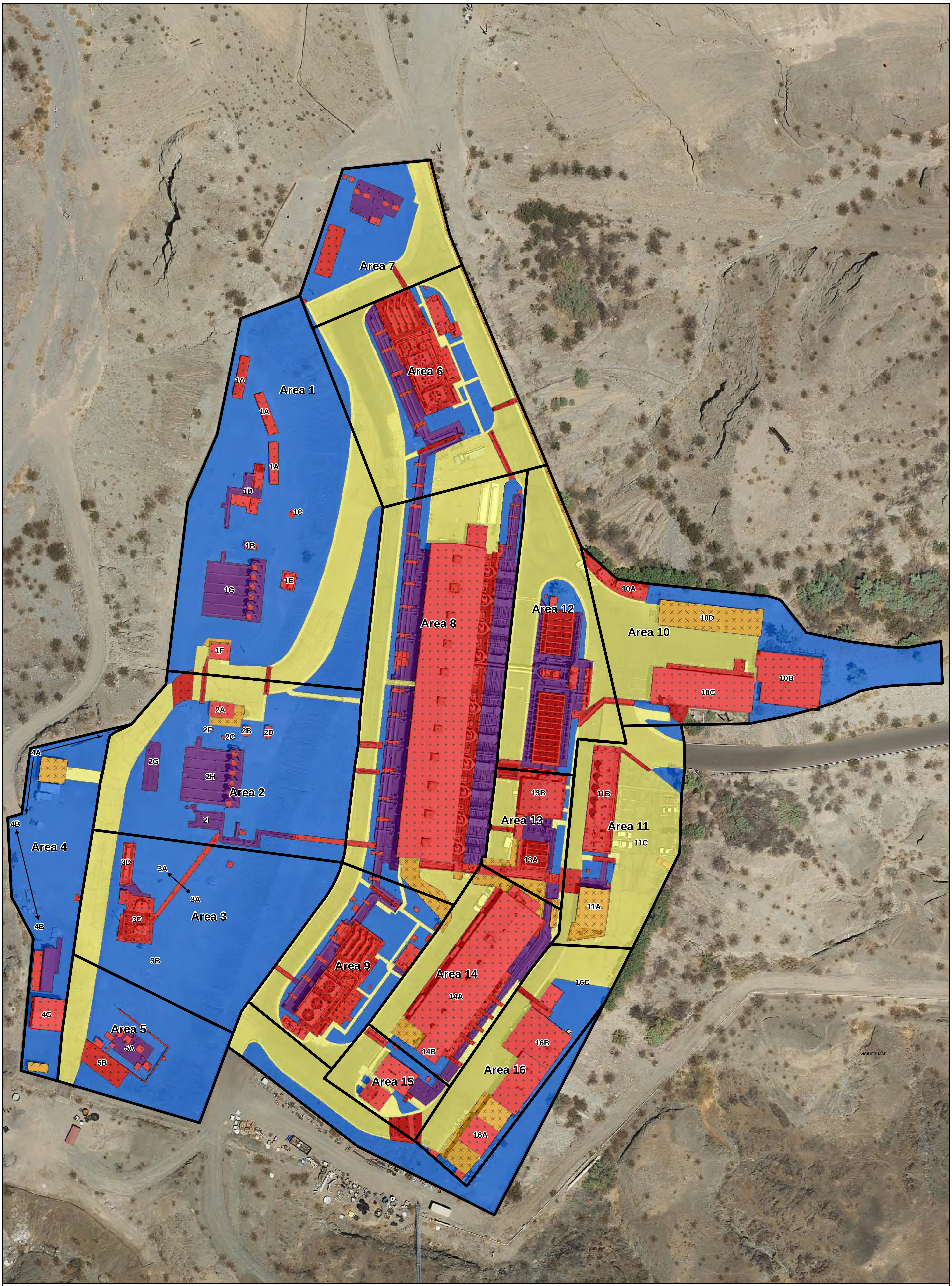
0 100 200 Feet

FIGURE B-1
SOLID WASTE MANAGEMENT UNITS, AREAS OF CONCERN, AND OTHER UNITS TO BE INVESTIGATED UNDER PART B SOIL INVESTIGATION

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL

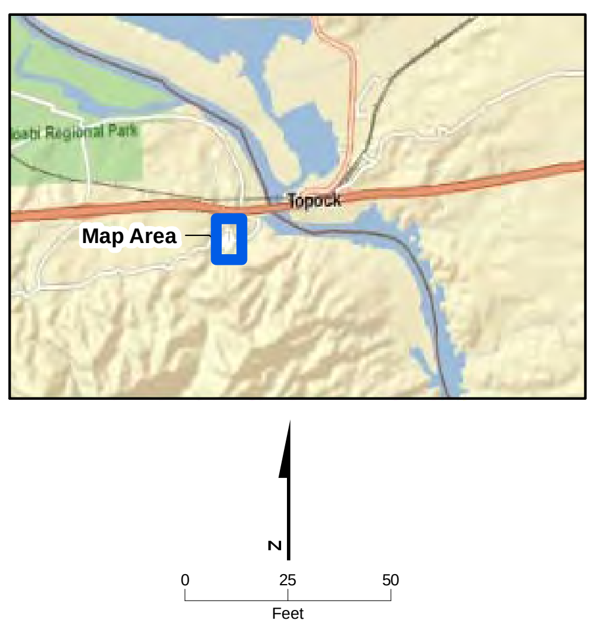
\\D\Projects\Topock\MAPFILES\2011\SWP_B\All_SWMU_AOC_Locs11X17_V2



COLOR CODE[1]	DESCRIPTION	DIRECT ACCESS TO SOIL?	SAFETY IMPLICATIONS OF SAMPLE COLLECTION[5]	
			SURFACE/ SHALLOW SOILS [2]	DEEPER SOILS [2]
RED	Operational TCS building or element of operational infrastructure.	NO	UNSAFE	UNSAFE
ORANGE	Covered operational structure or area of thick concrete cover located in close proximity to known dense underground utilities.	NO	UNSAFE	UNSAFE
YELLOW	Asphalt or thin concrete cover away from above ground infrastructure or known dense underground utilities.	NO	SAFE [3]	UNSAFE
PURPLE	Close proximity to above ground operational infrastructure without asphalt or concrete cover.	YES	SAFE [4]	UNSAFE
BLUE	Away from above ground operational infrastructure without asphalt or concrete cover.	YES	SAFE	UNSAFE

Notes:

1. Color code boundaries were established based on field observation only and are not surveyed or based on as-built records. Boundaries are approximate within 10-15 feet.
2. The term "surface/shallow soils" is intended to apply to depths easily sampled using small hand tools. Generally this infers a depth of 1 foot below ground surface, or less.
3. Given the presence of asphalt/concrete, any potential exposure/migration risks associated with contaminants that may be present are currently mitigated. Thus, risks associated with even shallow excavation are greater than those associated with any contaminants, and excavation is not recommended in these areas.
4. While there is direct access to surface soils at these locations, above ground operational structures limit worker s ability to collect soil samples deeper than the ground surface.
5. The locations of known utility corridors are approximate, and not all utilities are known. Prior to any intrusive work, strict utility location protocols must be followed. In consideration of safety, PG&E reserves the right to change/adjust the safety implications of sample collection in each area based on the results of utility location surveys or observations made during excavation.
6. See attached Table X for additional notes related to utilities in each area.



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Draft 02-07-2011

FIGURE B-2
Topock Compressor Station Accessibility Map

PG&E Company Topock Compressor Station
Topock, California

Pacific Gas and Electric Company

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Appendix B1

Data Quality Objectives Technical Memorandum – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

TECHNICAL MEMORANDUM CH2MHILL

Final Data Quality Objectives Steps 1 through 5 Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

PREPARED FOR: Pacific Gas and Electric Company

PREPARED BY: CH2M HILL

DATE: February 22, 2011

REGISTERED GEOLOGIST
KEITH R. SHEETS
No. 6888
STATE OF CALIFORNIA

Keith Sheets, P.G. No. 6888
Senior Hydrogeologist

1.0 Introduction

The purpose of this technical memorandum is to document the results of Steps 1 through 5 of the data quality objectives (DQOs) process for the soil investigation inside the fence line of the Topock Compressor Station. The proposed investigation program was described in the *PG&E Topock Compressor Station, Needles, California Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part B* (CH2M HILL, 2007a), referred to as the Draft Soil Part B Work Plan. Steps 1 through 5 of the Soil Part B DQOs were developed in response to California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and United States Department of the Interior (DOI) comments on the Draft Soil Part B Work Plan and followed the general approach used for the Soil Part A (outside the fence line) DQOs, Steps 1 through 5, as outlined in the *Data Quality Objectives Steps 1 through 5 – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (Soil Part A Data Quality Objectives Technical Memorandum) (CH2M HILL, 2010a). Consistent with Part A, Part B Steps 6 and 7 will be completed during working meetings to be held following implementation of the soil investigation. The soil investigation program inside the fence line addresses four Solid Waste Management Units (SWMUs), 11 Areas of Concern (AOCs), and three units within the fence line of the Topock Compressor Station fence line. These areas are SWMU 5, 6, 8, and 9; AOCs 5, 6, 7, 8, 13, 15, 16, 17, 18, 19, and 20; and Units 4.3, 4.4, and 4.5, as shown in Figure 1. (All figures are provided at the end of this technical memorandum.)

Two new areas of potential concern were identified recently based on employee interviews. These new investigation areas are the Teapot Dome Restaurant oil pit and a potential burn area near AOC 17, shown in Figure 1. Also, in its July 20, 2010, comments on the Pacific Gas and Electric Company (PG&E) "Response to Comments to the Draft Soil Part B Work Plan," DTSC requested the addition of seven other areas to the investigation program, including one new SWMU and six new AOCs (DTSC, 2010). The following six units have been added to the soil investigation program:

- SWMU 11: The former and current sulfuric acid tanks associated with the cooling towers

- AOC 21: A round depression near the sludge drying beds
- AOC 22: An unidentified three-sided structure in the upper yard
- AOC 23: The former Water Conditioning Building (now used as a storage building)
- AOC 24: The stained area associated with a potential former oil/water separator located in the lower yard in the vicinity of the northern bank of scrubbers
- AOC 25: The station compressor and auxiliary engines and associated basements
- AOC 26: Former Scrubber Sump

DTSC also requested the addition of a small depression carved out of the rock near AOC 10, which was identified by DTSC as a potential explosives storage area, as AOC 25. This unit is not being added as a new AOC. Based on existing information, it has no known connection to the compressor station. The unit identified as AOC 26 (Compressor and auxiliary Engines and Sumps) in DTSC's comments was therefore renumbered and is now AOC 25.

The DQO process is a recognized procedure for defining project objectives and decisions and optimizing sampling and other information-gathering programs to balance uncertainty, site disturbances, and cost in an acceptable manner. The goal of the DQO process is to ensure that data collected at each stage of the investigation process are of sufficient quantity and quality to enable the specified decisions to be made.

The United States Environmental Protection Agency (USEPA) has issued detailed guidance for the DQO process (USEPA, 2000, USEPA, 2006a-b). The DQO process consists of the following seven steps:

- **Step 1: State the Problem.** Concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem. Identify resources available to resolve the problem and develop the conceptual site model (CSM).
- **Step 2: Identify the Decision(s)**. Identify the principal study questions that require new environmental data to address the contamination problem and the resulting actions that may resolve the problem statement.
- **Step 3: Identify the Inputs to the Decision**. Identify the information and environmental measurements that are needed to resolve principal study questions.
- **Step 4: Define the Study Boundaries**. Specify the spatial and temporal aspects of the environmental media that the data must represent to support the decision.
- **Step 5: Develop a Decision Rule**. For each principal study question, define the statistical parameter(s) of interest, specify action levels, and integrate the previous DQO outputs into "if…then" statements that describe the logical basis for choosing among alternative actions.
- **Step 6: Specify Tolerable Limits on Decision Errors**. Define the decision makers' tolerable decision error rates based on the consequences of making an incorrect decision.

- **Step 7: Optimize the Design**. Evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

While the steps of the DQO process are described sequentially above, the iterative nature of the DQO process allows one or more of these steps to be revisited as more information on the problem is obtained. Detailed DQOs for the subsequent phases of the soil investigation will be developed during those phases.

This technical memorandum addresses Steps 1 through 5 of the DQO process for the Soil Part B program. Consistent with Part A, Steps 6 and 7 will be addressed after completion of sampling and analysis at each of the units. An understanding of the characteristics of the data is necessary to guide decisions on the tolerable limits on decision errors.

2.0 Data Quality Objectives

Steps 1 through 5 of the DQO process for the soil investigation were developed by PG&E, at the direction of DTSC and DOI, for all of the investigation areas included in the Draft Soil Part B Work Plan, as well as for the new areas identified in Section 1.0 in tabular form and as decision flow charts. This memorandum incorporates comments on the draft table and flow charts provided by DTSC and DOI. Furthermore, as discussed above, in response to DTSC comments on the PG&E "Comment Response for the Draft Part B Work Plan" (DTSC, 2010) and employee interviews, six additional units and two new investigation areas described in Section 1.0 were incorporated into Table 1 and into this technical memorandum.

The revised DQOs for Steps 1 through 5 are provided in Table 1, and the associated decision flow charts are provided in Figures 2 through 6. This section provides a corresponding detailed description of the assumptions for each step and the process for implementing each step.

2.1 Step 1: Problem Statement

Step 1 consists of defining the problem and includes review of existing information; identification of the planning team; development of a conceptual model of the environmental hazard to be investigated (CSM); identification of available resources, constraints, and deadlines; and a brief discussion of potential remedial/closure options. These components are described in detail below.

2.1.1 Problem Definition

Historic practices at the Topock Compressor Station have resulted in known and potential releases of constituents of potential concern (COPCs) in several locations within the fence line of the station.[1] These locations are defined in the approved *Revised Final RCRA Facility Investigation/Remedial Investigation Report, Volume 1 – Site Background and History* (Revised

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[1] As discussed in the Risk Assessment Work Plan, ecological exposure inside the Topock Compressor Station is insignificant because of the industrial development of the site and the very limited habitat; therefore, constituents of potential ecological concern will not be defined for areas within the fence line, except when required for the Decision 4 evaluation.

Final RFI/RI Volume 1) (CH2M HILL, 2007b). The Soil Part B program addresses SWMU 5, 6, 8, and 9; AOCs 5, 6, 7, 8, 13, 15, 16, 17, 18, 19, and 20; and Units 4.3, 4.4, and 4.5, as well as the new RCRA units (SWMU 11, and AOCs 21, 22, 23, 24, and 25) and two new investigation areas (the Teapot Dome Restaurant oil pit and the potential burn area near AOC 17). Also covered by these DQOs are the perimeter area in the immediate vicinity of the compressor station fence line, and existing and former storm drains and storm drain outfalls. The existing data regarding the units included in the Soil Part B Program have been documented in the Draft Part B Work Plan; no data are available for the new areas or the perimeter area.

The overall problem statement for the Soil Part B program is:

> *Contaminants in soil in SWMUs/AOCs and new investigation areas inside the compressor station fence line resulting from historical compressor station practices may pose an unacceptable risk to humans or the environment, or threaten groundwater. Adequate site-specific information is needed to:*
>
> - *Determine the nature and extent of soil contamination.*
> - *Estimate representative exposure point concentrations (EPCs) to support human health risk assessment being conducted separately from the Part B soil investigation.*
> - *Determine whether residual soil concentrations inside the compressor station fence line pose a threat to groundwater.*
> - *Determine whether migration of residual soil concentrations inside the compressor station fence line via a surface migration pathway poses a threat to receptors outside the compressor station fence line.*
> - *Determine the site-specific soil property and contaminant distribution information necessary to support the Corrective Measures Study/Feasibility Study (CMS/FS) and/or Interim Measures.*

The nature and extent of soil COPCs associated with former compressor station practices at or affecting these units must be defined to determine whether unacceptable risks or impacts to groundwater occur currently or could occur in the future, whether soil within the fence line potentially poses a threat to receptors outside the fence line because of migration of contamination from areas inside the fence line to areas outside the fence line, whether migration and/or exposure controls are required, and/or to support the CMS/FS, and remedial design and/or Interim Measures, if required. The extent of the soil COPCs must be understood in sufficient detail laterally and vertically to allow the human health risk assessment to be conducted and for appropriate remediation / interim measure decisions to be made.

An assessment must be made whether migration of residual soil concentrations from inside the compressor station fence line poses a potential threat to receptors outside the compressor station fence line. Potential receptors outside the fence line that are not applicable inside the fence line include ecological receptors, tribal users, recreational users, and potential residents. Appropriate screening levels will be used to evaluate potential migration of contaminants from inside the fence line to areas outside the fence line. The proposed screening levels to evaluate potential migration are described in Section 2.5.4.

2.1.2 Conceptual Site Model

A CSM is a schematic representation of how constituents released from a source may be transported to the surrounding environmental media and ultimately may come into contact with human or ecological receptors. A CSM includes known and suspected sources of contamination, types of constituents and affected media, known and potential routes of migration, and known or potential human and environmental receptors.

The CSM developed for the area inside the fence line provides the framework for where and to what depths investigations should occur and the factors that must be considered in developing screening values. The CSM also supports the identification of potential migration and exposure control measures. Information on contaminant transport and migration mechanisms and potentially exposed receptors helps guide the necessary investigation of the lateral and vertical extent of contamination. A detailed CSM for the area inside the fence line was developed for the *Human Health and Ecological Risk Assessment Work Plan* [RAWP], *Topock Compressor Station, Needles, California* (ARCADIS, 2008a). The CSM originally presented in the RAWP was based on knowledge from historical data. The CSM has been updated to address potential releases associated with the new SWMU and AOCs and the new investigation areas and is included as Figure 7. The focus of the CSM included with this DQO TM is on evaluating potential exposure pathways to human receptors. A CSM addressing potential off-site migration pathways will be incorporated into the Combined Soil Work Plan. Individual graphical CSMs will be provided for each unit within the fence line in the Soil RFI/RI Work Plan.

The CSM relies on the detailed information regarding the physical characteristics and setting of the study area, including surface features, meteorology, site geology, surface water hydrology, site hydrogeology, land use, cultural resources, and ecology presented in Appendix A of the Draft Soil Part B Work Plan.

2.1.3 Constituent Release, Migration, and Potential Exposure Pathways

Figure 7 depicts the conceptual contaminant release, migration, and potential exposure pathways for the areas and receptors (i.e., commercial worker and maintenance worker) within the fence line. Conceptual contaminant release, migration, and potential exposure pathways for the areas outside the fence line are presented in the Soil Part A DQO technical memorandum. Those CSMs would apply when assessing potential effects to receptors outside the fence line (including the perimeter area) caused by contaminants migrating from inside the fence line.

As indicated in the CSM shown in Figure 7, the primary sources that could have potentially resulted in releases to the surface soil include incidental spills/releases from the following areas and activities:

- Tanks, sumps, and pipelines
- Buildings and other facilities and areas associated with compressor station operations
- Residue from burning activities
- Former operations in the vicinity of the station (Teapot Dome Oil Pit)
- Dust control (spraying of petroleum materials)

For releases from these primary sources, the primary source medium for the area within the fence line is surface soil. In addition, concrete or structures displaying visible staining may be a source medium to surface water runoff or a potential source to underlying soil. The Teapot Dome Oil Pit or other features extending below the ground surface could have resulted in direct releases to shallow soil and/or subsurface soil. Depending on the depth of the release for these features, the primary source media could be shallow soil and/or subsurface soil. Constituents known to have been released at the Topock Compressor Station consist primarily of nonvolatile compounds. These constituents were released primarily as liquids. Some constituents may also have been released as dust on the station (e.g., from sand blasting) and would have been deposited onto the ground surface. COPCs in surface soil may be ingested or contacted directly by receptors. COPCs may also be entrained as dust in ambient air, leading to potential inhalation exposure and/or surface re-deposition (ARCADIS, 2008a).

Once released to the surface soil, the COPCs in surface soil may be eroded and entrained in stormwater/surface water runoff and subsequently re-deposited as contaminated surface soil in areas outside the Topock Compressor Station. Local topography is the primary feature to consider when examining releases of constituents from the Topock Compressor Station to areas outside the fence line via surface runoff. Constituents could also have been transported offsite by stormwater runoff via storm drains. The compressor station is located on a ridgeline bordered by low areas (washes and ravines) on the north, east, west, and southwest sides of the station. Higher-elevation terrain is located to the south and southeast. In the past, runoff from the compressor station and discharges from storm drains would have preferentially entered and/or accumulated in low-lying areas, including the Debris Ravine (AOC 4), the East Ravine (AOC 10), other topographic low areas (AOC 11), and Bat Cave Wash (SWMU 1/AOC 1), contiguous with the compressor station fence line and potentially contaminating surface soil. Runoff may also have carried COPCs from the upper portions of the compressor station to the lower yard.

In addition to addressing potential worker exposures to soil inside the fence line, the sampling conducted for Part B will also be designed to help determine whether residual soil concentrations in the surface soil from historic compressor station practices could migrate offsite, as discussed further in Section 2.7.4. However, any potential exposures to COPCs that have been transported via surface water runoff to areas outside the Topock Compressor Station will be addressed in the context of Part A soil risk assessment.

As indicated in the CSM, contaminants in surface soil may percolate or infiltrate into the subsurface to affect subsurface soil and groundwater as secondary source media. Contaminated subsurface soil may be ingested, contacted directly, or inhaled as dust during intrusive events (maintenance and construction).

As indicated in the CSM, groundwater potentially impacted by subsurface soil contamination could subsequently migrate to extraction wells, leading to potential ingestion and dermal contact exposure routes.

2.1.4 Potentially Exposed Human Receptors

As described in the RAWP (ARCADIS, 2008a), the Topock Compressor Station is an operating facility and will remain as such for the foreseeable future. Thus, the human receptors that could be exposed to soils within the compressor station fence line consist of the following:

- Commercial workers
- Maintenance workers

Commercial workers at the Topock Compressor Station could be incidentally exposed to soil as they perform their duties at the compressor station. Activities may include, but are not limited to, office work and equipment maintenance and monitoring. Commercial workers would be expected potentially to come into contact with surface soil and shallow subsurface soil in the 0-to-3-foot-depth interval. Maintenance workers' activities may include, but are not limited to, repair and maintenance of equipment, facilities, and subsurface utilities. Maintenance workers may come into contact with subsurface soils extending to 6 feet below ground surface (bgs) (subsurface soil I) or possibly as deep as 10 feet bgs (subsurface soil II) during excavation and/or grading activities associated with utility work or equipment maintenance/repair within the fence line of the compressor station.

Consistent with the Soil Part A Data Quality Objectives Technical Memorandum (CH2M HILL, 2010a) and as described in the RAWP (ARCADIS, 2008a), the assumption was made that, in the future, the groundwater within the compressor station could be hypothetically used as a potable source of water, even though residential use is not planned for the compressor station. Therefore, the hypothetical future groundwater user is included in Figure 7.

As described in Section 2.1.1, the offsite migration evaluation will consider whether offsite human receptors could be exposed to surface soil impacted by chemicals originating within the fence line of the compressor station through the offsite migration pathway. The specific pathways through which offsite receptors could be exposed to constituents that have migrated outside the fence line are defined in the RAWP (ARCADIS, 2008a) and the Soil Part A Data Quality Objectives Technical Memorandum (CH2MHILL, 2010a).

2.1.5 Potentially Exposed Ecological Receptors

As described in the RAWP (ARCADIS, 2008a), ecological exposure inside the compressor station fence line is insignificant because of the industrial development of the site and the very limited habitat. However, the offsite migration evaluation and the evaluation of the perimeter area will include consideration of offsite ecological exposure, as appropriate. Potentially relevant offsite ecological receptors were identified in the RAWP (ARCADIS, 2008a) and the Soil Part A Data Quality Objectives Technical Memorandum (CH2M HILL, 2010a).

2.1.6 Leaching to Groundwater

A potential indirect exposure route associated with soil is the potential for residual COPCs in soil to leach to groundwater. Potential sources of recharge within the compressor station include precipitation, irrigation, leaking water lines, and use of leachfields. If the rate of leaching is sufficiently high, concentrations of COPCs in groundwater could potentially pose a risk if receptors are exposed to extracted groundwater. There are no current uses of the groundwater at the facility, and no groundwater extraction is occurring within the fence line.

2.1.7 Potential Exposure Depth Intervals

Based on the types of receptors likely to be present at the compressor station, the types of worker activities likely to occur at the compressor station, and the nature of the soils in the area, four exposure depth intervals are of interest: surface soil, shallow soil, subsurface soil I, and subsurface soil II. For human health, exposure intervals for soil are surface soil (0 to 0.5 foot bgs), shallow soil (0 to 3 feet bgs), subsurface soil I (0 to 6 feet bgs), and subsurface soil II (0 to 10 feet bgs). For evaluating the potential for offsite migration, the exposure interval of interest typically is surface soil (0 to 0.5 foot bgs) exposure, although in some areas on the slopes surrounding the compressor station that have a high potential or likelihood for erosion, depths up to 1.0 foot bgs may be of interest.

2.2 Planning Team

The planning team for the Soil Part B program consists of PG&E, DTSC, DOI, the Tribes, and interested stakeholders. Designated representatives from these organizations will meet to evaluate data collected pursuant to the Final Soil Part B Work Plan and to determine whether each of the decisions to be made can be made with a sufficient level of certainty.

2.3 Constraints, Resources, and Deadlines

Resources available to complete the soil RFI/RI and subsequent steps in the RCRA and Corrective Action and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) programs consist of PG&E staff and consultants, DTSC and DOI staff and consultants, interested stakeholders, and Tribal staff and consultants. Resources are limited in terms of available knowledgeable staff and project deadlines (as outlined in the project “rainbow” schedule).

There are substantial physical as well as cultural and environmental constraints on the site investigation effort. Physical constraints within the compressor station are due to buildings and operating equipment in active use; aboveground pipelines set at heights ranging from several inches to more than 10 feet overhead; and subsurface high-pressure gas lines, high voltage electrical lines, and other utilities. It is essential for the compressor station to continue to operate during this investigation, and all samples must be collected within the safety constraints of the facility. Some portions of the perimeter area are located on steep slopes, resulting in physical constraints. The remote location of the compressor station also makes certain investigation activities more difficult. In addition, the compressor station is surrounded by sensitive habitat areas. The site is also located in an area rich in cultural and historical resources. Several federally recognized tribes have identified areas of traditional, religious, and cultural importance in the vicinity of the Topock Compressor Station.

2.4 Step 2: Identify the Decisions

Step 2 consists of identifying the decisions to be made in the Soil Part B program. Activities completed in this step consist of identifying the principal study questions, defining the alternative actions that may be taken based upon the range of possible outcomes, and combining the alternative actions and the principal study questions into decision statements.

The Part B soil investigation sampling and analysis activities are intended to provide site-specific information to accomplish the following:

- Determine the nature and extent of soil contamination.
- Estimate representative exposure point concentrations (EPCs) to support the human health risk assessment being conducted separately from the Part B soil study.
- Determine whether residual soil concentrations pose a potential threat to groundwater.
- Determine whether concentrations of COPCs within the fence line potentially pose an unacceptable risk to ecological receptors outside the fence line.
- Support development of the CMS/FS, remedial design, and Interim Measures, if needed.

Based on these objectives, five principal study questions were identified. The principal study questions and alternative outcomes of the questions are discussed below, with a decision statement provided for each (Decision Statements are summarized in Table 1):

1. What are the nature and extent of residual soil COPC concentrations resulting from historic compressor station practices?

   The alternative outcomes of this question are: (1) the nature and extent of residual soil concentrations are fully defined based on sample data, or (2) it is infeasible or unwarranted to fully define the nature and extent of concentrations based on sample data, and uncertainties will be addressed in the risk assessment and/or the CMS/FS or Interim Measures.

   Decision Statement: Determine the nature and extent of residual soil concentrations resulting from historic compressor station practices. If determination of the nature and extent of soil concentrations based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment and/or CMS/FS or Interim Measures.

2. What are representative EPCs for residual soil contamination resulting from historic compressor station practices?

   The alternative outcomes of this question are: (1) representative EPCs can be determined based on sample data, or (2) it is infeasible to determine representative EPCs based on sample data, and uncertainties will be addressed in the risk assessment.

   Decision Statement: Determine representative EPCs for residual soil contamination resulting from historic compressor station practices. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment.

3. Do residual soil concentrations resulting from historic compressor station practices pose a potential threat to groundwater?

   The alternative outcomes of this question are: (1) conclude that a threat to groundwater may exist, warranting either further site investigation or remedial action to protect groundwater, or (2) conclude that no threat to groundwater exists and no further action is needed to protect groundwater.

Decision Statement: Determine whether residual soil concentrations resulting from historic compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat[2] or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address threat to groundwater.

4. Do residual soil concentrations resulting from historic compressor station practices pose a potentially unacceptable risk to receptors outside the fence line via the surface migration pathway?

   The alternative outcomes of this question are: (1) conclude that a potentially unacceptable risk to receptors outside the fence line may exist, warranting either remediation or interim measures, or (2) conclude that no potentially unacceptable risk to receptors outside the fence line exists, and no further action is needed to protect receptors outside the fence line.

   Decision Statement: Determine whether residual soil concentrations inside the fence line resulting from past compressor station practices pose a potentially unacceptable risk to receptors outside the compressor station fence line via the surface migration pathway. If a potentially unacceptable risk to receptors outside fence line exists, or if determination of potential risk to receptors outside fence line based on sample data is not feasible, develop controls to eliminate migration pathways or remove contaminated soil.

5. What are the site-specific soil properties, contaminant distribution data, and transport pathway information required to support development of the CMS/FS, remedial design, and /or Interim Measures, if required?

   The alternative outcomes of this question are: (1) site-specific soil property, contaminant distribution, and transport pathway information required to support development of the CMS/FS, remedial design, and/or Interim Measures can be fully determined based on sample data, or (2) it is infeasible to fully determine site-specific soil property, contaminant distribution, and transport pathway information based on sample data and impediments to data collection will be documented, and uncertainties will be addressed in the risk assessment and/or CMS/FS or Interim Measures.

   Decision Statement: Determine the site-specific soil property, contaminant distribution, and transport pathway information required to support development of the CMS/FS, remedial design and Interim Measures, if required. If full determination of site-specific soil property, contaminant distribution, and transport pathway information based on sample data is not feasible, then document impediments and address uncertainties in the risk assessment and/or CMS/FS or Interim Measures.

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[2] The forthcoming Topock Compressor Station/East Ravine Groundwater Investigation will aid in assessing potential threats to groundwater from potential source areas within the compressor station as well as evaluating current impacts to groundwater.

2.5 Step 3: Inputs to the Decision

Once the necessary decisions have been determined, the next step is to identify the inputs required to make the decisions. While there may be significant overlap between the inputs required for the various decisions, the inputs for each decision are defined separately to ensure all required inputs have been identified. Inputs for each decision are also listed on Table 1.

2.5.1 Inputs to Decision 1 – Nature and Extent of COPCs

Three types of information have to be available and considered when assessing whether the nature and extent of contamination at a site are adequately understood: (1) usable COPC concentration data, (2) potential contaminant fate and transport mechanisms, and (3) screening and comparison values.

Both existing and new data may provide usable COPC concentrations for soil. Newly collected COPC concentration data must meet data quality criteria (including reporting limits and other criteria) set forth in the *Draft PG&E Program Quality Assurance Project Plan* (QAPP) (CH2M HILL, 2008a) to be considered usable. Existing data were evaluated in the *Final Soil and Sediment Data Usability Assessment Technical Memorandum, PG&E Topock Compressor Station* (CH2M HILL, 2008b). Category 1 and 2 data will be used to delineate the nature and extent of contamination. Collectively, new data meeting the criteria set forth in the QAPP and Category 1 and 2 data identified in the Data Usability Assessment are considered usable COPC data for Decision 1. Sufficient usable data must be available for each unit. These usable COPC concentration data must be compared with background and other screening levels to assess whether the delineation of nature and extent is adequate.

As described in the Revised Final RFI/RI Volume 1 (CH2M HILL, 2007b), five phases of data collection have been completed to date to support characterization of SWMUs and AOCs within the fence line of the compressor station. Data collected from implementation of the Soil Part B Work Plan will be combined with the usable data from the existing data set.

The CSM is an input to Decision 1 because it describes the potential transport mechanisms and fate of COPCs potentially released into the environment. This ensures that site data are collected in the appropriate locations.

Comparison/screening levels identified for Decision 1 include the following:

- Background soil concentrations for inorganic compounds (CH2M HILL, 2009b; CH2M HILL, 2010b)
- DTSC California human health screening levels (CHHSLs) for commercial use (OEHHA, 2005)
- USEPA regional screening levels (RSLs) for commercial use for those compounds for which CHHSLs are unavailable (USEPA, 2010)
- Environmental screening levels (ESLs) developed by staff of the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) for screening soil

samples analyzed for total petroleum hydrocarbons (TPH) as gasoline, diesel, and motor oil (Water Board, 2008)

- Project-specific screening levels developed for COPCs identified from Target Analyte List/Target Compound List (TAL/TCL) data (ARCADIS, 2009)
- For the perimeter area, the comparison/screening levels agreed on for the Topock Part A Phase 1 Soil Investigation

Screening levels will be used to assess the extent of contamination and do not necessarily indicate the presence of unacceptable risk (which will be evaluated in the baseline human health risk assessment). As noted in the discussion for Step 1 (Sections 2.1.5 and 2.3), physical, cultural, and biological constraints may limit the feasibility of sampling in certain areas within the fence line and in the perimeter area.

The background soil study determined that background metals concentrations are generally consistent throughout the study area and the soil column. There were no detectable ambient levels of polycyclic aromatic hydrocarbons or pesticides in the background soil samples; therefore, background concentrations were not calculated. A series of statistical tests will be conducted to assess whether concentrations of metals constituents detected in the soil at the various units are elevated above background. No single statistical test can be used to determine when concentrations in soil represent background levels. Rather, several tests may be used to support this determination. To evaluate whether the concentrations of metals constituents across the exposure area are comparable to background concentrations, the use of both point estimates (e.g., the 95 percent upper tolerance limit) and statistical distributional tests (comparisons of means and medians) may be used to compare the concentrations of constituents detected to background concentrations.

Background threshold values were also developed for several inorganic compounds detected in TAL/TCL analytical suites during the Soil Part A Phase 1 Investigation, as presented in Appendix E to the Soil Part A Data Quality Objectives Technical Memorandum (CH2M HILL, 2010b). The appendix summarizes the data evaluation and calculation of representative background concentrations for the additional detected inorganic compounds (aluminum, calcium, iron, magnesium, manganese, potassium, and sodium) for the compressor station. The evaluation and calculation approaches used to evaluate the additional detected inorganic compounds data followed the approaches used in the *Soil Background Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California* (CH2M HILL, 2009b).

2.5.2 Inputs to Decision 2 – Data to Support EPC Calculations

The inputs required for Decision 2 include COPC concentrations in soil within the exposure areas and depth categories defined in the RAWP (ARCADIS, 2008a). Only COPC data meeting data quality Category 1 standards may be used for the risk assessment. It should be noted that the inputs to determine data adequacy for Decision 2 will be considered in accordance with the RAWP (see Appendix A for additional details) and independently from Decision 1. However, the representativeness of the estimated EPC for each data group (identified below) is dependent on whether those data considered also satisfy Decision 1 and adequately represent the nature and extent of contamination. Additional data subsequently recommended to satisfy Decision 1 and/or Decision 2 for a data group will also be used in the risk assessment to estimate the representative EPC.

Approaches for developing the human health risk assessment and estimating representative EPCs are specified in the RAWP (ARCADIS, 2008a). The EPC is a conservative estimate of the average chemical concentration in an environmental medium to which a receptor may be exposed. The EPC is constituent-specific. The risk assessment will calculate EPCs based on specific data groupings for each of the depth categories, as discussed below. Therefore, it is critical to consider those data groupings for the depth categories when determining the inputs needed for estimation of representative EPCs.

As discussed in the RAWP (ARCADIS 2008a), the entire area within the fence line is considered one exposure area. The EPCs for direct soil contact (i.e., soil ingestion, dermal contact, and inhalation of particulates) will be estimated for each data group corresponding to the following separate depth categories: 0 to 0.5 foot bgs, 0 to 3 foot bgs, 0 to 6 foot bgs, and 0 to 10 foot bgs. Typically, the soil EPCs will be the 95 percent upper confidence limit (UCL) on the arithmetic mean for the depth category being considered. Additionally, after the data are available, a review may indicate that specific areas of hot spots may warrant specific assessment. In general, the identification of hot spots will be conducted through visual examination of the data, which is a qualitative assessment that includes consideration of relative concentrations in relation to the nearest neighboring sampling locations (both horizontally and vertically), field observations of staining or debris, and topography. Additional assessment may consist of evaluating the site data for outliers which, if conducted, will be done quantitatively using applicable statistical tests and may require additional and/or alternative statistical evaluations for identifying the appropriate EPCs. Potential exposures in the perimeter area will be evaluated in accordance with the Part A decision process previously described in the Part A DQO TM (CH2M HILL, 2010a).

EPCs in air from dust will be modeled from soil data by dividing the concentration of each constituent in the soil by a particulate emission factor. As stated in the preceding paragraph, the EPCs for direct contact pathways, including particulate inhalation, will be estimated using data from the four listed depth intervals, as appropriate, for the worker receptors identified in the RAWP. EPCs in air from volatile organic compounds, if present, will be modeled from soil data based on a volatilization factor equation.

2.5.3 Inputs to Decision 3 – Impacts to Groundwater

The inputs required for Decision 3 consist of information that is required to calculate soil screening levels (SSLs) protective of groundwater and to conduct modeling, where necessary. These inputs are shown in Table 1. Soil background concentrations are also an input to this decision because SSLs will only be calculated for metals where soil concentrations exceed background. SSLs consider the volume and cross-sectional area of the potential source and will thus be developed on a unit-specific basis. Groundwater maximum contaminant levels and groundwater background values will define the maximum allowable concentrations of COPCs in groundwater. USEPA literature and other technical literature will serve as the source for modeling parameters. Infiltration estimates will consider precipitation and other potential sources, such as landscape irrigation, leaking water lines, and leachfields. Existing Category 1 and 2 data, as well as validated new site data, will provide information on the nature and extent of COPCs; depth to groundwater; and geotechnical, geochemical, and hydraulic characteristics of the vadose zone soil.

2.5.4 Inputs to Decision 4 – Data for Evaluation of Potential Risk to Offsite Receptors in a Surface Migration Pathway

Inputs to Decision 4 consist of transport pathway information, contaminant distribution data, and other information needed to estimate potential risks to offsite receptors due to potential migration of contaminants, in a surface migration pathway, from areas within the fence line to areas outside the fence line. Inputs to Decision 4 include Category 1 COPC concentrations in shallow soil in areas where soil may be transported to areas outside the fence line; soil physical and chemical property information; potential mechanisms, directions, and rates of migration; information on structures; and other features that may prevent or facilitate offsite migration.

New and existing analytical data will provide information regarding chemical and physical soil characteristics. New and existing data regarding the nature and extent of COPCs coupled with the comparison/screening levels listed below will identify areas of potential concern with regard to offsite migration. The Decision 4 comparison/screening levels are the same comparison/screening levels agreed upon for the Topock Part A Phase 1 Soil Investigation.

Comparison/screening levels identified for Decision 4 include the following:

- Background soil concentrations for inorganic compounds (CH2M HILL, 2009b; CH2M HILL, 2010b)
- Ecological comparison values developed by ARCADIS for PG&E (ARCADIS, 2008b; ARCADIS, 2009)
- DTSC CHHSLs for residential use (OEHHA, 2005)
- USEPA RSLs for residential use for those compounds for which CHHSLs are unavailable or for which the toxicity factors used to calculate the CHHSLs are outdated (USEPA, 2010)
- ESLs developed by staff of the Water Board for screening soil samples analyzed for TPH-gasoline, TPH-diesel, and TPH-motor-oil (Water Board, 2008)
- Project-specific screening levels developed for COPCs identified from TAL/TCL data (ARCADIS, 2009)
- Consensus-based threshold effect concentrations (TECs) and consensus-based probable effects concentrations (PECs) for constituents in sediment (ARCADIS, 2008a)

2.5.5 Inputs to Decision 5 – Inputs to CMS/FS or Interim Measures

Inputs to Decision 5 consist of soil property, contaminant distribution and transport pathway information, and other information needed to evaluate potential remedies as well as migration and exposure control measures for areas requiring such measures and to determine the most appropriate and cost-effective remedies and/or control measures for each area potentially requiring controls. Inputs to Decision 5 include areas and volumes of soil potentially posing a threat to onsite workers or offsite receptors via the surface migration pathway, specific soil physical and chemical properties that could influence migration and exposure pathways, available transport pathways, and waste characterization parameters for any soils that may need to be removed and transported offsite.

New and existing analytical data will provide information regarding chemical and physical soil characteristics and waste characterization parameters. New and existing data regarding the nature and extent of COPCs coupled with results of the human health risk assessment and output from Decision 4 will provide the areas and volumes of soil potentially requiring remediation or control measures. New and existing data will be supplemented by USEPA and other technical literature regarding physical and chemical properties of COPCs and soils. Transport pathways will be assessed as part of a detailed site reconnaissance.

2.6 Step 4: Study Boundaries

Study boundaries include spatial (lateral and vertical), temporal, and analytical boundaries for each unit or group of units, as appropriate. Boundaries must be defined for each decision individually, as the scale at which data will be evaluated and the data populations of interest may vary for each decision. Temporal boundaries are required because a given medium or unit may change over time. Study boundaries, especially lateral and vertical, are subject to change as additional data are collected. The study boundaries associated with each of the decisions are summarized in Table 1.

2.6.1 Decision 1 Study Boundaries – Nature and Extent of COPCs

2.6.1.1 Lateral Boundaries

Lateral boundaries for Decision 1 are initially the same as the current boundaries of each individual unit as defined in the Revised Final RFI/RI Volume 1 (CH2M HILL, 2007b) and the tentative boundaries for the six additional units and two new investigation areas shown in Figure 1. The tentative boundaries for the six additional units and two new investigation areas will be refined based upon the results of the investigation. For units in the lower yard, such as SWMU 5, AOC 16, AOC 21, AOC 24, and Units 4.3, 4.4, and 4.5, the maximum extent of the lateral boundaries may be constrained by topography in the up-drainage direction. Where units are adjacent, the lateral study boundaries are defined at a clear physical demarcation to the extent feasible.

For AOC 13, the lateral boundary is initially estimated to be the current unpaved areas within the fence line of the compressor station, except where unpaved areas are contained within the footprint of another AOC (e.g., the graveled areas within AOCs 5 and 6 are not part of AOC 13).

The perimeter area is defined as the area extending from the facility fence line to the toe of the slope, outside of the fence line. The study boundary for existing and former storm drain outfalls will initially be defined by the alignment of the drains.

The following steps will be followed when assessing the lateral boundaries for perimeter area and storm drain outfalls:

1. Conduct perimeter area and storm drain outfall sampling (including step-out sampling where needed).
2. Identify perimeter and storm drain outfall locations with COPC concentrations above Part A screening levels.
3. Incorporate downslope soil areas with COPC concentrations above Part A screening levels into the appropriate Part A AOC.
4. Incorporate soil areas with COPC concentrations above Part A screening levels located in flat areas adjacent to compressor station fence into the appropriate Part B AOC, or AOC 13.

Lateral extent will be expanded as necessary and as feasible until COPCs concentrations fall below screening levels.

The lateral boundaries for each unit are summarized in Table 1.

2.6.1.2 Vertical Boundaries

The vertical boundary of the soil investigation for Decision 1 extends from the ground surface to the water table.

2.6.1.3 Analytical Boundaries

Analytical boundaries for Decision 1 include both chemical (COPCs and general chemistry) parameters and soil physical characteristics. Sample location tables were included in the Draft Soil Part B Work Plan (a separate table was provided for each unit). In addition, a comprehensive planned sample table specifying analytes for all proposed samples was provided in Appendix C of the Draft Work Plan. Similar tables will be provided in the Final Work Plan.

Chemical parameters were defined for each individual unit and may be refined following completion of the Phase 1 sampling program. The list of analytical parameters at each unit is based on the site use and release history described in the Revised Final RFI/RI Volume 1 (CH2M HILL, 2007b) and fate and transport mechanisms, as documented in the CSM. The COPCs for each unit are shown in Table 1. A preliminary list of COPCs for each of the new units and uninvestigated areas is also provided in Table 1. Ten percent of the samples collected in all units will be analyzed for the full suite of inorganic and organic analyses per the CERCLA TAL/TCL. Select samples will be analyzed to characterize the soluble fraction of compounds present at concentrations exceeding 10 times the total threshold limit concentration or 20 times the toxicity characteristic leaching procedure values. The samples selected will be determined based on the Title 22 metals analysis results.

2.6.1.4 Temporal Boundaries

All historic RFI/RI and new Part B soil sampling Category 1 data and acceptable Category 2 data (based on the final Data Usability Assessment [CH2M HILL 2008b]) will be evaluated for determination of the nature and extent of contamination.

2.6.2 Decision 2 Study Boundaries – Data to Support Calculation of EPCs

2.6.2.1 Lateral Boundaries

The lateral study boundaries for Decision 2 are the same as for Decision 1.

2.6.2.2 Vertical Boundaries

Vertical study area boundaries for Decision 2 are defined by potential maximum exposure depths. For commercial workers, the maximum exposure depth is 3 feet bgs. Depths up to 10 feet bgs are appropriate for maintenance workers.

2.6.2.3 Analytical Boundaries

The same analytical boundaries for chemical parameters that apply to Decision 1 apply to Decision 2.

2.6.2.4 Temporal Boundaries

The same temporal boundaries that apply to Decision 1 apply to Decision 2; however, only existing Category 1 data will be considered for use in the risk assessment.

2.6.3 Decision 3 Study Boundaries – Impacts to Groundwater

2.6.3.1 Lateral Boundaries

The definition of lateral study boundaries for Decision 3 will be an iterative process. Initially, the lateral study boundaries for Decision 3 will be the same as for Decision 1. Following completion of the data evaluation, Decision 3 study boundaries will be refined to consist of those areas with COPC concentrations exceeding the SSLs.

2.6.3.2 Vertical Boundaries

The vertical study area boundaries for Decision 3 are the same as for Decision 1.

2.6.3.3 Analytical Boundaries

The same analytical boundaries for chemical parameters that apply to Decision 1 also apply to Decision 3. Additional data regarding soil characteristics may be collected if needed to complete any required modeling. Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes.

2.6.3.4 Temporal Boundaries

The temporal boundaries for Decision 3 are the same as for Decision 1.

2.6.4 Decision 4 Study Boundaries – Data for Evaluation of Potential Risk to Offsite Receptors in a Surface Migration Pathway

2.6.4.1 Lateral Boundaries

The lateral boundaries for Decision 4 are the same as for Decision 1.

2.6.4.2 Vertical Boundaries

The vertical boundary for Decision 4 is typically 0.5 foot bgs (i.e., the surface interval from which soils might be transported offsite); however, because the perimeter area has a higher potential for erosion, a deeper vertical boundary of 1.0 foot bgs will be used.

2.6.4.3 Analytical Boundaries

The same analytical boundaries for chemical parameters that apply to Decision 1 apply to Decision 4.

2.6.4.4 Temporal Boundaries

The temporal boundaries for Decision 4 are the same as for Decision 2.

2.6.5 Decision 5 Study Boundaries – Inputs to CMS/FS or Interim Measures

2.6.5.1 Lateral Boundaries

Initially, the lateral study boundaries for Decision 5 will be the same as for Decision 1. The lateral study boundaries will be refined following completion of the risk assessment and assessment of threat to groundwater and practical constraints on soil removal, if required.

2.6.5.2 Vertical Boundaries

Initially, the vertical study boundaries for Decision 5 will be the same as for Decision 1. The vertical study boundaries will be refined following completion of the risk assessment and assessment of threat to groundwater and practical constraints, if required.

2.6.5.3 Analytical Boundaries

The same analytical boundaries for chemical parameters and soil characteristics that apply to Decision 1 also initially apply to Decision 5. Analytical parameters for Decision 5 will be refined to following the soil investigation to consist only of the constituents of concern identified by the risk assessment and assessment of threat to groundwater.

2.6.5.4 Temporal Boundaries

The temporal boundaries for Decision 5 are the same as for Decision 1.

2.7 Step 5: Decision Rule

Decision rules are “if…, then…” statements that describe the actions to be taken depending on the site-specific findings. A decision flow chart was developed for each of the five decisions identified in these DQOs. The decision process depicted in Figures 2 through 6 is described below.

2.7.1 Decision 1 – Nature and Extent of COPCs – Decision Rules and Decision Process

Refer to Figure 2 for the following discussion of the decision rule for Decision 1. The decision rule is applied separately for each AOC, SWMU, and potential new area.

2.7.1.1 Boxes 1 through 3

Once the Part B soil samples have been collected and the data have been validated (Boxes 1 and 2), these data will be combined with existing historic RFI/RI data sets for each unit, where applicable.

The data collected during the soil investigation will be validated as described in the QAPP (CH2M HILL, 2008a) and the *Draft Soil Addendum for the Topock Compressor Station, RCRA Facility Investigation/Remedial Investigation (*CH2M HILL, 2008c*)*. Existing data were evaluated in the Data Usability Assessment (CH2M HILL, 2008b), and only data meeting data quality Category 1 or 2 requirements will be used to assess the nature and extent of COPCs.

During this step, the existing data will also be reviewed to assess whether they are still considered reliable. If site conditions have changed substantially, the data will be assessed to determine whether it is likely that the changes in site conditions have altered the conditions at that particular location. This data assessment process will be limited to surface and near-surface samples, as deeper samples would not be expected to be affected. Any surface or near-surface data for organic COPCs will also be noted, as organic constituents located in surface and near-surface soils may have degraded under the influence of high surface temperatures and/or light. Older data for organic compounds will be compared with newer data for organics in the vicinity.

2.7.1.2 Boxes 4 through 8

Once the new and existing data sets have been combined and reviewed, the combined data set for each unit will first be reviewed to assess whether, as a result of the TAL/TCL analysis, any new compounds that qualify as COPCs have been identified in the areas within the fence line of the compressor station (Box 4). Box 4 consists of the following decision:

Are any new COPCs identified based on the TCL/TAL analysis?

If new compounds have been identified, a decision will be made to determine whether the detected compound represents a new COPC. The decision whether any newly identified compounds may represent a new COPC will be based on multiple factors, including the following:

- Potential for the compound to be related to the compressor station (e.g., potential for the compound to be associated with past activities at the compressor station and/or to be a breakdown product of constituents known to have originated at the compressor station)
- Frequency of detection
- Concentrations detected
- Distribution of detections

The outcome of Box 4 can be:

Yes*: new COPCs have been identified, or*
No*: no new COPCs have been identified.*

It should be noted that it is possible for new compounds to be detected without these compounds necessarily being designated as COPCs. Additional sampling may be warranted in order to make this decision.

If the outcome from the decision in Box 4 is yes, the next step is to determine whether development of screening values will be required for the newly identified COPCs (Box 5A). If the outcome from Box 4 is no, the decision process moves to Box 5C, and the decision process continues with comparison to screening levels (see discussion below).

The decision for Box 5A is:

> *Is development of screening value for new COPCs required?*

The possible outcomes for this decision step are:

> ***No**: Development of screening values is not required.*
> ***Yes**: Development of screening values is required.*

Screening levels may not need to be developed because they already exist (e.g., some screening levels for TAL/TCL inorganic compounds were developed as part of the Soil Part A Phase 1 Investigation). If a screening level does not need to be developed for the compound being evaluated, the process moves to Box 5C, comparison of data to screening values. Development of screening also may not be required if the frequency of detection and/or detected concentrations of these compounds are too low to merit the likely complex effort of developing screening levels. The decision to develop additional screening levels will be made based on the specific data and related information. If screening levels are not developed, the significance of the new COPCs and any associated uncertainties would be addressed in the risk assessment and the RFI/RI report (Box 5D).

If screening levels will be required for any new COPCs, they will be developed by PG&E and will require concurrence from DTSC and DOI (Box 5B). Once appropriate screening levels are available for all COPCs, the lateral and vertical extents of these compounds can be evaluated.

Following the identification of potential new COPCs, all data will then be compared with screening criteria (Box 5C). The combined data tables will flag each occurrence of a COPC exceeding one or more of the screening criteria. The following sets of screening values will be used:

- Background soil concentrations of metals and select TAL/TCL inorganics (CH2M HILL, 2009b; CH2M HILL, 2010b)
- CHHSLs for commercial use, where available (OEHHA, 2005)
- RSLs for commercial use for constituents for which CHHSLs are not available or for which CHHSLs are based on outdated toxicity factors (USEPA, 2010)
- ESLs for commercial use for TPH-gasoline, diesel, and motor oil
- Project-specific screening levels developed for COPCs identified from TAL/TCL data, if needed

The initial comparison will be on a point-by-point basis for all depths (i.e., a simultaneous lateral and vertical assessment). The detected concentrations at each unit will first be compared with either the background concentrations (for metals and inorganics) or the lowest applicable screening criterion for organic compounds (CHHSLs, RSLs, or ESLs, as applicable).

As a further check for metals, a population (central tendency) comparison such as the Wilcoxon Rank Sum Test or Gehan Test will be performed for the population of detected concentrations to the applicable background data set, provided there are sufficient detections of the metal in question to allow a meaningful statistical comparison to be made.

If any COPCs are present above background concentrations or the lowest applicable screening criterion for organic compounds, the locations of the COPC concentrations exceeding the initial screening will be examined to determine whether nearby samples provide an adequate perimeter (lateral) or base (vertical) of samples to meet the initial screening criteria. In addition to point by point comparisons of site data to screening levels, spatial trends will be reviewed graphically (Box 6).

Spatial trends will be evaluated both laterally and vertically. For lateral delineation for samples potentially containing elevated levels of COPCs, concentration trends toward the perimeter of the unit will be reviewed to ensure that concentrations are generally decreasing toward the perimeter. Vertical concentration trends will also be reviewed for each boring showing elevated concentrations of COPCs. Potential hot spots will be identified through the presence of clusters of elevated concentrations of COPCs. Evaluation of spatial trends will include the following:

- Lateral concentration trends toward the edge of a unit or affected area (i.e., potential hot spot) within a unit
- Vertical concentration trends in each boring and throughout a given unit or area
- Distribution of detections and non-detections of each constituent within a unit
- Where applicable, concentrations trends at an upgradient unit

For ease of evaluation, COPC concentrations exceeding the screening criteria will be presented in different colors on the figures, according to the lowest concentration screening criterion exceeded.

The spatial trends analysis will be used to make the decision identified in Box 7:

> *Are lateral and vertical boundaries of COPCs including hot spots, if applicable, defined?*

The possible outcomes of Box 7 are:

> ***Yes:*** *the lateral and vertical extent of COPCs including any hot spots are defined.*
> ***No:*** *the lateral and vertical extent of COPCs including any hot spots are not fully defined.*

This evaluation will be conducted for each compound and may indicate that the boundaries of some, but not all, compounds at a given unit are adequately defined. If all boundaries are defined for a given unit, no further data are required to resolve Decision 1 (Box 8). The determination that COPC boundaries have been adequately defined at a specific unit will then be made. Once a determination has been made that no further data are required to resolve Decision 1, the data evaluation proceeds with Decisions 2 through 5 (Boxes 16A – 16D), as described in Sections 2.7.2 through 2.7.5.

2.7.1.3 Boxes 9 through 15

If the determination is made that the boundaries of elevated concentrations of COPCs have not been adequately defined, additional sampling of specific compounds may be required to complete the delineation of the lateral and vertical extents of contamination and/or hot spots. The specific areas where COPC boundaries are not adequately defined will provide the basis for further sampling recommendations (Box 10). The information developed pursuant to Box 9 will be used to define the additional sampling needed to delineate a chemical boundary or to define potential hot spots in each area identified as needing further delineation. The extent of additional sampling recommended will then be defined. Once the additional sampling necessary to create a complete delineation has been defined (Box 10), Box 11 requires the following decision:

> *Would additional sampling significantly improve data quality or risk assessment and/or site remediation or interim measure decisions?*

The possible outcomes for the decision in Box 11 are as follows:

> ***Yes**: Additional data would significantly improve data quality or risk assessments and/or site remediation/interim measure decisions.*
>
> ***No:** The additional data would not significantly improve data quality and/or risk assessments and/or site remediation/interim measure decisions and is therefore not necessary.*

Data quality may be improved if existing sample results for the COPC in question at a given area are for older samples that may no longer represent current conditions or have data flags that could limit the reliability of the data.

The risk assessment team will review the value of the additional sampling for improving the risk characterization for the specific COPC for a specific exposure area. Risk characterization may be improved by additional sampling if (1) the existing number of samples for an exposure area or designated hot spot is low; (2) the detection limits did not achieve adequate concentrations for risk assessment purposes; (3) the total number of samples in a given exposure depth interval is low; or (4) the lateral or vertical distribution is uncertain at a level significant to the risk decisions.

Potential site remediation/interim measure decision making may be improved if the area or volume of potentially impacted soil could be defined more precisely. Thus, additional sampling in areas where samples are spaced relatively far apart and/or where vertical characterization is limited might be considered to improve decision making regarding the potential for migration. If uncertainties remain regarding soil physical properties in areas where site remediation or interim measures may be required, decision making regarding potentially required measures could also be improved through the collection of additional data pertaining to the physical characteristics of interest.

If it is concluded in Box 11 that additional sampling is not warranted, then no further sampling is required at this time, and no further sampling is required to resolve Decision 1

(Box 8). The agencies will have to concur that additional sampling is not feasible or warranted. However, PG&E will retain the right to make the final determination regarding the safety of the proposed sampling. If some sampling cannot be performed in a manner that is deemed safe by PG&E, that sampling will be considered infeasible.

If additional data collection is desirable, the feasibility of collecting the additional samples under current operating conditions will be evaluated (Box 12). The decision to be made following this evaluation is shown in Box 13:

> *Is additional data collection feasible under current operating conditions?*

The possible outcomes are:

> ***Yes**: Additional data collection is feasible under current operating conditions.*
>
> ***No:** Additional data is not feasible under current operating conditions, due to physical or institutional constraints.*

Institutional constraints may include safety requirements and the need to maintain operations at the compressor station. If additional data collection is desirable and feasible, then the sampling will be conducted and the new data will be validated (Box 14). After the data are validated, the flow chart leads back to Box 3 to reinitiate the data evaluation process. If the additional data collection is not feasible, then the uncertainties will be addressed in the risk assessment and/or CMS/FS or interim measures (Box 15).

2.7.1.4 Box 16

Once it has been determined that the nature and extent of contamination have been adequately defined and no further data collection is necessary to resolve Decision 1, the flow chart leads to Boxes 16A through 16D, which refer to the decision rules for Decisions 2, 3, 4, and 5. Those decision rules (Figures 3, 4, 5, and 6) address data sufficiency for estimating EPCs, data sufficiency for assessment of threat to groundwater, evaluation of the potential for offsite migration, and data sufficiency to support evaluation of CMS/FS, remedial design, and interim measures.

2.7.2 Decision 2 – Data to Support Calculation of EPCs – Decision Rules and Decision Process

Refer to Figure 3 for the following discussion of the decision rule for Decision 2. This decision rule follows from the decision rule for Decision 1.

2.7.2.1 Boxes 1 through 3

The first steps in addressing Decision 2 are to collect and validate Part B soil samples, validate the newly collected data, and group all Part B soil investigation and Category 1 historic RFI/RI soil data by exposure area and depth category defined in the RAWP (ARCADIS, 2008a), as discussed below.

2.7.2.2 Boxes 4 through 6

Boxes 4 through 6 consist of the evaluation of data adequacy and additional data needs, if warranted. Box 4 addresses the following decision:

> *Are sufficient Category 1 data available to calculate/determine a representative EPC for each applicable depth interval (as defined in the Risk Assessment Work Plan)?*

The outcomes of the decision in Box 4 are:

> ***Yes**: Sufficient data are available to calculate representative EPCs for each applicable depth interval.* If sufficient Category 1 data exist to calculate representative EPCs for each depth interval, then the flow chart leads to Box 5, which concludes that no further data collection is necessary to resolve Decision 2; the flow chart also leads to Box 13 to calculate the representative EPCs and to conduct the risk assessment (see discussion of Box 13, below). The RAWP defines the process to be used to calculate EPCs, assess risk, and determine whether chemicals present within the fence line of the compressor station potentially pose an unacceptable risk. The risk assessment will recommend which chemicals for which areas may require risk management until that time when full site characterization and evaluation of remedial technologies and alternatives will be conducted.
>
> ***No**: Sufficient data to calculate representative EPCs for each applicable depth interval are not available.* If the available Category 1 data are not sufficient to calculate representative EPCs for each depth interval, the flow chart leads to Box 6 to determine what additional samples are necessary to allow calculation of representative EPCs. In this step, specific sampling necessary to allow calculation of representative EPCs will be defined.

The Box 4 decision will be resolved by comparing the existing medium-specific data for each depth interval with the data requirements specified in the RAWP (ARCADIS, 2008a), coupled with professional judgment from the risk assessment experts.

2.7.2.3 Boxes 7 through 12

Box 7 addresses the feasibility of collecting the additional samples identified as desirable in Box 6. As discussed for Decision 1, there may be significant physical and other practical limitations on sampling in areas of the operating facility. The proposed additional sampling effort will be evaluated to determine whether implementation of the sampling effort is feasible. Box 7 addresses the following decision:

Is additional sampling feasible under current operating conditions?

The outcomes of Box 7 are:

> ***No**: Further sampling is not feasible.* The flow chart leads to Boxes 10 through 12, in which PG&E would document the impediments to additional data collection (Box 10) and address EPC uncertainties in the risk assessment (Box 12). No further sampling is necessary to resolve Decision 2 (Box 11).
>
> ***Yes**: Further sampling is feasible.* The flow chart leads to Box 8, in which additional sample collection is conducted and the data are validated. The flow chart then leads to Box 9 to combine the newly collected data with the previous Category 1 and Part B Phase 1 data set; the flow chart then leads back to Box 3 to restart the decision rule with the expanded data set.

The agencies will have to concur that additional sampling is not feasible or warranted. However, PG&E will retain the right to make the final determination regarding the safety of the proposed sampling. If some sampling cannot be performed in a manner that is deemed safe by PG&E, that sampling will be considered infeasible.

2.7.2.4 Box 13

The risk assessment work plan for the soil investigation program has been developed (ARCADIS, 2008a). Once sufficient data are available to calculate representative EPCs, the risk assessment can commence. It should be noted that adequate data to calculate representative EPCs may be available while uncertainty remains with regard to Decision 1, 3, and/or 5. For example, vertical extent may not be defined at a particular boring, but a representative EPC can be calculated for the exposure intervals identified in the RAWP.

2.7.3 Decision 3 – Potential Threat to Groundwater – Decision Rules and Decision Process

Refer to Figure 4 for the following discussion of the decision rule for Decision 3. This decision rule follows from the decision rule for Decision 1.

2.7.3.1 Boxes 1 through 6

The same data set used for Decision 1 will be used for Decision 3 (Boxes 1 through 3). The combined data set will be compared against background concentrations (Box 4). The decision to be made (Box 5) is:

> *Do COPCs in any area exceed background?*

The possible outcomes from Box 5 are:

> ***No**: No COPCs exceed background concentrations.* The flow chart leads to Box 10, and no further sampling is necessary to resolve Decision 3.
>
> ***Yes**: Some COPCs exceed background concentrations.* The flow chart leads to Box 6.

In Box 6, any COPCs exceeding background concentrations will be compared with soil screening levels for migration to groundwater. The combined data tables will flag each occurrence of a COPC exceeding the relevant SSL.

2.7.3.2 Boxes 7 through 10

Box 7 addresses whether the screening level assessment based on SSLs indicates a threat to groundwater. Box 7 addresses the following decision:

> *Do COPCs in any area exceed SSLs (do data indicate a potential threat to groundwater)?*

The potential outcomes of Box 7 are:

> ***Yes**: A potential threat to groundwater exists from residual soil contamination at this unit based on the screening level assessment.* Additional assessment is warranted. The flow chart leads to Box 8 to assess whether data indicate that a potential current threat to groundwater exists.
>
> ***No**: No threat to groundwater is indicated by the screening level assessment for this unit.* The flow chart leads to Box 10; no further sampling is required to resolve Decision 3.

The decision criteria used for this decision are the SSLs. The development of SSLs is described in the *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station Technical Memorandum* dated August 1, 2008 (CH2M HILL, 2008d). SSLs will be calculated for each unit. COPC concentrations within each unit will first be compared with the SSLs developed for that unit. If COPC concentrations are all below SSLs, then soil within that unit does not pose a potential threat to groundwater.

SSLs are highly conservative screening concentrations; SSLs were chosen as the first step in evaluating the potential threat of leaching to groundwater because they are a simple, conservative screening tool. The calculation process for SSLs does not take into consideration changes in concentration with depth. However, the calculation process assumes that the maximum concentration detected at any point in the soil column is present at the groundwater interface and that all constituents are completely leachable. If SSLs are exceeded for any COPC at any unit, it does not mean that that particular COPC in soil in that particular unit necessarily poses a potential threat of leaching to groundwater; rather, it is an indication of a potential threat. More site-specific and detailed evaluation (modeling) may be appropriate to better assess the potential threat of leaching to groundwater for that specific compound at that unit.

Box 8 addresses whether data indicating a potential current threat to groundwater exists, as follows:

> *Do data indicate a potential current groundwater impact?*

Potential outcomes of Box 8 are:

> ***Yes**: Soil data indicate a potential current groundwater impact.* The flow chart leads to Box 9, which requires the development of a plan for a unit-specific groundwater assessment.
>
> ***No**: Only a potential future threat to groundwater from residual soil contamination exists at this unit based on the screening level assessment.* Additional assessment is warranted. The flow chart leads to Box 11 to conduct vadose zone modeling to further assess the potential impact.

In order to assess whether a threat to groundwater currently exists, COPC concentrations are needed throughout the entire soil column down to the water table. Therefore, the criteria for resolving this decision are vertical concentration trends of compounds in each boring and throughout a given unit or area location. If the data indicate increasing COPC concentrations with soil depth, or if elevated COPC concentrations do not decrease with depth, and there are no monitoring wells located in the vicinity of the area, deeper samples would be collected. If soil data indicate elevated concentrations of compounds (as compared with screening criteria) in samples throughout the boring and at the soil/groundwater interface, a potential for a current impact to groundwater exists. If COPC concentrations decrease with depth and are not elevated at the water table, then no current threat exists.

2.7.3.3 Boxes 11 through 13

Boxes 11 and 12 address quantitative vadose zone modeling to assess whether residual soil concentrations could affect groundwater in the future even if current groundwater impacts are not indicated. The HYDRUS-1D (Simunek et al., 1998) vadose zone model will be used. HYDRUS is a finite-element model for one-dimensional solute fate and transport simulations that incorporates sorption along with dispersion in the vadose zone. Critical input to the model will be an estimate of the mass of the COPC(s) present in soil based on soil sample data. Box 12 addresses the following decision:

> *Does modeling indicate the potential for soil-related impacts to groundwater?*

Possible outcomes of Box 12 are:

> ***Yes**: Modeling indicates the potential for future impacts to groundwater from the residual soil contamination at the unit.* The flow chart leads to Box 13 to assess whether additional site-specific refinement of the model is warranted to better simulate site conditions.
>
> ***No**: Modeling does not indicate a potential future impact to groundwater.* The flow chart leads to Box 10; no further data are required to resolve Decision 3.

The criteria for resolving this decision are the simulated groundwater concentrations relative to groundwater chemical-specific applicable or relevant and appropriate requirements (ARARs) for COPCs. The target groundwater concentrations used to assess potential impacts to groundwater are the California groundwater maximum contaminant levels, both primary and secondary, and groundwater background values. The maximum contaminant levels have been defined as chemical-specific ARARs in Volume 2 of the RFI/RI Revised Final Report (CH2M HILL, 2009a).

If the outcome of Box 12 is yes, then Box 13 addresses the following decision:

> *Is further site-specific model refinement warranted to further evaluate a potential threat to groundwater?*

Possible outcomes of Box 13 are:

> ***Yes**: Further site-specific model refinement is warranted to further evaluate a potential threat to groundwater.* The flow chart leads to Box 14 to assess whether additional data collection is required to refine the model.
>
> ***No**: Further site-specific model refinement is not warranted.* The flow chart leads to Box 19; the potential future threat to groundwater will be evaluated in conjunction with the results from the Topock Compressor Station/East Ravine Groundwater Investigation (TCS/ERGI).

The primary consideration for this decision is the evaluation of the potential uncertainty in the refined model results (i.e., would the refined model be significantly more reliable?). The decision to pursue a more refined model on which to base decision making will be made based on the available data and the potential added information achievable by refining the model.

2.7.3.4 Boxes 14 through 18

If further model refinement is warranted, the next decision is a determination of whether additional data collection is required to refine the model. Refinements would not necessarily require additional sampling because refinements may also be achieved through further literature research regarding physical and chemical characteristics, more detailed modeling of the area of interest (i.e., smaller "cells") and/or use of a model more specifically targeted at the compound in question. Box 14 states:

> *Is additional data collection required to refine the model?*

The outcomes of Box 14 are:

> ***Yes**: Additional sampling is required.* The flow chart leads to Box 15 to determine additional data collection needs.
>
> ***No**: Further data collected is not required.* The flow chart leads to Box 18, and the model is refined without additional sample collection.

The need for additional data collection may be due to a variety of factors. It is likely that a number of assumptions will have had to have been made as part of the initial modeling effort; for example, site-specific leaching data (waste extraction test and/or toxicity characteristic leaching procedure data) may not be available for all compounds of interest. It may also be determined that, rather than this type of waste characterization analysis, a DI-WET or similar modified testing method would have been more appropriate to characterize the in-situ leaching potential in the areas outside the fence line.

Boxes 15 and 16 define the additional data needed and the feasibility of collecting the desired data. Following the decision in Box 14 that additional data collection is required to refine the model, the data to be collected are determined in Box 15. From Box 15, the process flows to Box 16, which addresses the following decision:

> *Is additional data collection feasible under current operating conditions?*

Considerations for this decision are the types of data that need to be collected to refine the model and the feasibility of collecting additional samples. Feasibility of sample collection may be limited by physical, cultural/historical, and/or biological factors, and the decision regarding the feasibility of additional data collection will be based on these factors.

Possible outcomes of Box 16 are:

> ***Yes**: Additional data collection is feasible.* The flow chart leads to Box 17 to collect the additional samples and to validate the newly collected data. From there, the flow chart leads to Box 18 to refine the model and then back to Box 11 to conduct the refined modeling.
>
> ***No**: Additional data collection is not feasible.* The flow chart leads to Box 19.

The agencies will have to concur that additional sampling is not feasible or warranted. However, PG&E will retain the right to make the final determination regarding the safety of the proposed sampling. If some sampling cannot be performed in a manner that is deemed safe by PG&E, that sampling will be considered infeasible.

2.7.3.5 Box 19

Once it has been determined that, while there is a potential future threat to groundwater but no further model refinement is warranted to assess this potential future threat or no further refinement of the model through data collection is feasible, the flow chart leads to Box 19. As part of this step, the results from the forthcoming TCS/ERGI investigation will be evaluated to assess groundwater conditions below the compressor station. The areas posing a potential future threat to groundwater will be evaluated in conjunction with the TCS/ERGI results to assess the need for further evaluation. The flow chart then leads to Box 9, which requires the development of a plan for a unit-specific groundwater assessment.

2.7.4 Decision 4 – Data for Evaluation of Potential Risk to Offsite Receptors in a Surface Migration Pathway – Decision Rules and Decision Process

Refer to Figure 5 for the following discussion of the decision rule for Decision 4. This decision rule follows from the decision rule for Decision 1.

2.7.4.1 Boxes 1 through 6

A portion of the same data set used for Decision 2 will be used for Decision 4. The existing and validated Part B data will be combined as described for Decision 2 (Boxes 1 through 3). The combined surface soil (0.0-to-0.5-foot-bgs interval) dataset (from unpaved areas potentially draining to offsite locations during storm events and/or potentially subject to windborne dust generation) will then be compared with the screening levels developed for the Soil Part A Program (also referred to as the Decision 4 screening levels in the context of the Soil Part B Program) (Box 4) to determine whether COPCs in soil exceed the screening levels.

Box 5 addresses the following decision:

> *Do COPCs in soil exceed the Decision 4 screening levels?*

The possible outcomes of the decision in Box 5 are:

> ***No**: No COPCs exceed Decision 4 screening levels.* The flow chart leads to Box 6, and no further sampling is necessary to resolve Decision 4.
>
> ***Yes**: Some COPCs exceed Decision 4 screening levels.* The flow chart leads to Box 7.

The purpose of this decision step is to identify areas that may pose a potential concern to offsite receptors if migration were to occur from these areas inside the fence line to areas outside the fence line. It is not necessary to evaluate the potential for offsite migration from areas where existing COPC concentrations are below the Decision 4 screening levels, because these areas would not pose a potential threat to offsite receptors.

2.7.4.2 Box 7

Once it has been determined in Box 5 that one or more areas within the fence line of the compressor station could pose a threat to offsite receptors if offsite migration were to occur, the next step is to determine whether migration from the area(s) in question could occur. The Box 7 decision is:

> *Are COPCs in shallow soil exceeding Decision 4 screening levels able to migrate offsite?*

The possible outcomes of the decision in Box 7 are:

> ***No**: COPCs exceeding Decision 4 screening levels are not able to migrate offsite.* The flow chart leads to Box 6, and no further sampling is necessary to resolve Decision 4.

> ***Yes**: Some COPCs exceeding Decision 4 screening levels may be able to migrate offsite.* The flow chart leads to Box 8.

The evaluation conducted as part of the Box 7 decision will include an assessment of potential stormwater flow pathways to assess whether contaminants in soil could be transported offsite through either sheet flow or through storm drains and the potential for windblown dust transport. If the subject area is paved (with gravel, asphalt, or concrete), contaminants would not migrate offsite via surface transport or storm drains. In unpaved areas, the topography of the potential source location with COPC concentrations above screening levels would be evaluated to determine if a path exists for surface water to flow from that area to a storm drain or if there is an unbermed edge of the compressor station or a breach in the berm. If such a pathway exists, then COPCs could potentially migrate offsite at concentrations that exceed screening levels.

2.7.4.3 Boxes 8 through 11

If some constituents exceeding Decision 4 screening levels are potentially able to migrate offsite, the next step is to determine the extent of the areas that pose a potential threat to offsite receptors. Therefore, the following decision is made in Box 8:

> *Are areas of COPCs in surface soil exceeding Decision 4 screening levels adequately defined?*

The possible outcomes of Box 8 are:

> ***Yes**: Areas of COPCs in surface soil exceeding Decision 4 screening levels are adequately defined.* The flow chart leads to Box 9, and no further sampling is necessary to resolve Decision 4. Box 9 then leads directly to Box 10, which requires evaluation of potential migration and exposure control measures for those areas with COPCs in shallow soil exceeding screening levels.
>
> ***No**: Areas of COPCs in surface soil exceeding Decision 4 screening levels are not adequately defined.* The next step in the decision process is to determine the additional sampling needed to adequately define the extent of the area(s) with COPCs in surface soil exceeding screening levels (Box 11).

Areas where COPCs in surface soil exceed Decision 4 screening levels and are able to migrate offsite are adequately defined if the lateral extent is known (i.e., if they are largely bounded by samples that have COPC concentrations below the screening levels, paved areas, buildings, and/or berms/curbs). The lateral extent would also be evaluated by considering the overall distribution of COPCs in the area of interest. Because runoff would occur from an area as opposed to a single location, the evaluation may consider an average concentration (e.g., 95 percent upper confidence limit on the mean) as well as individual point concentrations. If these areas are adequately defined, the next step is to evaluate the potential migration control measures that could be employed to control the potential threat to receptors outside the fence line (Box 10). If the areas have not been adequately defined, then additional data collection is required, if feasible, to delineate the areas. The next step is to determine additional sampling needs (Box 11).

2.7.4.4 Boxes 12 through 16

Once the additional sampling needs have been defined in Box 11, the next step is to determine whether additional sampling is feasible under current operating conditions (Box 12). Although Decision 4 is concerned only with surface soil, there could still be some physical limitations on sampling (e.g., lack of physical access to the area of interest). Sampling under pavement and structures is not required for this decision because offsite migration of surface soils is not possible from underneath these areas. The decision for Box 12 is:

> *Is additional sampling feasible under current operating conditions?*

The possible outcomes from Box 12 are:

> ***Yes**: Additional sampling is feasible under current operating conditions.* Additional sampling will be implemented and the data will be validated (Box 13).
>
> ***No**: Additional sampling is not feasible under current operating conditions.* The impediments to additional data needs will be documented for future action (Box 15).

The agencies will have to concur that additional sampling is not feasible or warranted. However, PG&E will retain the right to make the final determination regarding the safety of the proposed sampling. If some sampling cannot be performed in a manner that is deemed safe by PG&E, that sampling will be considered infeasible.

If additional sampling is feasible, it will be conducted. The validated data will be combined with the existing data set (Box 14), and the more extensive combined data set will be used to determine whether the extent of areas with COPCs above the screening levels is adequately defined (the flow chart returns to Box 8). If additional sampling is infeasible, the impediments will be documented (Box 15), the uncertainties pertaining to the potential for offsite migration will be addressed via the risk assessment, and/or potential migration and/or exposure control measures will be evaluated to prevent potential impacts to offsite receptors.

2.7.5 Decision 5 –Inputs to CMS/FS or Interim Measures– Decision Rules and Decision Process

Refer to Figure 6 for the following discussion of the decision rule for Decision 5. This decision rule follows from the decision rule for Decision 1. The goal of this decision is to ensure that sufficient data and other information have been collected to support development of the CMS/FS, remedial design and/or interim measures.

2.7.5.1 Boxes 1 through 6

The same data set used for Decision 1 will be used for Decision 5 (Boxes 1 through 3). Once the data sets have been combined, the next step is to determine whether sufficient information is available pertaining to potential migration pathways. Box 4 for Decision 5 asks the following:

> *Are sufficient soil property, transport pathway, and contamination distribution information and data available to support the CMS/FS and/or interim measures?*

The possible outcomes of Box 4 are:

> ***Yes****: Sufficient soil property, transport pathway, and contamination distribution information data are available to support the CMS/FS and/or interim measures.* The flow chart leads to Box 5, and no further sampling is necessary to resolve Decision 5. Box 5 then leads directly to Box 11, which requires evaluation of the need for potential remediation or interim measures.
>
> ***No****: There are insufficient soil property, transport pathway, and contamination distribution information and data to support the CMS/FS and/or interim measures.* The next step in the decision process is to define the additional data or other information needed to provide sufficient transport pathway information and soil property and contamination distribution data (Box 6).

Considerations for this decision are the availability of site-specific soil property data (such as grain size, organic carbon content, Atterberg limits, plasticity, washes, and chemical makeup) and transport pathway and contaminant distribution information. Decision 5 will build on the potential source locations and transport pathway information identified as part of Decision 4. This decision step would evaluate each potential source area to (1) determine whether the potential transport pathways have been adequately characterized to identify the means for controlling contaminant movement via that pathway and (2) characterize alternate pathways that may form if the primary pathway is eliminated. For example, in an area where sheet flow to the edge of the compressor station is the primary pathway for contaminant movement, offsite contaminant movement could be prevented by installing a curb. The flow diverted by the curb would then be expected to either infiltrate (if loose soil is present) or flow to another location (a storm drain or another area lacking a curb). The Box 4 evaluation would assess each area where COPC concentrations exceed screening levels to identify existing and potential migration pathways. Where the existing or potential migration pathways cannot be characterized, further assessment of site conditions may be required. In addition, this step would assess whether sufficient soil property data are available to support decisions regarding appropriate remedial technology. Decision 1 will ensure that sufficient data are available to calculate potential soil volumes/areas potentially requiring remediation.

The actual extent of required migration and/or exposure control measures, interim measures, and/or remediation will be determined based on the results of the risk assessment and other factors, such as the accessibility of the areas.

2.7.5.2 Boxes 7 through 11

Box 7 addresses the feasibility of collecting the additional samples and/or information. The proposed additional sampling effort will be evaluated to determine whether implementation of the sampling effort is feasible. Box 7 addresses the following decision:

> *Are additional soil property and/or contaminant distribution data collection feasible and/or can additional information on transport pathways be obtained?*

The outcomes of Box 7 are:

> ***No****: Further sampling and/or obtaining the additional information is not feasible.* The flow chart leads to Box 8 (document impediments to collecting the data and/or remaining uncertainties) and Box 11 (evaluate need for potential remediation or interim measures).

Yes: *Further sampling and/or information gathering is feasible.* The flow chart leads to Boxes 9 and 10. Additional data collection and/or information gathering are conducted (Box 9). The new data are validated and combined with existing data as well as additional information pertaining to potential transport pathways (Box 10). The flow chart then leads back to Box 4 to restart the decision rule with the expanded data set.

The agencies will have to concur that additional sampling is not feasible or warranted. However, PG&E will retain the right to make the final determination regarding the safety of the proposed sampling. If some sampling cannot be performed in a manner that is deemed safe by PG&E, that sampling will be considered infeasible. The final step for Decision 5 is the evaluation of the need for potential remediation or interim measures (Box 11).

2.8 Steps 6 and 7: Acceptable Limits on Decision Error and Optimize Sampling Design

Step 6 is intended to define acceptable limits on decision errors. A decision error would occur if, based on the available data, the project team chooses the wrong response action in the sense that a different response action would have been chosen if the project team had accessed "perfect data" or absolute truth.

If it is determined that data gaps exist and additional data are needed to resolve the Part B decisions, Step 7 will be conducted. The purpose of Step 7 is to *"identify a resource-effective data collection design for generating data that are expected to satisfy the DQOs"* (USEPA, 2000). Practical constraints may limit the spatial and/or temporal boundaries or regions that will be included in the study. Practical constraints associated with the Topock RCRA corrective action/CERCLA program consist primarily of access limitations (physical, cultural, historical, or biological constraints) but may also include other factors such as soil characteristics and the presence of bedrock. The output of this step will be the sampling design agreed upon by the stakeholders during the data gaps evaluation process. Following compilation of an initial data assessment, DOI, DTSC, and PG&E, in consultation with stakeholders, will reconvene to develop Steps 6 and 7 of the DQO process.

3.0 References

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Table

TABLE 1
Data Quality Objectives – Part B Soil Investigation
Final Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
Contaminants in soil in SWMUs/AOCs inside the compressor station fence line resulting from historical compressor station practices may pose an unacceptable risk to humans or the environment, or threaten groundwater. Adequate site-specific information is needed to: • Determine the nature and extent of soil contamination • Estimate representative exposure point concentrations (EPCs) to support human health risk assessment being conducted separately from the Part B soil investigation • Determine whether residual soil concentrations inside the compressor station fence line pose a threat to groundwater • Determine whether migration of residual soil concentrations inside the compressor station fence line via a surface migration pathway pose a threat to receptors outside the compressor station fence line • Determine the site-specific soil property and contaminant distribution information necessary to support the CMS/FS, remedial design, and/or Interim Measures	**Decision 1** Determine the nature and extent of residual soil concentrations resulting from historic compressor station practices. If determination of the nature and extent of contamination based on sample data is not feasible or is not warranted, address uncertainties in the risk assessment and/or the CMS/FS or Interim Measures.	• COPCs by AOC/SWMU • Part B and representative Category 1 and 2 historic RFI/RI COPC data grouped by AOC/SWMU • Comparison/screening values (background, risk-based, and regulatory screening values) • CSMs • Geologic/hydrogeologic/hydrologic information • Topographic information • Soil physical and chemical property information • AOC/SWMU location and use history information • Cultural and historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	**Lateral Extent** *For onsite units included in the Final RFI/RI:* Initially, the same as the currently defined boundaries of each SWMU and AOC: Lateral extent will be expanded if/as necessary until COPCs concentrations fall below screening values. If samples are collected outside the fenceline in areas that provide significant habitat, then data will be compared with ecological comparison values and constituents of potential ecological concern identified. The lateral extent of AOC 13 is to the fence line, where unpaved areas extend to the fence line. Onsite units included in the Final RFI/RI include SWMUs 5, 6, 8, and 9; Units 4.3, 4.4, and 4.5; and AOCs 5, 6, 7, 8, 13, 15, 16, 17, 18, 19, and 20. *For newly identified areas*: Initially, the tentative outline shown in Figure 1. Newly identified areas include SWMU 11; AOCs 21, 22, 23, 24, 25[1], and 26; the potential burn area near AOC 17; and the motor oil pit at the former Teapot Dome facility. *For the perimeter area:* initially from the facility fence line outward to the toe of the slope. Existing and former storm drain outfalls will initially be investigated during Part B investigation. *For storm drains:* Initially the lateral extent of the storm drain alignment. **Vertical Extent** Vertical study area boundaries extend from the ground surface to the water table. **Analytical Parameters** *Chemical Parameters (COPC):* • TPH, VOCs, and SVOCs (including PAHs) for SMWUs 5, 6, 8, and 9 • Title 22 metals, hexavalent chromium, and pH for SWMU 11 • Title 22 metals, VOCs, SVOCs (including PAHs), and pH for	See Figure 2 for the Decision 1 decision rule

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[1] This unit was identified as AOC 26 in the DTSC comments; however, AOC 25 as identified in the DTSC comments is a small, rectangular area carved out of the rock face near AOC 10 (East Ravine) that may have been used for explosives storage. Because the unit is outside the TCS, it will be further evaluated as needed in coordination with the Part A soil investigation.

TABLE 1
Data Quality Objectives – Part B Soil Investigation
Final Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
			Unit 4.3 • Title 22 metals, VOCs, and SVOCs (including PAHs) for Unit 4.4 • TPH, VOCs, and SVOCs (including PAHs) for Unit 4.5 • Title 22 metals, hexavalent chromium, and pH for AOCs 5, 6, 15, and 19 • VOCs, SVOCs including PAHs, PCBs, TPH, Cr(VI), pH, and Title 22 metals for AOC 7 • TPH, VOCs, and Title 22 metals for AOC 8 • Title 22 metals, hexavalent chromium, VOCs, TPH, PAHs, PCBs, SVOCs, and asbestos for AOC 13 • Title 22 metals for AOC 16 • Title 22 metals, hexavalent chromium, VOCs, TPH, PAHs, and SVOCs for AOC 17, and AOC 18 • Title 22 metals, hexavalent chromium, TPH, VOCs, and PAHs for AOC 20 • Calcium, sodium, Cr(VI), pH, and Title 22 metals for AOC 21 • VOCs and SVOCs including PAHs, PCBs, TPH, Cr(VI), pH, and Title 22 metals for AOCs 22, 23, 24, 25, and 26 • TPH, VOCs, and SVOCs including PAHs, PCBs, and Title 22 metals for the motor oil pit at the former Teapot Dome facility • VOCs and SVOCs including PAHs, PCBs, TPH, Cr(VI), pH, Title 22 metals, and dioxins/furans for the potential burn area near AOC 17 *Other parameters:* Select samples will be analyzed to characterize the soluble fraction of compounds present at concentrations exceeding 10 x TTLC or 20 x TCLP values. SPLP will be performed on approximately two soil samples per AOC and will be analyzed for hexavalent chromium, and total chromium.	

TABLE 1
Data Quality Objectives – Part B Soil Investigation
Final Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	STEP 2 Decision Statement	STEP 3 Inputs to the Decision	STEP 4 Study Area Boundaries	STEP 5 Decision Rules
			Ten percent of samples will be analyzed for the CERCLA TAL/TCL compounds. **Temporal Boundaries** Validated Part B soil sampling data and representative Category 1 and Category 2 historic RFI/RI data (based on the final Data Usability Assessment).	
	Decision 2 Determine representative EPCs for residual soil contamination resulting from historic compressor station practices. If determination of representative EPCs based on sample data is not feasible, address uncertainties in the risk assessment.	• Nature and extent of contamination assessment from Decision 1 • Part B and representative Category 1 historic RFI/RI COPC data grouped by exposure area and depth interval • Comparison/screening values (background, risk-based, and regulatory screening values) • Existing surface and subsurface utilities, pavement, buildings, and other structures • RAWP CSM • Geologic/hydrogeologic/hydrologic information • Topographic information • Soil physical and chemical property information • Site Worker activities and practices by AOC/SWMU, AOC/SWMU location, and use history information • Cultural and historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	**Lateral Extent** Same as for Decision 1. **Vertical Extent** Vertical study area boundaries for Decision 2 are defined by potential maximum exposure depths. *For onsite workers*: the maximum exposure depth is 3 feet bgs. *For maintenance workers*: the maximum exposure depth is defined as 0 to 10 feet bgs. *For potential receptors outside the fence line*: surface interval only (0 to 0.5 foot bgs). For areas within the fence line (i.e., soil that could potentially be transported to areas outside the compressor station fence line); Part A parameters apply in the perimeter area and to storm drain sampling along outfalls outside the fence line. **Analytical Parameters** Same as for Decision 1. **Temporal Boundaries** Validated Part B soil sampling data and representative Category 1 historic RFI/RI data (based on the final Data Usability Assessment).	See Figure 3 for the Decision 2 decision rule
	Decision 3	• Nature and extent of contamination assessment from Decision 1	**Lateral Extent**	See Figure 4 for the Decision 3 decision

TABLE 1
Data Quality Objectives – Part B Soil Investigation
Final Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
	Determine whether residual soil concentrations resulting from historic compressor station practices may threaten groundwater. If so, conduct additional site-specific assessment of the threat*, or implement response actions to mitigate the threat. If not, no further assessment or response actions are necessary to address threat to groundwater.	• Data collected from compressor station wells installed during East Ravine Groundwater Investigation • COPCs by AOC/SWMU • Part B and representative Category 1 and 2 historic RFI/RI COPC data grouped by AOC/SWMU • Comparison/screening values (SSLs, groundwater background values, and groundwater/ drinking water ARARs, including MCLs) • CSMs • Geologic/hydrogeologic/hydrologic information • Sources of recharge within the compressor station • Topographic information • Soil physical and chemical property information • AOC/SWMU location and use history information • Cultural and historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	Those portions of each AOC/SWMU where COPC concentrations exceed SSLs. **Vertical Extent** Same as for Decision 1. **Analytical Parameters** *Chemical Parameters (COPCs):* Same as for Decision 1. *Other Parameters: Soil Characteristics* (to support modeling): Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes. **Temporal Boundaries** Same as for Decision 1.	rule
	<u>Decision 4</u> Determine if residual soil concentrations inside the compressor station fence line resulting from historic compressor station practices pose a potentially unacceptable	• Nature and extent of contamination assessment from Decision 1 • Part B and representative Category 1 historic RFI/RI COPC data grouped by depth interval • Mechanisms, directions and rates of	**Lateral Extent** Same as for Decision 1. **Vertical Extent** 0 to 0.5 foot bgs, except within the perimeter area, where the vertical boundary is 1.0 foot bgs.	See Figure 5 for the Decision 4 decision rule

TABLE 1
Data Quality Objectives – Part B Soil Investigation
Final Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
	risk to receptors outside the compressor station fenceline via a surface migration pathway. If a potentially unacceptable risk to receptors outside the fenceline exists, or if determination of potential risk to receptors outside the fenceline based on sample data is not feasible, develop controls to eliminate migration pathways or remove contaminated soil.	migration • Interim screening levels from Soil Part A Program • Existing surface and subsurface utilities, pavement, buildings, and other structures • RAWP CSM • Geologic/hydrogeologic/hydrologic information • Topographic information • Soil physical and chemical property information • AOC/SWMU location and use history information • Cultural and historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	**Analytical Parameters** *Chemical Parameters (COCs):* Same as COPCs for Decision 1. **Temporal Boundaries** Same as for Decision 1.	
	<u>Decision 5</u> Determine the site-specific soil property, contaminant distribution, and transport pathway information necessary to support the CMS/FS, remedial design, and/or Interim Measures, if required. If full determination of site-specific soil property, contaminant distribution, and transport pathway information based on sample data is not feasible, document impediments and uncertainties in the risk assessment and/or CMS/FS or	• Nature and extent of contamination assessment from Decision 1 • Constituents of concern from human health and ecological risk assessments • Remedial action objectives and ARARs • Risk-based and regulatory soil and/or sediment cleanup levels • Estimated soil areas and volumes • Waste classification testing results for soil, as required • Waste comparison/screening levels (TTLC, STLC, RCRA toxicity)	**Lateral Extent** Initially, same as for Decision 1, to be refined based on results of risk assessments and threat to groundwater assessments. **Vertical Extent** Initially, same as for Decision 1, to be refined based on results of risk assessments, threat to groundwater assessments, and remedial alternative practical constraints. **Analytical Parameters** *Chemical Parameters (COCs):* Initially, same as COPCs for Decision 1, to be refined to specific COCs based on results of risk assessments and threat to groundwater assessments.	See Figure 6 for the Decision 5 decision rule

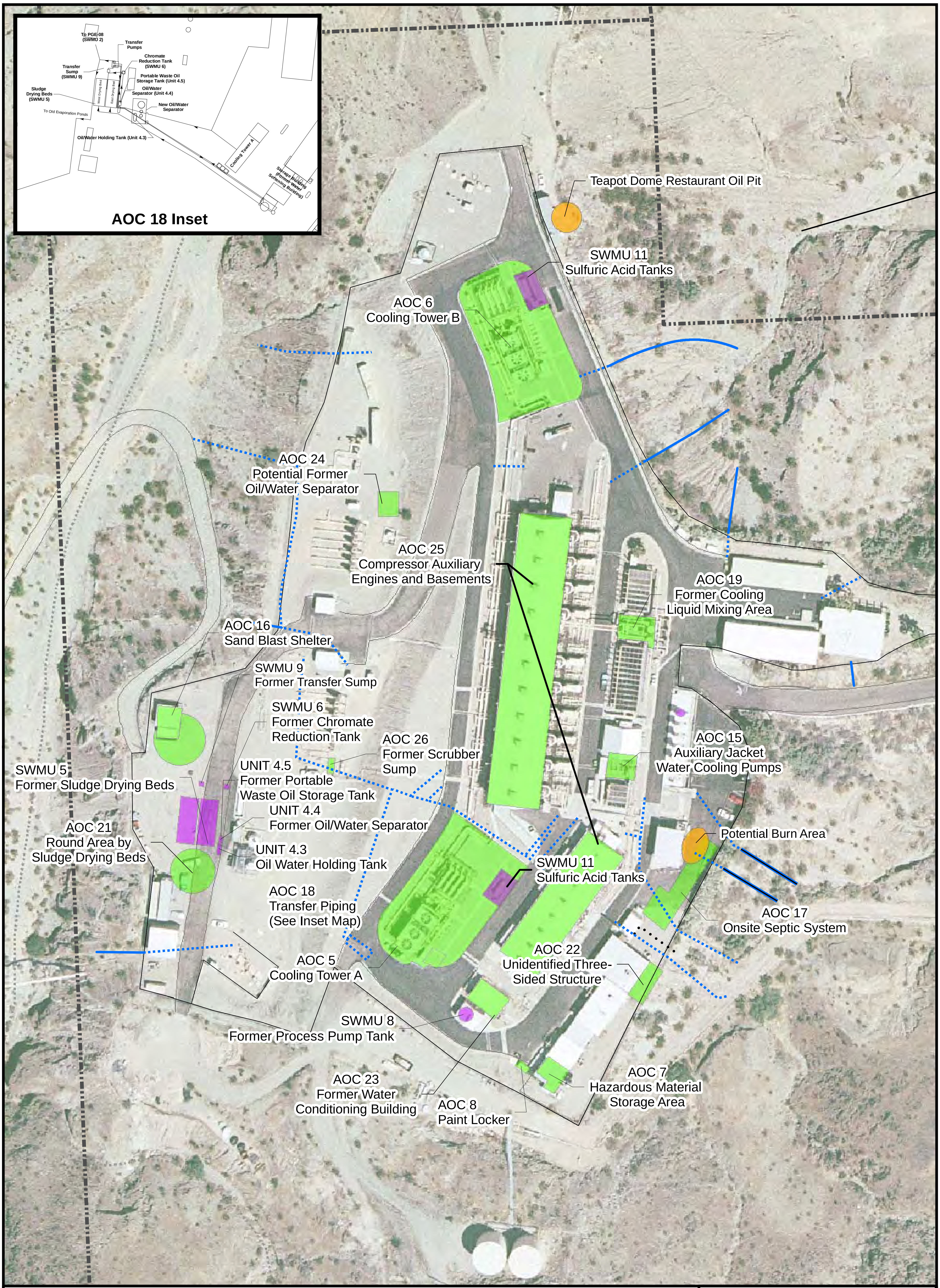
TABLE 1
Data Quality Objectives – Part B Soil Investigation
Final Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

STEP 1 Problem Statement	**STEP 2 Decision Statement**	**STEP 3 Inputs to the Decision**	**STEP 4 Study Area Boundaries**	**STEP 5 Decision Rules**
	Interim Measures.	• Soil physical and chemical property information • Geologic/hydrogeologic/hydrologic information • Topographic information • Location of paved/unpaved areas • AOC/SWMU location and use history information • Historic information by AOC/SWMU • Infrastructure information by AOC/SWMU	*Soil Characteristics* (to support evaluation of potential migration and/or exposure control measures): Select samples will be analyzed for organic carbon content, grain size, Atterberg limits, gradation, and washes. **Temporal Boundaries** Same as for Decision 1.	

The list of analytical parameters is based on CSM and will be refined after each round of investigation/data evaluation. COCs will be selected based on the risk assessment.

ARARs = applicable or relevant and appropriate requirements.
COC = constituent of concern
Cr(VI) = hexavalent chromium..
PCB = polychlorinated biphenyl.
PAH = polycyclic aromatic hydrocarbon.
SPLP = synthetic precipitation leaching procedure
STLC = soluble threshold limit concentration
SVOC = semivolatile organic compound
TCLP = toxicity characteristic leaching procedure
TPH = total petroleum hydrocarbons
TTLC = total threshold limit concentration
VOC = volatile organic compound

Figures



LEGEND

—	Site Fence Boundary
🟪	Solid Waste Management Unit (SWMU)
🟩	Area of Concern (AOC)
🟧	Other Areas
━	Former Stormwater Pipeline (Now Degraded)
━	Stormwater Piping Above Ground (Approximate Location)
┅	Stormwater Piping Below Ground (Approximate Location)
• • • •	Alternate Stormwater Piping Below Ground (Approximate Location)

Notes:
1) AOC 13 is not depicted on this figure. It consists of the unpaved areas within the compressor station.

2) AOC 20 is not depicted on this figure. It consists of industrial floor drains within the compressor station.

3) Boundaries of all SWMUs, AOCs, and Other Areas are approximate.

N

0 100 200 Feet

FIGURE 1
SOLID WASTE MANAGEMENT UNITS, AREAS OF CONCERN, AND OTHER AREAS ADDRESSED BY THE DATA OBJECTIVES FOR THE PART B SOIL INVESTIGATION

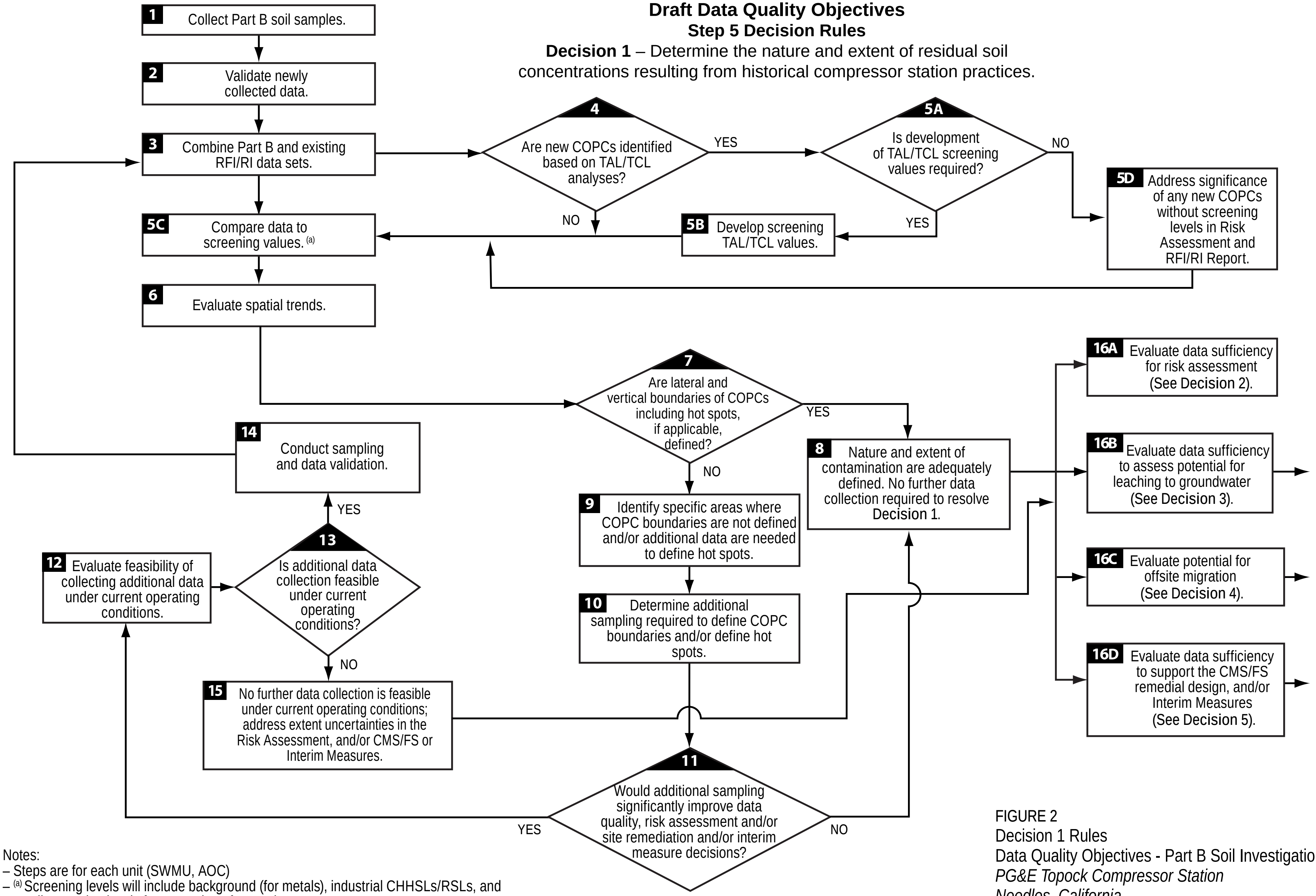
Data Quality Objectives - Part B
Soil Investigation
Pacific Gas and Electric Company
Topock Compressor Station
Needles, California

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2010\ALL_SWMU_AOC_LOCS11X17_V2.MXD JLAMANTI 2/18/2011 11:57:08

Draft Data Quality Objectives
Step 5 Decision Rules

Decision 1 – Determine the nature and extent of residual soil concentrations resulting from historical compressor station practices.



Notes:
– Steps are for each unit (SWMU, AOC)
– (a) Screening levels will include background (for metals), industrial CHHSLs/RSLs, and soil screening levels for protection of groundwater
COPCs: chemicals of potential concern

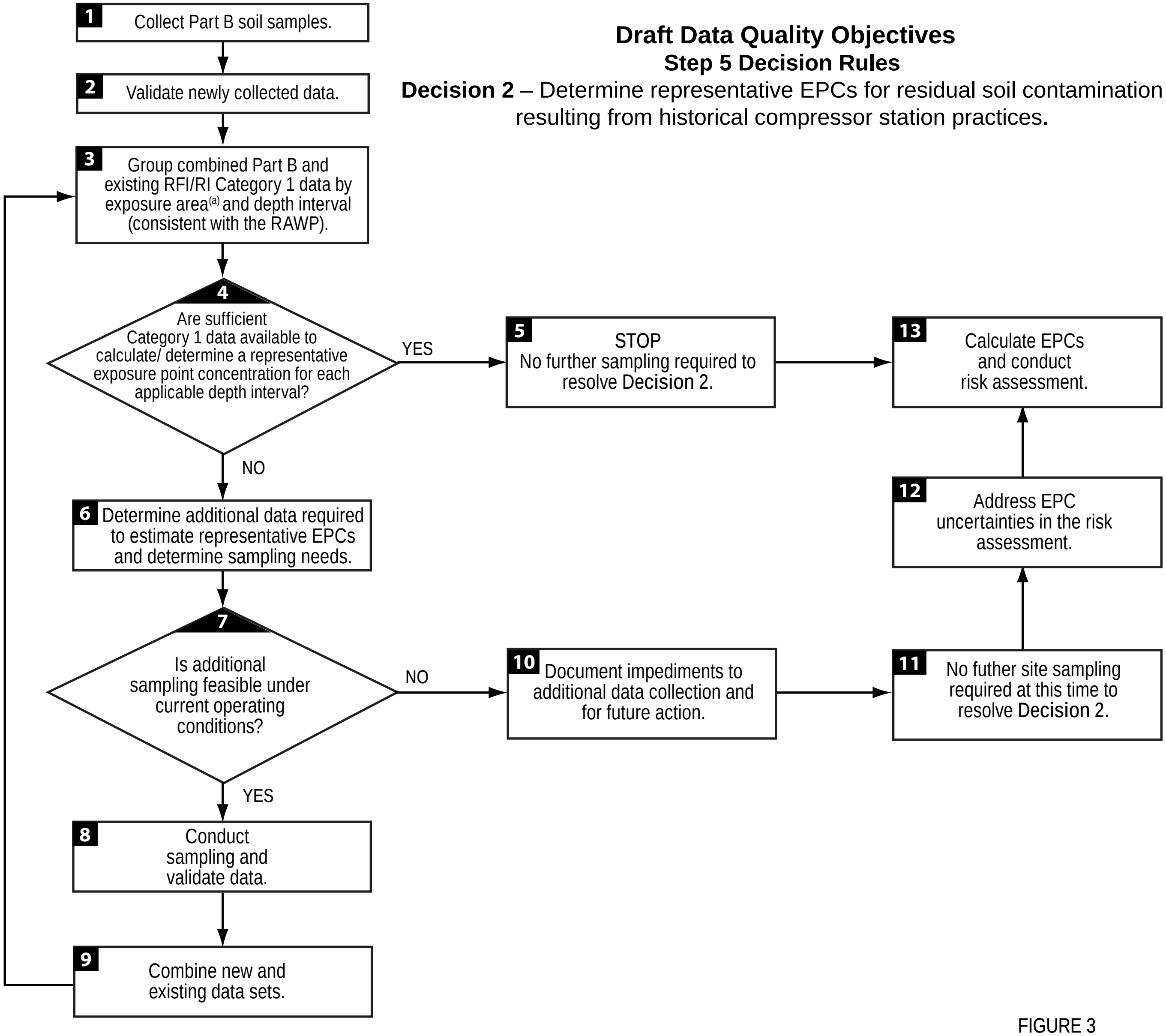
FIGURE 2
Decision 1 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

CH2MHILL

Draft Data Quality Objectives

Step 5 Decision Rules

Decision 2 – Determine representative EPCs for residual soil contamination resulting from historical compressor station practices.



Notes:
– [a] The entire area within the fenceline is considered one exposure area.
COPCs: chemicals of potential concern
EPC: exposure point concentration
RAWP: risk assessment workplan

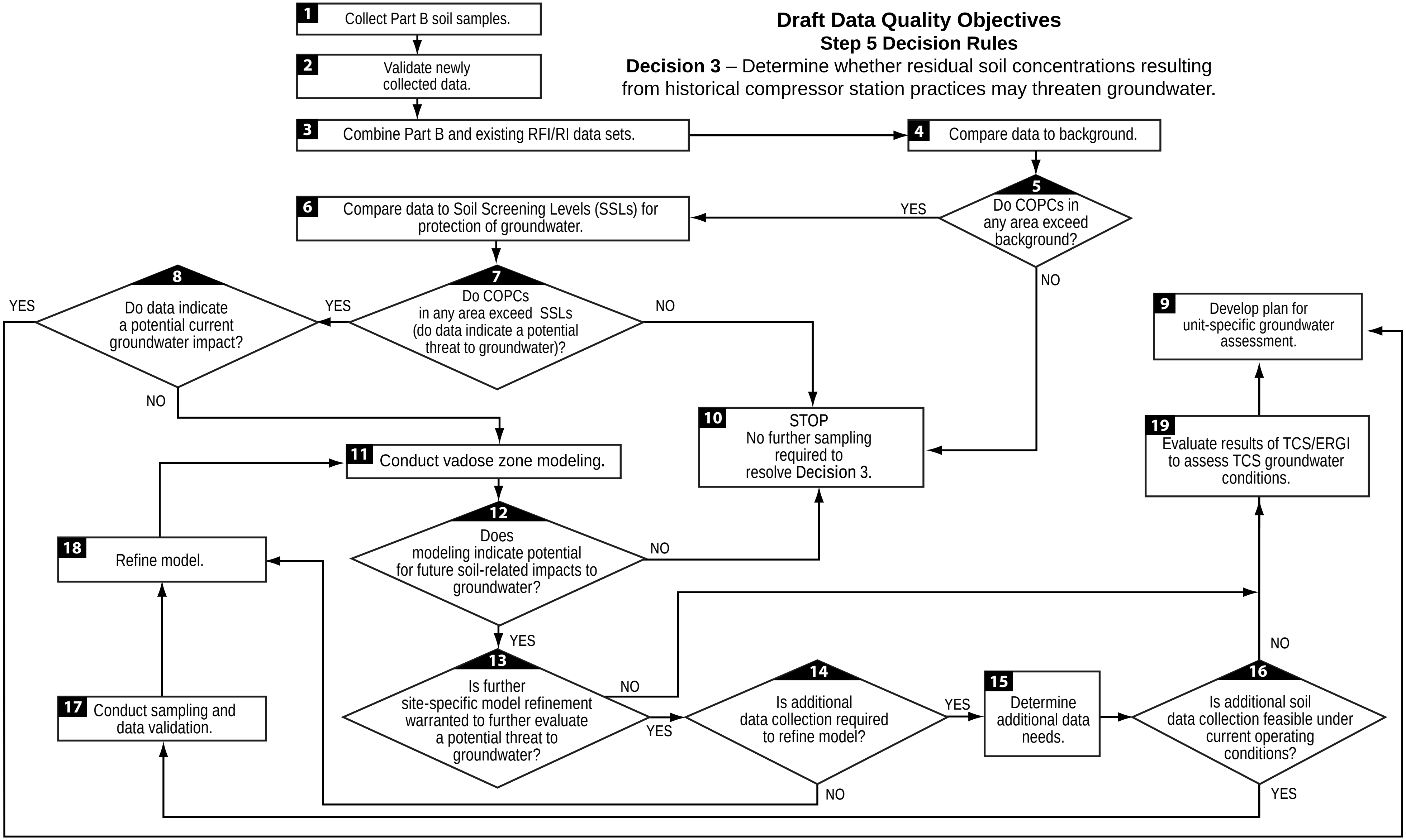
FIGURE 3
Decision 2 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

CH2MHILL

Draft Data Quality Objectives

Step 5 Decision Rules

Decision 3 – Determine whether residual soil concentrations resulting from historical compressor station practices may threaten groundwater.



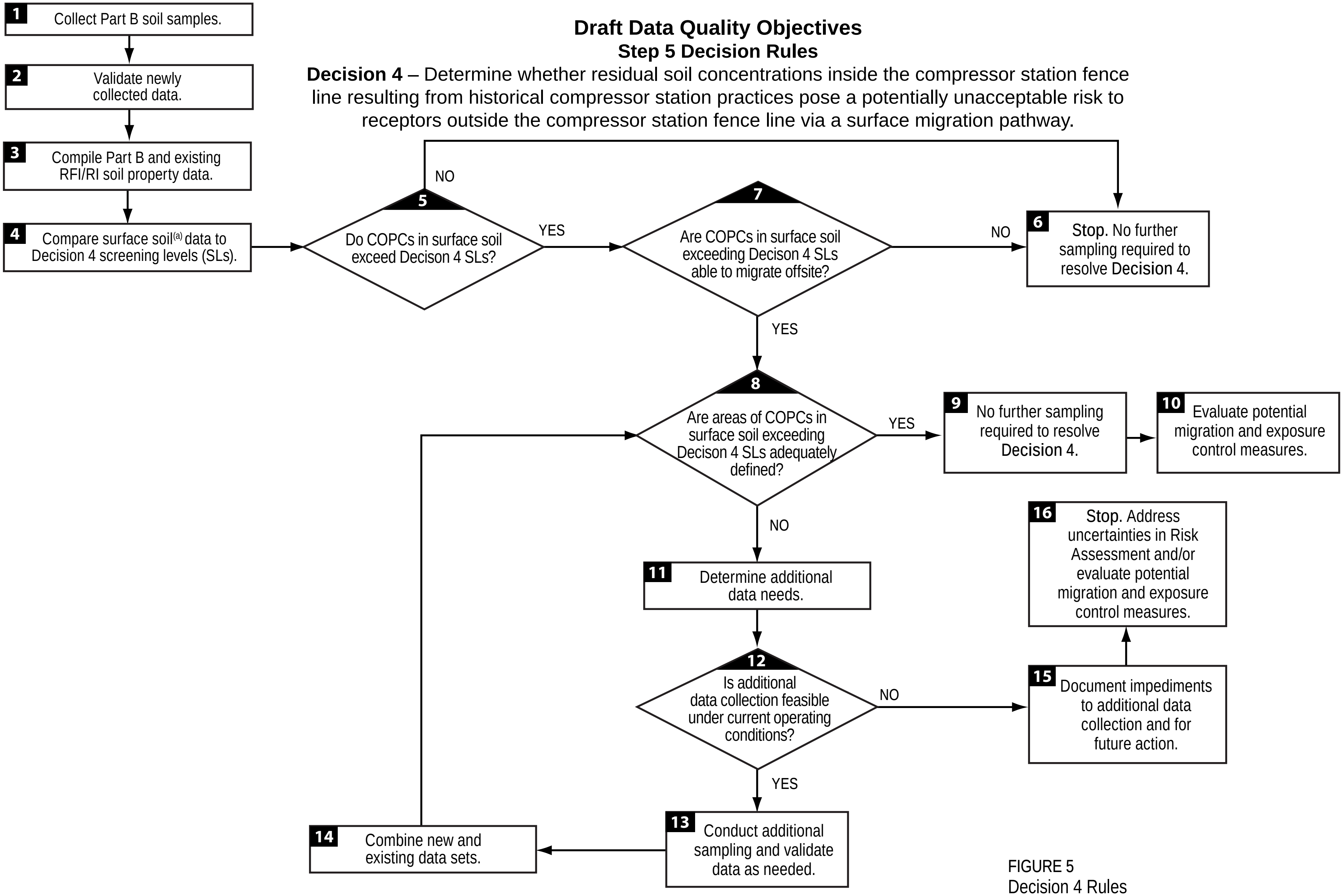
Notes:
SSL: soil screen levels for protection of groundwater
COPCs: chemicals of potential concern
TCS/ERGI: Topock compressor station/East Ravine Groundwater Investigation

FIGURE 4
Decision 3 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

Draft Data Quality Objectives

Step 5 Decision Rules

Decision 4 – Determine whether residual soil concentrations inside the compressor station fence line resulting from historical compressor station practices pose a potentially unacceptable risk to receptors outside the compressor station fence line via a surface migration pathway.



Notes:
– (a) Shallow soil defined as 0 to 0.5 feet/bgs
COPCs: chemicals of potential concern
Decison 4 SLs: Interim screening levels as defined in the Soil Part A Phase 1 Data Gaps Evaluation Report

FIGURE 5
Decision 4 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

Draft Data Quality Objectives

Step 5 Decision Rules

Decision 5 – Determine site-specific transport pathway and contaminant distribution information necessary to support the CMS/FS, remedial design and/or Interim Measures.

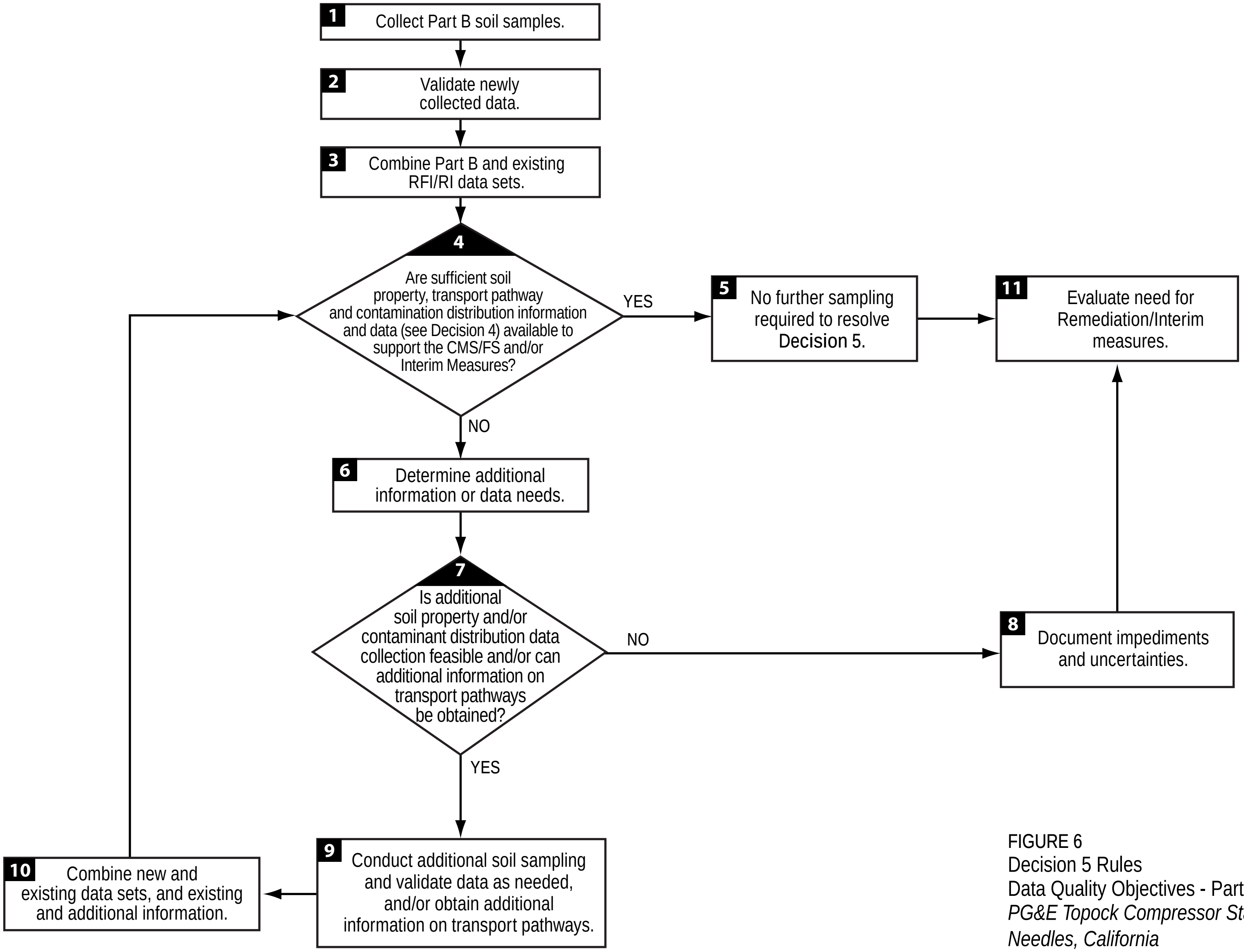
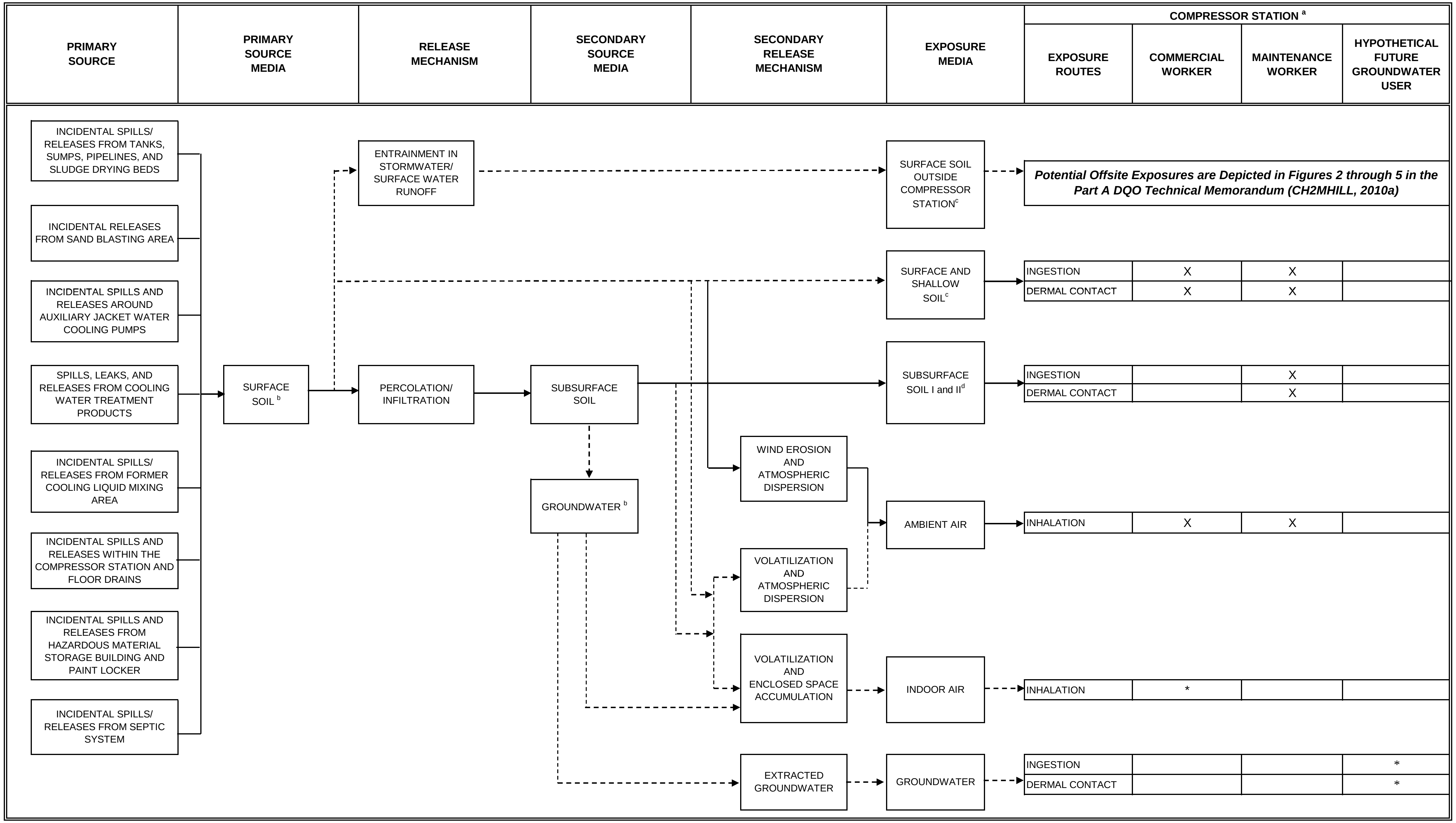


FIGURE 6
Decision 5 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

FIGURE 7
PRELIMINARY HUMAN HEALTH CSM FOR INSIDE THE COMPRESSOR STATION
PACIFIC GAS AND ELECTRIC COMPANY
DATA QUALITY OBJECTIVES - PART B SOIL INVESTIGATION



NOTES:

References are provided in the *Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California* (August 2008).

[a] The former sludge-drying beds, chromate reduction tank, process pump tank, transfer sump, oil holding water tank, oil/water separator, and wastewater transference pipelines inside the compressor station have already been closed (CH2MHILL, 2007i), but DTSC has requested additional investigation (CalEPA, 2007d). If complete pathways are identified based on the results, any of these areas will also be included in the HHRA.

[b] Potentially complete transport pathway from primary and secondary source media within the compressor station to exposure media outside of the compressor station and potentially complete exposure pathways will be further evaluated in the risk assessment in the context of areas outside of the compressor station (See Figures 2 through 5 of the Part A DQO Technical Memorandum; CH2MHILL, 2010a).

[c] Surface soils defined as soils collected at depths between 0 and 0.5 feet below ground surface (bgs); shallow soil defined as soil collected between 0 and 3 feet bgs. (See Figure 3-1 in the RAWP (ARCADIS, 2008a)).

[d] Subsurface soil I defined as soil collected between depths of 0 an 6 feet bgs; subsurface soil II defined as soil collected between 0 and 10 feet bgs (See Figure 3-1 in the RAWP (ARCADIS, 2008a)).

⟶	Potentially complete transport pathway to be included in the quantitative risk assessment.
- - - ➝	Potentially complete transport pathway to be further evaluated in the risk assessment.
X	Potentially complete exposure route to be included in the quantitative risk assessment.
*	Potentially complete exposure route to be further evaluated in the risk assessment.

Response to Comment Tables

DTSC Comments on the October 5, 2010 document *Draft Data Quality Objectives Steps 1 through 5 Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California*

Comment Number	Section/ Page	DTSC Comment (November 1, 2010)	PG&E Response (November 30, 2010)	DTSC Response (December 23, 2010)	PG&E Response (February 4, 2011)
1.	Cover page	The draft and final Technical Memorandum must be signed by a Professional Geologist of Engineer due to the geologic interpretation process documented in the Data Quality Objective (DQO) decision rules.	The final Technical Memorandum is signed as requested. PG&E does not intend to retroactively sign the Draft Technical Memorandum.	Comment noted. In the future, PG&E should ensure draft and final technical documents are appropriately signed.	No response necessary.
2.	Section 1.0.	DTSC is still waiting for PG&E to provide the scrubber sump closure report to DTSC. As noted in DTSC comments from 2008, DTSC may also be requesting additional characterization at the former oil scrubber sump based on evaluation of the closure report.	The closure report will be provided as soon as it is obtained.	DTSC requested this report over two years ago and PG&E has had ample time to provide it to DTSC. PG&E shall provide the closure report to DTSC no later than January 7, 2011.	The report was provided to DTSC on January 18, 2011.
3.	Section 2.1.1. Page 3. Footnote.	The footnote should be modified as indicated in the revised text provided to ensure accuracy. *“[1] As discussed in the Risk Assessment Work Plan, ecological exposure inside the Topock Compressor Station is insignificant because of the industrial development of the site and the very limited habitat; therefore, constituents of potential ecological concern will not be defined for areas within the fence line except when required for Decision 4 evaluation.”*	The footnote was revised as requested.	No response necessary.	No response necessary.
4.	Section 2.1.1. Page 4. First paragraph.	The AOC/SWMU listing should call out perimeter sampling as a unique area to be investigated. See comment 8.	This area was characterized as the perimeter area, but was not added to the AOC/SWMU list. It is not an identified unit.	This section of the memorandum was changed to address the perimeter area. No further changes are requested.	No response necessary.
5.	Section 2.1.1. Page 4. Second paragraph. Last Bullet.	The bullet related to Decision 5 should be modified as follows to be consistent with the corrective action process: *Determine the site-specific soil property and contaminant distribution information necessary to support the CMS/FS, remedial design, and/or Interim ~~evaluate potential migration and exposure control m~~ Measures.* This language change should be made at all similar occurrences throughout the entire document.	The overall purpose of the Part B investigation is to support the assessment of potential migration and exposure concerns of the Compressor Station at this time, and evaluation of potentially migration and exposure control measures that may be required to address current exposure and/or migration concerns. The full investigation and remediation of the area within the fence line will not occur until after the facility has been permanently decommissioned. No change was made to the text.	DTSC wants to ensure that appropriate data are collected to allow clean up of units (e.g., dig and haul, soil washing, etc.), if necessary, utilizing data gathered as part of the associated characterization activities. The stated overall purpose in PG&E’s response is too limiting and would only require additional, unnecessary intrusions into the area at a later date, an area considered sacred by some tribes. Elimination of data collection to address the CMS/FS, remedial design, and/or Interim Measures, either short or long term, is inappropriate. DTSC does understand that full investigation/remediation of the Compressor Station Area inside the fence line is not envisioned by PG&E. However, the CMS/FS and Interim Measures process will still allow for the “potential migration and exposure control measures” identified in the Tech Memo to be addressed. Introduction of these new terms is not warranted as they are not adequately defined in the document. The RCRA and CERCLA process must not be reinvented without reason (e.g., the process flow	The text was modified as directed.

DTSC Comments on the October 5, 2010 document *Draft Data Quality Objectives Steps 1 through 5 Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California*

Comment Number	Section/ Page	DTSC Comment (November 1, 2010)	PG&E Response (November 30, 2010)	DTSC Response (December 23, 2010)	PG&E Response (February 4, 2011)
				chart followed for this project and shared with the public must be utilized - see the Topock Project Executive Abstract process flow chart attached to all recent PG&E documents including this technical memorandum). Changes must be made to the document as originally requested in DTSC's comment.	
6.	Section 2.1.2. Page 5. Second paragraph.	The Part B Work Plan should provide illustrative conceptual site models for each AOC/SWMU as requested for the Part A Data Reports. The Tech. Memo states that the focus of the CSM is on evaluating potential exposure pathways to human receptors. It must also adequately address the CSM for offsite receptors. The CSM for this particular pathway should be expanded upon in the Part B Work Plan.	Based on the similar release mechanisms of the Part B AOCs and SWMUs, the physical layout of the AOCs and SWMUs across the compressor station, and the higher topographic elevation of the station to surrounding areas, a general illustrative conceptual site model will be developed for the entire compressor station, as opposed to individual CSMs for each AOC. The Part A TM addressed the potential exposure pathways for off-site receptors. The Part B CSM (Figure 7) provides the link to the Part A DQO TM.	Using the same conceptual model for all the AOCs and SWMUs is inappropriate as it ignores differences between units and will actually distract from evaluating unique issues for a particular unit. Conceptually, the units themselves and associated releases to soil are not and will not be identical. PG&E needs to address the original comment and provide illustrative conceptual models for each unit. As previously explained to PG&E in meetings, a cross-sectional conceptual figure is requested to evaluate data needs and gaps. Regarding the second DTSC comment on offsite receptors, PG&E needs to add text to the document as the existing text (page 5, second paragraph, last sentence) downplays off site migration when it is actually a separate problem statement. A single clarifying sentence added to the end of the paragraph will suffice. However, an illustrative conceptual model showing offsite migration pathways (e.g., surface water flow, storm drain flow, wind dispersal and drift) is requested as indicated above.	PG&E will prepare an individual illustrative CSM for each AOC. The text has been modified as follows: The focus of the CSM included with this Part B DQO TM is on evaluating potential exposure pathways to human receptors. A CSM addressing potential off-site migration pathways will be incorporated into the Combined Soil Workplan.
7.	Section 2.1.3. Page 5. Last paragraph.	The Tech Memo states, *"For releases from these primary sources, the primary source medium for the area within the fence line is surface soil."* Releases to concrete and buildings should also be mentioned. The Tech Memo also states that constituents known to have been released at the Topock Compressor Station consist of nonvolatile compounds. Delete this inaccurate statement from the Tech Memo as there are Topock Compressor Station releases that would have included volatile constituents (e.g., oily waste/waste water releases, gas pipeline condensate releases, fuel storage tank releases, waste solvent cleaning solutions).	The bullets above this paragraph list areas and activities that serve as primary sources for incidental spills/releases to surface soil. The second bullet already includes 'buildings and other facilities." Text changed to "consist *primarily* of…"	PG&E's first response does not address the comment. Contaminants may also be released onto concrete, buildings and other structures in addition to surface soils. To address the comment, the following sentence revision should be accepted into the final memo: *For releases from these primary sources, the primary source medium for the area within the fence line is surface soil, concrete and buildings.* No response necessary for the second comment.	PG&E concurs that contaminants may have also been released onto concrete and certain other structures in addition to surface soil. Visible staining may provide an indicator of such a case. We understand that DTSC's primary concern expressed in this comment is that potentially contaminated building materials be appropriately handled during future maintenance or demolition activities. To resolve this comment, PG&E will change the text in

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Comment Number	Section/ Page	DTSC Comment (November 1, 2010)	PG&E Response (November 30, 2010)	DTSC Response (December 23, 2010)	PG&E Response (February 4, 2011)
					Section 2.1.3 as follows: *"For releases from these primary sources, the primary source medium for the area within the fence line is surface soil. In addition, concrete or structures displaying visible staining may be a source medium to surface water runoff or a potential source to underlying soil*
8.	Section 2.1.3. Page 6. Paragraph 1 and 2.	The Tech Memo states*, "Local topography is the primary feature to consider when examining releases of constituents from the Topock Compressor Station to areas outside the fence line via surface runoff."* A more significant feature to consider appears to be storm drains that would intentionally divert facility fluids, sediments, and surface water to areas beyond the facility fence line. PG&E must identify all current and historic storm drains on a facility figure. The Part B Work Plan should sample soils offsite at the storm drain outfalls and along the drains as they are known to have leaked over time. It is recommended that this sampling be included with AOC-13 as originally envisioned. Also see comment on Figure 7 below regarding site-wide storm water sampling. The Tech Memo also states*, "However, any potential exposures to COPCs that have been transported via surface water runoff to areas outside the Topock Compressor Station will be addressed in the context of Part A soil sampling and subsequent risk assessment."* As Part A is not addressing this issue, this sentence should be deleted.	PG&E has previously provided all available information in the RFI Report (Volume 1). As previously discussed with DTSC staff, developing the type of map that DTSC is requesting would be major undertaking that would include geophysical investigation, dye testing, video investigation, and likely excavation to trace lines. No investigation of the storm drain system is proposed for the Part B investigation. For the Part B Work Plan, PG&E will review the information provided to date, and to the degree possible, correlate it with an on-the-ground review of the existing catch basins. This updated information will be provided in graphical format. The referenced Paragraph 2 was revised to specifically state that storm drains may serve as a migration pathway. To address the overall concern potentially associated with storm drains, PG&E first proposes to conduct the Part B investigation, including the perimeter sampling, The Part B investigation will include sampling at the terminus of storm drain outfalls, as well as proposed step-out sampling downslope of the outfalls. The Part B data will then be reviewed to determine which storm drain locations, if any, appear to represent a continued threat of release. Depending on the outcome of the investigation, the specific storm drains in question may be traced, sealed, or the flow to the drain rerouted to prevent potential future	PG&E has provided some additional information on storm drains since the 2007 RFI Volume 1 including adding storm drain locations on maps. PG&E has not discussed conducting a thorough investigation of historic storm drains with DTSC especially one as outlined in PG&E's response to this comment. PG&E's RFI Report (Volume 1) does document several miscellaneous releases via storm drains, but the locations of the drains are not specified in RFI figures. The information contained in the Volume 1 RFI Report does support the need to investigate storm drains. An investigation of the storm drain system is required. This includes older drains potentially no longer in service that are of greater environmental concern. Historic releases through these lines may have greater adverse impacts assuming waste management practices in the past were not as stringent as they are today. We have all learned this lesson at AOC-9 where a waste release(s) at a storm drain impacted soil and resulted in removal of the contaminated soil. A detailed drain investigation should occur at the perimeter of the site to locate potential sources that could travel further offsite. If significant contamination is eventually identified, then investigations could continue along storm drain lines on site. For instance, the storm drain on AOC-9 should be further investigated on-site if possible. DTSC concurs with the sampling approach proposed by PG&E especially for existing storm drain outfalls as well as the down slope step out plan. However, DTSC also requests that some	Per DTSC direction, PG&E will conduct an investigation of the storm drain system. The investigation will include geophysical tools, video equipment and dye tracer tests to evaluate the locations of storm drains and storm drain discharge areas, and assess storm drain conditions. In addition, soil samples will be collected and characterized in the vicinity of storm drains to the extent needed to meet DQOs and to the extent the areas are accessible and it is safe to do so. The storm drain investigation sampling approach will be incorporated into the Combined Soil Workplan. A detailed perimeter sampling effort was previously included in the Draft Part B Soil Workplan, and will be reevaluated and expanded as appropriate .

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			releases to the environment. It would be premature to conduct a full-scale analysis of the storm drain system at this time, and such an investigation would be very time-intensive, and potentially intrusive. Potential exposures to off-site receptors will be addressed partially in the context of the Part A investigation and partially in the context of the Part B investigation. The data collected from the perimeter sampling effort to be conducted as part of the Part B investigation will be used for both investigation programs. In the context of the Part B investigation it will be used to assess potential sources to off-site areas; in the context of the Part A investigation it will be used to determine whether further investigation, risk assessment, or remediation may be required. The Part B Work Plan will describe in detail how the two investigation programs will interface to ensure that no gaps in investigation coverage, risk evaluation, and remediation will occur.	sampling occur outside the fence line along drains prior to the outfall (see original comment). Documented, detailed discussion of the perimeter sampling program is welcome. Coordination of the Part A (off site) and Part B (on site) perimeter sampling program will hopefully become evident as the Part A and B are combined into one document. Currently, the Part A data gap evaluation and draft Part B Work Plan have not put sampling locations on a map to address this issue.	
9.	Section 2.1.7. Page 7. Paragraph 5.	The Tech Memo states, *"For evaluating the potential for offsite migration, the exposure interval of interest is surface soil (0 to 0.5 foot bgs) exposure."* The Tech Memo should acknowledge that there may be circumstances where evaluation of deeper samples might be necessary (e.g., along slopes, areas of significant erosion/potential erosion, areas that could erode over time).	The text has been modified to state that in some circumstances it may be necessary to sample more deeply to characterize the potential for off-site migration. A depth of 1.0 foot bgs is proposed for the perimeter area.	No response necessary.	No response necessary.
10.	Section 2.3. Page 8. Third paragraph.	The last paragraph of this section should be deleted. Limitations regarding possible future exposure control actions are not completely known and should not be discussed at this time.	The referenced paragraph states "The physical constraints and the types of COPCs released limit the potential migration and exposure control actions that could be employed to address constituents posing an unacceptable risk to human health and the environment or posing a threat to groundwater." This does not limit any future actions, it merely indicates that choices may be limited.	DTSC disagrees with the response. Please remove the sentence as it is predicting outcomes prior to the investigation. Currently, the COPCs released at each unit are unknown as is contaminant distribution and relation to potential physical constraints. Physical constraints at each unit have not been defined. Potential remedial actions have not been addressed at any level, yet the sentence is already limiting remedial measures before documenting what they may be, let alone knowing if they are even needed.	The sentence has been removed as directed.
11.	Section 2.4. Page 9. Item 1.	The language contained in the Tech Memo should be modified as indicated below (see comment 5): *"The alternative outcomes of this question are: (1) the nature and extent of*	Please see response to Comment 5.	Please see response to Comment 5.	The text was modified as directed.

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		residual soil concentrations are fully defined based on sample data, or (2) it is infeasible or unwarranted to fully define the nature and extent of concentrations based on sample data, and uncertainties will be addressed in ~~the RFI/RI report and~~ the risk assessment and/or ~~managed through contaminant migration and/or worker exposure control measures~~ the CMS/FS or Interim Measures. ***Decision Statement:*** *Determine the nature and extent of residual soil concentrations resulting from historic compressor station practices. If determination of the nature and extent of soil concentrations based on sample data is not feasible or is not warranted, address uncertainties in ~~the RFI/RI report and~~ the risk assessment and/or ~~develop controls to prevent migration and/or worker exposure to contamination, if warranted~~ the CMS/FS or Interim Measures."*			
12.	Section 2.4. Page 9. Footnote.	The footnote should be modified as indicated in the revised text provided below to ensure accuracy. *"[1] The forthcoming Topock Compressor Station/East Ravine Groundwater Investigation will aid in assessing potential threats to groundwater from potential source areas within the compressor station as well as evaluating current impacts to groundwater."*	Comment noted. The footnote was revised as directed.	No response necessary.	No response necessary.
13.	Section 2.4. Page 10. Item 5.	This decision should essentially copy Decision 4 language from the Part A Tech Memo (see comment 5).	Please see response to Comment 5.	Please see response to Comment 5.	The text was modified as directed.
14.	Section 2.5.1. Page 11. Paragraph 4.	According to previous sections, there are no biological concerns within the fence line of the station. Please provide clarification on the presence of biological and cultural resources within the fence line which may limit the ability to collect samples.	The TM contains explicit statements about biological concerns within and around the compressor station. For example, Section 2.1.5 states that "As described in the RAWP (ARCADIS, 2008a), ecological exposure inside the compressor station fence line is insignificant because of the industrial development of the site and the very limited habitat." Section 2.3 also states that "In addition, the compressor station is surrounded by sensitive habitat areas. The site is also located in an area rich in cultural and historical resources. Several federally recognized tribes have identified areas of traditional, religious, and cultural importance in the vicinity of the Topock Compressor Station." Physical, cultural and biological resources may also be present in the perimeter area and may	No response necessary.	No response necessary.

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			constrain investigation in this area. The text was clarified.		
15.	Section 2.5.3. Page 13.	Modeling parameters will need to consider infiltration from other compressor station sources (e.g., landscape irrigation, leaking water lines/units, ponded surface water from cleaning operations) and not just precipitation.	Comment noted. These factors will be considered in the model, and were added to the text in this section.	No response necessary.	No response necessary.
16.	Section 2.5.5. Page 14.	This decision should utilize language from the Part A Tech Memo (e.g., include the term remediation), Decision 4. See comment 5.	Please see response to Comment 5.	Please see response to Comment 5.	The text was modified as directed.
17.	Section 2.6.1.1. Page 15. Paragraph 2.	Previous discussions regarding AOC 13 included the areas outside the fence line, but immediately adjacent to the facility. Please provide clarification on the lateral extent of AOC 13 outside of the fence line. Also see comment 8.	The text and Table 1 have been clarified to indicate that AOC 13 extends to the fence line, and that the area immediately outside the fence line is considered part of the compressor station perimeter (the perimeter area previously noted in response to Comment 4). Investigation of the perimeter area will occur as outlined in response to Comment 8; and portion of the perimeter may be added to AOC 13 if necessary.	No response necessary.	No response necessary.
18.	Section 2.6.1.3 and 2.6.1.4. Page 15.	The differences between Section 2.6.1.3 Analytical Boundaries and 2.6.1.4 Chemical Parameters are not immediately clear. Subsequent sections and tables discuss analytical boundaries only, there are no chemical parameters sections. Please clarify the difference between the two sections.	Sections 2.6.1.3 and 2.6.1.4 were combined.	No response necessary.	No response necessary.
19.	Section 2.7.1.3. Page 21.	See comment 5. An example of modified text is provided below. "The possible outcomes for the decision in Box 11 are as follows: ***Yes**: Additional data would significantly improve data quality or risk assessments and/or ~~migration potential~~ site remediation/interim measure decisions.* ***No:** The additional data would not significantly improve data quality and/or risk assessments and/or ~~migration potential~~ site remediation/interim measure decisions and is therefore not necessary."*	Please see response to Comment 5.	Please see response to Comment 5. Changes must be made to the document as originally requested in DTSC's comment.	The text was modified as directed.
20.	Section 2.7.1.3. Page 22.	The sentence, "The agencies will have to concur that additional sampling is not feasible or warranted." should be applied to all decisions. The section introduces the term "institutional constraints". This term should	This sentence was added to all decisions, with the following clarification: "PG&E will retain the right to make the final determination regarding the safety of proposed sampling. If sampling	No response necessary.	No response necessary.

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Comment Number	Section/ Page	DTSC Comment (November 1, 2010)	PG&E Response (November 30, 2010)	DTSC Response (December 23, 2010)	PG&E Response (February 4, 2011)
		be clarified and examples given in the Tech Memo. A detailed list of these constraints must be included in the Part B Work Plan.	cannot be conducted in a manner that is deemed safe by PG&E, it will be considered infeasible." The text was revised to include examples of institutional constraints. A more detailed list of potential institutional constraints will be provided as part of the work plan.		
21.	Section 2.7.3.3. Page 26.	The Part B Work Plan and Report should include model runs and input parameters.	Model input parameters will be provided in the Part B Work Plan; model runs will be provided in the report for the Part B investigation.	No response necessary.	No response necessary.
22.	Section 2.7.5. Page 29.	See comment 5. Change the title of the section to the following: Decision 5 – Inputs to CMS/FS or Interim Measures – Decision Rules and Decision Process	Please see response to Comment 5.	See DTSC's response to Comment 5. Changes must be made to the document as originally requested in DTSC's comment.	The text was modified as directed.
23.	Section 2.7.5.1. Page 30.	Box 4 (Figure 6) in Decision 5 states, "*Is sufficient soil property, transport pathway, and contamination distribution information available to identify areas that may result in offsite migration concerns?"* This inappropriately limits interim or remedial measures to those onsite Part B soils that could cause an offsite problem. As onsite problems (human health risk, potential to impact groundwater) must also be addressed, the section and Figure 6 will need to be modified. Box 4 should read as follows: "*Is sufficient soil property, transport pathway, and contamination distribution ~~information~~ data available to ~~identify areas that may result in offsite migration concerns~~ support the CMS/FS or Interim Measures*?	Box 4 of Decision 5 was revised to read: "*Is sufficient soil property, transport pathway, and contamination distribution information available to identify areas that may result in offsite migration or excess onsite exposure concerns?"*	See DTSC's response to Comment 5. Changes must be made to the document as originally requested in DTSC's comment.	The text was modified as directed.
24.	Figure 7.	Releases from the cooling towers (Primary Source column) should also be documented as occurring as mists/drift that would have coated soils, concrete, and building surfaces. The figure identifies storm water/surface water runoff as a potentially complete pathway. Therefore, PG&E is directed to establish a site-wide storm water monitoring program to assess potential impacts from the facility to offsite receptors.	Release of mist/drift is an incidental spill/release from the cooling towers, and is addressed in the CSM. Other incidental spills/releases may also have contacted buildings, concrete pads or other structures in addition to soils. Any deposits on outdoor surfaces may then result in secondary release to surface soil The request for a storm water monitoring program requires further discussion between PG&E and DTSC, and is not related to the Part B DQO TM.	See DTSC's response to Comment 7 regarding releases to concrete and buildings. PG&E should add the establishment of a storm water monitoring program to the rainbow schedule. This program will ensure that current PG&E operations are not adversely affecting site conditions.	Please see PG&E's response to DTSC's Comment 7. As directed by DTSC, PGE will conduct storm drain monitoring, however, due to the location of storm drains primarily along the steep slopes of the facility perimeter, the highly sporadic nature of rainfall in this area, as well as significant safety issues, traditional storm water monitoring is anticipated to be both spatially and temporally

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					incomplete. As an alternative, we propose to assess both storm drains and their potential as conduits for contamination with a series of tests that systematically evaluate the discharge of each storm drain individually using potable water This approach will be described in more detail in the workplan.

Additional DTSC Comments on the February 4, 2011 document *Draft Data Quality Objectives Steps 1 through 5 Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California.* (Received via e-mail from Jose Marcos on February 8, 2011)

Comment Number	Section/ Page	DTSC Comment (February 8, 2011)	PG&E Response (February 25, 2011)		
1.	Figure 6, Sections 2.1.1 Section 2.7.5.1 Section 2.7.5.2	Box 11 of Figure 6 should be updated to be consistent with the CMS/FS/interim measures text changes previously incorporated into the document. The following language is suggested for Box 11: "Evaluate need for potential migration and exposure control remediation / interim measures. Related text in Sections 2.1.1 (page 4, paragraph 3, last sentence) - Section 2.7.5.1 (page 31, Yes response, last sentence mentioning Box 11), and Section 2.7.5.2 (page 31, last paragraph, last sentence), should be updated in a similar manner. Please review the entire document and revise all relevant sections, for consistency with the changes identified above.	The text was modified as directed.		
2.	Section 1.0.	Add AOC-26: Scrubber Oil Sump to the soils workplan (inside fence line) as reports provided by PG&E on January 18, 2011 indicate that contaminated soils were left in place as part of previous closure activities. AOC-25 should be revised to include both compressor and auxiliary engines and associated basement for completeness.	AOC 26 – Former Scrubber Sump has been added. The auxiliary engines and basements have been added to ACO 25		
3.	Section 2.6.1.1	Section 2.6.1.1 of the Tech Memo should be revised to more broadly define the perimeter area. The sentence on page 15 should be modified as follows: "The perimeter area is ~~initially~~ defined as the area extending from the facility fence line to the ~~edge~~ toe of the slope, outside of the fence line.	The text was modified as directed.		

DOCUMENT REVIEW AND COMMENT RESOLUTION SHEET

Document Title	**Draft Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation**	**Document Date**	10/5/2010
		Originator/Organization	PG&E/CH2MHILL
Reviewer, Organization, and Phone Number	**DOI Pam Innis 303-445-2502**	**Review Criteria**	Technical and CERCLA Compliance

	Location	Type[a]	Comment	PG&E Response	Accept
1	Section 1.0, Page 2	S	The first full paragraph refers to the rock "cave" in AOC 10, noting it will be deferred to the Soil Part A investigation. Since this location is not associated with PG&E, it is recommended that deferral be eliminated and the site be absolved from further consideration.	Per email correspondence from DTSC and DOI on November 24 and 29, 2010, respectively, the text has been modified to read as follows: *DTSC also requested the addition of a small depression carved out of the rock near AOC 10, which was identified by DTSC as a potential explosives storage area, as AOC 25. This unit is not being added as a new AOC. Based on existing information, it has no known connection to the compressor station.*	
2	Section 2.1.1, Page 4, last paragraph	S	Receptors outside the compressor station should include tribal members engaged in traditional uses.	Agreed. Edits were added to this section.	
3	Section 2.1.3, Page 5, 3rd Paragraph	M	Please explain why releases from some features that are buried or extend below the surrounding ground surface (e.g., sumps) could not directly affect subsurface soil without necessarily affecting surface soil.	Edits were added to this paragraph to further clarify that features (such as the Teapot Dome Oil Pit) extending below the ground surface may result in releases to shallow soil and/or subsurface soil.	
4	Section 2.1.3, Page 6, 2nd Paragraph	M	This section states that exposure to COPCs that have been transported outside the fence line via runoff will be addressed by the Part A soil investigation. An example might be if the perimeter sampling planned for the Part B investigation identifies contamination at the fence line, with probable migration beyond the fence line. The Soil Part A sampling only addresses the	As this comment correctly notes, a third phase of investigation outside the fence line may be required if the perimeter area sampling conducted during the Part B investigation indicates that further investigation is necessary. The investigation process will be streamlined as much as possible by including potential step-out	

[a] Comment Types: M = Mandatory, S = Suggested, E = Editorial

			prescribed AOCs and SWMUs under current investigation. Perimeter sampling may indicate that other potential areas of contamination exist and require further assessment. If this is to be addressed in the Part A soil investigation, this will necessitate a third (or more) phase of Part A soil sampling.	sampling locations for the perimeter sampling detailed in the Part B Work Plan. Also, the anticipated duration of the overall investigation effort is such that it is likely that the need for follow-up sampling can be evaluated. If follow-up sampling is necessary, it can be conducted during the same mobilization. Phasing the investigation effort is critical to avoid excessive sampling. The connection between the Part A and Part B investigations will be addressed in detail in both Work Plans.	
5	Section 2.1.3, Page 6, second paragraph	M	Although off-site migration is the agencies primary concern under CERCLA, Soil Part B sampling also addresses on-site exposure to workers.	The text has been revised as requested.	
6	Section 2.1.4, Page 6, 2nd Paragraph, 3rd sentence Figure 7, Page 49	M	This paragraph characterizes the surface soil interval as deep as 3 feet; however Figure 7 and Section 2.1.7 specify that the surface interval is 0-6 inches. Soil extending from 0 to 3 feet is specified as shallow soil. Revise 3rd sentence to say "Commercial workers would be expected potentially to come into contact with surface **and shallow** soil in the 0-to-3-foot-depth interval."	The text has been revised as requested.	
7	Section 2.1.6, Page 7	S	It may be appropriate to note potential sources of recharge within the compressor station area, including meteoric water.	The text and Table 1 have been revised as requested.	
8	Section 2.1.7, Page 7	M	For clarification, distinguish the difference between subsurface soil I and subsurface soil II. Section 2.1.4 discussions do not include the 0-6' interval although all intervals are discussed in the RAWP. Please ensure consistency with the RAWP.	Comment noted. The text has been edited in Section 2.1.4 to include the 0-to-6-foot bgs interval for maintenance workers; subsurface soil I is defined as the 0-to-6-foot bgs interval, and subsurface soil II as the 0-to10-foot bgs interval.	
9	Section 2.5.2, Page 12	M	See comment on 2.1.7.	See response to Comment 8 for Section 2.1.7 and edits in Section 2.1.4	
10	Section 2.5.2, Page 12	M	This section identifies the need developing the human health risk assessment and estimating representative EPCs are specified in the RAWP	Comment noted. Clarifying edits have been added to Section 2.5.2. Data adequacy for estimating an EPC for Decision 2 is	

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			(ARCADIS, 2008a). The RAWP provided general information on how this will be accomplished. The Figure 3, block 4 question asks "Are sufficient Category 1 data available to calculate/ determine a representative exposure point concentration for each applicable depth interval?" The document should describe how this will be done. Please provide additional detail on the process and parameters that will be used to develop EPCs. DOI would anticipate the process to address any additional data and quality requirements, plans for integrating existing data, target sample sizes to obtain confidence levels, and spatial aggregation plans.	considered according to the RAWP (see Appendix A) independently from Decision 1 for nature and extent. However, the representativeness of the estimated EPC for each data group is dependent on whether those data considered also satisfy Decision 1 and adequately represent the nature and extent. Additional data subsequently recommended to satisfy Decision 1 and/or Decision 2 for a data group will also be used in the risk assessment to estimate the representative EPC. Spatial aggregation is not planned because the entire area within the fence line is one exposure area for human health risk evaluation, as agreed in the RAWP.	
11	Section 2.6.4.2, Page 17	M	The vertical boundary for decision 4 is suggested to be 0.5 foot bgs. Visual inspections of rills along the boundary of the TCS suggest that 1.0' bgs may be a more appropriate interval for potential offsite transport.	The text and Table 1 have been revised to reflect the fact that a deeper vertical boundary for Decision 4 may be appropriate in some locations; the vertical boundary for the perimeter area has been set at 1 foot bgs.	
12	Section 2.7.1.1, Page 18, 3rd Paragraph, 3rd sentence	M	The statement that "This data assessment process will be limited to surface and near-surface samples, as deeper samples would not be expected to be affected." is not accurate. The vertical study area, as discussed in Section 2.6.1.2, extends from the ground surface to the water table. Existing data for this interval should be included.	The data assessment referred to in this sentence is the need to evaluate whether COPC concentrations in existing samples have changed since the samples were collected. Changes in COPC concentrations could occur as a result of runoff, volatilization, and/or photodegradation, and these mechanisms are not expected to affect deeper samples.	
13	Section 2.7.1.2, Page 18, bullet list	M	As has been repeatedly commented on in the Part A DQOs, these criteria have only limited applicability because only 10 percent of the samples are being analyzed for TAL/TCL constituents.	The criteria presented are appropriate. As discussed in the context of the Part A investigation and data gaps evaluation, the purpose of analyzing 10 percent of the samples for TAL/TCL constituents is to screen the site for any new, unexpected	

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				compound detections that may require further investigation. The results from the Part A investigation demonstrated that only PCBs were detected at a frequency that merited further assessment and that other constituents not already identified as COPCs were detected at a low frequency and at low concentrations.	
14	Section 2.7.4.1, Page 28, last sentence	M	Regarding the sentence reading "It is not necessary to evaluate the potential for offsite migration from areas where existing COPC concentrations are below the Decision 4 screening levels, because these areas would not pose a potential threat to offsite receptors." While DOI agrees that areas with soil concentrations not exceeding SLs should not be evaluated further, it is noted that there is potential for water-borne materials eroded from such areas, or a combination of such areas, to accumulate in off-site locations (such as behind a bermed drainage like seen in AOC 11), potentially resulting in an unacceptable risk off-site. Based on the outcome of the Part A investigations, it may become necessary to control off-site migration of stormwater to prevent continued off-site degradation.	Comment noted.	
15	Table 1, Page 35	M	See applicable comments made on text.	Table 1 has been corrected to be consistent with the revised text, as noted in the various responses to comments.	
16	Table 1, Page 35 Step 5 decision rules	M	Please provide additional information describing how (e.g., information needed and interpretive rationale) PG&E anticipates answering the following questions posed in the decision diagram. Decision 2; Block 4 (See comment on Section 2.5.2) Decision 3; Block 8 Decision 4; Blocks 7 and 8 Decision 5; Block 4	For Decision 2, Block 4, please see the response to Comment 10 for Section 2.5.2. For the other blocks, the applicable subsections of Section 2.7 have been revised to provide added information regarding the referenced steps in the decision process.	

17	Figure 2, Page 44	M	The arrow from 5A connects to 5D (as it should) and also connects to the line from 5B. This is inconsistent with the if/then statements in the text. Also 5D should connect to 16A for consistency.	Box 5D should not have been shown as an endpoint. The “No” arrow from Box 5A will continue to connect to Box 5D, but will not connect directly to the “No” line between Box 5B and Box 5C. Instead, a line from Box 5D will lead to the “No” line between Box 5B and Box 5C. Box 5D is a reminder that any new COPCs without screening levels must be addressed in the RA and RFI/RI reports, and evaluation of the data set continues with Box 5C. Figure 2 for Decision 1 has been corrected as described.	

[a] Comment Types: M = Mandatory, S = Suggested, E = Editorial

Appendix B2
SWMU 5 – Sludge-drying Beds Investigation Program

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B2

SWMU 5 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU) 5 comprises the two former sludge-drying beds that were constructed in 1951 with the rest of the compressor station and are located within the facility fence line in the southern part of the lower yard, as shown in Figure B2-1. (All tables and figures appear at the end of this sub-appendix.) The two sludge-drying beds were located directly adjacent to one another. The closure report for this unit indicates that each bed was approximately 20 feet wide by 50 feet long. Both beds sloped longitudinally, with the upper end at grade level and the lower end about 2 feet below grade. The walls and floors of both beds were constructed of 8-inch-thick concrete and a drain line ran from the beds to the Transfer Sump (SWMU 9) to facilitate the removal of liquids (Mittelhauser, 1990).

The drying beds were used from 1951 until April 1962 to dehydrate lime sludge generated by the Permutit water softening process used to condition well water at the facility (PG&E, 1962, 1968). In historical aerial photographs from the mid-1950s, the drying beds contain whitish material. A whitish area is also present just south of the sludge-drying beds, which has been designated AOC 21, which is discussed in sub-Appendix B18.

From 1964 through 1969, a treatment pond constructed within one of the beds was used to treat chromium-bearing wastewater (PG&E, 1968). Wastewater was allowed to flow through the pond and was injected with sulfur dioxide to reduce hexavalent chromium to trivalent chromium prior to discharge to SWMU 1.

From 1969 through October 1985, the drying beds were used to dehydrate chromic hydroxide sludge generated by the two-step wastewater treatment system prior to disposal. The chromic hydroxide sludge discharged into the drying beds contained up to 37,500 milligrams per kilogram (mg/kg) total chromium and 4 mg/kg hexavalent chromium (Mittelhauser, 1986). The volume of chromic hydroxide sludge disposed of offsite was about 15,000 gallons per year (PG&E, 1984).

California Regional Water Quality Control Board Order 70-73 was issued on December 10, 1970 (Water Board, 1970), and it appears that the chromium sludge was disposed of at Needles Landfill from that time until 1983. Shipping documentation compiled by PG&E indicated that the amount of sludge disposed of each year was highly variable; it appears that the sludge-drying beds had some storage capacity. Disposal of the chromium sludge at Needles Landfill was discontinued by 1984. From January 1984 to May 1985, the dried sludge was transported offsite to an approved Class I hazardous waste facility (PG&E, 1984).

Use of both sludge-drying beds ceased in October 1985. Closure of the drying beds was initiated in December 1988, and most of the beds were removed by February 1989 (Mittelhauser, 1990). In 1995, California Environmental Protection Agency, Department of

Toxic Substances Control (DTSC) issued a closure certification acceptance letter for this unit (DTSC, 1995).

Closure of the sludge-drying beds was accomplished during Phase 1 closure activities performed from December 1988 and February 1989 (Mittelhauser, 1990). A closure certification acceptance letter for this unit was issued in 1995 (DTSC, 1995). The steps taken during closure of the sludge-drying beds included:

- Removal of a thin layer (0 to 5 millimeters) of dry solids consisting of sand and some clay and removal of a small volume of stormwater using a sorbent material; the dry solids and sorbent were placed in a roll-off bin and were transported offsite for disposal as hazardous waste.
- Hydroblasting of the concrete walls and floors to remove green deposits observed on the concrete; the hydroblast water was containerized, characterized, and properly disposed of as hazardous waste.
- Demolition, removal, and disposal of an estimated 95 cubic yards of concrete from the walls and floors of the beds; the concrete was broken up, characterized, and disposed of offsite as a Class III waste. Rebar from the concrete was transported offsite for recycling.
- Removal of the concrete footings. After determining that this concrete was not hazardous, the concrete was used as fill material onsite.
- Collection of confirmation samples.
- Final filling and grading of the area.

At the time of closure, confirmation samples were only analyzed for inorganic constituents.

Organic constituents may potentially have been present in the wastewater as a result of treated water discharge from the oily water separator. Chemicals of potential concern (COPCs) potentially associated with discharge of treated effluent from the oily water separator include total petroleum hydrocarbon (TPH) and polycyclic aromatic hydrocarbons (PAHs).

2.0 Summary of Past Soil Characterization

Following removal of the sludge-drying beds, confirmation soil samples were collected from four locations (WDB-4, WDB-5, EDB-4, and EDB-5) at an estimated depth of 2.5 to 3 feet below ground surface (bgs). The results of these samples are presented in Table B2-1 and Figure B2-1. These samples were analyzed for Title 22 metals, hexavalent chromium, fluoride, and pH. The samples were collected underneath the deeper portion of the former sludge-drying beds (i.e., in the area where releases would have been most likely, as liquids would have been present most frequently in the portion of the sludge drying beds overlying this area). Historical soil samples were analyzed for antimony, arsenic, barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silver, selenium, thallium, vanadium, zinc, fluoride, and pH. Laboratory analytical results for the historical soil samples are presented in Table B2-1. Data for both splits from sample WDB-4 are included in these tables. Table B2-2 presents a statistical summary of soil analytical results for COPCs and chemicals of potential ecological concern that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value. All historical data are considered Category 2.

Beryllium, hexavalent chromium, selenium, silver, and thallium were not detected in soil samples collected in SMWU 5. Table B2-1 lists the 15 detected constituents. Only three of these constituents (total chromium, lead, and zinc) exceeded background threshold values (BTVs). None of constituents exceeded the applicable commercial screening values (California human health screening levels for commercial use, or United States Environmental Protection Agency Region 9 regional screening levels for commercial use). Fluoride ranged from 130 to 791 mg/kg; pH ranged from 10.21 to 11.25. Total chromium exceeded the BTV once (47 mg/kg compared to the BTV of 39.8 mg/kg), lead exceeded the BTV twice (maximum concentration of 17 mg/kg compared to the BTV of 8.39 mg/kg), and zinc exceeded the BTV once (detected concentration of 100 mg/kg compared to the BTV of 58 mg/kg). These exceedances are only marginally above the BTV, and the overall concentration and distribution of constituents in the five samples indicate that there has been no adverse impact to soil beneath the former sludge-drying beds.

This unit was closed by DTSC in 1995. Subsequent to this closure, DTSC has requested that additional analysis be conducted for volatile organic compounds (VOCs), TPH, and semivolatile organic compounds (SVOCs) in soil at SWMU 5 (DTSC, 2006). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Section 3.0 provides the recommended sampling for this unit.

3.0 SWMU 5 Proposed Sampling

3.1 SMWU 5 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. SMWU 5 is located in Area 3 on the Topock Compressor Station Accessibility Map (Figure B-2). Twenty-three utility risers, including gas, odorant, waste water, electrical, SCADA, and an emergency shutoff device are located in Area 3. In addition, a utility trench, a cathodic protection anode, and three vaults were identified in Area 3. Photographs 60 and 61 in sub-Appendix B25 show the accessibility constraints in SMWU 5. Sample locations and depths identified for SMWU 5 reflect the identified access constraints. As described in the main text of Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

3.2 SMWU 5 Proposed Sampling

Although this unit was closed in 1995, additional sampling for organic COPCs and sampling of the fill used to backfill the excavation is proposed as required by DTSC. Table B2-3 summarizes the proposed SMWU 5 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B2-2. The figure also shows proposed samples associated with nearby SWMUs and AOCs. The proposed SMWU 5 sample locations are

Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at two locations: SWMU 5-1 and SWMU 5-2 within the footprint of the former sludge-drying beds. Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in SWMU 5; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. If the area of sampling is covered with asphalt, the surface sampling interval will begin at the bottom of the asphalt or gravel sub-base. In most cases, this first interval will be from 0.5 to 1 foot bgs. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs. As required by the United States Department of Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B2-3); the specific sample to be analyzed will be confirmed in the field. Data will be reviewed and evaluated as described in the main text of this appendix. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

4.0 References

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Tables

TABLE B2-1

Sample Results: Metals

Solid Waste Management Unit 5 – Sludge Drying Beds Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																		General Chemistry	
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic[4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium Hexavalent**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**	**pH**	**Fluoride**
Category2																							
EDB-4	12/09/88	3 - 0	N	ND (0.3)	1.63	120	ND (1)	ND (0.5)	ND (1)	23	6.4	ND (3)	**17**	ND (0.002)	ND (1)	12	ND (0.5)	ND (1)	ND (5)	18	34	11.25	504
EDB-5	12/09/88	3 - 0	N	ND (0.3)	1.21	110	ND (1)	ND (0.5)	ND (1)	37	8.2	3.8	4.4	0.016	ND (1)	9.3	ND (0.5)	ND (1)	ND (5)	24	53	10.85	791
	12/09/88	3 - 0	FD	ND (0.3)	1.14	120	ND (1)	ND (0.5)	ND (1)	**47**	8.3	1.8	2.8	0.03	ND (1)	9.1	ND (0.5)	ND (1)	ND (5)	29	56	10.71	621
WDB-4	12/09/88	3 - 0	N	0.3	1.84	210	ND (0.05)	0.5	ND (1)	30	8.3	8.1	5.2	0.019	0.11	11	ND (0.1)	ND (0.05)	ND (0.3)	20	**100**	10.35	310
WDB-5	12/09/88	3 - 0	N	ND (0.3)	1.29	110	ND (1)	ND (0.5)	ND (1)	22	7.1	ND (3)	**15**	0.014	ND (1)	7.5	ND (0.5)	ND (1)	ND (5)	21	33	10.53	528

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

TABLE B2-2

Constituent Concentrations in Soil Compared to Screening Values
Solid Waste Management Unit 5 – Sludge Drying Beds Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

							Background Threshold Value (BTV) [1]		RWQCB Environmental Screening Levels (ESL) [2]		Commercial Screening Level (Com SL) [3]	
Parameter	**Units**	**Frequency of Detection Total**	**Frequency of Detection Category 1**	**Frequency of Detection Category 2**	**Frequency of Detection Category 3**	**Maximum Detected Value**	**# of Exceedences [4]**	**(BTV)**	**# of Exceedences [5]**	**(ESL)**	**# of Exceedences [5]**	**(Com SL)**
General Chemistry												
Fluoride	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	791	NA	(NE)	NA	(NE)	NA	(NE)
pH	pH units	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	11.25	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Antimony	mg/kg	1 / 4 (25%)	0 / 0 (0%)	1 / 4 (25%)	0 / 0 (0%)	0.3	0	(NE)	0	(NE)	0	(380)
Arsenic	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	1.84	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	210	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	0 / 4 (0%)	0 / 0 (0%)	0 / 4 (0%)	0 / 0 (0%)	ND (1) ‡	0	(0.672)	NA	(NE)	0	(190)
Cadmium	mg/kg	1 / 4 (25%)	0 / 0 (0%)	1 / 4 (25%)	0 / 0 (0%)	0.5	0	(1.1)	0	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	0 / 4 (0%)	0 / 0 (0%)	0 / 4 (0%)	0 / 0 (0%)	ND (1) ‡	0	(0.83)	NA	(NE)	0	(37)
Chromium, total	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	47	1	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	8.3	0	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	2 / 4 (50%)	0 / 0 (0%)	2 / 4 (50%)	0 / 0 (0%)	8.1	0	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	17	2	(8.39)	0	(NE)	0	(320)
Mercury	mg/kg	3 / 4 (75%)	0 / 0 (0%)	3 / 4 (75%)	0 / 0 (0%)	0.03	0	(NE)	0	(NE)	0	(180)
Molybdenum	mg/kg	1 / 4 (25%)	0 / 0 (0%)	1 / 4 (25%)	0 / 0 (0%)	0.11	0	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	12	0	(27.3)	0	(NE)	0	(16,000)
Thallium	mg/kg	0 / 4 (0%)	0 / 0 (0%)	0 / 4 (0%)	0 / 0 (0%)	ND (5)	NA	(NE)	NA	(NE)	0	(63)
Vanadium	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	29	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	100	1	(58)	0	(NE)	0	(100,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B2-3
Proposed Sampling Plan
SWMU 5 Sludge-drying Beds
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

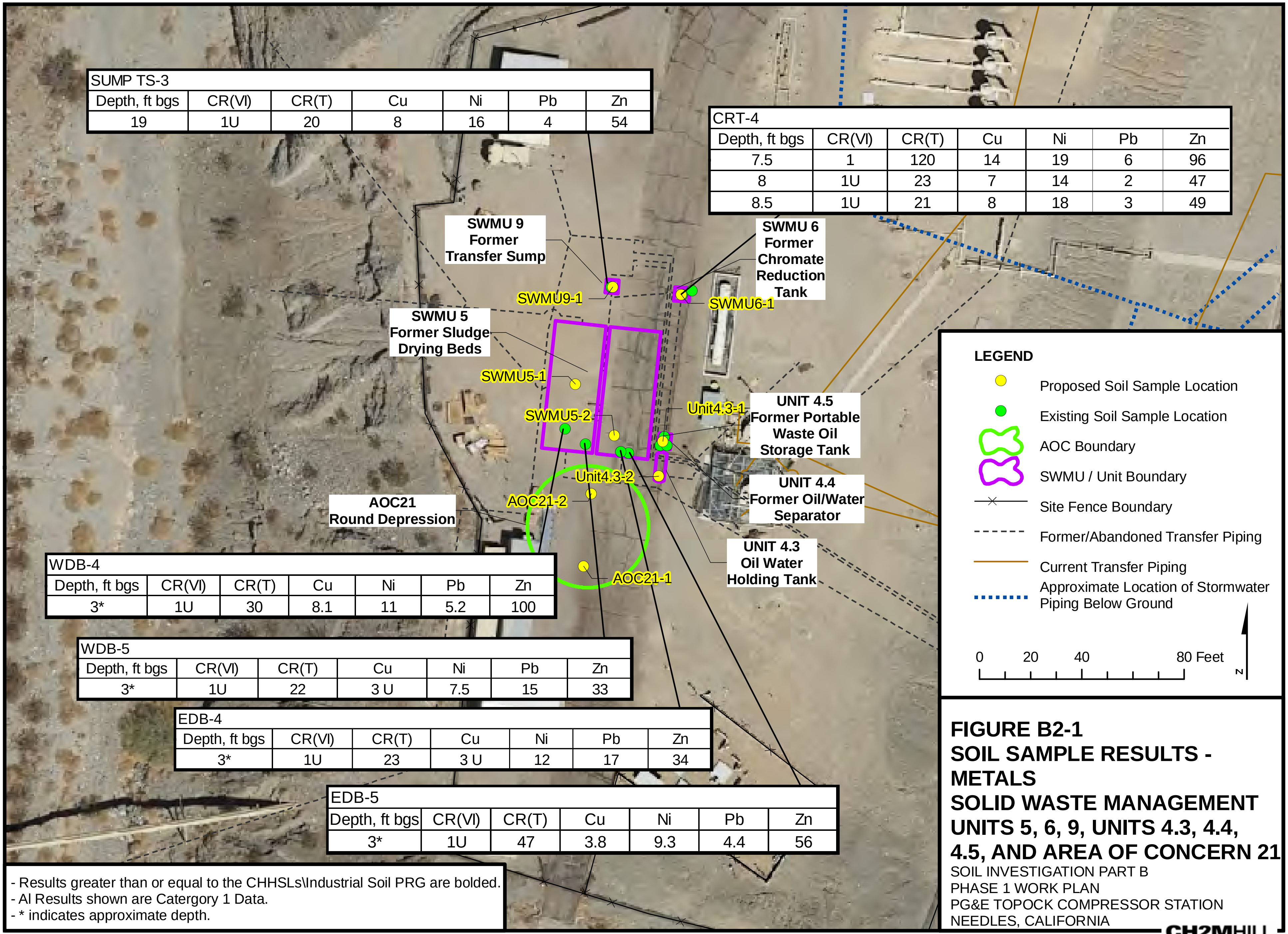
Location	Depths (feet)	Description/Rationale	Analytes
SWMU 5-1	0-0.5 and 3, if feasible	Collect additional soil samples to analyze for organics	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
SWMU 5-2	0-0.5 and 3, if feasible	Collect additional soil samples to analyze for organics	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs

Notes:

Ten percent of samples will be analyzed for the Target Analyte List/Target Compound List.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



SUMP TS-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
19	1U	20	8	16	4	54

CRT-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
7.5	1	120	14	19	6	96
8	1U	23	7	14	2	47
8.5	1U	21	8	18	3	49

WDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	30	8.1	11	5.2	100

WDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	22	3 U	7.5	15	33

EDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	23	3 U	12	17	34

EDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	47	3.8	9.3	4.4	56

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
	AOC Boundary
	SWMU / Unit Boundary
—×—	Site Fence Boundary
- - - -	Former/Abandoned Transfer Piping
——	Current Transfer Piping
·······	Approximate Location of Stormwater Piping Below Ground

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- Al Results shown are Catergory 1 Data.
- * indicates approximate depth.

FIGURE B2-1
SOIL SAMPLE RESULTS - METALS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\SWMU5_9_Result_Metal

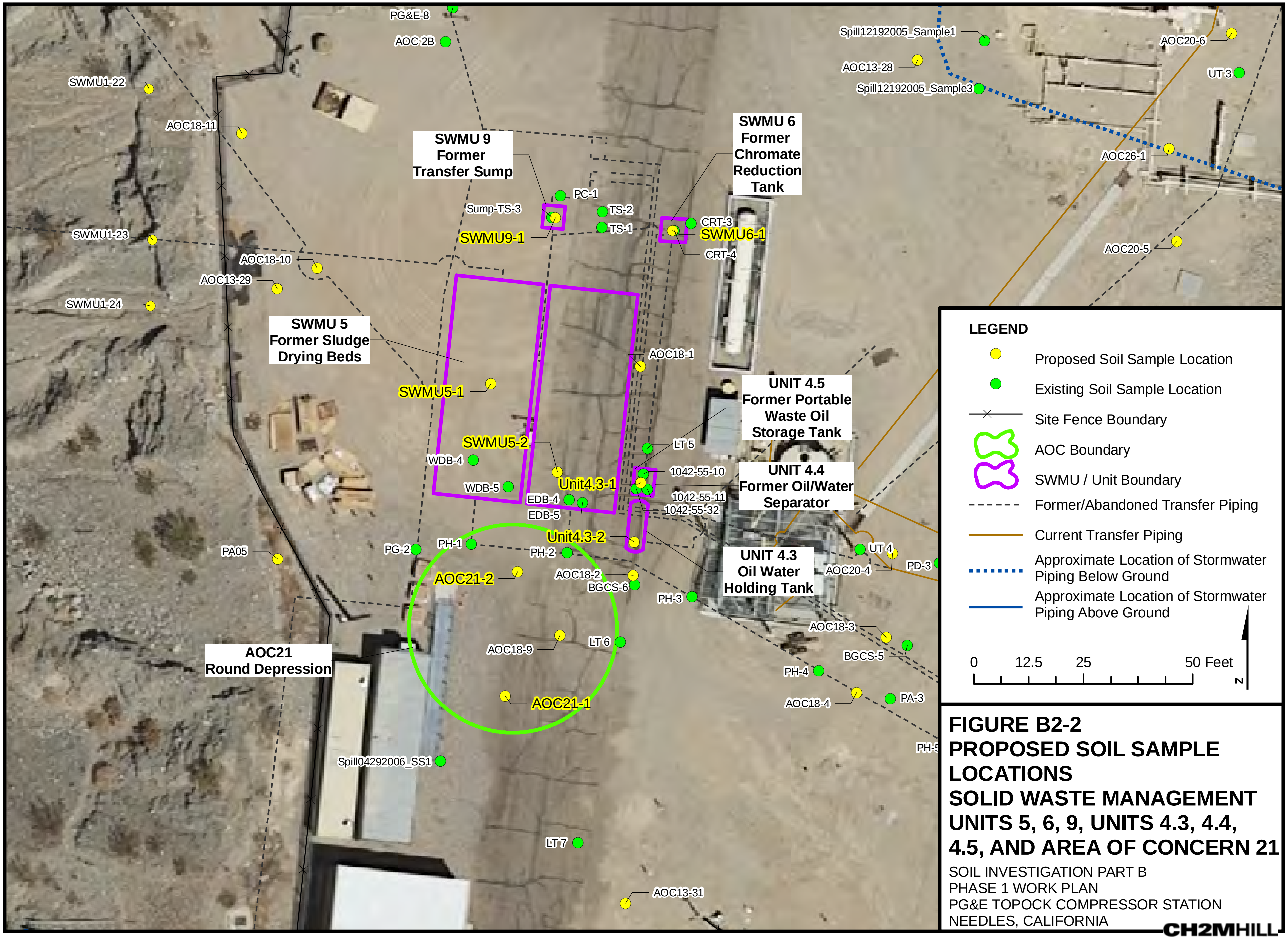


FIGURE B2-2
PROPOSED SOIL SAMPLE LOCATIONS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\SWMU5_9_Proposed_sample_Locs

Appendix B3
SWMU 6 – Chromate Reduction Tank Investigation Program

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Acronyms and Abbreviations

bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B3

Solid Waste Management Unit 6 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU) 6 comprises the chromate reduction tank that was a component of the two-step wastewater treatment system setup at the compressor station in late 1969.[1] The two-step system consisted of the chromium reduction tank to reduce hexavalent chromium in the wastewater to trivalent chromium) (Step 1) and a precipitation tank (SWMU 7) for removing chromium from the wastewater (Step 2). Cooling-water blowdown that contained chromium was treated in the chromate reduction tank by injecting the wastewater with sulfur dioxide. The treatment reduced hexavalent chromium to trivalent chromium. The two-step treatment system remained in service from 1969 through October 1985, when the use of a chromium-based inhibitor system in the cooling water was replaced with a phosphate-based inhibitor system. The chromate reduction tank was formerly located within the facility fence line in the southern end of the lower yard, as shown in Figure B3-1. (All tables and figures appear at the end of this sub-appendix.)

The chromate reduction tank was approximately 10 feet high and 5 feet in diameter, with a capacity of 1,500 gallons (PG&E, 1982; Kearny, 1987). The tank was of steel construction and had an open top. The tank was partially set below grade within a pit that measured 10 feet wide by 10 feet long by 6 feet deep. The pit was supported on all four sides with wooden retaining walls; however, the bottom of the pit was not lined or paved (Kearny, 1987).

Cooling-water blowdown that contained chromium flowed by gravity from the cooling towers to the chromate reduction tank via a 3-inch-diameter steel pipe. A maximum combined flow of 30,000 gallons per day was discharged continuously from the cooling towers into this tank (Mittelhauser, 1986). Wastewater in the tank was injected with sulfur dioxide gas to maintain the pH between 2.9 and 3.2 units. Within this pH range, hexavalent chromium is reduced to trivalent chromium. Treated wastewater was then discharged by gravity flow through a 3-inch-diameter steel pipe into the transfer sump (SWMU 9).

Wastewater samples collected from the cooling towers contained total chromium and hexavalent chromium ranging from 2.6 to 7.8 milligrams per liter to (mg/L) and 0.62 to 6.0 mg/L, respectively (Mittelhauser, 1986). Concentrations of total chromium and hexavalent chromium in the effluent from the chromate reduction tank were found to be at 23 mg/L and 0.42 mg/L, respectively (Mittelhauser, 1986). No indications of any releases were observed during a facility inspection performed as part of the Resource Conservation and Recovery Act facility assessment (Kearny, 1987).

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[1] Historic documents indicate that the system was installed and began operation sometime between November 1969 and March 1970.

The chromate reduction tank was removed from service when the compressor station switched to the non-hazardous phosphate-based inhibitor system in October 1985. However, starting in November 1985, the tank was reportedly used as a holding tank for an unspecified period of time (Kearny, 1987).[2] As a holding tank, it received treated effluent from the Oil/Water Separator (Unit 4.4) prior to discharge of the treated effluent to the evaporation ponds.

Closure of the chromium treatment system was completed between December 1988 and March 1990. Physical removal of the chromate reduction tank occurred during Phase 2 of the hazardous waste management facilities closure process between November 1989 and March 1990 (Mittelhauser, 1990). In 1995, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) issued a closure certification acceptance letter for this unit (DTSC, 1995). The steps taken during closure of the chromate reduction tank included:

- Removal of sludge and water in the tank for characterization and disposal of the materials as hazardous waste.
- Hydroblasting of the steel tank; the hydroblast water was containerized and properly disposed of as hazardous waste.
- Removal of the tank from the pit; inspection revealed that all the green sludge adhering to the tank could not be removed. The tank was disposed of as hazardous waste.
- Removal of the concrete footings. After determining that this concrete was non-hazardous, the concrete was used as fill material onsite.
- Removal of approximately 1 foot of soil over the entire floor and disposal of the soil as hazardous waste.
- A shallow trench was dug across floor of excavation for collection of confirmation samples.
- Removal of the wooden shoring from the excavation, backfilling with local (non-native) fill material, and final grading.

The confirmation samples were collected from the wall of the trench at one location at 0.5, 1.0, 1.5, and 5.0 feet below the bottom of the trench. Because the tank pit was originally 6 feet deep and another 1 foot of soil was removed during closure activities, actual sample depths from the trench were 7.5, 8, 8.5, and 12 feet below ground surface (bgs). These samples were analyzed for Title 22 metals, hexavalent chromium, fluoride, specific conductance, and pH. The closure report identified oil stained soil on the south wall of the excavation; however, no analysis for organic constituents was conducted.

2.0 Summary of Past Soil Characterization

Four historical subsurface soil samples (collected approximately 7.5, 8.0, 8.5, and 12.0 feet bgs) were collected from one location in the bottom of the tank excavation (CRT-4) in

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[2] It is possible that the tank was used as holding tank up until October 1989 when the associated transfer sump was also removed from service.

SMWU 6, as shown in Figure B3-1. Historical soil samples were analyzed for antimony, arsenic, barium, beryllium, cadmium, total chromium, trivalent chromium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, fluoride, and pH. Laboratory analytical results for the historical soil samples are presented in Table B3-1. Table B3-2 presents a statistical summary of soil analytical results for chemicals of potential concern (COPCs) that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value. All historical data are considered Category 2.

Antimony, mercury, selenium, silver, and thallium were not detected in soil samples collected in SMWU 6. Table B3-1 lists the sixteen detected constituents. Only three of these constituents (total chromium, hexavalent chromium, and zinc) exceeded their respective background threshold values (BTVs). None of constituents exceeded the applicable commercial screening values (California human health screening levels for commercial use or United States Environmental Protection Agency Region 9 regional screening levels for commercial use). Fluoride ranged from 380 to 650 milligrams per kilogram (mg/kg); pH ranged from 8.42 to 10.01.

Hexavalent chromium and total chromium each exceeded their respective BTVs once. Hexavalent chromium was detected in one sample at concentration of 1 mg/kg (compared to the BTV of 0.83 mg/kg). Total chromium was detected in all four samples; the maximum detected concentration of 120 mg/kg exceeded the BTV (39.8 mg/kg). Detected zinc concentrations exceeded the BTV three times (maximum detected concentration of 96 mg/kg compared to the BTV of 58 mg/kg). These exceedances are only marginally above the BTV, and the overall concentration and distribution of constituents in the four samples indicate that there has been no adverse impact to soil beneath the former tank.

This unit was closed by DTSC in 1995. Subsequent to this closure, DTSC has requested that additional analysis be conducted for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), and semivolatile organic compounds (SVOCs) in soil at SWMU 6 (DTSC, 2006). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Section 3.0 provides the recommended sampling for this unit.

3.0 SWMU 6 Proposed Sampling

3.1 SMWU 6 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. SMWU 6 is located in Area 3 on the Topock Compressor Station Accessibility Map (Figure B-2). Twenty-three utility risers, including gas, odorant, waste water, electrical, SCADA, and an emergency shutoff device are located in Area 3. In addition, a utility trench, a cathodic protection anode, and three vaults were identified in Area 3. Photographs 60 through 61 in sub-Appendix B25 show the accessibility constraints in SMWU 6. Sample locations and depths identified for SMWU 6 take into account the identified access constraints. As described in the main text of Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

3.2 SMWU 6 Proposed Sampling

Although this unit was closed in 1995, additional sampling for organic COPCs and sampling of the fill used to backfill the excavation is proposed as required by DTSC. Table B3-2 summarizes the proposed SMWU 6 sample locations, depths, description/rationale for each location, and analytes. Proposed sample locations are also shown in Figure B3-2. The figure also shows proposed samples associated with nearby SWMUs and AOCs. The proposed SMWU 6 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at one location (SWMU 6-1). Because of numerous subsurface utilities and pipelines in the area, only hand tools can be used to collect samples in SWMU 6; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. If the area of sampling is covered with asphalt, the surface sampling interval will begin at the bottom of the asphalt or gravel sub-base. This sample location will be placed as close as possible to the center of the area that was excavated as part of the closure activity. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons. As required by United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

4.0 References

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 1995. Letter from Mohinder Sandhu/DTSC to Mel Wong/PG&E. "Closure Certification Acceptance: Hazardous Waste Management Units at PG&E Topock Compressor Station." June 26.

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Pacific Gas and Electric Company (PG&E). 1982. *Operation Plan for Hazardous Waste Facility at the Topock Compressor Station.* December.

Tables

TABLE B3-1

Sample Results: Metals

Solid Waste Management Unit 6 – Chromate Reduction Tank Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																		**General Chemistry in mg/kg unless otherwise noted**		
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic[4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium Hexavalent**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**	**pH**	**Specific conductance**	**Fluoride**
Category2																								
CRT-4	11/15/89	7.5	N	ND (0.3)	4.3	165	ND (1)	ND (0.5)	**1**	**120**	10	14	6	ND (0.002)	ND (1)	19	ND (0.5)	ND (1)	ND (5)	25	**96**	8.42	170	380
	11/15/89	8	N	ND (0.3)	1.7	103	ND (1)	ND (0.5)	ND (1)	23	9	7	2	ND (0.002)	ND (1)	14	ND (0.5)	ND (1)	ND (5)	23	47	9.03	65	490
	11/15/89	8.5	N	ND (0.3)	2.5	168	ND (1)	ND (0.5)	ND (1)	21	10	8	3	ND (0.002)	ND (1)	18	ND (0.5)	ND (1)	ND (5)	24	49	9.52	45	400

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

Specific conductance is reported in micro siemens per centimeter.

TABLE B3-2

Constituent Concentrations in Soil Compared to Screening Values
Solid Waste Management Unit 6 – Chromate Reduction Tank Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV)[1]		RWQCB Environmental Screening Levels (ESL)[2]		Commercial Screening Level (Com SL)[3]	
							# of Exceedences[4]	(BTV)	# of Exceedences[5]	(ESL)	# of Exceedences[5]	(Com SL)
General Chemistry												
Fluoride	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	490	NA	(NE)	NA	(NE)	NA	(NE)
pH	pH units	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	9.52	NA	(NE)	NA	(NE)	NA	(NE)
Specific conductance	µS/cm	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	170	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Antimony	mg/kg	0 / 3 (0%)	0 / 0 (0%)	0 / 3 (0%)	0 / 0 (0%)	ND (0.3)	NA	(NE)	NA	(NE)	0	(380)
Arsenic	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	4.3	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	168	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	0 / 3 (0%)	0 / 0 (0%)	0 / 3 (0%)	0 / 0 (0%)	ND (1) ‡	0	(0.672)	NA	(NE)	0	(190)
Chromium, Hexavalent	mg/kg	1 / 3 (33%)	0 / 0 (0%)	1 / 3 (33%)	0 / 0 (0%)	1	1	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	120	1	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	10	0	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	14	0	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	6	0	(8.39)	0	(NE)	0	(320)
Nickel	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	19	0	(27.3)	0	(NE)	0	(16,000)
Thallium	mg/kg	0 / 3 (0%)	0 / 0 (0%)	0 / 3 (0%)	0 / 0 (0%)	ND (5)	NA	(NE)	NA	(NE)	0	(63)
Vanadium	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	25	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	96	1	(58)	0	(NE)	0	(100,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B3-3
Proposed Sampling Plan
SWMU 6 Chromate Reduction Tank
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

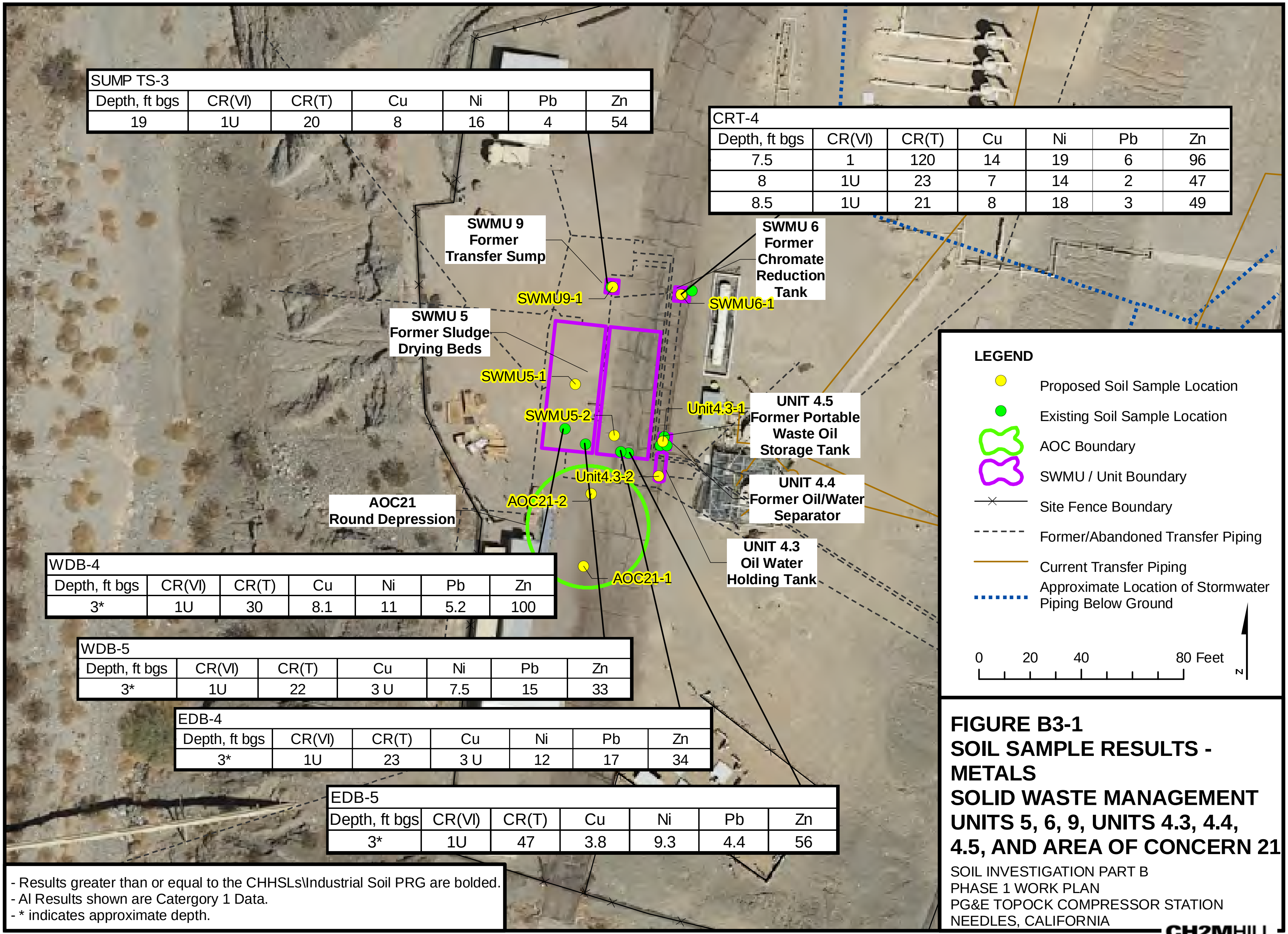
Location	Depths (feet)	Description/Rationale	Analytes
SWMU 6-1	0-0.5 and 3, if feasible	Collect additional soil samples to analyze for organics	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons

Notes:

Ten percent of samples from this investigation will be analyzed for Target Analyte List/Target Compound List.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



SUMP TS-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
19	1U	20	8	16	4	54

CRT-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
7.5	1	120	14	19	6	96
8	1U	23	7	14	2	47
8.5	1U	21	8	18	3	49

WDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	30	8.1	11	5.2	100

WDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	22	3 U	7.5	15	33

EDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	23	3 U	12	17	34

EDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	47	3.8	9.3	4.4	56

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Soil Sample Location
🟩	AOC Boundary
🟪	SWMU / Unit Boundary
—×—	Site Fence Boundary
- - - -	Former/Abandoned Transfer Piping
——	Current Transfer Piping
······	Approximate Location of Stormwater Piping Below Ground

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- Al Results shown are Catergory 1 Data.
- * indicates approximate depth.

FIGURE B3-1 SOIL SAMPLE RESULTS - METALS SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\SWMU5_9_Result_Metal

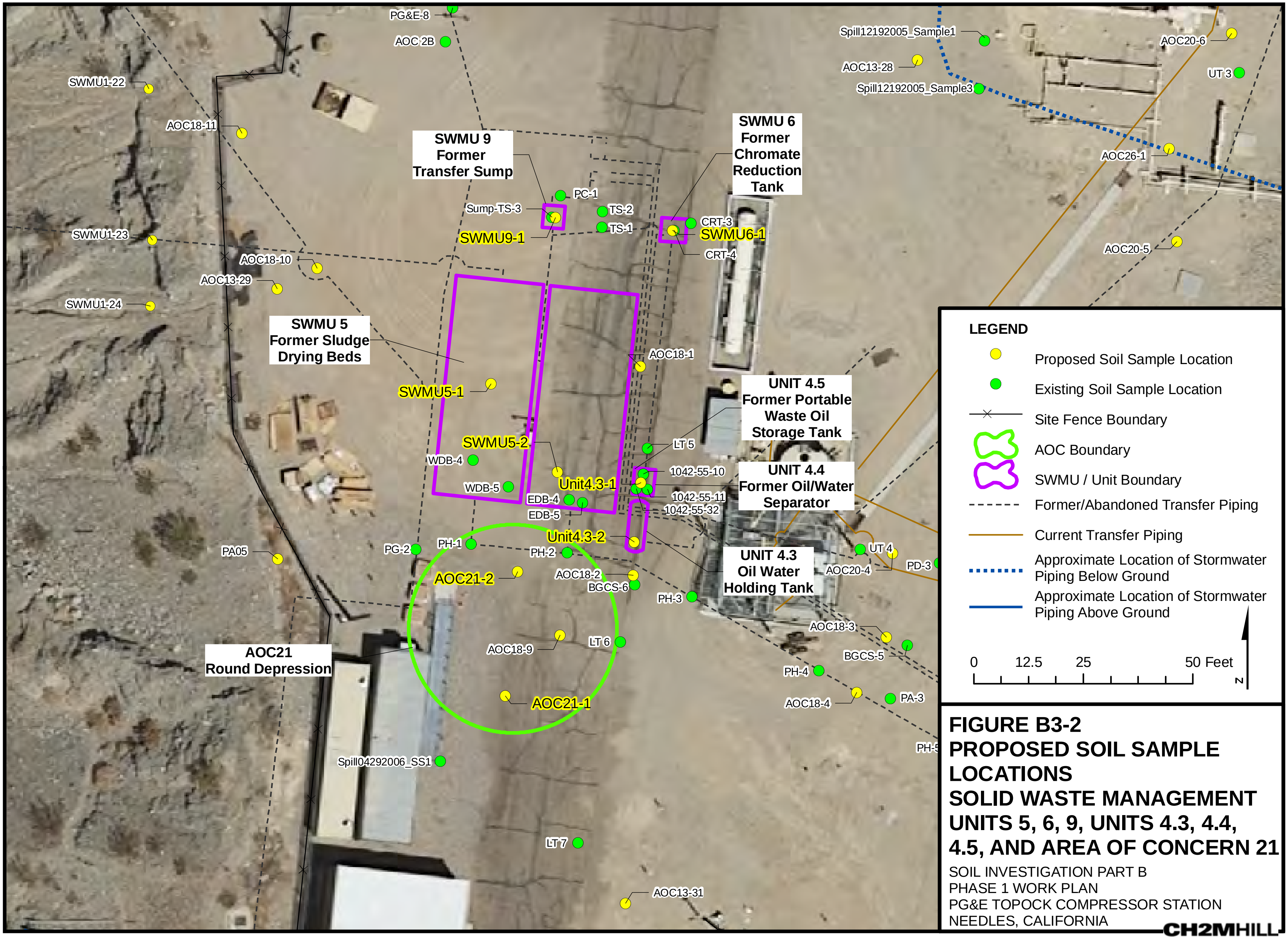


FIGURE B3-2
PROPOSED SOIL SAMPLE LOCATIONS SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\SWMU5_9_Proposed_sample_Locs

Appendix B4
SWMU 8 – Process Pump Tank Investigation Program

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Acronyms and Abbreviations

bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
mg/kg	milligrams per kilogram
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B4

SWMU 8 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU) 8 comprises the process pump tank that was part of the two-step wastewater treatment system and was located within the facility fence line on the southern end of the lower yard, shown in Figure B4-1. (All tables and figures appear at the end of this sub-appendix.) The process pump tank consisted of a 1,500-gallon-capacity steel holding tank about 8 feet high and 5.5 feet in diameter (PG&E, 1982; Kearny, 1987). The tank had an open top and was situated on a concrete pad. Before being reused in the hazardous waste treatment system, this tank was used in the Permutit water-softening process that operated at the facility until 1962. The area immediately around the tank was formerly unpaved. The station road is present to the east and south of this unit, and the former Water Conditioning Building (AOC 23) is located immediately to the north. SWMU 7 was located to the west of this unit. Currently, the fire pump building is located over the area formerly occupied by this SWMU. A small strip of gravel-covered soil is present between the station road and the fire pump building, and between the fire pump building and the former Water Conditioning Building.

The process pump tank was used as a temporary holding tank for treated wastewater discharged from the precipitation tank (SWMU 7; closed). Treated wastewater from this tank was sent to the former percolation bed (SWMU 1) from late 1969 to May 1970. From May 1970 to December 1973, effluent was discharged primarily to injection well PGE-08 (SWMU 2); however, after Pond 1 (part of SWMU 10) was constructed in late 1971, it also received some of the discharged wastewater. From December 1973 to October 1985, the effluent was discharged to the old evaporation ponds (SWMU 10). Chemical analysis data for wastewater held within the process pump tank are not available. No indication of a release was observed during a facility inspection performed as part of the Resource Conservation and Recovery Act facility assessment (Kearny, 1987).

The process pump tank was removed from service, along with the remainder of the two-step treatment system, in October 1985. Closure of the process pump tank was accomplished during Phase 1 closure activities performed from December 1988 through February 1989. A closure certification acceptance letter that included this SWMU was issued by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) on June 26, 1995 (DTSC, 1995).The steps taken during closure of the process pump tank included:

- Hydroblasting of the steel tank; the hydroblast water was containerized and disposed of as hazardous waste.
- Removal of sludge from the tank and disposal of the sludge as hazardous waste.
- Removal of the tank from its foundation; the tank was cut up and recycled.

- Removal of the concrete foundation; this concrete was combined with the concrete from the Precipitation Tank (SWMU 7), for a total of about 30 cubic yards, and was disposed of as Class III waste.
- Collection of an initial round of confirmation samples.
- Soil removal after the initial confirmation samples indicated residual contamination (the volume of soil removed is estimated to have been about 0.25 cubic yard).
- Collection of final confirmation samples.
- Backfilling of the area with local (non-native) material and final grading.

Following removal of the tank, concrete foundation, and subsoils, and approximately 1.5 feet of contaminated soil, a trench was dug and samples were collected from the wall of the trench at 2 feet and 3 feet below the bottom of the excavation (which corresponds to approximately 4 and 5 feet below ground surface [bgs]). Locations for the confirmation samples were selected based upon the DTSC-approved *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station* (Mittelhauser, 1986). The samples were analyzed for Title 22 metals, hexavalent chromium, fluoride, and soil pH. Previous sampling encountered bedrock at approximately 5 to 6 feet bgs at this site (Mittelhauser, 1990).

2.0 Summary of Past Soil Characterization

Two historical confirmation subsurface soil samples (4 and 5 feet bgs) were collected from one location (PPT-4) in SMWU 8, as shown in Figure B4-1. Historical soil samples were analyzed for antimony, arsenic, barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, fluoride, and pH. Laboratory analytical results for the historical soil samples are presented in Table B4-1. Table B4-2 presents a statistical summary of soil analytical results for chemicals of potential concern (COPCs) that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value. All historical data are considered Category 2.

Antimony, beryllium, hexavalent chromium, molybdenum, selenium, silver, and thallium were not detected in soil samples collected in SMWU 8. Table B4-1 lists the 13 detected constituents. Only three of these constituents (cobalt, copper, and nickel) exceeded their respective background threshold values (BTVs). None of constituents exceeded the applicable commercial screening values (California human health screening levels for commercial use, or United States Environmental Protection Agency Region 9 regional screening levels for commercial use). Cobalt, copper, and nickel each exceeded their respective BTVs once. The detected cobalt concentration of 13 milligrams per kilogram (mg/kg) exceeded the BTV of 12.7 mg/kg, copper was detected at 19 mg/kg (compared to the BTV of 16.8 mg/kg), and nickel was detected at concentration of 33 mg/kg (compared to the BTV of 27.3 mg/kg). These exceedances are only very marginally above the BTV, and the overall concentration and distribution of constituents in the two samples indicate that there has been no adverse impact to soil beneath the former tank.

This unit was closed by DTSC in 1995. Subsequent to this closure, DTSC has requested that additional analysis be conducted for (VOCs), total petroleum hydrocarbons (TPH), and semivolatile organic compounds (SVOCs) in soil at SWMU 8 (DTSC, 2006). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Section 3.0 provides the recommended sampling for this unit.

3.0 SWMU 8 Proposed Sampling

3.1 SMWU 8 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. SMWU 8 is located in Area 15 on the Topock Compressor Station Accessibility Map (Figure B-2). Thirty-five utility risers, including gas, electrical, SCADA, and water lines are located in Area 3. In addition two cathodic protection anodes, and a vault were identified in Area 15. Sample locations and depths identified for SMWU 8 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less,

3.2 SMWU 8 Proposed Sampling

Although this unit was closed in 1995, additional sampling for organic COPCs and sampling of the fill used to backfill the excavation is proposed as required by DTSC. Table B4-3 summarizes the proposed SMWU 8 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B4-2. The proposed SMWU 8 sample locations are Pacific Gas and Electric Company’s initial assessment of candidate locations for additional characterization. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at one location (SWMU8-1). Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in SWMU 8 therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. If the area of sampling is covered with concrete or asphalt, the surface sampling interval will begin at the bottom of the concrete/asphalt or gravel sub-base. In most cases, this first interval will be from 0.5 to 1 foot bgs. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons. As required by the United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

4.0 References

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 1995. Letter from Mohinder Sandhu/DTSC to Mel Wong/PG&E. “Closure Certification Acceptance: Hazardous Waste Management Units at PG&E Topock Compressor Station.” June 26.

__________. 2006. Letter “Response to Comments Related to the Site History Position of the RCRA Facility Investigation Report, dated February 2005, Pacific Gas and Electric Company Topock Compressor Station, Needles, California.” July 13.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

Kearny, A.T. 1987. *RCRA Facility Assessment, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California.* August.

Mittelhauser Corporation. 1986. *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station.* Revision 1. August.

__________. 1990. *Phases 1 and 2 Closure Certification Report, Hazardous Waste Management Facilities, Topock Compressor Station, Needles, California.* June.

Pacific Gas and Electric Company (PG&E). 1982. *Operation Plan for Hazardous Waste Facility at the Topock Compressor Station.* December.

Tables

TABLE B4-1

Sample Results: Metals

Solid Waste Management Unit 8 – Process Pump Tank Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																		General Chemistry	
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic[4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium Hexavalent**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**	**pH**	**Fluoride**
Category2																							
PPT-4	02/08/89	2	N	ND (0.3)	1.1	65	ND (1)	ND (0.5)	ND (1)	32	**13**	**19**	5	0.02	ND (1)	**33**	ND (0.5)	ND (1)	ND (5)	41	44	8.68	636
	02/08/89	2	FD	ND (0.3)	1.2	65	ND (1)	ND (0.5)	ND (1)	29	9	15	4	0.027	ND (1)	26	ND (0.5)	ND (1)	ND (5)	32	36	8.74	664
	02/08/89	3	N	ND (0.3)	1.3	50	ND (1)	0.5	ND (1)	26	10	16	5	0.007	ND (1)	25	ND (0.5)	ND (1)	ND (5)	38	44	9.34	576

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

TABLE B4-2

Constituent Concentrations in Soil Compared to Screening Values
Solid Waste Management Unit 8 – Process Pump Tank Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV)[1]		RWQCB Environmental Screening Levels (ESL)[2]		Commercial Screening Level (Com SL)[3]	
							# of Exceedences[4]	(BTV)	# of Exceedences[5]	(ESL)	# of Exceedences[5]	(Com SL)
General Chemistry												
Fluoride	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	664	NA	(NE)	NA	(NE)	NA	(NE)
pH	pH units	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	9.34	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Antimony	mg/kg	0 / 2 (0%)	0 / 0 (0%)	0 / 2 (0%)	0 / 0 (0%)	ND (0.3)	NA	(NE)	NA	(NE)	0	(380)
Arsenic	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	1.3	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	65	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	0 / 2 (0%)	0 / 0 (0%)	0 / 2 (0%)	0 / 0 (0%)	ND (1) ‡	0	(0.672)	NA	(NE)	0	(190)
Cadmium	mg/kg	1 / 2 (50%)	0 / 0 (0%)	1 / 2 (50%)	0 / 0 (0%)	0.5	0	(1.1)	0	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	0 / 2 (0%)	0 / 0 (0%)	0 / 2 (0%)	0 / 0 (0%)	ND (1) ‡	0	(0.83)	NA	(NE)	0	(37)
Chromium, total	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	32	0	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	13	1	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	19	1	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	5	0	(8.39)	0	(NE)	0	(320)
Mercury	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	0.027	0	(NE)	0	(NE)	0	(180)
Nickel	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	33	1	(27.3)	0	(NE)	0	(16,000)
Thallium	mg/kg	0 / 2 (0%)	0 / 0 (0%)	0 / 2 (0%)	0 / 0 (0%)	ND (5)	NA	(NE)	NA	(NE)	0	(63)
Vanadium	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	41	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	44	0	(58)	0	(NE)	0	(100,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B4-3
Proposed Sampling Plan - SWMU 8 Process Pump Tank
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

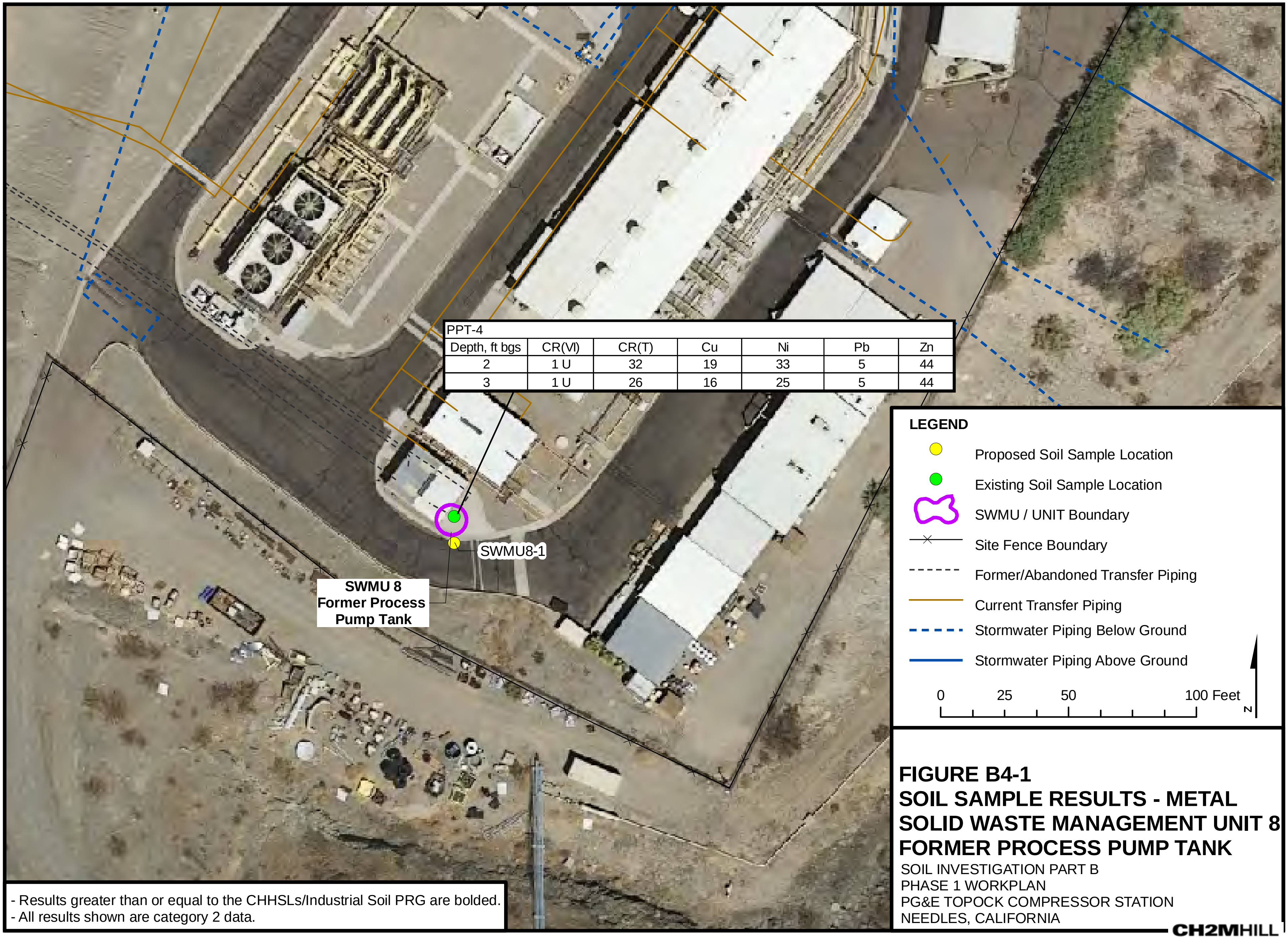
Location	Depths (feet)	Description/Rationale	Analytes
SWMU 8-1	0-0.5 and 3, if feasible	Collect additional soil samples to analyze for organics	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons

Notes:

Ten percent of samples from this investigation will be analyzed for Target Analyte List/Target Compound List.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



PPT-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2	1 U	32	19	33	5	44
3	1 U	26	16	25	5	44

- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.
- All results shown are category 2 data.

FIGURE B4-1
SOIL SAMPLE RESULTS - METAL SOLID WASTE MANAGEMENT UNIT 8 FORMER PROCESS PUMP TANK

SOIL INVESTIGATION PART B
PHASE 1 WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\SWMU_8_Result_Metal

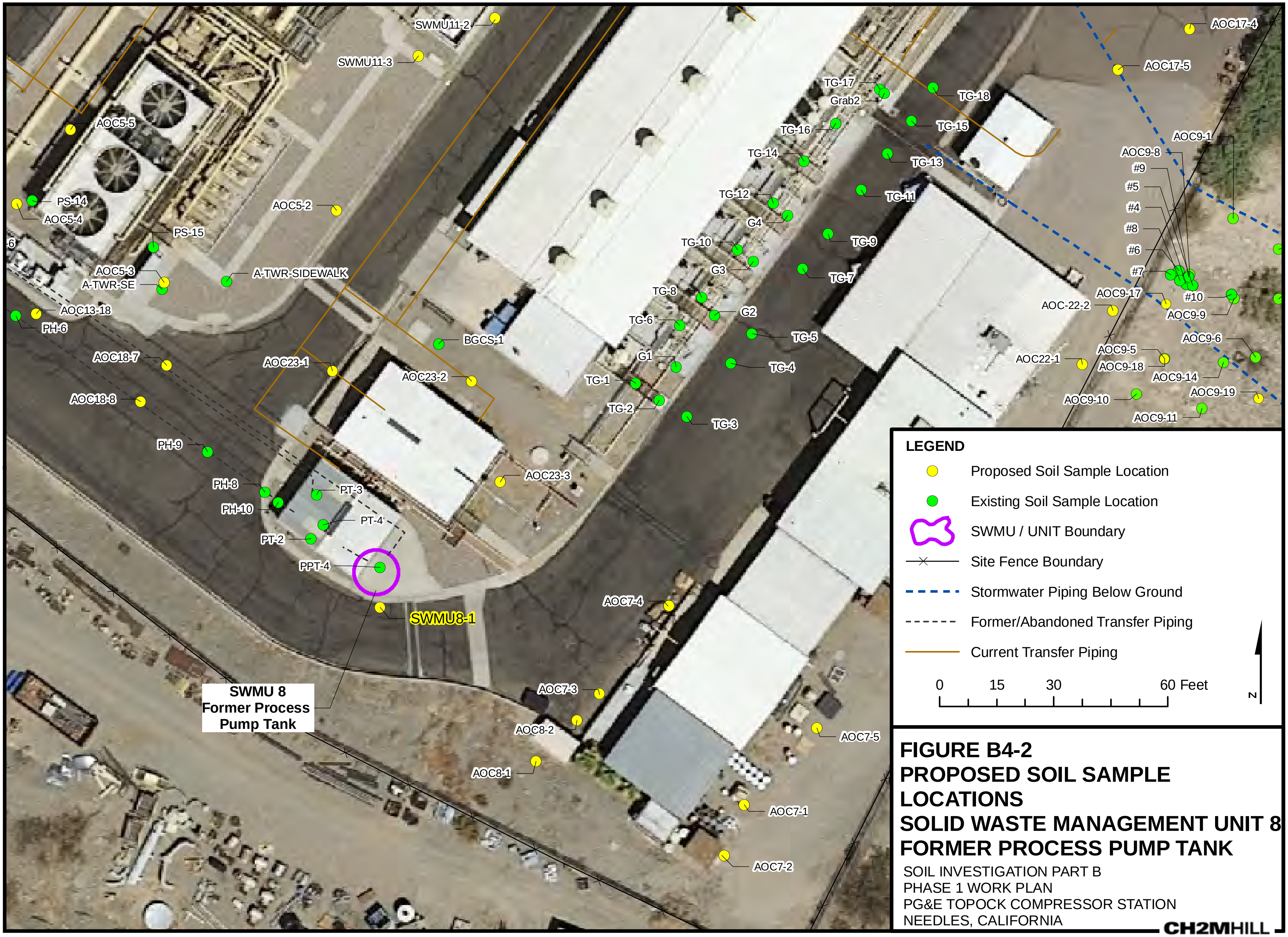


FIGURE B4-2
PROPOSED SOIL SAMPLE LOCATIONS
SOLID WASTE MANAGEMENT UNIT 8
FORMER PROCESS PUMP TANK

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\SWMU8_Proposed_sample_Locs

Appendix B5

SWMU 9 – Transfer Sump Investigation Program

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2.0 Summary of Past Soil Characterization B5-2

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B5-1 Soil Sample Results Metals
B5-2 Proposed Soil Sample Locations

Acronyms and Abbreviations

bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
mg/kg	milligrams per kilogram
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B5

SWMU 9 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU 9) comprises the transfer sump that was part of the two-step wastewater treatment system and was located within the facility fence line in the southern end of the lower yard, shown in Figure B5-1. (All tables and figures appear at the end of this sub-appendix.) The transfer sump was a pre-fabricated concrete septic tank with a capacity of 1,500 gallons (PG&E, 1982; Mittelhauser, 1990). The sump measured about 3 feet in diameter and 20 feet deep, of which 18.5 feet was set below grade. The sump was fitted with a concrete cover.

From 1969 to October 1985, effluent containing chromium from the chromate reduction tank (SWMU 6) was routed through SWMU 9 to the precipitation tank (SWMU 7; closed). In addition, a 3-inch-diameter steel pipe ran from the sludge-drying beds (SWMU 5) to the transfer sump (SWMU 9) to facilitate the removal of liquids from the sludge-drying beds (Mittelhauser, 1990). Sometime around 1974, SWMU 9 also started to receive treated effluent water from the oily water separator (either directly or through the chromate reduction tank) (Kearny, 1987). From November 1985 to October 1989, the transfer sump received non-hazardous (i.e., phosphate-based) cooling-water blowdown, and the effluent from the transfer sump was discharged directly to the old evaporation ponds (SWMU 10). Oily sludges and solids that accumulated in the transfer sump were periodically removed and transported to an offsite disposal facility (Kearny, 1987).

The transfer sump was removed from service in October 1989. Physical removal of the transfer sump occurred during Phase 2 of the hazardous waste management facilities closure process between November 1989 and March 1990 (Mittelhauser, 1990). In 1995, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) issued a closure certification acceptance letter for this unit (DTSC, 1995).

The steps taken during closure of the transfer sump included:

- Removal of surface soil around the manhole of the sump that was visibly stained with oil; approximately 2 cubic feet of stained soil were removed and disposed of as hazardous waste.
- Removal of sludge and water in the sump followed by hydroblasting of the concrete sump; the sludge and hydroblast water was containerized and disposed of as a hazardous waste.
- Demolition of the sump in place; the concrete rubble was found to be non-hazardous and was used as fill onsite.

- Collection of a confirmation sample underneath the former tank location.
- Backfilling of the approximately 18.5-foot excavation with local material and final grading.

The confirmation sample was collected from the base of the excavation.

2.0 Summary of Past Soil Characterization

One historical subsurface soil sample, TS-3, was collected from one location directly beneath the former sump, as shown in Figure B5-1. The historical soil sample was collected at approximately 19 feet below ground surface (bgs) and was analyzed for antimony, arsenic, barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, fluoride, and pH. Laboratory analytical results for the historical soil samples are presented in Table B5-1. Antimony, hexavalent cadmium, chromium, mercury, molybdenum, selenium, silver, and thallium were not detected in the sample. Beryllium was the only constituent detected at a concentration exceeding its background threshold value (BTV); the detected concentration of 1 mg/kg exceeds the BTV (0.672 milligrams per kilogram [mg/kg]). Fluoride was detected at 400 mg/kg, and the pH of the sample was 9.05. Based on the available information, no release occurred from the bottom of the tank. The historical data are considered Category 2.

This unit was closed by DTSC in 1995. Subsequent to the closure, DTSC has requested that additional analysis be conducted for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), and semivolatile organic compounds (SVOCs) in soil at SWMU9 (DTSC, 2006). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Section 3.0 provides the recommended sampling for this unit.

3.0 SMWU 9 Proposed Sampling

3.1 SMWU 9 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. SMWU 9 is located in Area 3 on the Topock Compressor Station Accessibility Map (Figure B-2). Twenty-three utility risers, including gas, odorant, waste water, electrical, SCADA, and an emergency shut-off device, are located in Area 3. In addition, a utility trench, a cathodic protection anode, and three vaults were identified in Area 3. Photograph 61 in sub-Appendix B25 show the accessibility constraints in SMWU 9. Sample locations and depths identified for SMWU 9 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils, which apply to depths easily sample using small hand tools. Generally, this infers a depth of 1 foot bgs or less

3.2 SMWU 9 Proposed Sampling

Although this unit was closed in 1995, additional sampling for organic COPCs and sampling of the fill used to backfill the excavation, is proposed as required by DTSC.

Table B5-2 summarizes the proposed SMWU 9 sample locations, depths, description/ rationale for each location, and analytes. Proposed sample locations are also shown in Figure B5-2. The proposed SMWU 9 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at one location (SWMU9-1). Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in SWMU 5; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. If the area of sampling is covered with asphalt, the surface sampling interval will begin at the bottom of the asphalt or gravel sub-base. This sample location will be placed as close as possible to the center of the area that was excavated as part of the closure activity. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons. As required by the United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

4.0 References

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 1995. Letter from Mohinder Sandhu/DTSC to Mel Wong/PG&E. "Closure Certification Acceptance: Hazardous Waste Management Units at PG&E Topock Compressor Station." June 26.

______. 2006. Letter "Response to Comments Related to the Site History Position of the RCRA Facility Investigation Report, dated February 2005, Pacific Gas and Electric Company Topock Compressor Station, Needles, California." July 13.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*. August 10.

Kearny, A.T. 1987. *RCRA Facility Assessment, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California.* August.

Mittelhauser Corporation. 1990. *Phases 1 and 2 Closure Certification Report, Hazardous Waste Management Facilities, Topock Compressor Station, Needles, California.* June.

Pacific Gas and Electric Company (PG&E). 1982. *Operation Plan for Hazardous Waste Facility at the Topock Compressor Station.* December.

Tables

TABLE B5-1

Sample Results: Metals

Solid Waste Management Unit 9 – Transfer Sump Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																		General Chemistry		
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic[4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium Hexavalent**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**	**pH**	**Specific conductance**	**Fluoride**
Category2																								
SumpTS-3	11/15/89	19	N	ND (0.3)	2.1	100	**1**	ND (0.5)	ND (1)	20	11	8	4	ND (0.002)	ND (1)	16	ND (0.5)	ND (1)	ND (5)	23	54	9.05	87	400

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

Specific conductance is reported in micro siemens per centimeter.

TABLE B5-2
Proposed Sampling Plan - SWMU 09 Transfer Sump
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

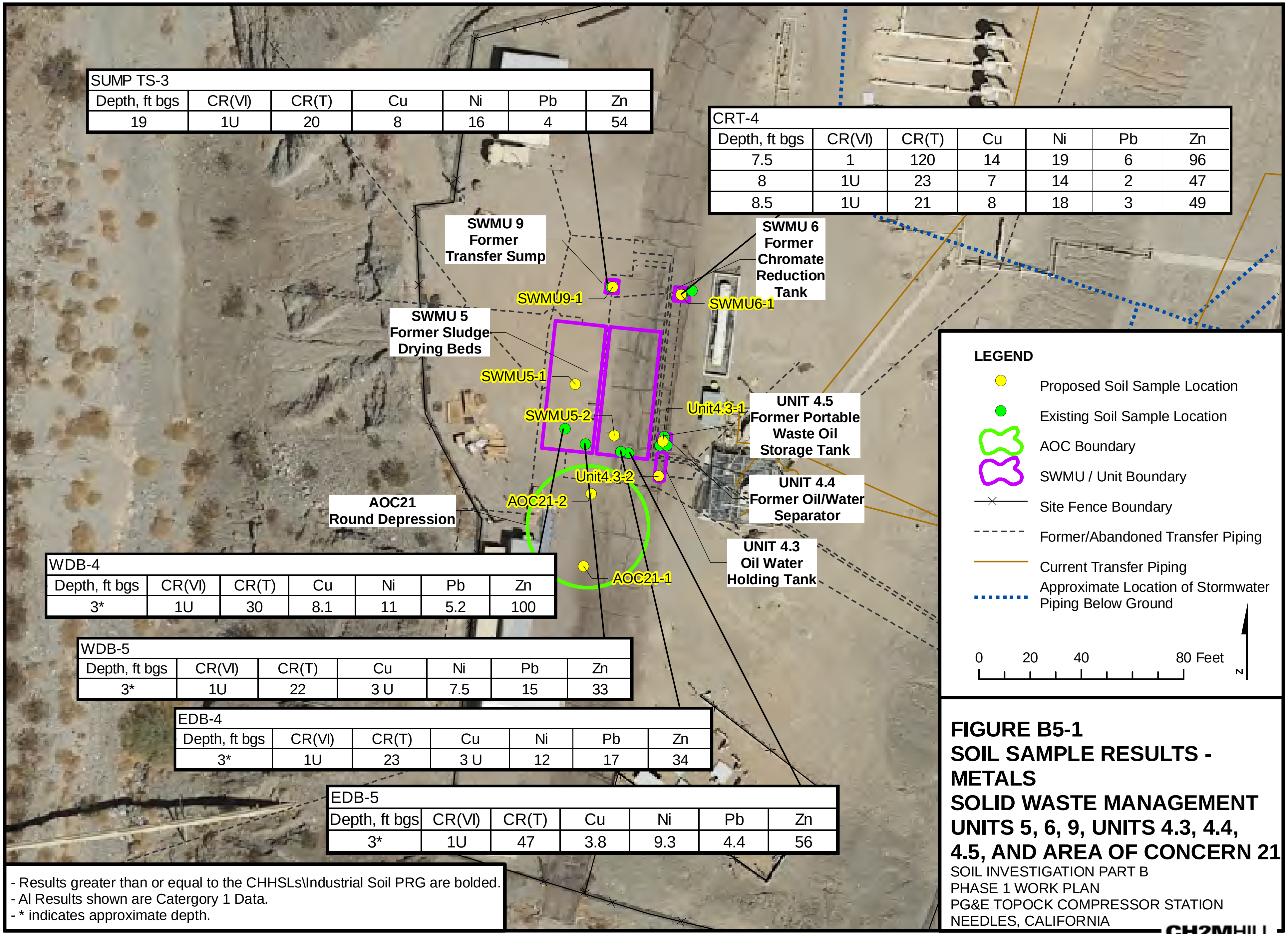
Location	Depths (feet)	Description/Rationale	Analytes
SWMU 9-1	0-0.5 and 3, if feasible	Collect additional soil samples to analyze for organics	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons

Notes:

Ten percent of samples from this investigation will be analyzed for Target Analyte List/Target Compound List.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



SUMP TS-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
19	1U	20	8	16	4	54

CRT-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
7.5	1	120	14	19	6	96
8	1U	23	7	14	2	47
8.5	1U	21	8	18	3	49

WDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	30	8.1	11	5.2	100

WDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	22	3 U	7.5	15	33

EDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	23	3 U	12	17	34

EDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	47	3.8	9.3	4.4	56

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- Al Results shown are Catergory 1 Data.
- * indicates approximate depth.

FIGURE B5-1
SOIL SAMPLE RESULTS - METALS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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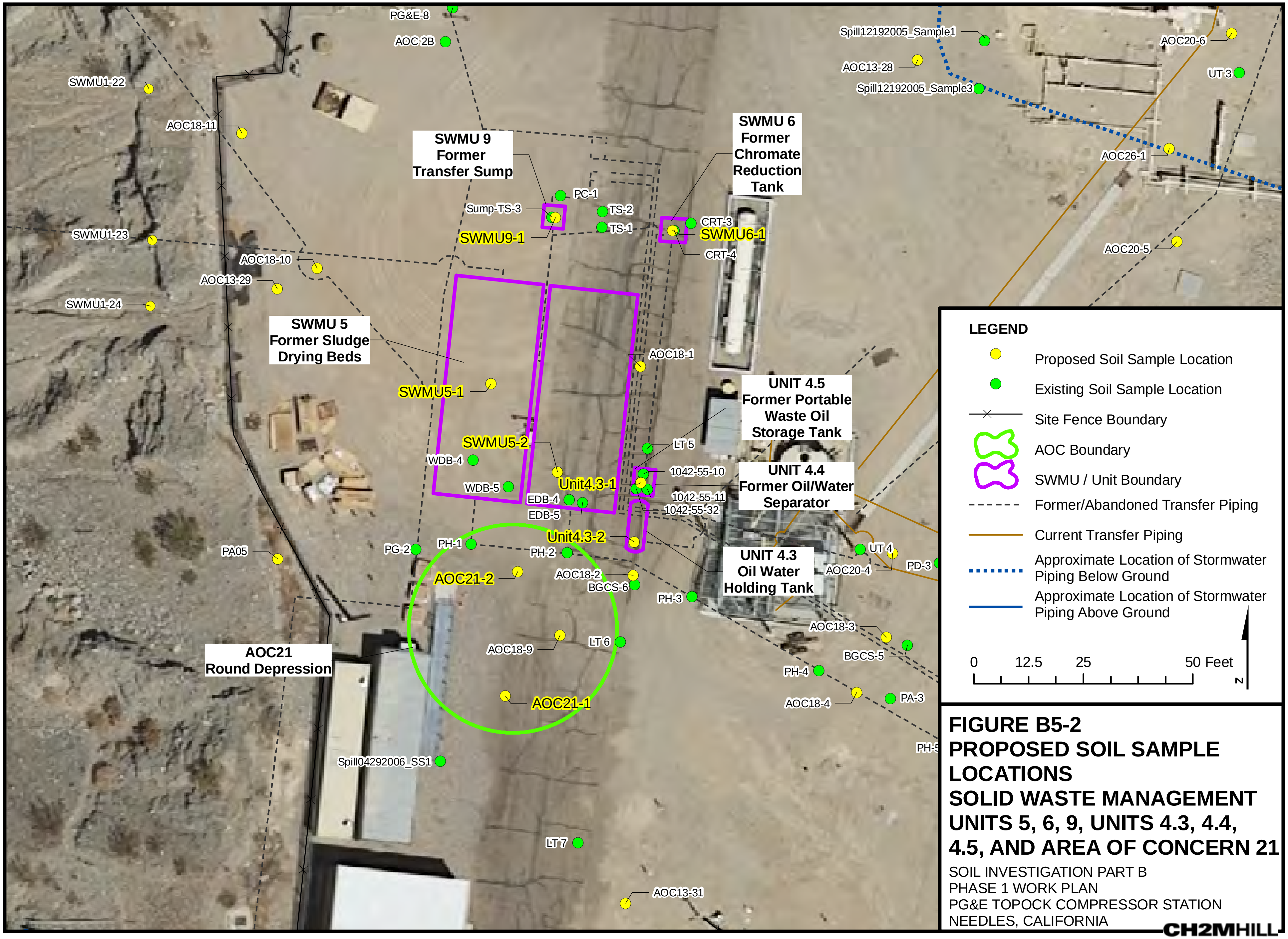

LEGEND

- ● Proposed Soil Sample Location
- ● Existing Soil Sample Location
- —×— Site Fence Boundary
- AOC Boundary
- SWMU / Unit Boundary
- - - - Former/Abandoned Transfer Piping
- —— Current Transfer Piping
- ······ Approximate Location of Stormwater Piping Below Ground
- —— Approximate Location of Stormwater Piping Above Ground

FIGURE B5-2
PROPOSED SOIL SAMPLE LOCATIONS SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix B6
SWMU 11 – Sulfuric Acid Tanks Investigation Program

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
mg/kg	milligrams per kilogram
PCB	polychlorinated biphenyl
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons

APPENDIX B6

SWMU 11 Investigation Program

1.0 Introduction and Background

1.1 Background

Solid Waste Management Unit (SWMU) 11 consists of two 400-gallon sulfuric acid tanks, one tank is located at Cooling Tower A in Area of Concern (AOC) 5 and the other tank is located at Cooling Tower B in AOC 6. SWMU11 was incorporated into this Work Plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2010). Sulfuric acid is and was used to control pH and minimize scaling in the cooling towers. The composition of the cooling water must be carefully maintained at optimal conditions to minimize the potential for scale, corrosion, and biological growth. As needed, an automatic controller adds sulfuric acid and other chemicals to maintain the proper conditions in the cooling water.

When the station first began operations, sulfuric acid was delivered to the facility in drums and pumped or dumped directly into the basins at the bottoms of the old cooling towers. The original tanks were unlined steel aboveground storage tanks with a capacity of 2,600 gallons each and were located within concrete secondary containment areas. The steel tanks were replaced with polyethylene-lined 400-gallon tanks in 1984. These tanks were located within the original epoxy-coated concrete contaminated structures.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for SMWU 11 based on the above site history and background, as shown in Figure B6-1. (All tables and figures appear at the end of this sub-appendix.) Table B6-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for SMWU 11. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011). The primary sources of contamination at SMWU 11 are likely to be historical incidental spills of sulfuric acid during transfer. The quantity of acid released, if any, is unknown but is expected to be relatively small, as any spills or incidental leaks would have quickly been addressed due to the inherent hazards of the acid. If a large release from the tank occurred, it could have resulted in acid reaching the storm drain system. Releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D of the main report.

The primary source medium at SMWU 11 is surface soil. Because the majority of the area around the tanks is covered with gravel, liquids released in SMWU 11 would have been released to surface soil and would have infiltrated shallow soil. Acid released to soils could have solubilized metals in the soil matrix. Liquids released to shallow soils and metals solubilized from surface and shallow soils could also have infiltrated to deeper soils.

Because the entire SWMU is covered with gravel or pavement, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway.

2.0 Summary of Past Soil Characterization

No data have been collected specifically to evaluate potential concerns associate with the sulfuric acid tanks; however, one surface soil sample (2 B-Tower) was collected in AOC 6 at 0 feet below ground surface (bgs) in the immediate vicinity of the sulfuric acid tank. This sample was analyzed for hexavalent chromium, total chromium, copper, nickel, and zinc. Hexavalent chromium was not detected, and nickel was only detected a concentration below its background threshold value (BTV). Total chromium, copper, and zinc were each detected at concentrations exceeding their BTVs. The detected total chromium concentration of 78 milligrams per kilogram (mg/kg) exceeds the BTV of 39.8 mg/kg, the detected copper concentration of 41 mg/kg exceeds the BTV of 16.8 mg/kg, and the detected zinc concentration (120 mg/kg) exceeds the BTV for zinc (58 mg/kg). All constituent concentrations are well below the applicable commercial screening levels (California human health screening levels for commercial use or United States Environmental Protection Agency Region 9 regional screening levels for commercial use).

3.0 SWMU 11 Data Gaps and Proposed Sampling

3.1 SMWU 11 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gaps identified for Decision 1 include:

1. Data Gap #1 – Lateral and vertical extent of contamination in area around the sulfuric acid tank in AOC 5.
2. Data Gap #2 – Lateral and vertical extent of contamination in area around the sulfuric acid tank in AOC 6.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include the following:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes polycyclic aromatic hydrocarbons, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data

are required to characterize surface soils in unpaved areas to define locations with chemical of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data, and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 SMWU 11 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. SMWU 11 is located in Areas 6 and 9 on the Topock Compressor Station Accessibility Map (Figure B-2). Ninety-one utility risers, including main gas, cooling water, sulfuric acid, telecommunications, plant air, instrument air, water, and electrical lines, were identified in Area 6. Eighty-two utility risers, including main gas, gas, cooling water, sulfuric acid, electrical, and plant air lines, seven vaults, a SCADA cabinet, and two anodes were identified in Area 9. Photographs 4, 10, and 11 in sub-Appendix B25 show the accessibility constraints in SMWU 11. Sample locations and depths identified for SMWU 11 reflect the identified access constraints. As described in the main text of Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less

3.3 SMWU 11 Proposed Sampling

Table B6-2 summarizes the proposed SMWU 11 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figures B6-2 and B6-3. The figure also shows proposed sample locations for nearby AOCs. The proposed SMWU 11 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at seven locations: SWMU 11-1 through SWMU 11-7. Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. All samples will be analyzed for Title 22 metals, hexavalent chromium, and pH. As required by the United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite. In addition, soil samples collected for AOCs 5 and 6 will be used to assess this SWMU.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B6-2); the specific sample to be analyzed will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

California Department of Toxic Substances Control. 2010. "*Response to Comments to the Soil Part B Work Plan.*" July 20.

Tables

TABLE B6-1
Conceptual Site Model – SWMU 11 Former/Current Sulfuric Acid Tanks
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Potential incidental Spills/ Releases from sulfuric acid tanks	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/enclosed space accumulation
				Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B6-2
Proposed Sampling Plan - SWMU 11 Former/Current Sulfuric Acid Tanks
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

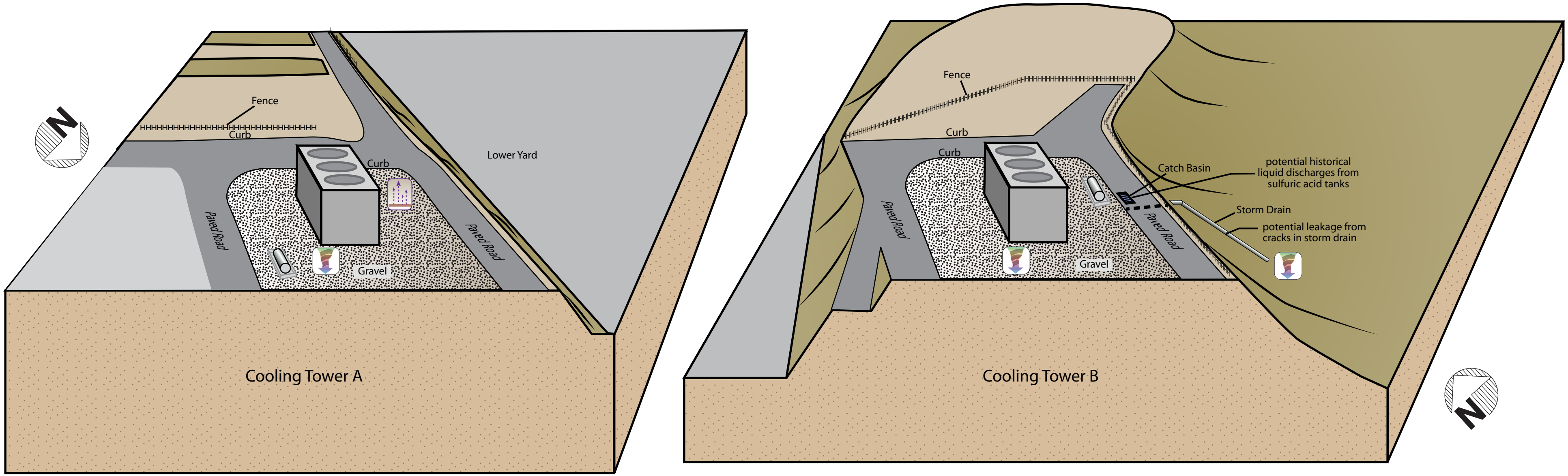
Location	**Depths (feet)**	**Description/Rationale**	**Analytes**
SWMU11-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination northwest of the sulfuric acid tank in AOC 5.	Title 22 metals, hexavalent chromium, and pH
SWMU11-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination east of the sulfuric acid tank in AOC 5.	Title 22 metals, hexavalent chromium, and pH
SWMU11-3	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination south of the sulfuric acid tank in AOC 5.	Title 22 metals, hexavalent chromium, and pH
SWMU11-4	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination west of the sulfuric acid tank in AOC 5.	Title 22 metals, hexavalent chromium, and pH
SWMU11-5	0-0.5 and 3, if feasible	To resolve Data Gap #2- Lateral and vertical extent of contamination north of the sulfuric acid tank in AOC 6.	Title 22 metals, hexavalent chromium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
SWMU11-6	0-0.5 and 3, if feasible	To resolve Data Gap #2- Lateral and vertical extent of contamination south of the sulfuric acid tank in AOC 6	Title 22 metals, hexavalent chromium, and pH
SWMU11-7	0-0.5 and 3, if feasible	To resolve Data Gap #2- Lateral and vertical extent of contamination west of the sulfuric acid tank in AOC 6	Title 22 metals, hexavalent chromium, and pH

Notes:

Ten percent of samples from this investigation will be analyzed for Target Analyte List/Target Compound List.

Samples collected for AOCs 5 and 6 will also be used to assess SWMU 11.

Figures



NOT TO SCALE

NOT TO SCALE

LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration

FIGURE B6-1
Conceptual Site Model for SWMU 11–
Sulfuric Acid Tanks
PG&E Topock Compressor Station
Needles, California

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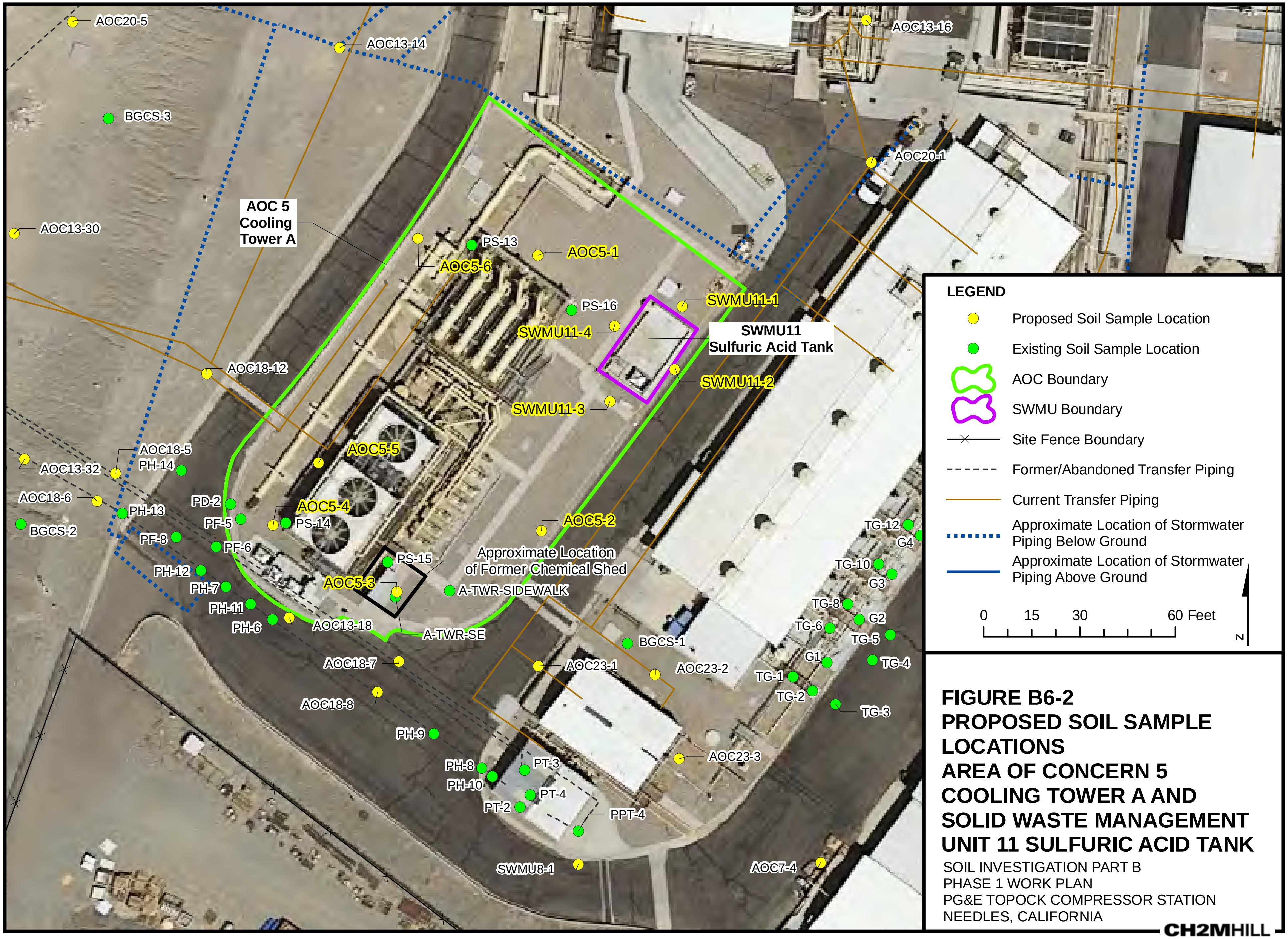

FIGURE B6-2
PROPOSED SOIL SAMPLE LOCATIONS AREA OF CONCERN 5 COOLING TOWER A AND SOLID WASTE MANAGEMENT UNIT 11 SULFURIC ACID TANK

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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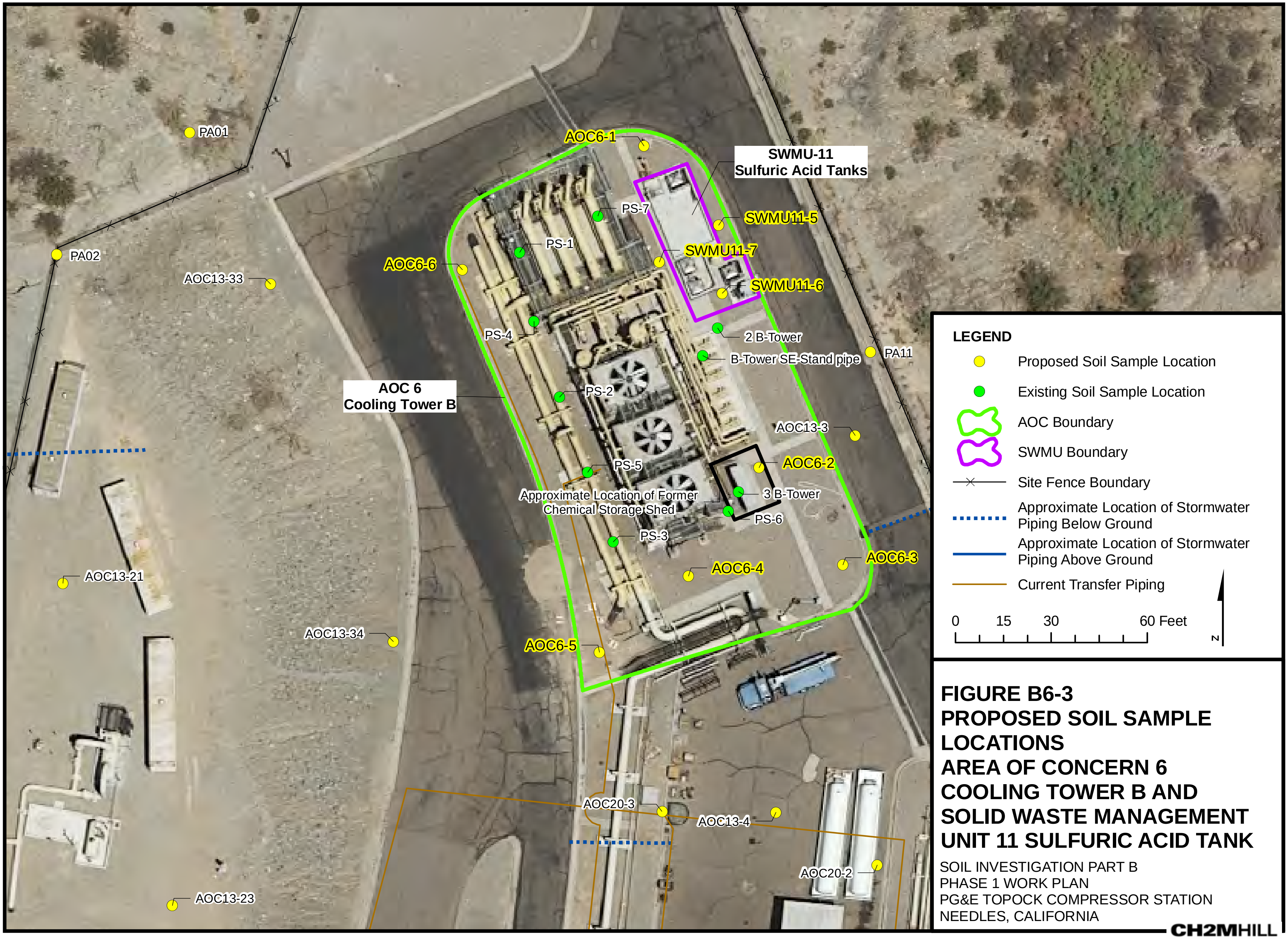

FIGURE B6-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERNN 6
COOLING TOWER B AND
SOLID WASTE MANAGEMENT
UNIT 11 SULFURIC ACID TANK

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix B7
AOC 5 – Cooling Tower A Investigation Program

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
COPC	chemical of potential concern
mg/kg	milligrams per kilogram
RSL	regional screening level
SWMU	Solid Waste Management Unit

APPENDIX B7

AOC 5 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of concern (AOC) 5 consists of the area surrounding original Cooling Tower A, as shown in Figure B7-1. (All tables and figures appear at the end of this sub-appendix.) The new Cooling Tower A is in the same location as the original Cooling Tower A. AOC 5 encompasses the cooling tower, the location of the former chemical shed, the sulfuric acid tank (now addressed separately as part of Solid Waste Management Unit 11 [SWMU 11]; further discussed in Appendix B6), and the current cooling water treatment chemical tanks, as well as the unpaved areas around the cooling tower. The majority of AOC 5 is unpaved (covered with gravel), but the area is bounded on all sides by pavement.

Operations in this area consist of the storage, handling, and use of cooling water additives. From 1951 to 1985, chromium-based corrosion inhibitors were used to treat the cooling water. From 1985 to the present, non-hazardous, phosphate-based inhibitors, scale control agents, and biocides have been used. The closed-loop systems were converted to a molybdenum-based corrosion protection system at about the same time. Sulfuric acid has been used from 1951 to the present to control the pH of the cooling water. The major features located in this AOC are discussed below.

Original Cooling Tower A: The original Cooling Tower A was a coil shed tower constructed along with the rest of the compressor station in 1951. The original tower was replaced with a new tower in 2001. The cooling tower is used to cool compressed natural gas and lubricating-oil cooling water. The original tower was located within a concrete water basin that held heated cooling water (a hotwell). The original basin still exists and was used as a foundation for the new tower, but the hotwell basin is no longer used for cooling water; the new tower is closed system. Wastewater samples collected from the cooling towers contained total chromium and hexavalent chromium ranging from 2.6 to 7.8 and 0.62 to 6.0 milligrams per liter, respectively (Mittelhauser, 1986).

Former Chemical Shed: The former chemical shed was located about 15 feet east of Cooling Tower A. The shed was used to store chromium-based cooling water additives used in the cooling tower from 1951 to 1985. The shed was demolished in the summer of 2000 as part of the replacement of Cooling Tower A. Stained soils beneath the former chemical storage shed were observed after its demolition (PG&E, 2000). The stained soils were reportedly limited to a small area of about 4 feet by 4 feet. The stained soil was excavated by the construction crew and hauled offsite. Confirmation soil samples were not collected. After removal, the area was backfilled with clean fill. As part of the new cooling tower construction, a reinforced concrete pad was built adjacent to the removal area, and a small portion of the area is covered with this pad.

Chemical Storage Tanks: There are three aboveground storage tanks at the southern end of the cooling tower that are used for the storage of the currently used cooling water treatment products. Two of the tanks are constructed of polyethylene and one is a stainless-steel tank; all tanks have secondary containment.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 5 based on the above site history and background, as shown in Figure B7-2. Table B7-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 5. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 5 are likely to be potential historical liquid discharges (spills) from the cooling tower hotwell (i.e., while the old cooling tower was in operation) and potentially incidental spills of cooling system additives during storage and/or transfer of the additive chemicals. The quantity of liquid released from the hotwell is unknown; however, periodic overflows are known to have occurred. The potential quantity of chemicals released in the vicinity of the storage shed is also unknown; however, is expected to be relatively small, as any spills or incidental leaks would have been small. If a large release from the hotwell occurred, it could have resulted in cooling water reaching the storm drain system and being discharged outside the fence line. Potential releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D of this Work Plan.

Until 1985, cooling water blowdown containing hazardous constituents was discharged to the hazardous waste treatment system as part of routine operations. Potential leaks from the hazardous waste transference piping are addressed by the AOC 18 investigation program, and effects outside the fence line due to routine cooling water blowdown discharge are evaluated in AOC 1 and SWMU 1. Finally, while there is no information indicating that the concrete hotwells have lacked integrity in the past, it is possible that potential cracks are present and that small quantities of cooling water may have been released to shallow soil directly beneath the hotwell.

The primary source medium at AOC 5 is surface soil. Because the majority of the area around the cooling tower and former chemical shed is covered with gravel, liquids released in AOC 5 would have been released to surface soil and infiltrated shallow soil. Liquids released to shallow soils could have infiltrated to deeper soils. If present, organic constituents in surface soils could have been degraded by heat and light. Because the entire AOC is covered with gravel or pavement, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway. Stained concrete has not been identified at this unit.

The normal operation of the cooling towers also included some loss of cooling water through evaporation and/or mist from the top of the tower; this phenomenon is known as drift. As discussed in the *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*, drift accounts for an estimated 1 percent of total cooling water losses from a cooling tower. Chemicals released in drift could have affected concrete surfaces and surface soils in unpaved areas. In paved areas, any chemicals deposited from drift would ultimately have been discharged to storm drains via surface water runoff.

2.0 Summary of Past Soil Characterization

Five historical surface and shallow soil samples (0 and 3 feet below ground surface [bgs]) were collected from four locations (PS-13, PS-14, PS-15, and PS-16) in AOC 5, as shown in Figure B7-1. Historical soil samples were analyzed for five constituents: total chromium, hexavalent chromium, copper, nickel, and zinc. One sample (PS-16) was also analyzed for iron, manganese, and sulfates. Laboratory analytical results for the historical soil samples are presented in Tables B7-2 and B7-3. Table B7-4 presents a statistical summary of soil analytical results for chemicals of potential concern (COPCs) that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one or more samples was greater than the interim screening value.

All historical data are considered Category 1 and were used as inputs to the five data quality objective decisions for AOC 5. As described in the main text of Appendix B, there is insufficient information to conduct a data gaps analysis for Decisions 3 and 4. Because the risk assessment will be conducted for the entire area within the fence line, the data gaps evaluation for Decision 2 was conducted for the entire area within the fence line as a whole. Decision 5 data gaps analysis was also conducted for the entire area within the fence line. The data gaps evaluation for Decision 2 through 5 is presented in the main text of this appendix, and additional sampling for these decisions, if necessary, are included in this sub-appendix.

All five constituents analyzed were detected in soil samples collected in AOC 5. Table B7-2 lists the five detected constituents. Iron, manganese, and sulfate were detected above laboratory reporting limits in the one sample (surface soil sample collected at PS-16) analyzed for these constituents. California human health screening levels (CHHSLs) for commercial use or United States Environmental Protection Agency Region 9 regional screening levels (RSLs) for soil have not been developed for sulfates. In addition, a Topock-specific background threshold value has not been developed for iron; however, the one detected concentration of iron was below the commercial screening level. Two of the remaining six constituents (manganese and nickel) were only detected at concentrations below their respective background threshold value (BTV). Four of these constituents (total chromium, hexavalent chromium, copper, and zinc) exceeded their respective backgrounds in at least one sample; however, all detected concentrations were below the respective CHHSLs for commercial use or RSLs for commercial use (collectively referred to as the commercial screening levels). The four constituents with concentrations above the BTVs are discussed below. In all cases, the lowest concentrations of detected constituents were found in the shallow soil sample.

3.0 AOC 5 Nature and Extent Data Gaps Evaluation

The following subsection discusses the nature and extent of detected COPCs detected above BTVs at AOC 5. As discussed in the main text of Appendix B, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Constituents that may require further evaluation are summarized in Section 3.5, and Section 4.0 of this sub-appendix provides the recommended sampling for this unit.

3.1 Total Chromium

Total chromium was detected in five of five soil samples collected at AOC 5. None of the detected concentrations of total chromium exceeded the commercial screening level (1,400 milligrams per kilogram [mg/kg]) (RSL), as shown in Tables B7-2 and B7-4 and Figure B7-1. Detected concentrations ranged from 8.4 mg/kg to 535 mg/kg. Concentrations in three of five samples exceeded the background concentration (39.8 mg/kg). The highest concentration was detected in a surface soil sample collected in the vicinity of the former chemical storage area at location PS-15; however, a concentration of 505 mg/kg was also detected at the northeast corner of the AOC at location PS-16. The total chromium concentration in the soil sample collected at 3 feet bgs at location PS-13 was well below background. The lateral extent of contamination has not been adequately delineated in the unpaved areas to the east, north, and west of the cooling tower and associated equipment, and the vertical extent of contamination has not been has not been defined.

3.2 Hexavalent Chromium

Hexavalent chromium was detected in four of five soil samples collected at AOC 5. It was not detected in the soil sample collected at 3 feet bgs. None of the detected concentrations of hexavalent chromium exceeded the commercial screening level (37 mg/kg) (CHHSL), as shown in Tables B7-2 and B7-4 and Figure B7-1. Three of the detected concentrations exceeded the background concentration (0.83 mg/kg). Detected concentrations ranged from 0.7 to 9.8 mg/kg. The lateral extent of contamination has not been adequately delineated in the unpaved areas to the east, north, and west of the cooling tower and associated equipment, and the vertical extent of contamination has not been has not been defined.

3.3 Copper

Copper was detected in five of five soil samples collected at AOC 5. None of the detected concentrations of copper exceeded the commercial screening level (38,000 mg/kg) (CHHSL), as shown in B7-2 and B7-4 and Figure B7-1. Three of the detected concentrations exceeded the background concentration (16.8 mg/kg). Detected concentrations ranged from 6.7 to 95.6 mg/kg. The lateral extent of contamination has not been fully delineated in the unpaved areas to the east, north, and west of the cooling tower and associated equipment, and the vertical extent of contamination has not been has not been defined.

3.4 Zinc

Zinc was detected in five of five soil samples collected at AOC 5. None of the detected concentrations of copper exceeded the commercial screening level (100,000 mg/kg)

(CHHSL), as shown in B7-2 and B7-4 and Figure B7-1. All five samples exceeded the background concentration (58 mg/kg). Detected concentrations ranged from 70.4 to 1,250 mg/kg. The lateral extent of contamination has not been fully delineated in the unpaved areas to the east, north, and west of the cooling tower and associated equipment, and the vertical extent of contamination has not been has not been defined.

3.5 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, a qualitative review of the historical data indicates that metals are present above background levels but are well below commercial screening levels in surface soil. No data have been collected for organic constituents. The number of samples and depths of samples collected to date are insufficient to adequately delineate the vertical and lateral extent of COPCs in this AOC.

4.0 AOC 5 Data Gaps and Proposed Sampling

Based on the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*, data gaps were identified for Decision 1 include:

- Data Gap #1 – Lateral and vertical extent of contamination in the unpaved areas to the north, east, and west of the cooling tower.
- Data Gap #2 – Lateral and vertical extent of contamination near previous samples PS-13, PS-15, and PS-16.
- Data Gap #3 – Assess former chemical storage shed.
- Data Gap #4 – Vertical extent of contamination (if any) underneath the cooling towers.

Data gaps for Decisions 2 through 5 are discussed in the main text of Appendix B and include the following:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes polycyclic aromatic hydrocarbons, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas and to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening

levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.1 AOC 5 Access Constraints

As discussed in Section 3.0 of the main text of Appendix B, there are substantial access constraints within the compressor station. AOC 5 is located in Area 9 (see Figure B-2). Eighty-two utility risers, including main gas, gas, cooling water, sulfuric acid, electrical, and plant air lines, seven vaults, a SCADA cabinet, and two anodes were identified in Area 9. Photographs 1 through 6 in sub-Appendix B25 show the accessibility constraints in AOC 5. The area beneath the cooling tower and portions of the area immediately adjacent to the cooling tower are considered inaccessible. Proposed sample locations and depths identified for AOC 5 reflect the identified access constraints. As described in the main text of Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

4.2 AOC 5 Proposed Sampling

Table B7-5 summarizes the proposed AOC 5 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B7-3. The figure also shows proposed sample locations for surrounding SWMUs and AOCs. The proposed AOC 5 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for risk management and soil remediation.

Samples will be collected at six locations: AOC 5-1 through AOC 5-6. Because of limited access, only hand tools can be used to collect samples in AOC 5. Therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. All samples will be analyzed for Title 22 metals, hexavalent chromium, and pH. Ten percent of all samples collected during the investigation will also be analyzed for the full suite of United States Environmental Protection Agency Contract Laboratory Program Target Analyte List/Target Compound List. In addition, soil samples collected for SWMU 11 will be used to assess this AOC.

To address the data needs associated with Decision 5, two samples will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The samples have been tentatively identified (see Table B7-5); the specific samples to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in the main text of Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

————. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Mittelhauser Corporation. 1986. *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station.* Revision 1. August.

————. 2000. Letter from Mel Wong/PG&E to Robert Senga/DTSC. "Additional Soil Sampling Results, PG&E Topock Compressor Station, Needles, California, USEPA ID No. CAT080011729." June 2.

Tables

TABLE B7-1
Conceptual Site Model – AOC 5 Cooling Tower A
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Potential historical liquids discharges (spills) and leaks (possible discharge to storm drain system and discharge offsite)	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/ enclosed space accumulation
				Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B7-2

Sample Results: Metals

Area of Concern 5 – Cooling Tower A Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)					
Commercial Screening Level [1]:				**37**	**1,400**	**38,000**	**16,000**	**100,000**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**0.83**	**39.8**	**16.8**	**27.3**	**58**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium Hexavalent**	**Chromium**	**Copper**	**Nickel**	**Zinc**	**Sulfate**
Category1									
PS-13	04/13/99	0	N	**9.8**	**88**	14.8	6.8	**1,250**	---
	04/13/99	3	N	ND (0.53)	8.4	6.7	3.6	**70.4**	---
PS-14	04/13/99	0	N	0.7	34.2	**31.3**	10.7	**82.3**	---
PS-15	04/13/99	0	N	**9.3**	**535**	**51.6**	14.4	**954**	---
PS-16	04/13/99	0	N	**3**	**505**	**95.6**	10.6	**685**	3,690

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

TABLE B7-3

Sample Results: Contract Laboratory Program Inorganics
Area of Concern 5 – Cooling Tower A Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)	
			Commercial Screening Level [1]:	**720,000**	**23,000**
			RWQCB Environmental Screening Level [2]:	**NE**	**NE**
			Background [3]:	**NE**	**402**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Iron**	**Manganese**
Category1					
PS-16	04/13/99	0	N	15,200	191

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

TABLE B7-4

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 5 – Cooling Tower A Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV) [1]		RWQCB Environmental Screening Levels (ESL) [2]		Commercial Screening Level (Com SL) [3]	
							# of Exceedences [4]	(BTV)	# of Exceedences [5]	(ESL)	# of Exceedences [5]	(Com SL)
Contract Laboratory Program Inorganics												
Iron	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	15,200	0	(NE)	0	(NE)	0	(720,000)
Manganese	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	191	0	(402)	0	(NE)	0	(23,000)
General Chemistry												
Sulfate	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	3,690	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Chromium, Hexavalent	mg/kg	4 / 5 (80%)	4 / 5 (80%)	0 / 0 (0%)	0 / 0 (0%)	9.8	3	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	5 / 5 (100%)	5 / 5 (100%)	0 / 0 (0%)	0 / 0 (0%)	535	3	(39.8)	0	(NE)	0	(1,400)
Copper	mg/kg	5 / 5 (100%)	5 / 5 (100%)	0 / 0 (0%)	0 / 0 (0%)	95.6	3	(16.8)	0	(NE)	0	(38,000)
Nickel	mg/kg	5 / 5 (100%)	5 / 5 (100%)	0 / 0 (0%)	0 / 0 (0%)	14.4	0	(27.3)	0	(NE)	0	(16,000)
Zinc	mg/kg	5 / 5 (100%)	5 / 5 (100%)	0 / 0 (0%)	0 / 0 (0%)	1,250	5	(58)	0	(NE)	0	(100,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B7-5
Proposed Sampling Plan – AOC 5 Cooling Tower A
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

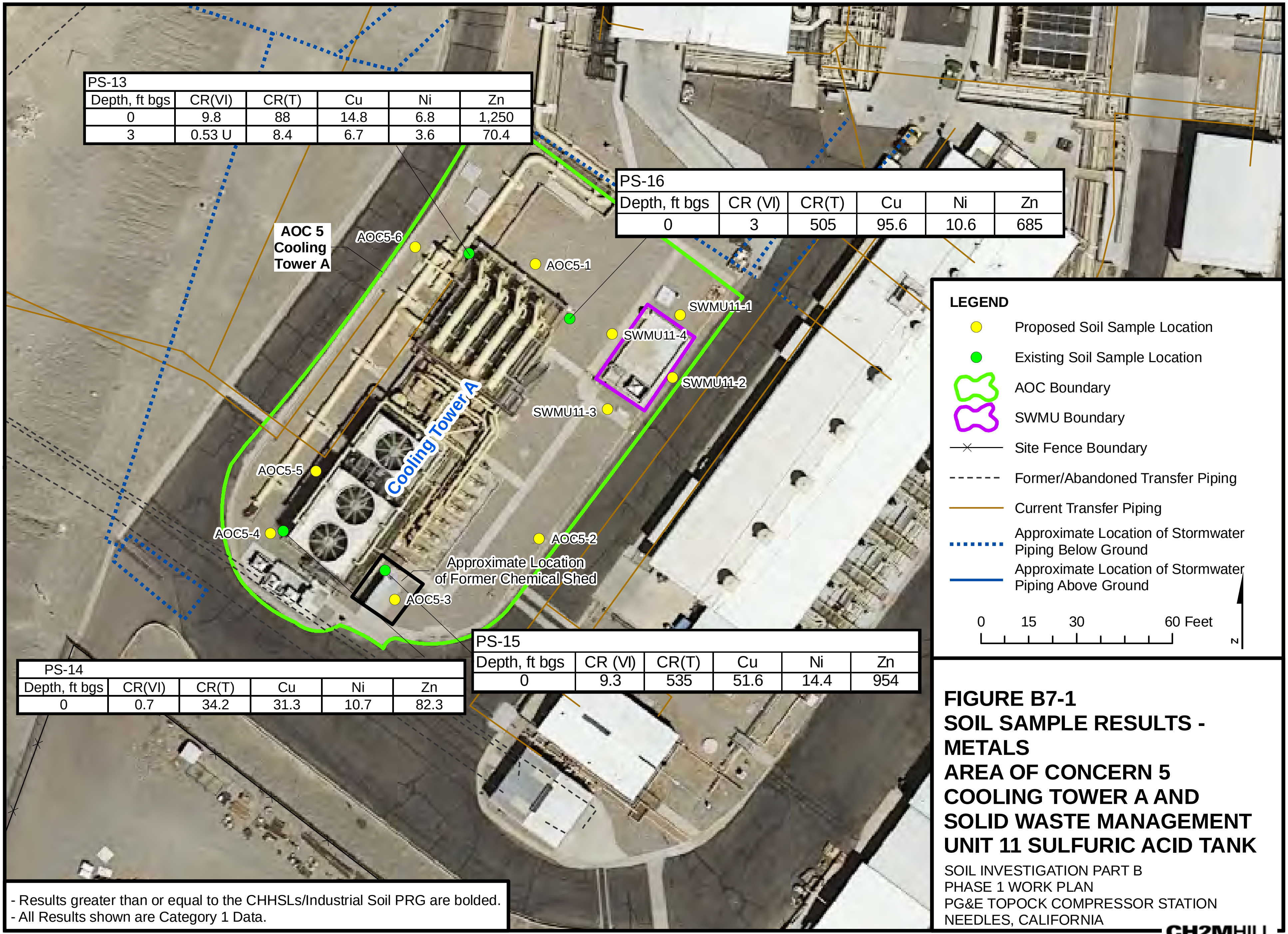
Location	Depths (feet)	Description/Rationale	Analytes
AOC 5-1	0-0.5 and 3, if feasible	To resolve Data Gap #2 - Lateral and vertical extent of contamination near previous samples PS-13 and PS-16	Title 22 metals, hexavalent chromium, and pH
AOC 5-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved areas to the north, east, and west of the cooling tower	Title 22 metals, hexavalent chromium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 5-3	0-0.5 and 3, if feasible	To resolve Data Gaps #2 and #3 - Lateral and vertical extent of contamination near previous samples PS-15 and assess former chemical storage shed	Title 22 metals, hexavalent chromium, and pH
AOC 5-4	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved areas to the north, east, and west of the cooling tower	Title 22 metals, hexavalent chromium, and pH
AOC 5-5	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved areas to the north, east, and west of the cooling tower	Title 22 metals, hexavalent chromium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 5-6	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved areas to the north, east, and west of the cooling tower	Title 22 metals, hexavalent chromium, and pH

Notes:

Ten percent of samples collected during the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

Samples collected for SWMU 11 will also be used to assess AOC 5.

Figures



PS-13

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	9.8	88	14.8	6.8	1,250
3	0.53 U	8.4	6.7	3.6	70.4

PS-16

Depth, ft bgs	CR (VI)	CR(T)	Cu	Ni	Zn
0	3	505	95.6	10.6	685

PS-15

Depth, ft bgs	CR (VI)	CR(T)	Cu	Ni	Zn
0	9.3	535	51.6	14.4	954

PS-14

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	0.7	34.2	31.3	10.7	82.3

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
🟩	AOC Boundary
▨	SWMU Boundary
—×—	Site Fence Boundary
- - - - -	Former/Abandoned Transfer Piping
——	Current Transfer Piping
········	Approximate Location of Stormwater Piping Below Ground
——	Approximate Location of Stormwater Piping Above Ground

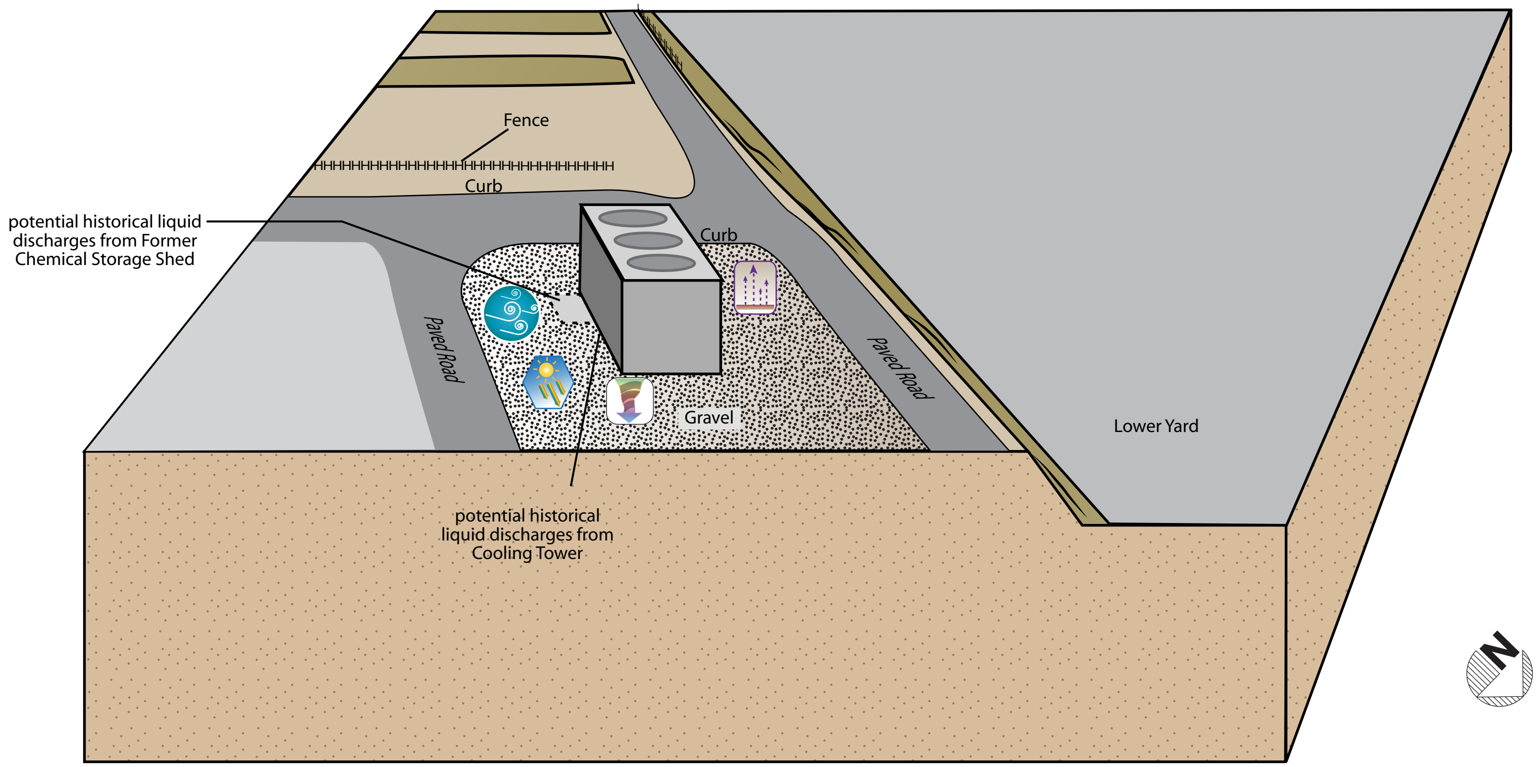
- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.
- All Results shown are Category 1 Data.

FIGURE B7-1
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 5 COOLING TOWER A AND SOLID WASTE MANAGEMENT UNIT 11 SULFURIC ACID TANK

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC5_Result_Metal



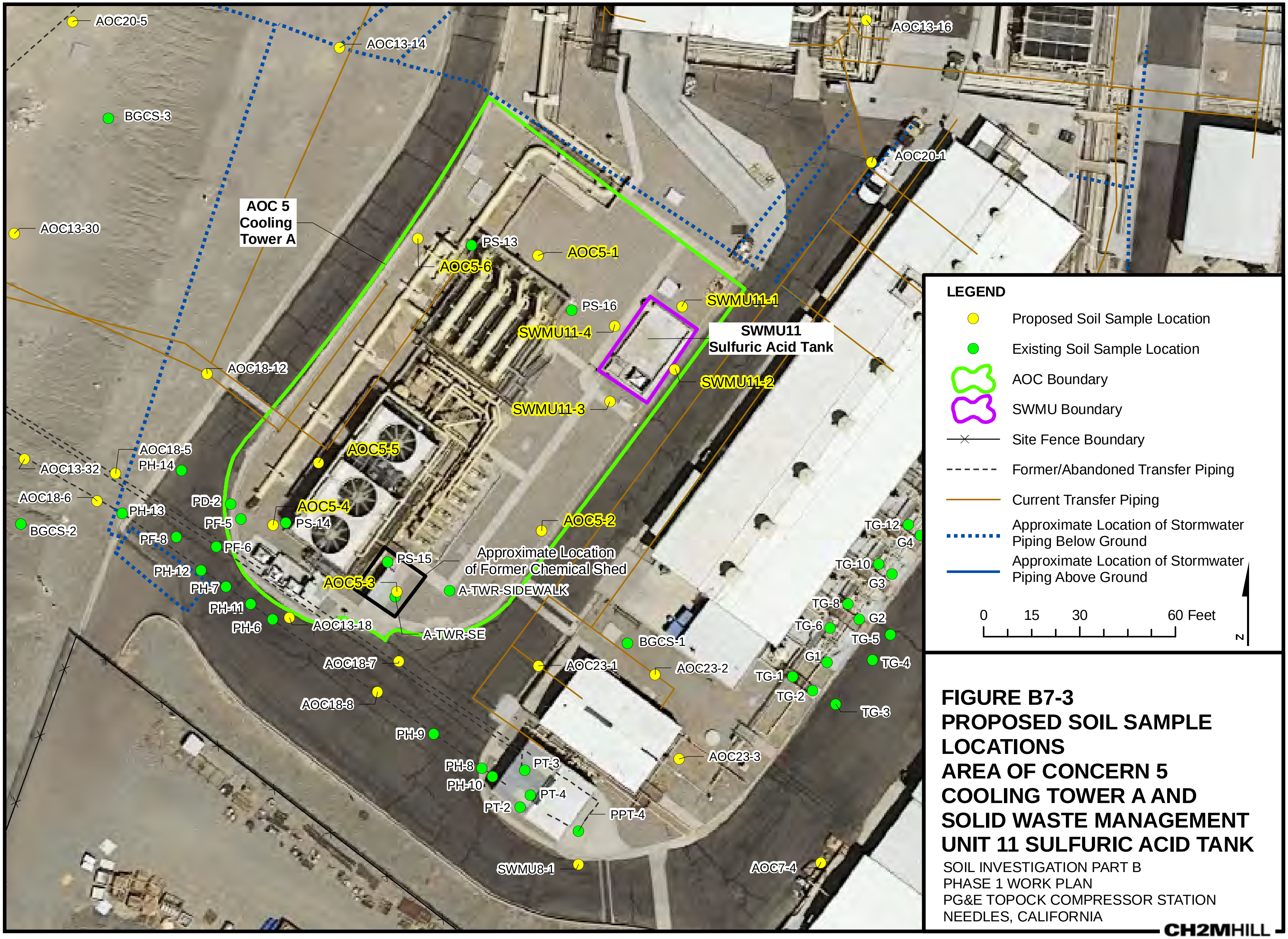
NOT TO SCALE

LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration

FIGURE B7-2
Conceptual Site Model for AOC5 –
Cooling Tower A
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California



LEGEND

● Proposed Soil Sample Location

● Existing Soil Sample Location

AOC Boundary

SWMU Boundary

Site Fence Boundary

Former/Abandoned Transfer Piping

Current Transfer Piping

Approximate Location of Stormwater Piping Below Ground

Approximate Location of Stormwater Piping Above Ground

FIGURE B7-3
PROPOSED SOIL SAMPLE LOCATIONS AREA OF CONCERN 5 COOLING TOWER A AND SOLID WASTE MANAGEMENT UNIT 11 SULFURIC ACID TANK

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC5_Proposed_sample_locs

Appendix B8
AOC 6 – Cooling Tower B
Investigation Program

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B8-3 Proposed Soil Sample Locations

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
CHHSL	California human health screening level
COPC	chemical of potential concern
mg/kg	milligrams per kilogram
RSL	regional screening level
SWMU	Solid Waste Management Unit

APPENDIX B8

AOC 6 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 6 includes the entire area surrounding Cooling Tower B, as shown in Figure B8-1. (All tables and figures appear at the end of this sub-appendix.) The new Cooling Tower B is in the same location as the original Cooling Tower B. The area encompasses the cooling tower, the location of the former chemical shed, the sulfuric acid tank (now addressed as part of Solid Waste Management Unit 11 (SWMU) 11, discussed further in sub-Appendix B6), and the current cooling water treatment chemical tanks. AOC 6 is largely unpaved (covered with gravel) but is bounded on all sides by pavement. A former employee stated that he had once observed cooling water from Cooling Tower B overflowing and discharging into the Northeast Ravine upstream of AOC 11 (Russell, 2006a).

Operations in this area consist of the storage, handling, and use of cooling water additives. Operations in this area began in 1954 with the construction of a two-cell cooling tower. From 1954 to 1985, chromium-based corrosion inhibitors were used to treat the cooling water. From 1985 to the present, non-hazardous, phosphate-based inhibitors, scale control agents, and biocides have been used. The closed-loop systems were converted to a molybdenum-based corrosion protection system at about the same time. Sulfuric acid has been used from 1954 to the present to control the pH of the cooling water. The major features located in this AOC are discussed below.

Original Cooling Tower B: The original Cooling Tower B was a coil shed tower constructed as a two-cell unit in 1954 to support the expansion of the compressor station. Cooling Tower B was subsequently expanded to a four-cell tower in 1958. The original tower was replaced with a new tower in 2002. The cooling tower is used to cool compressed natural gas and lubricating-oil cooling water. The original tower was located within a concrete water basin that held heated cooling water (i.e., a hotwell). The original hotwell basin still exists and is used as a foundation for the new tower, but the hotwell is no longer used for cooling water; the new tower operates as a closed system. Wastewater samples collected from the cooling towers contained total chromium and hexavalent chromium ranging from 2.6 to 7.8 and 0.62 to 6.0 milligrams per liter, respectively (Mittelhauser, 1986).

Former Chemical Shed: The former chemical shed was located approximately 15 feet east of Cooling Tower B. The shed was used to store the chromium-based cooling water additives used in the cooling tower from 1954 to 1985. The shed was demolished in the winter of 2001 in conjunction with the installation of the new cooling tower. Stained soil was observed beneath the shed following its removal. The stained soil was removed, generating five drums of material that were shipped offsite for disposal. The excavation was backfilled with clean soil. No confirmation samples were collected. As part of the new cooling tower construction, a reinforced concrete pad was built adjacent to the removal area, and a small portion of the area is covered with this pad.

Chemical Storage Tanks: There are currently three aboveground storage tanks located just east of the cooling tower that are used for the storage of cooling water treatment products. Two of the tanks are constructed of polyethylene; one is a stainless-steel tank; and all tanks have secondary containment.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 6 based on the above site history and background, as shown in Figure B8-2. Table B8-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 6. A detailed discussion of the migration pathways, exposure media, exposure routes, and human and ecological receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 6 are likely to be potential historical liquid discharges (spills) from the cooling tower hotwell (i.e., while the old cooling tower was in operation) and potential incidental spills of cooling system additives during storage and/or transfer of the additive chemicals. The quantity of liquid released from the hotwell is unknown; however, periodic overflows are known to have occurred. The quantity of chemicals released in the vicinity of the storage shed is also unknown; however, is expected to be relatively small, as any spills or incidental leaks would have been small. If a large release from the hotwell occurred, it could have resulted in cooling water reaching the storm drain system and being discharged outside the fence line, most likely to AOC 11. In addition, if large quantities of cooling water overflowed, they also could have migrated to the west to the station road and potentially down the station road to the lower yard. Potential releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D of this Work Plan. Downslope impacts to the east are addressed by the investigation being conducted for AOC 11, and potential impacts to the lower yard are being addressed in AOC 13.

Until 1985, cooling water blowdown containing hazardous constituents was discharged to the hazardous waste treatment system as part of routine operations. Potential leaks from the hazardous waste transference piping are addressed by the AOC 18 investigation program, and effects outside the fence line due to routine cooling water blowdown discharge are evaluated in AOC 1 and SWMU 1. Finally, while there is no information indicating that the concrete hotwell lacked integrity in the past, it is possible that small fractures are present and that small quantities of cooling water may have been released to shallow soil directly beneath the hotwell.

The primary source medium at AOC 6 is surface soil. Because the majority of the area around the cooling tower and former chemical shed is covered with gravel, liquids released in AOC 6 would have been released to surface soil and would have infiltrated shallow soil. Liquids released to shallow soils could have infiltrated to deeper soils. If present, organic constituents in surface soils could have been degraded by heat and light. Because the entire AOC 6 is covered with gravel or pavement, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway. Stained concrete has not been identified at this unit.

The normal operation of the cooling towers also included some loss of cooling water through evaporation and/or mist from the top of the tower; this phenomenon is known as drift. As discussed in the *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2007), drift accounts for an estimated 1 percent of total cooling water losses from a cooling tower. Chemicals released in drift could have affected concrete surfaces and surface soils in unpaved areas. In paved areas, any chemicals deposited from drift would ultimately have been discharged to storm drains via surface water runoff.

2.0 Summary of Past Soil Characterization

Thirteen historical surface and shallow soil samples (10 surficial samples from 0 feet below ground surface [bgs], one sample from 1 foot bgs, and two samples from 3 feet bgs) were collected from 10 locations (2 B-Tower, 3 B-Tower, B-Tower SE standpipe, and PS-1 through PS-7) in AOC 6, as shown in Figure B8-1. Historical soil samples were analyzed for five constituents: total chromium, hexavalent chromium, copper, nickel, and zinc. Laboratory analytical results for the historical soil samples are presented in Table B8-2. Table B8-3 presents a statistical summary of soil analytical results for chemical of potential concern (COPCs) that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one or more samples were greater than the interim screening value.

All historical data are considered Category 1 and were used as inputs to the five data quality objective decisions for AOC 6. As described in the main text of Appendix B, there is insufficient information to conduct a data gaps analysis for Decisions 3 and 4. Because the risk assessment will be conducted for the entire area within the fence line, the data gaps evaluation for Decision 2 was conducted for the entire area within the fence line as a whole. Decision 5 data gaps analysis was also conducted for the entire area within the fence line. The data gaps evaluation for Decision 2 through 5 is presented in the main text of Appendix B, and additional sampling for these decisions, if necessary, are included in this sub-appendix.

All five constituents analyzed were detected in soil samples collected in AOC 6. One constituent (nickel) was only detected at concentrations at or below its background concentration. The four remaining constituents detected at AOC 6 (chromium, hexavalent chromium, copper, and zinc) were detected at concentrations above the below their applicable commercial screening values (California human health screening levels [CHHSLs] for commercial use or United States Environmental Protection Agency Region 9 regional screening levels [RSLs] for commercial use).

Samples were collected around the perimeter of the cooling tower and associated equipment. Two locations were sampled in the area of the former chemical shed.

3.0 AOC 6 Nature and Extent Data Gaps Evaluation

The following subsection discusses the nature and extent of detected COPCs detected above interim screening levels at AOC 6. As discussed in the main text of Appendix B, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Constituents that may require further evaluation are summarized in Section 3.5, and Section 4.0 of this sub-appendix provides the recommended sampling for this unit.

3.1 Total Chromium

Total chromium was detected in 13 of 13 soil samples collected at AOC 6. None of the detected concentrations of total chromium exceeded the commercial screening level (1,400 milligrams per kilogram [mg/kg]) (RSL), as shown in Table B8-2 and Figure B8-1. Detected concentrations ranged from 4.9 mg/kg to 459 mg/kg. Concentrations in 12 of 13 samples exceeded the background concentration (39.8 mg/kg). The highest concentration was detected in the vicinity of the former chemical storage area; however, a concentration of 386 mg/kg was also detected on the west side of cooling tower at location PS-5. The total chromium concentration in the soil samples collected at 3 feet bgs was much lower than the surface soil sample from the same location. The lateral extent of contamination has not been adequately delineated in the unpaved areas to the east, west, and south of the cooling tower and associated equipment, and the vertical extent of contamination has not been has not been defined.

3.2 Hexavalent Chromium

Hexavalent chromium was detected in 8 of 13 soil samples collected at AOC 6. It was not detected in soil samples collected at 1 foot bgs. None of the detected concentrations of hexavalent chromium exceeded the commercial screening level (37 mg/kg) (CHHSL), as shown in Table B8-2 and Figure B8-1. All eight detected concentrations exceeded the background concentration (0.83 mg/kg). Detected concentrations ranged from 1.3 to 15.3 mg/kg (at PS-6 in the area of the former chemical storage shed). The lateral extent of contamination has not been adequately delineated in the unpaved areas to the west and south of the cooling tower and associated equipment, and the vertical extent of contamination has not been has not been defined.

3.3 Copper

Copper was detected in 13 of 13 soil samples collected at AOC 6. None of the detected concentrations of copper exceeded the commercial screening level (38,000 mg/kg) (CHHSL), as shown in Table B8-2 and Figure B8-1. Eleven of the detected concentrations exceeded the background concentration (16.8 mg/kg). Detected concentrations ranged from 9 to 211 mg/kg. The lateral extent of contamination has not been fully delineated in the unpaved areas to the east, west, and south of the cooling tower and associated equipment. While the near surface and shallow soil samples all contained lower concentrations of copper than the overlying surface soil samples, the vertical extent of contamination has not been has not been adequately defined.

3.4 Zinc

Zinc was detected in 13 of 13 soil samples collected at AOC 6. None of the detected concentrations of copper exceeded the commercial screening level (100,000 mg/kg) (CHHSL), as shown in Table B8-2 and Figure B8-1. Eleven of the detected concentrations exceeded the background concentration (58 mg/kg). Detected concentrations ranged from 31 to 1,130 mg/kg. The lateral extent of contamination has not been fully delineated in the unpaved areas to the east, west, and south of the cooling tower and associated equipment. While the near surface and shallow soil samples all contained lower concentrations of zinc than the overlying surface soil samples, the vertical extent of contamination has not been has not been adequately defined.

3.5 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review of the historical data indicates that metals are present above background levels but are well below commercial screening levels in surface soil. No data have been collected for organic constituents. The number of samples and depths of samples collected to date are insufficient to adequately delineate the vertical and lateral extent of COPCs in this AOC.

4.0 AOC 6 Data Gaps and Proposed Sampling

Based on the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*, data gaps were identified for Decision 1 including:

- Data Gap #1 - Lateral and vertical extent of contamination in the unpaved area to the north, east, west, and south of the cooling tower.
- Data Gap #2 - Lateral and vertical extent of contamination near existing sample locations PS-1 and PS-4.
- Data Gap #3 – Assess soil in vicinity of former chemical storage shed.
- Data Gap #4 - Vertical extent of contamination (if any) underneath the cooling tower.

Data gaps for Decisions 2 through 5 are discussed in the main text of Appendix B and include the following:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes polycyclic aromatic hydrocarbons, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas and to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.
- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data, and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.1 AOC 6 Access Constraints

As discussed in Section 3.0 of the main text of Appendix B, there are substantial access constraints within the compressor station. AOC 6 is located in Area 6 (see Figure B-2). Ninety-one utility risers, including main gas, cooling water, sulfuric acid, telecommunications, plant air, instrument air, water, and electrical lines were identified in Area 6. Photographs 7 through 11 in sub-Appendix B25 show the accessibility constraints in AOC 6. The area beneath the cooling tower and portions of the area immediately adjacent to the cooling tower are considered inaccessible. Proposed sample locations and depths identified for AOC 6 reflect the identified access constraints. As described in the main text of Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

4.2 AOC 6 Proposed Sampling

Table B8-4 summarizes the proposed AOC 6 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B8-3. The figure also shows proposed sample locations for surrounding SWMUs and AOCs. The proposed AOC 6 sample locations are Pacific Gas and Electric's initial assessment of accessible, candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for risk management and soil remediation.

Samples will be collected at six locations: AOC 6-1 through AOC 6-6. Because of limited access, only hand tools can be used to collect samples in AOC 6. Therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. All samples will be analyzed for Title 22 metals, hexavalent chromium, and pH. Ten percent of all samples collected during this investigation will also be analyzed for the full suite of the United States Environmental Protection Agency Contract Laboratory

Program Target Analyte List/Target Compound List. In addition, soil samples collected for SWMU 11 will be used to assess this AOC.

To address the data needs associated with Decision 5, two samples will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The samples have been tentatively identified (see Table B8-4); the specific samples to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in the main text of Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

——————. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Mittelhauser Corporation. 1986. *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station.* Revision 1. August.

Russell, Curt. 2006a. Personal Communication in "Final Field Notes Memorandum, May 8 to 9, 2006." May.

Tables

TABLE B8-1
Conceptual Site Model – AOC 6 Cooling Tower B
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	**Primary Source Media**	**Potential Release Mechanism**	**Secondary Source Media**	**Potential Secondary Release Mechanism**
Potential historical liquids discharges (spills) and leaks (possible discharge to storm drain system and discharge offsite)	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/ enclosed space accumulation
				Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B8-2

Sample Results: Metals

Area of Concern 6 – Cooling Tower B Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)				
Commercial Screening Level [1]:				**37**	**1,400**	**38,000**	**16,000**	**100,000**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**0.83**	**39.8**	**16.8**	**27.3**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium Hexavalent**	**Chromium**	**Copper**	**Nickel**	**Zinc**
Category1								
2 B-Tower	04/13/99	0	N	ND (0.5)	**78**	**41**	8.8	**120**
3 B-Tower	04/13/99	0	N	ND (0.5)	**150**	**110**	5.8	**170**
B-tower SE Stand pipe	04/13/99	0	N	ND (0.5)	**51**	9	4.3	31
PS-1	04/13/99	0	N	**3.7**	**115**	**92.3**	9	**336**
	04/13/99	1	N	**3.9**	**118**	**62.6**	9.3	**293**
PS-2	04/13/99	0	N	**3.1**	**72.4**	**40.1**	6.3	**94.6**
	04/13/99	3	N	ND (0.51)	4.9	**18.7**	3.2	31.7
PS-3	04/13/99	0	N	**3.3**	**350**	**59.8**	10.1	**465**
	04/13/99	3	N	**1.3**	**83.3**	14.5	4.2	**114**
PS-4	04/13/99	0	N	**1.5**	**264**	**70.2**	6.3	**394**
PS-5	04/13/99	0	N	**5.9**	**386**	**58**	7.7	**513**
PS-6	04/13/99	0	N	**15.3**	**459**	**211**	11.3	**1,130**
PS-7	04/13/99	0	N	ND (0.56)	**80.5**	**44**	14.5	**181**

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

TABLE B8-3

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 6 – Cooling Tower B Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV)[1] # of Exceedences[4]	Background Threshold Value (BTV)[1] (BTV)	RWQCB Environmental Screening Levels (ESL)[2] # of Exceedences[5]	RWQCB Environmental Screening Levels (ESL)[2] (ESL)	Commercial Screening Level (Com SL)[3] # of Exceedences[5]	Commercial Screening Level (Com SL)[3] (Com SL)
Metals												
Chromium, Hexavalent	mg/kg	8 / 13 (62%)	8 / 13 (62%)	0 / 0 (0%)	0 / 0 (0%)	15.3	8	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	13 / 13 (100%)	13 / 13 (100%)	0 / 0 (0%)	0 / 0 (0%)	459	12	(39.8)	0	(NE)	0	(1,400)
Copper	mg/kg	13 / 13 (100%)	13 / 13 (100%)	0 / 0 (0%)	0 / 0 (0%)	211	11	(16.8)	0	(NE)	0	(38,000)
Nickel	mg/kg	13 / 13 (100%)	13 / 13 (100%)	0 / 0 (0%)	0 / 0 (0%)	14.5	0	(27.3)	0	(NE)	0	(16,000)
Zinc	mg/kg	13 / 13 (100%)	13 / 13 (100%)	0 / 0 (0%)	0 / 0 (0%)	1,130	11	(58)	0	(NE)	0	(100,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B8-4
Proposed Sampling Plan – AOC 6 Cooling Tower B
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

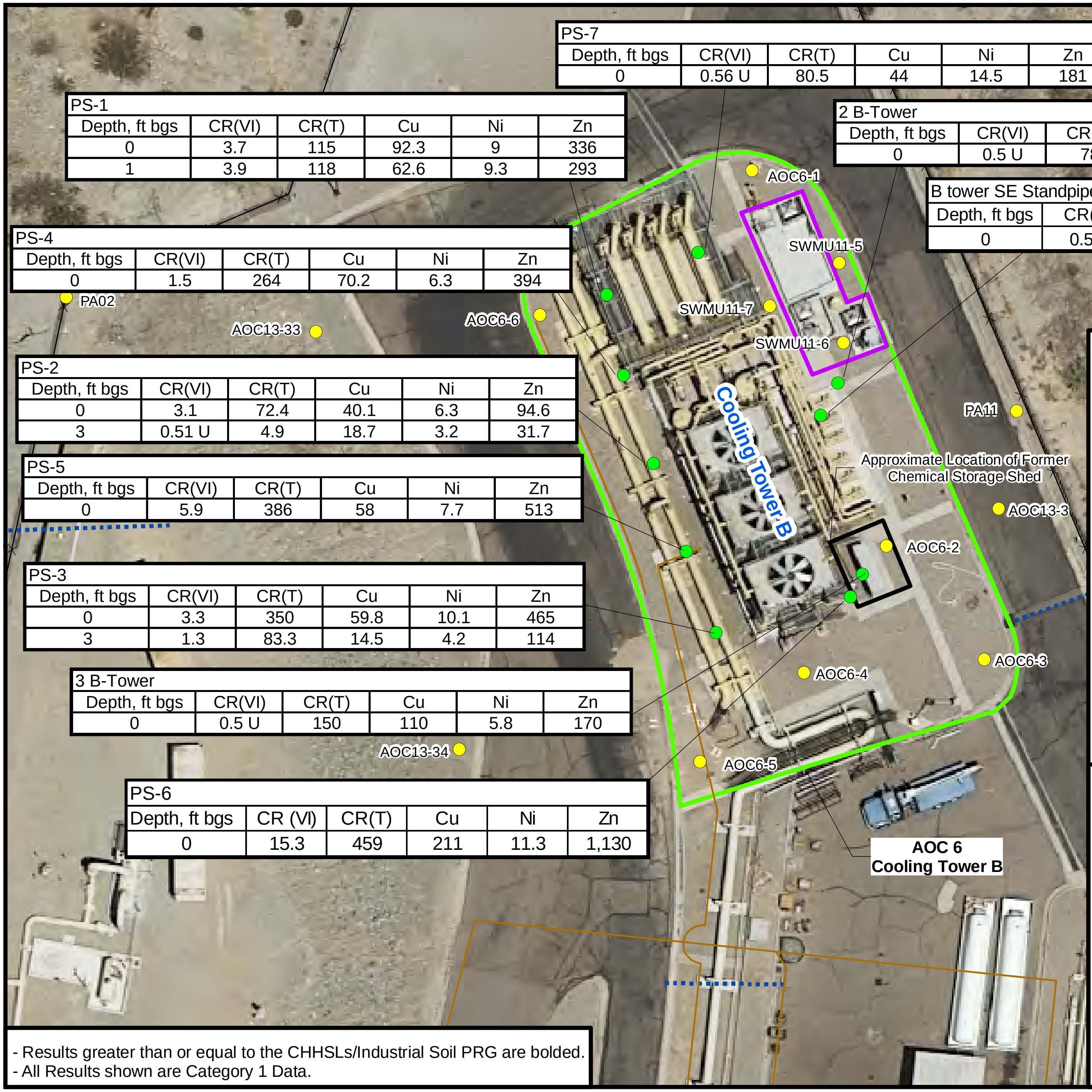
Location	**Depths (feet)**	**Description/Rationale**	**Analytes**
AOC 6-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved areas to the north, east, west and south of the cooling tower	Title 22 metals, hexavalent chromium, and pH
AOC 6-2	0-0.5 and 3, if feasible	To resolve Data Gaps #1 and #3 - Lateral and vertical extent of contamination in the unpaved and assess former chemical storage shed	Title 22 metals, hexavalent chromium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 6-3	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved area southeast of Cooling Tower B	Title 22 metals, hexavalent chromium, and pH
AOC 6-4	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved area south of Cooling Tower B	Title 22 metals, hexavalent chromium, and pH
AOC 6-5	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extent of contamination in the unpaved area southwest of Cooling Tower B	Title 22 metals, hexavalent chromium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 6-6	0-0.5 and 3, if feasible	To resolve Data Gap #2 - Lateral and vertical extent of contamination near existing sample locations PS-1 and PS-4	Title 22 metals, hexavalent chromium, and pH

Notes:

Ten percent of samples collected during the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

Samples collected for SWMU 11 will also be used to assess AOC 6.

Figures



PS-7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	0.56 U	80.5	44	14.5	181

PS-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	3.7	115	92.3	9	336
1	3.9	118	62.6	9.3	293

2 B-Tower

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	0.5 U	78	41	8.8	120

B tower SE Standpipe

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	0.5 U	51	9	4.3	31

PS-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	1.5	264	70.2	6.3	394

PS-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	3.1	72.4	40.1	6.3	94.6
3	0.51 U	4.9	18.7	3.2	31.7

PS-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	5.9	386	58	7.7	513

PS-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	3.3	350	59.8	10.1	465
3	1.3	83.3	14.5	4.2	114

3 B-Tower

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	0.5 U	150	110	5.8	170

PS-6

Depth, ft bgs	CR (VI)	CR(T)	Cu	Ni	Zn
0	15.3	459	211	11.3	1,130

- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.
- All Results shown are Category 1 Data.

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
🟩	AOC Boundary
▨	SWMU Boundary
—×—	Site Fence Boundary
—	Current Transfer Piping
·····	Approximate Location of Stormwater Piping Below Ground
—	Approximate Location of Stormwater Piping Above Ground

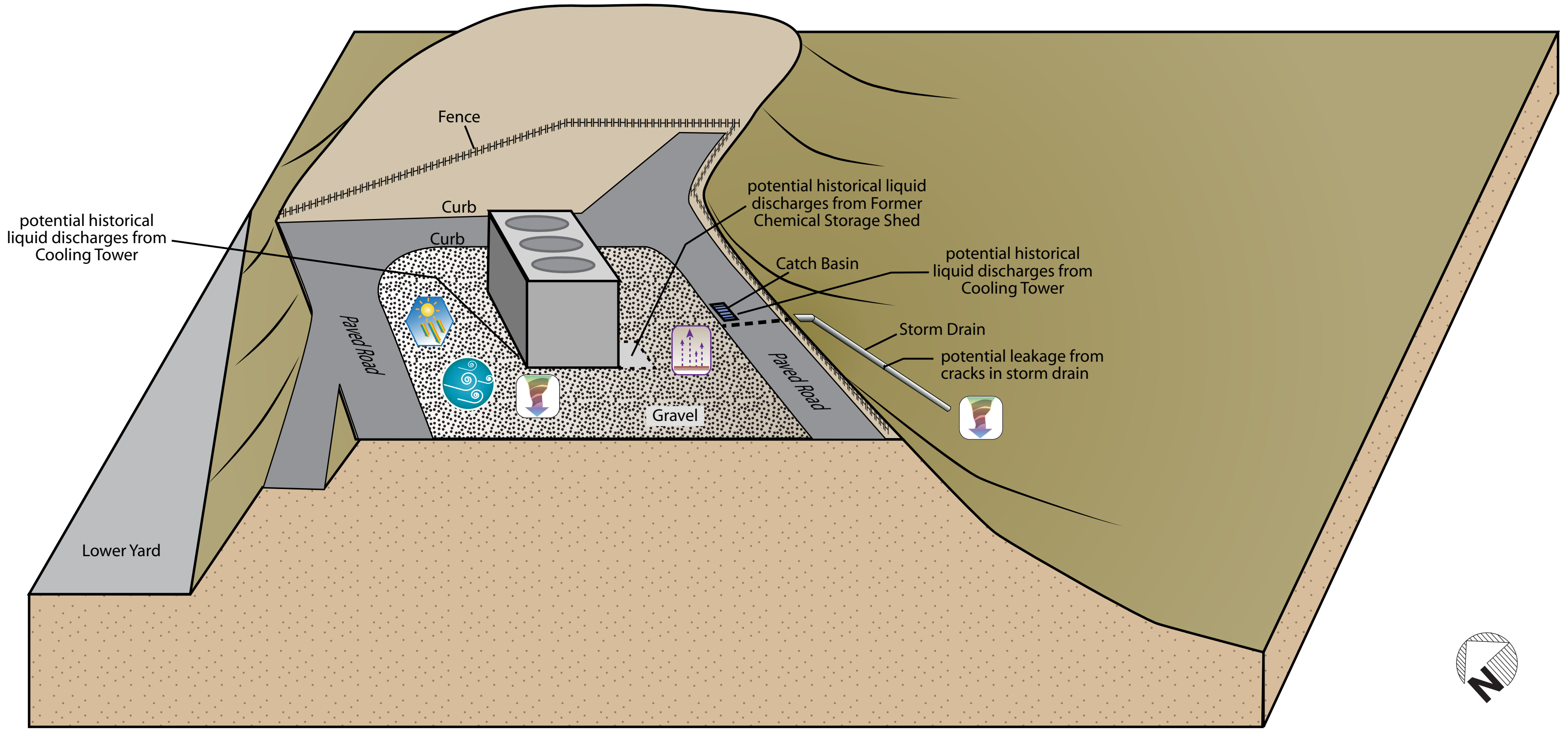
0 15 30 60 Feet

N

FIGURE B8-1
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 6 COOLING TOWER B AND SOLID WASTE MANAGEMENT UNIT 11 SULFURIC ACID TANK

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC6_Result_Metal



NOT TO SCALE

LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration

FIGURE B8-2
Conceptual Site Model for AOC6 –
Cooling Tower B
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL®

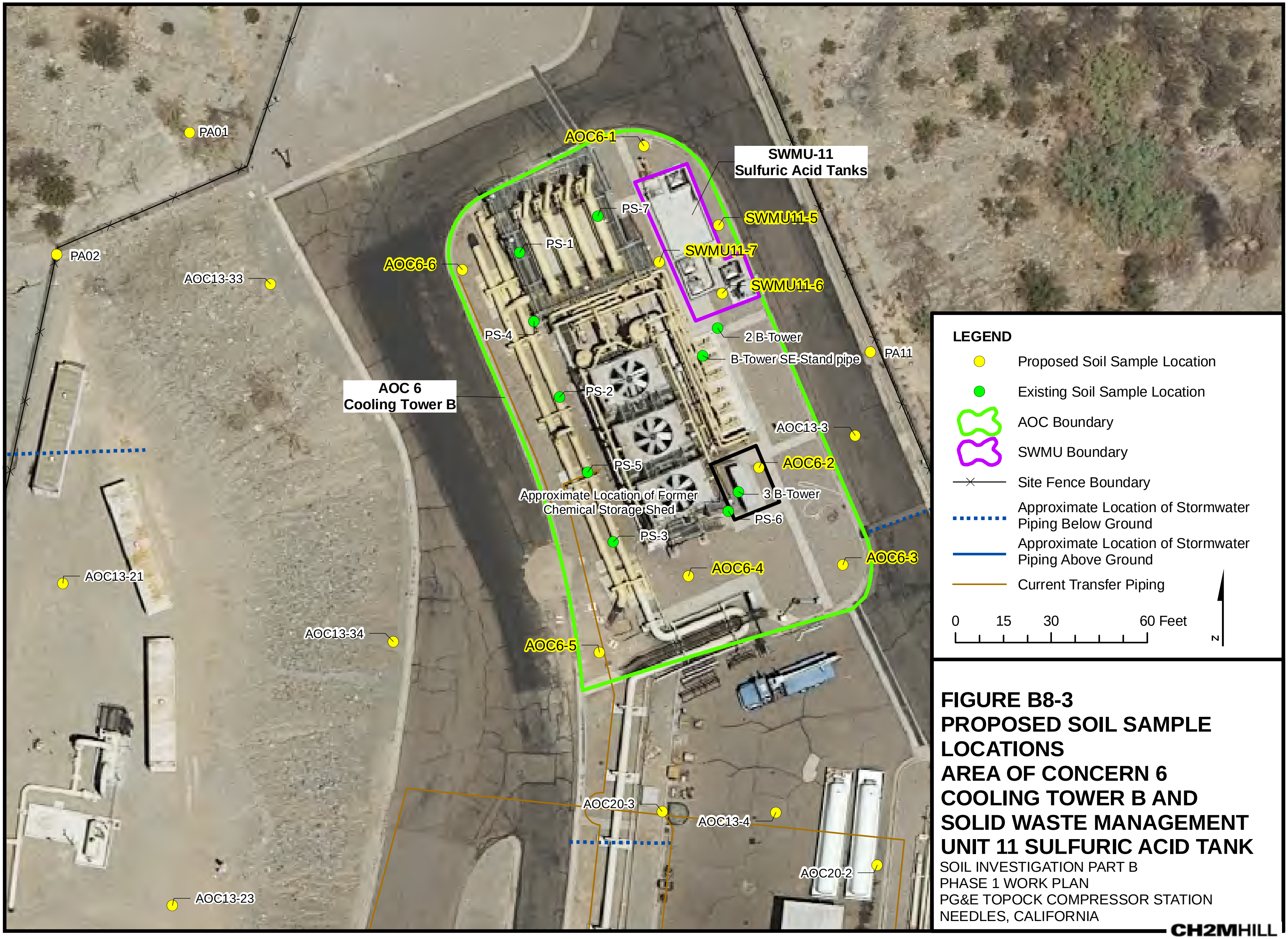


FIGURE B8-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 6
COOLING TOWER B AND
SOLID WASTE MANAGEMENT
UNIT 11 SULFURIC ACID TANK

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix B9
AOC 7 – Hazardous Materials Storage Area Investigation Program

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  1.2 Conceptual Site Model B9-1

2.0 Summary of Past Soil Characterization B9-2

3.0 Area of Concern 7 Data Gaps and Proposed Sampling B9-2
  3.1 AOC 7 Data Gaps B9-2
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B9-2 Proposed Sampling Program

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B9-1 Proposed Soil Sample Locations
B9-2 Conceptual Site Model – AOC 7 Hazardous Materials Storage Area

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B9

AOC 7 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 7 consists of a hazardous materials storage building and loading dock located in the southeastern portion of the facility, inside the facility fence line, as shown in Figure B9-1. (All tables and figures appear at the end of this sub-appendix.) At the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2010), the footprint of this AOC was expanded to include the adjacent building (the Carpenter Shop). The building currently used as the Carpenter Shop is visible in the 1955 aerial photographs of the facility provided in the *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2007). Materials appear to be stored immediately in front of this building in areas that were then unpaved (these areas are now paved). Currently, pavement is present to the west of AOC 7. Other maintenance shops are present to the north. The area to the north was historically open and unpaved. The area to east (behind AOC 7 and the facility fence line) is unpaved and may have been periodically used for storage. To the south, AOC 7 abuts a retaining wall; the soil surface is approximately 0.5 foot higher than the floor of the hazardous materials storage area.

A portion of the hazardous materials storage area is concrete-lined and is equipped with secondary containment walls. It serves as the storage area for hazardous wastes generated at the facility (e.g., oily rags, used oil filters, etc.). The hazardous materials storage area has been used for the collection and storage of hazardous materials since at least the early to mid 1980s (Riddle, 2004). The area is also used to store chemical products used at the compressor station (e.g., lubricants, parts-cleaning compounds, and small quantities of solvents). The largest typical container size is a 55-gallon drum. This area has apparently always been used for chemical storage (Riddle, 2004), although the types of chemicals stored are unknown. A roof was installed over the storage area during in the 1980s (Russell, 2006). Review of aerial photographs suggests that this area was open and unpaved until at least the mid-1950s.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 7 based on the above site history and background, as shown in Figure B9-2. Table B9-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 7. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2010).

The primary sources of contamination at AOC 7 are likely to be incidental spills of hazardous materials and/or waste during storage and/or transfer of the materials. The specific compounds released, if any, are unknown. The potential quantity of any chemicals released in AOC 7 are also unknown; however, is expected to be relatively small because the containers stored in this area are 55 gallons in capacity or smaller. Due to small quantity of materials that would have been released at any one time, it is not expected that the material would have migrated to any nearby storm drains; however, this potential migration pathway is included for completeness. Releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D to the main report.

The primary source media at AOC 7 are pavement and surface soil. The majority of the area around AOC 7 is asphalt-paved or covered by concrete foundations; however, unpaved soils are present immediately to the east of this unit. Liquids released in AOC 7 would either have been released to pavement or to surface soil. From surface soils, materials could have infiltrated to shallow soil and subsurface soil. Some materials could potentially also have penetrated the asphalt paving. The concrete foundations in this area are quite thick, and it is unlikely that any materials migrated through the concrete. If any materials did penetrate either asphalt or concrete and reach surface soil, they could also have migrated into shallow soil. In the paved area, movement of contaminants with rainwater (i.e., infiltration) is not considered an existing pathway and any liquids released are unlikely to have migrated to subsurface soils. If present, organic constituents in surface soil or on pavement could have been degraded by heat and light. Runoff of contaminated surface soil in rainwater is a potential migration pathway from the eastern side of this AOC.

2.0 Summary of Past Soil Characterization

This AOC has not been previously sampled.

3.0 Area of Concern 7 Data Gaps and Proposed Sampling

3.1 AOC 7 Data Gaps

Based on the site conceptual model and Part B DQOs, the following data gap was identified for Decision 1, as follows:

1. Data Gap #1 – Lateral and vertical extent of contamination in the unpaved area to the east of this AOC and the asphalt paved area to the west of the AOC.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include the following:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemical of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.
- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 7 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 7 is located in Area 16 on the Topock Compressor Station Accessibility Map (Figure B-2). Thirty-six utility risers, consisting of various water and electrical lines are present in this area. Photographs 12 and 13 in sub-Appendix B25 show the accessibility constraints in the AOC 7 and AOC 8 area. Sample locations and depths identified for AOC 7 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils depth of 1 foot below ground surface (bgs) or less.

3.3 AOC 7 Proposed Sampling

Table B9-2 summarizes the proposed AOC 7 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B9-1. The figure also shows proposed sample locations for surrounding Solid Waste Management Units and AOCs. The proposed AOC 7 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figure is provided to facilitate planning for additional sampling that may be needed to address data gaps, meet agency requirements, and define the need for soil remediation, if any.

The precise chemicals and hazardous wastes historically stored at this unit are unknown; however, it is likely that they were similar to the types of chemicals stored today (new and spent lubricants and other maintenance materials). Based on interviews with station personnel, weed and insect control is conducted by a contractor, so these materials are not stored onsite. Chemicals used in the cooling towers were stored in the chemical storage sheds by the cooling towers, and are currently stored in tanks located near the cooling towers. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Samples from this area will be analyzed for Title 22 metals, hexavalent chromium, total petroleum hydrocarbons (TPH), SVOCs including PAHs, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and pH. Sampling for AOC 8 will also be used to assess AOC 7 since this unit is immediately adjacent. Ten percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List suite, as required by the United States Department of the Interior.

Samples will be collected at five locations: AOC 7-1 through AOC 7-5. Because of limited access and numerous subsurface utilities, only hand tools can be used to collect samples in AOC 7; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Where the area of sampling is covered with concrete or asphalt, the surface sampling interval will begin at the bottom of the concrete/asphalt or gravel sub-base. In most cases, this first interval will be from 0.5 to 1 foot below the pavement.

To address the data needs associated with Decision 5, one of the samples will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B9-2); the specific sample to be analyzed for these parameters will be confirmed in the field.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

California Department of Toxic Substance Control. Topock Compressor Station, DTSC GSU Comments on "RCRA Facility Investigation/Remedial Investigation, Soil Investigation Work Plan Part B, PG&E Topock Compressor Station Needles, California". March.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*. August 10.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Riddle, Glen. 2004. Personal communication between Rick Sturm/CH2M HILL and Glen Riddle/District Superintendent, Topock Compressor Station. September 15.

Russell, Curt. 2006. Personal Communication in "Final Field Notes Memorandum, May 8 to 9, 2006." May.

Tables

TABLE B91-1
Conceptual Site Model, AOC 7 – Hazardous Materials Storage Area
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental spills from Hazardous Material Storage Building	Surface Soil and Pavement	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part A Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B9-2
Proposed Sampling Plan
AOC 7 – Hazardous Materials Storage Area
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 7-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 Lateral and vertical extent of contamination to the east of this AOC.	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 7-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 Lateral and vertical extent of contamination to the east of this AOC.	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH
AOC 7-3	0-0.5 and 3, if feasible	To resolve Data Gap #1 Lateral and vertical extent of contamination to the west of this AOC.	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH
AOC 7-4	0-0.5 and 3, if feasible	To resolve Data Gap #1 Lateral and vertical extent of contamination to the west of this AOC.	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH
AOC 7-5	0-0.5 and 3, if feasible	To resolve Data Gap #1 Lateral and vertical extent of contamination to the east of the AOC.	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH

Notes:

Ten percent of samples collected during the investigation will be analyzed for Target Analyte List/Target Compound List constituents.VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures

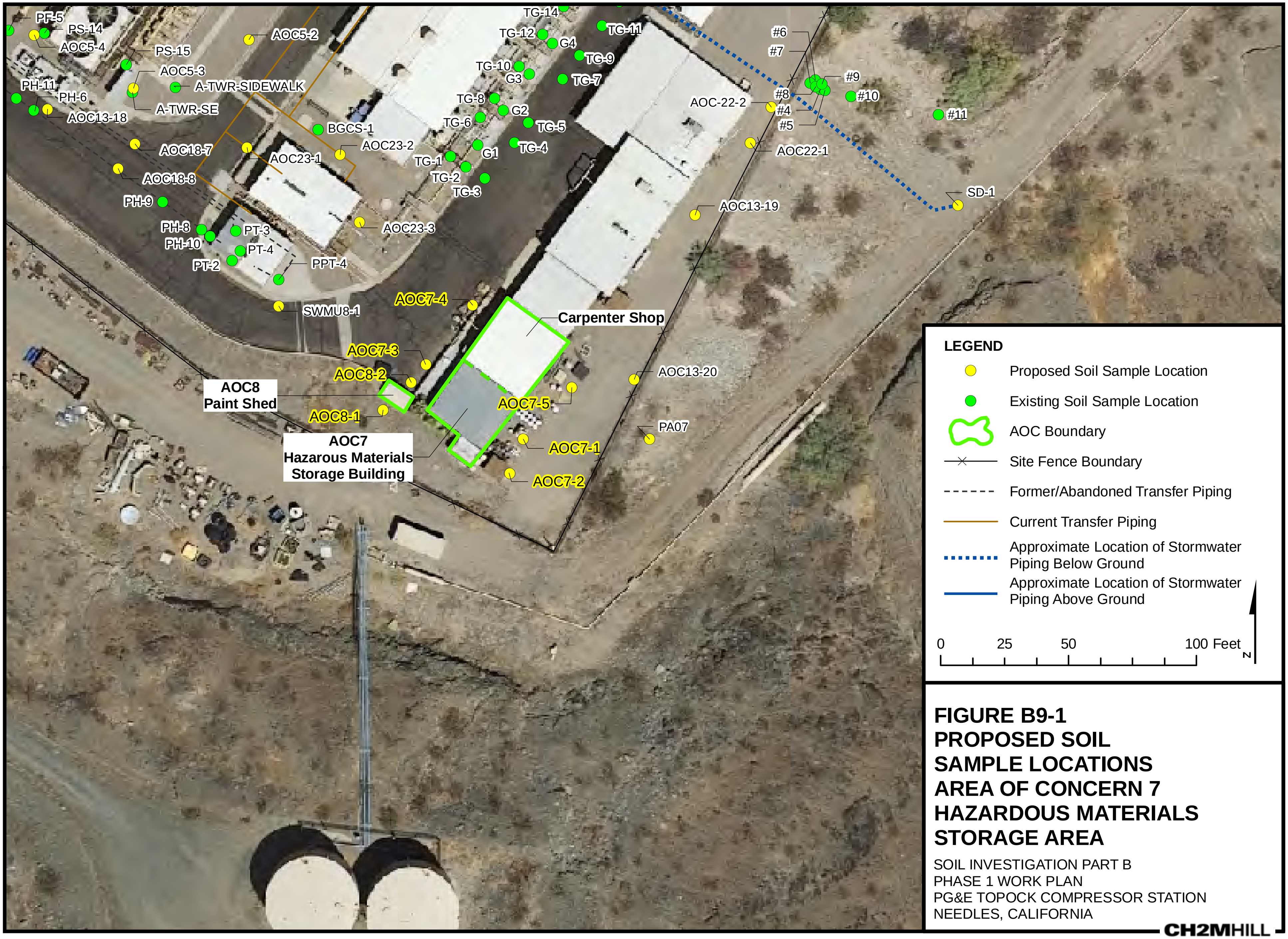
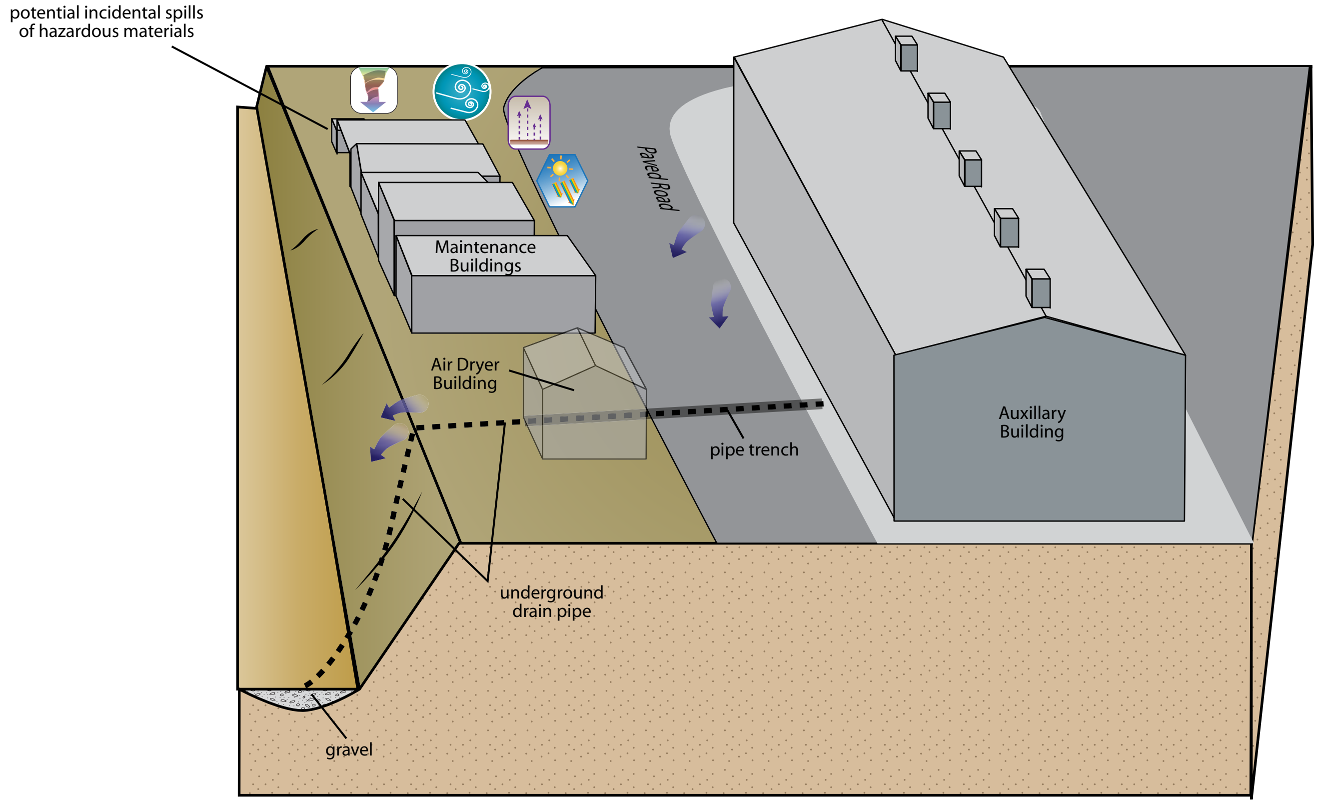


FIGURE B9-1
PROPOSED SOIL SAMPLE LOCATIONS AREA OF CONCERN 7 HAZARDOUS MATERIALS STORAGE AREA

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC7_Proposed_sample_locs



NOT TO SCALE

LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration
- ➜ Infrequent Surface Water Runoff

FIGURE B9-2
Conceptual Site Model for AOC7–
Hazardous Material Storage Area
PG&E Topock Compressor Station
Needles, California

Appendix B10
AOC 8 – Paint Locker Investigation Program

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3.0 AOC 8 Data Gaps and Proposed Sampling **B10-2**
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B10-1 Proposed Soil Sample Locations
B10-2 Conceptual Site Model – AOC 8 Paint Storage Locker Area

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
DQO	data quality objective
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B10

AOC 8 Investigation Program

1.0 Introduction and Background

1.1 Background

A small storage locker used for paint storage is located in the southeastern portion of the facility, shown in Figure B10-1. (All tables and figures appear at the end of this sub-appendix.) The paint locker measures about 5 feet wide by 5 feet long and is set back into a niche constructed into the southern retaining wall in this portion of the compressor station. It is constructed of steel and is located on pavement. The area in front of the paint locker is also paved, and a small retaining wall is present on the sides and behind the paint locker because the ground surface around the locker rises approximately 2 to 3 feet. The locker has tight-fitting doors and was designed for fire-safe storage of flammable materials. Sub-Appendix B25 presents photos of Area of Concern (AOC) 8. AOC 7, the Hazardous Materials Storage Area, is located immediately to the east of AOC 8.

Large-scale painting activities at the compressor station are handled by subcontractors (Riddle, 2004). Therefore, only small quantities of paint and thinners used for minor touch-up work are stored in this shed. Paint is stored in both spray cans and in 1- to 5-gallon cans. Non-chlorinated paint thinners are also stored in 1-gallon cans. Approximately 100 gallons of paint and thinners can be stored in this shed, but the quantity is typically far less than 100-gallons. No evidence of any release is present in or around the shed.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 8 based on the above site history and background, as shown in Figure B10-2. Table B10-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 8. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

If contamination is found at AOC 8, the likely source would be incidental spills of paints and paint thinners (solvents) to pavement. There is no information indicating that any spills have occurred, and the maximum quantity likely to be released at any one time would be small (i.e., 5 gallons or less of paint; 1 gallon or less of thinners). Due to small quantity of materials that would have been released at any one time, it is highly unlikely that material would have migrated to any nearby storm drains; however, this potential migration pathway is included for completeness. Releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D of the main report.

The primary source medium at AOC 8 is pavement. Because the majority of the area around the paint locker is asphalt-paved, liquids released in AOC 8 would have been released to pavement and potentially from there to surface soil. If any materials did penetrate the pavement and reach surface soil, they could also have migrated into shallow soil. Because the area is paved, movement of contaminants with rainwater (i.e., infiltration) is not considered an existing pathway, and any liquids released are unlikely to have migrated to deeper soils. If present, organic constituents in pavement could have been degraded by heat and light. Because the entire AOC likely to have been affected by spills is covered with pavement, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway.

2.0 Summary of Past Soil Characterization

This AOC has not been previously sampled.

3.0 AOC 8 Data Gaps and Proposed Sampling

3.1 AOC 8 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gap was identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination north and northwest of the paint locker.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemical of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 8 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 8 is located in Area 16 on the Topock Compressor Station Accessibility Map (Figure B-2). Thirty-six utility risers, consisting of various water and electrical lines are present in this area. Photograph 14 in sub-Appendix B25 show the accessibility constraints in AOC 8. Sample locations and depths identified for AOC 8 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot below ground surface (bgs) or less.

3.3 AOC 8 Proposed Sampling

Table B10-2 summarizes the proposed AOC 8 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B10-1. The proposed AOC 8 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figure is provided to facilitate planning for additional sampling that may be needed to address data gaps, meet agency requirements, and define the need for soil remediation, if any.

It is likely that paints contained within the locker have consisted of oil-based and water-based paints. Thinners are believed to have consisted of non-chlorinated thinners. Based on this information, COPCs for soil associated with AOC 8 consist of volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Samples from this area will be analyzed for Title 22 metals, TPH, and VOCs. Sampling for AOC 7 will also be used to assess AOC 8 since this unit is immediately adjacent. Ten percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List suite, as required by the United States Department of the Interior.

Samples will be collected at two locations: AOC 8-1 and AOC 8-2. Because of limited access and numerous subsurface utilities, only hand tools can be used to collect samples in AOC 8; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Where the area of sampling is covered with concrete or asphalt, the surface sampling interval will begin at the bottom of the concrete/ asphalt or gravel sub-base. In most cases, this first interval will be from 0.5 to 1 foot below the pavement.

To address the data needs associated with Decision 5, one of the samples will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B10-2); the specific sample to be analyzed for these parameters will be confirmed in the field.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil*. July 1.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*. August 10.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Riddle, Glen. 2004. Personal communication between Rick Sturm/CH2M HILL and Glen Riddle/District Superintendent, Topock Compressor Station. September 15.

Tables

TABLE B10-1
Conceptual Site Model, AOC 8 – Paint Storage Locker Area
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental spills from Paint Locker	Pavement	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Surface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B10-2
Proposed Sampling Plan
AOC 8 – Paint Storage Locker Area
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

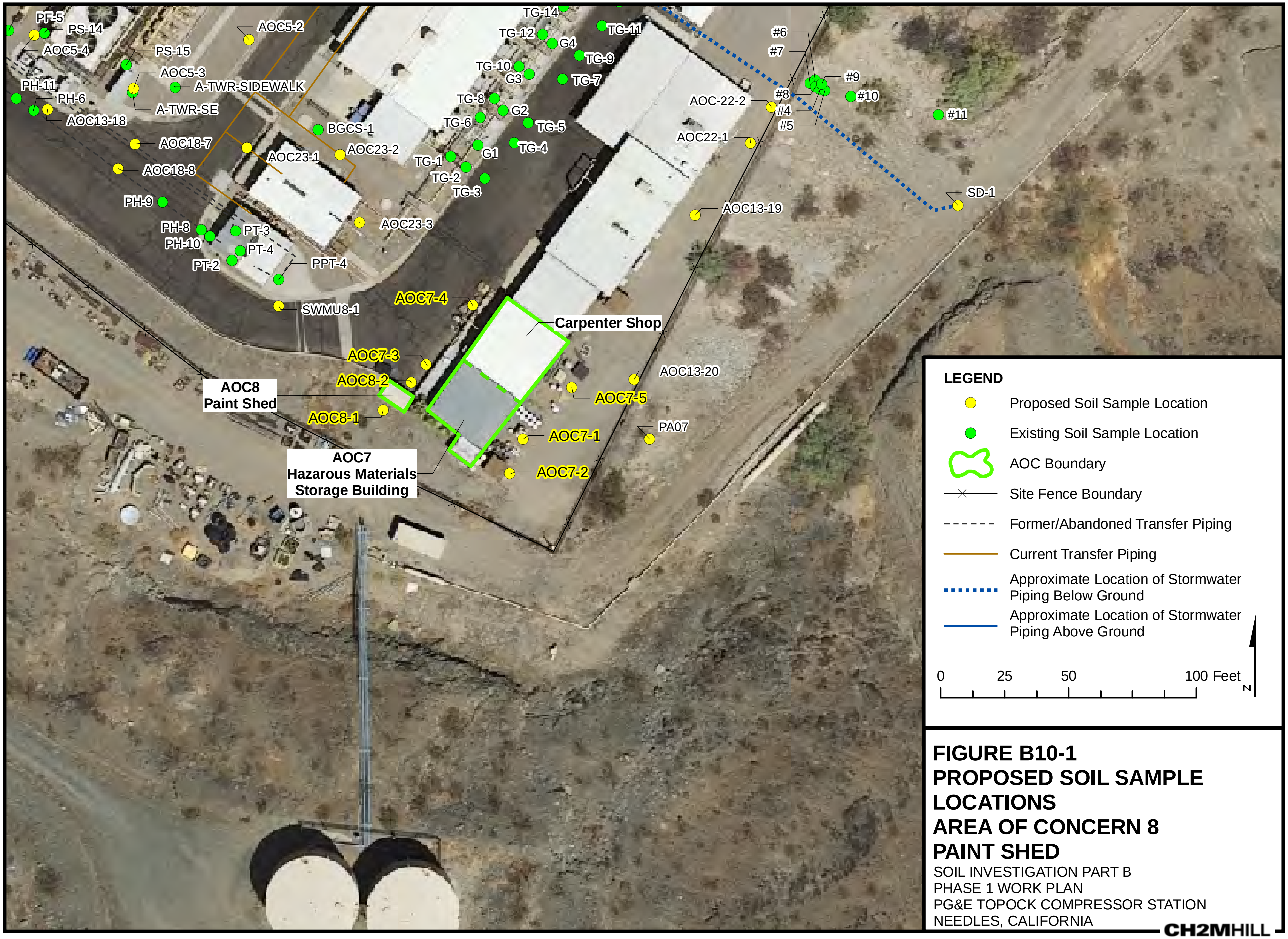
Location	**Depths (feet)**	**Description/Rationale**	**Analytes**
AOC 8-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 Lateral and vertical extent of contamination to the southwest of this AOC.	Title 22 metals, VOCs and TPH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 8-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 Lateral and vertical extent of contamination to the northeast of this AOC.	Title 22 metals, VOCs and TPH

Notes:

Ten percent of samples collected during the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
🟩	AOC Boundary
—×—	Site Fence Boundary
- - - -	Former/Abandoned Transfer Piping
——	Current Transfer Piping
······	Approximate Location of Stormwater Piping Below Ground
——	Approximate Location of Stormwater Piping Above Ground

FIGURE B10-1
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 8
PAINT SHED

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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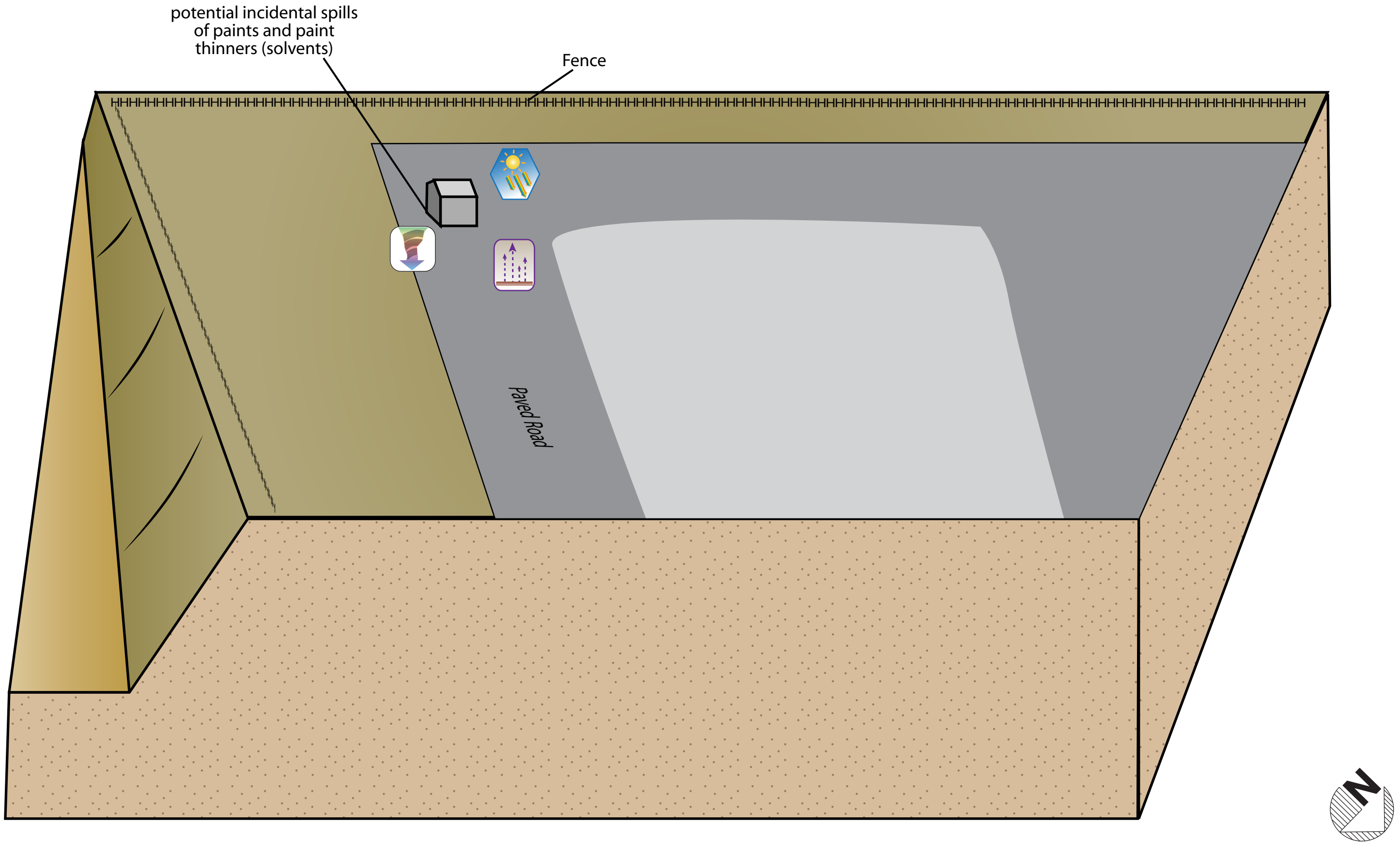

NOT TO SCALE

LEGEND

Potential Release Mechanisms

Infiltration

Volatilization

Degradation by Heat/Light

FIGURE B10-2
Conceptual Site Model for AOC8–
Paint Locker
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL.

Appendix B11
AOC 13 – Unpaved Areas within the Compressor Station Investigation Program

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B11-2 Soil Sample Results Metals AOC 13 – Unpaved Areas within the Compressor Station – Upper Yard
B11-3 Soil Sample Results Total Petroleum Hydrocarbons and Benzo(a)pyrene Equivalent AOC 13 – Unpaved Areas within the Compressor Station – Lower Yard
B11-4 Soil Sample Results Total Petroleum Hydrocarbons AOC 13 – Unpaved Areas within the Compressor Station – Upper Yard
B11-5 Proposed Soil Sample Locations

Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ESL	environmental screening level
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B11

AOC 13 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 13 consists of current and formerly unpaved areas within the fence line of the compressor station. These areas may have been impacted incidentally as a result of facility activities. In addition, former employees have reported, and existing documentation suggests, that pipeline liquids and/or waste oil were sprayed on station roads for dust control (PG&E, 1980; Russell, 2006). Some dark staining is visible in the May 1955 aerial photographs (CH2M HILL, 2007). In addition, incidental staining is visible in the lower yard in construction photographs taken in the early 1950s. Currently, the unpaved areas are located in various strips and patches among buildings and structures on this active facility. The majority of the unpaved areas within the fence line lie within the lower yard on the west side of the facility, shown in Figure B11-1. (All tables and figures appear at the end of this sub-appendix.) Formerly unpaved areas that are now paved or covered by buildings include much of the upper yard, including most of the area east of the main station buildings (i.e., east of the Compressor and Auxiliary Buildings). Ecology and Environment, Inc. identified numerous subareas within AOC 13; however, given that stormwater runoff is likely to have traversed various areas, pipeline liquids could have been sprayed in various areas, and potential spills of cooling water could have occurred in various areas, AOC 13 will be addressed as one unit across the entire station.

Eight spills that have occurred at the Topock facility are associated with AOC 13. Confirmation sample results from these spills are included in Tables B11-1 through B11-7. All spill sample results contain the word 'spill' and the date of the spill in the location column of the associated tables. Detailed information regarding each of these spills is presented in the *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2007).

1.2 Conceptual Site Model

Table B11-8 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 13. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 13 are likely to be historical incidental spills of lubricants and pipeline liquids, cooling water, and wastewater. The quantity of liquid released to unpaved areas of the compressor station is unknown; however, overflows from some of the equipment on the station are known to have occurred in past. While spills that occurred in recent years have been cleaned up; no information is available regarding the cleanups of any historical spills.

The primary source medium at AOC 13 is surface soil. Because areas comprising AOC 13 either are or historically were unpaved, liquids released in AOC 13 would have been released to surface soil and would have infiltrated shallow soil. Liquids released to shallow soils could have infiltrated to deeper soils. If present, organic constituents in surface soils could have been degraded by heat and light. During high rainfall events, chemicals contained in currently unpaved portions of AOC 13 could also reach the storm drain system and/or runoff in sheet flow. Releases to areas outside the fence line via the storm drain system are addressed by the storm drain investigation program described in Appendix D of the main report.

2.0 Summary of Past Soil Characterization

AOC 13 comprises a large area, and multiple investigations have occurred within the unit. Investigations include samples designed to help establish background concentrations (Mittelhauser, 1986),[1] spill cleanup confirmation samples, sampling to evaluate potential petroleum releases from the former oil bath filters, and samples collected during the installation of various utility trenches. Some past sampling has been within the unpaved areas adjacent to the industrial buildings and equipment where the greatest potential for contamination exists; however, the majority of these data are considered data quality Category 3. One hundred fifty-five historical soil samples, ranging in depth from 0 to 13 feet below ground surface (bgs), were collected from 124 locations in AOC 13, as shown in Figures B11-1 through B11-4.. Historical soil samples were analyzed for Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs); benzene, toluene, etheylbenzene, and xylene (BTEX); polycyclic aromatic hydrocarbons (PAHs); polychlorinated biphenyls (PCBs); total petroleum hydrocarbons (TPH); total recoverable petroleum hydrocarbons; oil and grease; chloride; fluoride; sulfate; and pH.

Forty-nine constituents, including one calculated quantity (benzo(a)pyrene equivalents), were detected in AOC 13. The detected constituents included:

- Twenty-one metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, iron, lead, manganese, total mercury, dissolved mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc)
- Fluoride
- Chloride
- Sulfates
- Fourteen PAHs (acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene,

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[1] Because these samples were collected within the fence line of the compressor station, they were removed from the background data set used for the Part A and B soil investigations.

dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and benzo(a)pyrene equivalent)

- Five VOCs (acetone, chloroform, methylene chloride, toluene, and total xylenes)Six TPH-range compounds (TPH-gasoline, TPH-diesel, TPH-motor-oil, total recoverable hydrocarbons, oil and grease, and heavy oil [>C_{34}])
- Benzo(a)pyrene equivalents

Laboratory analytical results for the historical soil samples are presented in Tables B11-1 through B11-7. Table B11-9 presents a statistical summary of soil analytical results for chemicals of potential concern (COPCs) that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value.

Historical data Category 1 and 2 data were used as inputs to Decision 1; only Category 1 data were used as inputs for Decision 2. As described in Appendix B, there is insufficient information to conduct a data gaps analysis for Decisions 3 and 4. Because the risk assessment will be conducted for the entire area within the fence line, the data gaps evaluation for Decision 2 was conducted for the entire area within the fence line as a whole. Decision 5 data gaps analysis was also conducted for the entire area within the fence line. The data gaps evaluation for Decision 2 through 5 is presented in the main text of this sub-appendix, and additional sampling for these decisions, if necessary, are included in this sub-appendix. Section 3.0 presents the Decision 1 data gaps evaluation for AOC 13.

Eleven metals (beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, selenium, and zinc) were detected at concentrations exceeding their respective background threshold values (BTV). Lead was the only metal detected at a concentration that exceeded the respective California human health screening level for commercial use or United States Environmental Protection Agency Region 9 regional screening levels for commercial use (collectively referred to as the commercial screening levels). With the exception of lead, all metals data are Category 1 or 2.

Benzo(a)pyrene exceeded its commercial screening level of 130 micrograms per kilogram (µg/kg) in one sample (210 µg/kg); consequently, benzo(a)pyrene equivalents also exceeded the screening level in two samples. All PAH data are Category 1. Finally, three TPH compounds (TPH-gasoline, TPH-diesel, and TPH-motor-oil) were detected at concentrations exceeding their respective California Regional Water Quality Control Board environmental screening level (ESLs). These TPH data include Category 1 through 3 data.

Some of the data collected for other units at the compressor station are also pertinent to AOC 13, including data from Solid Waste Management Unit (SWMU) 5 (EDB-4, EDB-5, WDB-4, and WDB-5 samples; Table B2-1),[2] Unit 4.3 through Unit 4.5 (all five samples; Table B24-1), AOC 16 (two samples; Table B13-2), and AOC 18 (all samples; Table B15-2).

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[2] Although the data associated with SWMUs 6 and 9 were also collected from unpaved areas, they were collected at depth (approximately 7 feet bgs and 18.5 feet bgs, respectively) and are thus not representative of the general conditions associated with AOC 13. Impacts to AOC 13 would have been associated with releases to the surface of the compressor station. The samples associated with these two SWMUs evaluated concentrations associated with releases at depth.

3.0 AOC 13 Nature and Extent Data Gaps Evaluation

The following subsection discusses the nature and extent of detected COPCs and chemicals of potential ecological concern detected above interim screening levels at AOC 13. As discussed in Appendix B, multiple factors were considered to assess whether the nature and extent of a specific constituent has been adequately delineated. Constituents that may require further evaluation are summarized in Section 3.16, and Section 4.0 of this sub-appendix provides the recommended sampling for this unit.

3.1 Beryllium

Beryllium was detected in one of 24 Category 1 samples and eight of 25 Category 2 samples. Detected concentrations of beryllium in soil ranged from 0.5 to 1 milligrams per kilograms (mg/kg), as shown in Table B11-1. The concentrations of beryllium in three samples were above the BTV (0.672 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with beryllium data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of beryllium concentrations exceeding the screening level have not been defined.

3.2 Cadmium

Cadmium was detected in four of 24 Category 1 samples and 10 of 25 Category 2 samples. Detected concentrations of cadmium in soil ranged from 0.5 to 14 mg/kg, as shown in Table B11-1. The concentrations of cadmium in two samples were above the BTV (1.1 mg/kg).

While the total number of samples with cadmium data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of cadmium concentrations exceeding the screening level have not been defined.

3.3 Hexavalent Chromium

Hexavalent chromium was detected in 11 of 35 Category 1 samples and 0 of 17 Category 2 samples. Detected concentrations of hexavalent chromium in soil ranged from 0.48 to 12.2 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of hexavalent chromium in seven samples were above the BTV (0.83 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with hexavalent chromium data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of hexavalent chromium concentrations exceeding the screening level have not been defined.

3.4 Total Chromium

Total chromium was detected in 35 of 35 Category 1 samples and 24 of 25 Category 2 samples. Detected concentrations of total chromium in soil ranged from 3.1 to 743 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of total chromium in nine samples were above the BTV (39.8 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with total chromium data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of total chromium concentrations exceeding the screening level have not been defined.

3.5 Cobalt

Cobalt was detected in 20 of 24 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of cobalt in soil ranged from 1.2 to 18 mg/kg, as shown in Table B11-1. The concentrations of cobalt in three samples were above the BTV (12.7 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with cobalt data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of cobalt concentrations exceeding the screening level have not been defined.

3.6 Copper

Copper was detected in 35 of 35 Category 1 samples and 10 of 25 Category 2 samples. Detected concentrations of copper in soil ranged from 1.7 to 760 mg/kg, as shown in Table B11-1and Figures B11-1 and B11-2. The concentrations of copper in 25 samples were above the BTV (16.8 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with copper data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of copper concentrations exceeding the screening level have not been defined.

3.7 Lead

Lead was detected in 24 of 24 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of lead in soil ranged from 2.2 to 330 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of lead in 17 Category 1 and 2 samples combined were above the BTV (8.39 mg/kg); one sample was detected at a concentration above the commercial screening level (320 mg/kg).

While the total number of samples with lead data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of lead concentrations exceeding the screening level have not been defined.

3.8 Mercury

Mercury was detected in two of 24 Category 1 samples and 42 of 42 Category 2 samples. Detected concentrations of mercury in soil ranged from 0.008 to 3.4 mg/kg, as shown in Table B11-1. No BTV is available for mercury; however, the concentrations of mercury were below the commercial screening levels.

While the total number of samples with mercury data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of mercury concentrations exceeding the screening level have not been defined.

3.9 Molybdenum

Molybdenum was detected in seven of 24 Category 1 samples and nine of 25 Category 2 samples. Detected concentrations of molybdenum in soil ranged from 0.6 to 16 mg/kg, as shown in Table B11-1. The concentrations of molybdenum in 13 samples were above the BTV (1.37 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with molybdenum data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of molybdenum concentrations exceeding the screening level have not been defined.

3.10 Nickel

Nickel was detected in 35 of 35 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of nickel in soil ranged from 2.1 to 56 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of nickel in five samples were above the BTV (27.3 mg/kg), but all concentrations were below the commercial screening levels.

While the total number of samples with nickel data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of nickel concentrations exceeding the screening level have not been defined.

3.11 Selenium

Selenium was detected in 6 of 24 Category 1 samples and 9 of 25 Category 2 samples. Detected concentrations of zinc in soil ranged from 0.5 to 3 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of selenium in four samples were above the BTV (1.47 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with zinc data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of zinc concentrations exceeding the screening level have not been defined.

3.12 Zinc

Zinc was detected in 35 of 35 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of zinc in soil ranged from 3.4 to 315 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of zinc in 22 samples were above the BTV (58 mg/kg), but all concentrations were below commercial screening levels.

While the total number of samples with zinc data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of zinc concentrations exceeding the screening level have not been defined.

3.13 Benzo(a)pyrene

Benzo(a)pyrene was detected in six of 24 Category 1 samples. Detected concentrations of benzo(a)pyrene in soil ranged from 28 to 210 µg/kg, and detected concentrations of benzo(a)pyrene equivalents in soil ranged from 5.0 to 320 µg/kg, as shown in Table B11-3 and Figure B11-3. The concentration of benzo(a)pyrene in one surface soil sample collected at PGE-LT8 was above the commercial California human health screening level (130 µg/kg).

The concentration of calculated benzo(a)pyrene equivalents in two surface soil samples (Grab1 and PGE-LT8) was above the commercial California human health screening level (130 µg/kg).

The total number of samples with PAH data is relatively limited. The lateral and vertical extent of benzo(a)pyrene and benzo(a)pyrene equivalents concentrations exceeding the screening levels have not been defined.

3.14 TPH-diesel

TPH-diesel was detected in seven of 24 Category 1 samples and 0 of 12 Category 2 samples. Detected concentrations of TPH-diesel in soil ranged from 13 to 120 mg/kg, as shown in Table B11-4 and Figures B11-3 and B11-4. None of the concentrations of TPH-diesel were above the ESL (540 mg/kg).

While the total number of samples with TPH-diesel data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of TPH-diesel concentrations exceeding the screening level have not been defined.

3.15 TPH-motor-oil and Heavier Hydrocarbons

TPH-motor oil was detected in 12 of 24 Category 1 samples and 11 of 12 Category 2 samples. Detected concentrations of TPH-motor-oil in soil ranged from 14 to 240,000 mg/kg, as shown in Table B11-4 and Figures B11-3 and B11-4. The concentrations of TPH-motor-oil in 10 samples were above the ESL (1,800 mg/kg).

While the total number of samples with TPH-motor-oil data is extensive, the distribution of sample points is relatively localized. The lateral and vertical extents of TPH-motor-oil concentrations exceeding the screening level have not been defined.

Oil and grease by United States Environmental Protection Agency Method 418.1 was also analyzed for 18 Category 2 samples. However, there are no screening levels for oil and grease.

3.16 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review of the historical data indicates that the lateral and vertical extents of the 10 metals discussed above, benzo(a)pyrene, and TPH (gasoline, diesel, and motor oil) have not been defined. In addition, PCB data are limited, and the majority of the samples collected have high detection limits. Although there are no known current exposure pathways for the formerly unpaved areas that are now covered by buildings and pavement, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) has requested that these areas also be investigated as part of the current sampling program.

4.0 AOC 13 Data Gaps and Proposed Sampling

4.1 AOC 13 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gaps were identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of COPCs.
2. Data Gap #2 – Potential impacts associated with surface soil discoloration in historical aerial photographs.
3. Data Gap #3 – Potential impacts from potential burn area near AOC 17.

DTSC has also requested that soil at select locations around the perimeter of the compressor station be characterized to assess if COPCs may have migrated offsite. Appendix C describes the Perimeter Area monitoring program. Perimeter sample locations were identified during the October 18, 2007 agency site reconnaissance walk. Perimeter samples were located based on visual observations of potential impacts on slopes around the station and also in areas where surface or storm water discharged.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of PAHs in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.
- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.2 AOC 13 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. Portions of AOC 13 are located in most areas of the compressor station (Figure B-2), and access constraints are present throughout most of these areas. Photographs 15 and 16 sub-Appendix B25 show the accessibility constraints in AOC 13. Sample locations and depths identified for AOC 13 reflect the identified access constraints and will be modified. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

4.3 AOC 13 Proposed Sampling

Table B11-10 summarizes the proposed AOC 13 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B11-5. The proposed sample locations for all SWMUs, AOCs, and units within the fence line, Perimeter Area, Storm Drain Investigation, and Part A Phase 2 Investigation have also been included on the figure. The proposed AOC 13 sample locations are Pacific Gas and Electric Company’s initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Soil samples will be collected at the locations shown on Figure B11-5 and are summarized on Table B11-10. Sampling will be in both the currently paved (formerly unpaved) and currently unpaved areas. Sample locations were initially identified using an approximate grid spacing of 100 feet. Samples locations were added or adjusted to address specific concerns identified in the unpaved areas of the compressor, including historical staining identified in photographs, and the potential burn area. Samples were located to ensure adequate coverage of the paved and unpaved areas.

Samples will be collected at 34 locations (AOC 13-1 through AOC 13-34), including two former Perimeter Area sample locations actually located on the slope between the upper and lower yards (former samples AOC13-39 and AOC13-40) that were added and integrated into the overall AOC 13 sampling program. Because of limited access, numerous subsurface utilities and pipelines, and proximity to operational structures, only hand tools can be used to collect samples in AOC 13. Therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Where the area of sampling is covered with concrete or asphalt, the surface sampling interval will begin 6 inches below the bottom of the concrete/asphalt or gravel sub-base. All samples will be analyzed for Title 22 metals, hexavalent chromium, TPH, VOCs, SVOCs, including PAHs, PCBs, and asbestos. Dioxin and furan analysis will be added to proposed sample location near the potential burn area (AOC13-17). As required by United States Department of the Interior, 10 percent of all samples collected during this investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite. In addition, data from various other AOCs, including AOCs 17, 18, 20, 21, 22, and 24 will be used to assess AOC 13.

To address the data needs associated with Decision 5, two samples will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The samples have been tentatively identified (see Table B11-10); the specific samples to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

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Tables

TABLE B11-1

Sample Results: Metals

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																	
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic [4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium, Hexavalent**	**Chromium, total**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
Category1																					
Grab1	05/13/08	1	N	3.4	4.2	160	ND (0.1)	0.23	**5.68**	**190**	2.5	**760**	**39**	ND (0.1)	**2.8**	5.9	ND (1)	ND (0.26)	ND (1)	13	**170**
	05/13/08	3	N	ND (0.41)	4.1	62	ND (0.1)	ND (0.1)	ND (0.408)	4.5	1.4	4.1	2.6	ND (0.1)	**2.1**	2	**3**	ND (0.25)	ND (1)	7.2	4.6
	05/14/08	5.5	N	ND (0.41)	4.5	85 J	ND (0.1)	ND (0.1)	ND (0.412)	3.1	2.4	1.7	2.4	ND (0.1)	1.3	2.2	**2.5**	ND (0.26)	ND (1)	7.9	3.4
	05/14/08	5.5	FD	ND (0.41)	4.4	67 J	ND (0.1)	ND (0.1)	ND (0.411)	3.1	2	1.5	2.2	ND (0.1)	1.1	2.1	**2.9**	ND (0.26)	ND (1)	7.3	3.4
Grab2	05/13/08	1	N	0.77	4.4	89	ND (0.1)	0.29	**10.6**	**44**	4.1	**21**	**330**	0.19	**1.9**	8.3	ND (1)	ND (0.25)	ND (1)	18	53
	05/13/08	3	N	ND (0.41)	3.9	53	ND (0.1)	ND (0.1)	ND (0.41)	3.9	1.2	1.7	2.3	ND (0.1)	0.6	1.8	**2.6**	ND (0.26)	ND (1)	8.4	4.3
	05/13/08	4 - 4.5	N	ND (0.82)	4.8	81	ND (0.1)	ND (0.1)	0.54	8.3	1.4	4	5.6	ND (0.1)	0.81	2.4	**2.3**	ND (0.26)	ND (1)	9.7	8.8
PGE-LT5	03/08/07	0.5	N	ND (6.1J)	2.6	72	ND (0.51)	ND (0.51)	ND (0.2)	9.1	ND (5.1)	9.7	3.2	ND (0.1)	ND (4.1)	7.3	ND (0.51)	ND (1)	ND (1)	19	18
	03/08/07	3	N	ND (6.2)	3	180	ND (0.51)	ND (0.51)	ND (0.21)	22	8.1	**20**	2.4	ND (0.1)	ND (4.1)	14	ND (0.51)	ND (1)	1.2	44	42
PGE-LT6	03/08/07	0.5	N	ND (6.1)	2.8	190	ND (0.51)	ND (0.51)	ND (0.2)	29	7.9	**30**	4.3	ND (0.1)	ND (4.1)	18	ND (0.51)	ND (1)	ND (1)	46	46
	03/08/07	3	N	ND (6.2)	3.6	190	ND (0.52)	ND (0.52)	ND (0.21)	25	7.4	**37**	4.9	ND (0.1)	ND (4.1)	17	ND (0.52)	ND (1)	ND (1)	42	46
PGE-LT7	03/08/07	0.5	N	ND (6.1)	5.4	180	0.54	ND (0.51)	ND (0.2)	27	8.5	**37**	7.4	ND (0.1)	ND (4.1)	23	ND (0.51)	ND (1)	ND (1)	41	52
	03/08/07	3	N	ND (6.1)	3.3	60	ND (0.51)	ND (0.51)	ND (0.2)	10	ND (5.1)	7.8	4.8	ND (0.1)	ND (4.1)	9.3	ND (0.51)	ND (1)	ND (1)	20	18
PGE-LT8	03/08/07	0.5	N	ND (6.2)	2.5	170	ND (0.51)	ND (0.51)	ND (0.21)	**41**	7.4	14	8	ND (0.1)	ND (4.1)	24	ND (0.51)	ND (1)	ND (1)	34	38
	03/08/07	3	N	ND (6.1)	3.1	98	ND (0.51)	ND (0.51)	ND (0.2)	15	ND (5.1)	**17**	4.6	ND (0.1)	ND (4.1)	13	0.52	ND (1)	ND (1)	28	28
PGE-LT9	03/08/07	0.5	N	ND (6.2)	2.5	180	ND (0.52)	ND (0.52)	ND (0.21)	26	6.9	**18**	5	ND (0.1)	ND (4.2)	17	ND (0.52)	ND (1)	ND (1)	36	38
	03/08/07	3	N	ND (6.2)	2.8	190	ND (0.51)	0.56	ND (0.21)	34	8.7	**35**	6.3	ND (0.1)	ND (4.1)	25	ND (0.51)	ND (1)	ND (1)	46	46
PGE-UT1	03/08/07	0.5	N	ND (6.2)	3.9	190	ND (0.52)	ND (0.52)	ND (0.21)	18	6.1	**54**	**9.4**	ND (0.1)	ND (4.2)	13	ND (0.52)	ND (1)	ND (1)	33	**60**
	03/08/07	3	N	ND (6.1)	4.8	170	ND (0.51)	ND (0.51)	ND (0.2)	15	5.8	**25**	3.7	ND (0.1)	ND (4.1)	11	ND (0.51)	ND (1)	ND (1)	32	34
PGE-UT2	03/08/07	0.5	N	ND (6.2)	3.9	180	ND (0.52)	ND (0.52)	ND (0.21)	18	5.6	**29**	**56**	0.41	ND (4.1)	12	ND (0.52)	ND (1)	ND (1)	32	51
	03/08/07	3	N	ND (6.2)	3	69	ND (0.51)	ND (0.51)	ND (0.21)	19	ND (5.1)	**43**	4.3	ND (0.1)	ND (4.1)	14	ND (0.51)	ND (1)	ND (1)	26	37
PGE-UT3	03/08/07	0.5	N	ND (6.3)	3.3	85	ND (0.52)	ND (0.52)	ND (0.21)	14	5.3	**26**	**8.4**	ND (0.1)	ND (4.2)	10	0.86	ND (1)	ND (1)	31	40
	03/08/07	3	N	ND (6.4)	3.6	140	ND (0.53)	ND (0.53)	ND (0.21)	23	8.3	**22**	4.8	ND (0.11)	ND (4.2)	23	ND (0.53)	ND (1.1)	ND (1.1)	41	39
PGE-UT4	03/08/07	0.5	N	ND (6.2)	3	160	ND (0.52)	0.53	0.48	36	5.4	**35**	**18**	ND (0.1)	**6.5**	12	ND (0.52)	ND (1)	ND (1)	30	**130**
	03/08/07	3	N	ND (6.3)	3.4	140	ND (0.52)	ND (0.52)	ND (0.21)	22	5.5	**26**	7.5	ND (0.1)	ND (4.2)	13	ND (0.52)	ND (1)	ND (1)	31	55
PS-8	04/13/99	0	N	---	---	---	---	---	**12.2**	**743**	---	**76.6**	---	---	---	12.9	---	---	---	---	**315**
	04/13/99	3	N	---	---	---	---	---	**1**	17.3	---	**30.2**	---	---	---	6	---	---	---	---	26.9
PS-9	04/13/99	0	N	---	---	---	---	---	**1.3**	**66.7**	---	**40.4**	---	---	---	12.2	---	---	---	---	**169**
PS-10	04/13/99	0	N	---	---	---	---	---	ND (0.51)	20.5	---	6.8	---	---	---	6.4	---	---	---	---	52.4
PS-11	04/13/99	0	N	---	---	---	---	---	**5.2**	**154**	---	**18**	---	---	---	17.6	---	---	---	---	43
PS-12	04/13/99	0	N	---	---	---	---	---	**7.6**	**321**	---	13.5	---	---	---	8.6	---	---	---	---	51.8
PS-17	04/13/99	0	N	---	---	---	---	---	ND (0.51)	14.6	---	8.2	---	---	---	7.4	---	---	---	---	32.4
	04/13/99	3	N	---	---	---	---	---	ND (0.52)	12.6	---	**35**	---	---	---	9.2	---	---	---	---	44
PS-18	04/13/99	0	N	---	---	---	---	---	0.7	24.6	---	12.1	---	---	---	13	---	---	---	---	49.1
PS-19	04/13/99	0	N	---	---	---	---	---	ND (0.51)	31.8	---	**19.6**	---	---	---	17.7	---	---	---	---	**69.5**
PS-20	04/13/99	0	N	---	---	---	---	---	0.6	15.8	---	11	---	---	---	10.7	---	---	---	---	45.5

TABLE B11-1

Sample Results: Metals

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																	
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic[4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium, Hexavalent**	**Chromium, total**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
Category2																					
BGCS-1	09/08/88	0.5	N	ND (0.3)	2	150	ND (1)	ND (0.5)	ND (1)	**47**	**17**	ND (3)	6	0.022	ND (1)	**56**	ND (0.5)	ND (1)	ND (1)	40	**75**
	09/08/88	1	N	ND (0.3)	2.2	150	**1**	ND (0.5)	ND (1)	ND (3)	**18**	ND (3)	5	0.027	ND (1)	**38**	ND (0.5)	ND (1)	ND (1)	39	**270**
	09/08/88	1.5	N	ND (0.3)	2.2	49	ND (1)	ND (0.5)	ND (1)	19	**14**	ND (3)	7	0.03	ND (1)	**34**	ND (0.5)	ND (1)	ND (1)	36	**61**
BGCS-2	09/08/88	0.5	N	ND (0.3)	3.37	190	ND (1)	ND (0.5)	---	11	9	ND (3)	5	0.051	ND (1)	16	ND (0.5)	ND (1)	ND (1)	29	47
	09/08/88	1	N	8.5	3.6	270	ND (0.2)	0.8	ND (1)	24	6	**26**	6.7	0.034	**1.4**	17	0.11	ND (0.2)	ND (0.3)	22	54
	09/08/88	1.5	N	7.5	2.5	210	ND (1)	**2.4**	ND (1)	15	7	15	**9**	0.029	ND (1)	12	ND (0.5)	ND (1)	ND (1)	23	29
BGCS-3	09/08/88	0.5	N	ND (0.3)	1.5	160	ND (1)	ND (0.5)	ND (1)	22	9	ND (3)	**9**	0.037	ND (1)	21	ND (0.5)	ND (1)	ND (1)	26	**91**
	09/08/88	1	N	ND (0.3)	3.3	220	ND (0.2)	**14**	ND (1)	26	9	11	**15**	0.09	**2.1**	18	0.14	ND (0.2)	ND (0.3)	23	**76**
	09/08/88	1.5	N	ND (0.3)	1.8	180	ND (1)	ND (0.5)	ND (1)	7	10	ND (3)	4	0.036	ND (1)	13	ND (0.5)	ND (1)	ND (1)	27	**82**
BGCS-4	09/08/88	0.5	N	ND (0.3)	1.9	180	ND (1)	ND (0.5)	ND (1)	12	9	ND (3)	7	0.064	ND (1)	17	ND (0.5)	ND (1)	ND (1)	24	**86**
	09/08/88	1	N	ND (0.3)	2.42	220	ND (1)	ND (0.5)	ND (1)	9	9	ND (3)	8	0.046	ND (1)	19	ND (0.5)	ND (1)	ND (5)	29	**85**
	09/08/88	1.5	N	ND (0.3)	1.5	150	ND (1)	ND (0.5)	ND (1)	9	9	ND (3)	6	0.026	ND (1)	15	ND (0.5)	ND (1)	ND (1)	28	**74**
BGCS-5	09/08/88	0.5	N	ND (0.3)	2.4	190	ND (1)	ND (0.5)	ND (1)	14	9	ND (3)	**10**	0.03	ND (1)	23	ND (0.5)	ND (1)	ND (1)	27	7.9
	09/08/88	1	N	ND (0.3)	2.1	160	ND (1)	ND (0.5)	ND (1)	16	8	ND (3)	8	0.134	ND (1)	**28**	ND (0.5)	ND (1)	ND (1)	25	**76**
	09/08/88	1.5	N	ND (0.3)	2.2	160	ND (1)	ND (0.5)	ND (1)	6	8	ND (3)	7	0.074	ND (1)	14	ND (0.5)	ND (1)	ND (1)	20	**69**
BGCS-6	09/08/88	0.5	N	ND (0.3)	1.7	300	ND (1)	ND (0.5)	ND (1)	23	10	ND (3)	**12**	0.038	ND (1)	**30**	ND (0.5)	ND (1)	ND (1)	27	**77**
	09/08/88	1	N	ND (0.3)	1.8	220	ND (1)	ND (0.5)	ND (1)	17	9	ND (3)	7	0.042	ND (1)	20	ND (0.5)	ND (1)	ND (1)	21	46
	09/08/88	1.5	N	ND (3)	2	230	ND (1)	ND (0.5)	ND (1)	10	7	ND (3)	7	0.047	ND (1)	12	ND (0.5)	ND (1)	ND (1)	18	43
Spill04162006_Sample1	04/26/06	0	N	5	2.3	140	0.5	0.5	---	35	5.3	10	**18**	0.14	**2.7**	15	1	0.5	5	24	**78**
Spill04162006_Sample2	04/26/06	0	N	10	4.6	210	**1**	1	---	20	7	11	6.2	0.16	**5**	15	1	1	10	34	42
Spill04292006_SS1	05/02/06	0	N	5	4.1	140	0.5	0.5	---	30	6.3	16	**11**	0.13	**5.3**	16	0.5	0.5	5	35	30
Spill10011995_C1	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.72	**---**	---	---	---	---	---	---
Spill10011995_C2	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.76	**---**	---	---	---	---	---	---
Spill10011995_C3	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.55	**---**	---	---	---	---	---	---
Spill10011995_C4	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.025	**---**	---	---	---	---	---	---
Spill10011995_C5	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.38	**---**	---	---	---	---	---	---
Spill10011995_C6	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	3.4	**---**	---	---	---	---	---	---
Spill10011995_C7	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.071	**---**	---	---	---	---	---	---
Spill10011995_C8	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.26	**---**	---	---	---	---	---	---
Spill10011995_C9(2ND)	12/19/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.008	**---**	---	---	---	---	---	---
Spill10011995_C10	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.6	**---**	---	---	---	---	---	---
Spill10011995_C11	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	2.1	**---**	---	---	---	---	---	---
Spill10011995_C12	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.083	**---**	---	---	---	---	---	---
Spill10011995_LatNI	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	2.8	**---**	---	---	---	---	---	---
Spill10011995_NLatOutside	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.65	**---**	---	---	---	---	---	---
Spill10011995_Nwall	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.19	**---**	---	---	---	---	---	---

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																	
Commercial Screening Level [1]:				380	0.24	63,000	190	500	37	1,400	300	38,000	320	180	4,800	16,000	4,800	4,800	63	5,200	100,000
RWQCB Environmental Screening Level [2]:				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Background [3]:				NE	11	410	0.672	1.1	0.83	39.8	12.7	16.8	8.39	NE	1.37	27.3	1.47	NE	NE	52.2	58
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic [4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium, Hexavalent**	**Chromium, total**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
Category2																					
Spill10011995_SLatInside	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.82	**---**	---	---	---	---	---	---
Spill10011995_Swall	12/12/95	0	N	---	---	---	---	---	---	---	---	---	**---**	0.12	**---**	---	---	---	---	---	---
Spill12242005_Sample1Comp	03/08/06	0	N	5	3.3	120	0.5	0.5	---	34	3.5	13	**100**	0.16	**16**	8.8	0.54	0.5	5	21	**100**
Spill12242005_Sample2	03/08/06	0	N	5	2.9	96	0.5	0.5	---	13	3.3	7.5	**57**	0.16	**2.5**	7.8	0.5	0.5	5	16	42
Spill12242005_Sample3	03/08/06	0	N	5	4.5	100	0.5	0.5	---	20	4.6	13	**24**	0.16	**2.5**	13	0.5	0.5	5	30	**65**
Spill12242005_Sample4	03/08/06	0	N	10	3.9	160	**1**	1	---	**51**	5	**43**	**170**	0.21	**15**	13	1	1	1	23	**200**
Category3																					
TC-1	06/14/94	1	N	---	---	---	**---**	---	---	**---**	---	**---**	**10**	---	**---**	---	---	---	---	---	**---**
TC-2	06/14/94	3	N	---	---	---	**---**	---	---	**---**	---	**---**	**85**	---	**---**	---	---	---	---	---	**---**
TC-4	06/14/94	0	N	---	---	---	**---**	---	---	**---**	---	**---**	**208**	---	**---**	---	---	---	---	---	**---**
TC-6	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**30**	---	**---**	---	---	---	---	---	**---**
TC-7	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	2.7	---	**---**	---	---	---	---	---	**---**
TC-9	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	8	---	**---**	---	---	---	---	---	**---**
TC-12	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**14**	---	**---**	---	---	---	---	---	**---**
TC-13	06/14/94	5	N	---	---	---	**---**	---	---	**---**	---	**---**	**19**	---	**---**	---	---	---	---	---	**---**
TC-14	06/14/94	5	N	---	---	---	**---**	---	---	**---**	---	**---**	**41**	---	**---**	---	---	---	---	---	**---**
TC-15	06/14/94	4.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**16**	---	**---**	---	---	---	---	---	**---**
TC-17	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**24**	---	**---**	---	---	---	---	---	**---**
TC-18	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**16**	---	**---**	---	---	---	---	---	**---**
TC-19	06/14/94	3	N	---	---	---	**---**	---	---	**---**	---	**---**	**52**	---	**---**	---	---	---	---	---	**---**
TC-21	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**9.9**	---	**---**	---	---	---	---	---	**---**
TC-22	06/14/94	4.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**27**	---	**---**	---	---	---	---	---	**---**
TC-23	06/14/94	5	N	---	---	---	**---**	---	---	**---**	---	**---**	3.5	---	**---**	---	---	---	---	---	**---**
TC-24	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	8	---	**---**	---	---	---	---	---	**---**
TC-26	06/14/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**9**	---	**---**	---	---	---	---	---	**---**
TG-1	06/13/94	0	N	---	---	---	**---**	---	---	**---**	---	**---**	**20**	---	**---**	---	---	---	---	---	**---**
TG-4	06/13/94	0	N	---	---	---	**---**	---	---	**---**	---	**---**	**31**	---	**---**	---	---	---	---	---	**---**
TG-6	06/13/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**18**	---	**---**	---	---	---	---	---	**---**
TG-9	06/13/94	2.5	N	---	---	---	**---**	---	---	**---**	---	**---**	**16**	---	**---**	---	---	---	---	---	**---**
TG-11	06/13/94	2	N	---	---	---	**---**	---	---	**---**	---	**---**	**10**	---	**---**	---	---	---	---	---	**---**
TG-13	06/13/94	1.5	N	---	---	---	**---**	---	---	**---**	---	**---**	8	---	**---**	---	---	---	---	---	**---**
TG-14	06/13/94	2	N	---	---	---	**---**	---	---	**---**	---	**---**	**19**	---	**---**	---	---	---	---	---	**---**
TG-15	06/13/94	3	N	---	---	---	**---**	---	---	**---**	---	**---**	8	---	**---**	---	---	---	---	---	**---**

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.
2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.
3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.
4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.
Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.
NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
RWQCB = California Regional Water Quality Control Board
CHHSL = California human health screening levels
-- = not analyzed
FD = Field Duplicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
mg/kg = milligrams per kilogram
N = Primary Sample
ND = not detected at the listed reporting limit

TABLE B11-2

Sample Results: Contract Laboratory Program Inorganics
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)	
			Commercial Screening Level [1]:	**720,000**	**23,000**
			RWQCB Environmental Screening Level [2]:	**NE**	**NE**
			Background [3]:	**NE**	**402**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Iron**	**Manganese**
Category1					
PS-10	04/13/99	0	N	9,420	179
PS-18	04/13/99	0	N	17,500	311

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

TABLE B11-3

Sample Results: Polycyclic Aromatic Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																	
			Commercial Screening Level [1]	**4,100,000**	**17,000,000**	**33,000,000**	**170,000,000**	**1,300**	**130**	**1,300**	**17,000,000**	**1,300**	**13,000**	**380**	**22,000,000**	**22,000,000**	**1,300**	**18,000**	**17,000,000**	**17,000,000**	**130**
			RWQCB Environmental Screening Level [2]	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Background [3]	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**2-Methyl naphthalene**	**Acena phthylene**	**Acena phthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluor anthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phen anthrene**	**Pyrene**	**B(a)P Equivalent**
Category1																					
Grab1	05/13/08	1	N	ND (5.2)	ND (5.2)	10	17	160	120	350	87	90	160	21	590	ND (5.2)	78	ND (5.2)	150	490	200
	05/13/08	3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.7	ND (5.1)	ND (5.1)	5.1	ND (5.1)	8.7	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.3	5
	05/14/08	5.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)
	05/14/08	5.5	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)
Grab2	05/13/08	1	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	15	29	48	27	18	31	6	39	ND (5.1)	23	ND (5.1)	9.7	38	42
	05/13/08	3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)
	05/13/08	4 - 4.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	7.6	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	5.4	ND (5.2)	ND (5.2)	ND (4.8)	ND (5.2)	5.3	5
PGE-LT5	03/08/07	0.5	N	---	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)
	03/08/07	3	N	---	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)
PGE-LT6	03/08/07	0.5	N	---	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)
	03/08/07	3	N	---	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)
PGE-LT7	03/08/07	0.5	N	---	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)
	03/08/07	3	N	---	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)
PGE-LT8	03/08/07	0.5	N	---	ND (5.2)	ND (5.2)	7.7	71	210	580	160	130	360	46	65	ND (5.2)	140	ND (5.2)	ND (5.2)	81	320
	03/08/07	3	N	---	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	7.1	ND (5.5)	9.1	ND (5.5)	ND (5.5)	ND (5.5)	ND (5.5)	9.4	4.9
PGE-LT9	03/08/07	0.5	N	---	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)
	03/08/07	3	N	---	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)
PGE-UT1	03/08/07	0.5	N	---	ND (5.5)	ND (5.5)	ND (5.5)	14	28	43	35	14	29	ND (5.5)	45	ND (5.5)	24	ND (5.5)	13	42	39
	03/08/07	3	N	---	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)
PGE-UT2	03/08/07	0.5	N	---	ND (5.2)	ND (5.2)	ND (5.2)	19	44	58	45	22	33	ND (5.2)	53	ND (5.2)	35	ND (5.2)	9.1	53	59
	03/08/07	3	N	---	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)	ND (4.7)
PGE-UT3	03/08/07	0.5	N	---	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.5)
	03/08/07	3	N	---	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (4.6)
PGE-UT4	03/08/07	0.5	N	---	ND (5.2)	ND (5.2)	ND (5.2)	40	60	88	56	ND (5.2)	46	ND (5.2)	110	ND (5.2)	45	ND (5.2)	31	98	79
	03/08/07	3	N	---	ND (5.3)	ND (5.3)	ND (5.3)	7.2	ND (5.3)	ND (5.3)	14	ND (5.3)	8.9	ND (5.3)	16	ND (5.3)	13	ND (5.3)	ND (5.3)	14	6.2

TABLE B11-3

Sample Results: Polycyclic Aromatic Hydrocarbons
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.
2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.
3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
RWQCB = California Regional Water Quality Control Board
CHHSL = California human health screening levels

Calculations:

BaP equivalent = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all PAHs are nondetect, the final qualifier code is U.
PAHLow = Sum of Result of low molecular weight PAHs, zero is used for nondetect values.
PAHHigh= Sum of Result of high molecular weight PAHs, zero is used for nondetect values.
-- = not analyzed
µg/kg = micrograms per kilogram
FD = Field Duplicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
N = Primary Sample
ND = not detected at the listed reporting limit

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)					
Commercial Screening Level [1] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Level [2] :				**NE**	**540**	**540**	**NE**	**1,800**	**NE**
Background [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as kerosene**	**TPH as diesel**	**TPH as gasoline**	**TPH as heavy oil**	**TPH as motor oil**	**Oil and Grease**
Category1									
Grab1	05/13/08	1	N	---	120	---	---	310	---
	05/13/08	3	N	---	ND (10)	ND (1.1)	---	17	---
	05/14/08	5.5	N	---	ND (10)	ND (1.1)	---	14	---
	05/14/08	5.5	FD	---	ND (10)	ND (1.1)	---	16	---
Grab2	05/13/08	1	N	---	51	---	---	140	---
	05/13/08	3	N	---	ND (10)	ND (1.1)	---	17	---
	05/13/08	4 - 4.5	N	---	23	ND (0.92)	---	51	---
PGE-LT5	03/08/07	0.5	N	---	ND (10)	ND (1)	---	ND (10)	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	ND (11)	---
PGE-LT6	03/08/07	0.5	N	---	ND (11)	ND (1.1)	---	ND (11)	---
	03/08/07	3	N	---	ND (10)	ND (1)	---	ND (10)	---
PGE-LT7	03/08/07	0.5	N	---	ND (10)	ND (1)	---	ND (10)	---
	03/08/07	3	N	---	ND (10)	ND (1)	---	ND (10)	---
PGE-LT8	03/08/07	0.5	N	---	18	ND (1)	---	240	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	36	---
PGE-LT9	03/08/07	0.5	N	---	ND (10)	ND (1)	---	ND (10)	---
	03/08/07	3	N	---	ND (10)	ND (1)	---	ND (10)	---
PGE-UT1	03/08/07	0.5	N	---	13	ND (1.1)	---	70	---
	03/08/07	3	N	---	ND (10)	ND (1)	---	ND (10)	---
PGE-UT2	03/08/07	0.5	N	---	19	ND (1)	---	53	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	ND (11)	---
PGE-UT3	03/08/07	0.5	N	---	32	ND (1)	---	26	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	ND (11)	---
PGE-UT4	03/08/07	0.5	N	---	ND (10)	ND (1)	---	38	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	ND (11)	---
Category2									
BGCS-1	09/08/88	0.5	N	---	---	---	---	---	460
	09/08/88	1	N	---	---	---	---	---	ND (10)
	09/08/88	1.5	N	---	---	---	---	---	120
BGCS-2	09/08/88	0.5	N	---	---	---	---	---	155
	09/08/88	1	N	---	---	---	---	---	25
	09/08/88	1.5	N	---	---	---	---	---	190
BGCS-3	09/08/88	0.5	N	---	---	---	---	---	335
	09/08/88	1	N	---	---	---	---	---	755
	09/08/88	1.5	N	---	---	---	---	---	245
BGCS-4	09/08/88	0.5	N	---	---	---	---	---	245
	09/08/88	1	N	---	---	---	---	---	205
	09/08/88	1.5	N	---	---	---	---	---	1,145

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)					
			Commercial Screening Level [1]:	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Level [2]:	**NE**	**540**	**540**	**NE**	**1,800**	**NE**
			Background [3]:	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as kerosene**	**TPH as diesel**	**TPH as gasoline**	**TPH as heavy oil**	**TPH as motor oil**	**Oil and Grease**
Category2									
BGCS-5	09/08/88	0.5	N	---	---	---	---	---	275
	09/08/88	1	N	---	---	---	---	---	200
	09/08/88	1.5	N	---	---	---	---	---	895
BGCS-6	09/08/88	0.5	N	---	---	---	---	---	2,775
	09/08/88	1	N	---	---	---	---	---	610
	09/08/88	1.5	N	---	---	---	---	---	215
Spill03012004_Sample1	05/21/04	0	N	---	---	ND (1)	---	---	---
Spill03012004_Sample2	05/21/04	0	N	---	---	ND (1)	---	---	---
Spill04232006_Sample2K6	04/26/06	0	N	8,000	ND (8,000)	ND (16,000)	---	240,000	---
Spill04232006_Sample3K6	04/26/06	0	N	1,000	ND (1,000)	ND (2,000)	---	25,000	---
Spill04232006_Sample4K6	04/26/06	0	N	20	ND (20)	ND (40)	---	510	---
Spill12192005_Sample1	12/20/05	0	N	---	ND (10)	ND (20)	---	79	---
Spill12192005_Sample2	12/20/05	0	N	---	ND (10)	ND (20)	---	20	---
Spill12192005_Sample3	12/20/05	0	N	---	ND (10)	ND (20)	---	ND (20)	---
Spill12192005_Sample4	12/20/05	0	N	---	ND (20)	ND (40)	---	420	---
Spill12192005_Sample5	12/20/05	0	N	---	ND (10)	ND (20)	---	59	---
Spill12242005_Sample1Comp	03/08/06	0	N	10	ND (10)	ND (20)	---	210	---
Spill12242005_Sample2	03/08/06	0	N	10	ND (10)	ND (20)	---	220	---
Spill12242005_Sample3	03/08/06	0	N	200	ND (200)	ND (410)	---	4,800	---
Spill12242005_Sample4	03/08/06	0	N	200	ND (200)	ND (400)	---	3,900	---
Category3									
COM-1	07/21/93	1.7	N	---	---	---	---	---	---
COM-2	07/21/93	1	N	---	---	---	---	---	---
COM-3	07/21/93	1.7	N	---	---	---	---	---	---
COM-4	07/21/93	1.3	N	---	---	---	---	---	---
COM-5	07/21/93	2.3	N	---	---	---	---	---	---
COM-6	07/21/93	1	N	---	---	---	---	---	---
COM-7	07/21/93	1.5	N	---	---	---	---	---	---
COM-8	07/21/93	1.5	N	---	---	---	---	---	---
COM-9	07/21/93	1.5	N	---	---	---	---	---	---
COM-10	07/21/93	1	N	---	---	---	---	---	---
COM-11	07/21/93	2.5	N	---	---	---	---	---	---
COM-12	07/21/93	1.5	N	---	---	---	---	---	---
COM-13	07/21/93	1.5	N	---	---	---	---	---	---
COM-14	07/21/93	1.5	N	---	---	---	---	---	---
COM-15	07/21/93	1.5	N	---	---	---	---	---	---
COM-16	07/21/93	1.5	N	---	---	---	---	---	---
COM-17	07/21/93	1.7	N	---	---	---	---	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)					
Commercial Screening Level [1]:				NE	NE	NE	NE	NE	NE
RWQCB Environmental Screening Level [2]:				NE	540	540	NE	1,800	NE
Background [3]:				NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as kerosene**	**TPH as diesel**	**TPH as gasoline**	**TPH as heavy oil**	**TPH as motor oil**	**Oil and Grease**
Category3									
COM-18	07/21/93	1.3	N	---	---	---	---	---	---
COM-20	07/21/93	2	N	---	---	---	---	---	---
G1	07/21/93	1	N	---	---	---	---	---	---
G2	07/21/93	1.7	N	---	---	---	---	---	---
G3	07/21/93	1	N	---	---	---	---	---	---
G4	07/21/93	0.83	N	---	---	---	---	---	---
	07/21/93	2	N	---	---	---	---	---	---
TC-1	06/14/94	1	N	---	ND (5)	ND (5)	ND (5)	390	---
TC-2	06/14/94	3	N	---	ND (5)	ND (5)	ND (5)	834	---
TC-3	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	144	---
TC-4	06/14/94	0	N	---	ND (5)	ND (5)	ND (4)	3,830	---
	06/14/94	3	N	---	ND (5)	ND (5)	ND (5)	370	---
TC-5	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	119	---
TC-6	06/14/94	2.5	N	---	ND (5)	ND (5)	102	ND (5)	---
	06/14/94	6.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-7	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
	06/14/94	8	N	---	ND (5)	ND (5)	43	37	---
TC-8	06/14/94	3.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-9	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-10	06/14/94	3	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-11	06/14/94	5	N	---	ND (5)	ND (5)	ND (5)	1,670	---
TC-12	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	69	---
TC-13	06/14/94	5	N	---	ND (5)	ND (5)	ND (5)	66	---
TC-14	06/14/94	5	N	---	ND (5)	ND (5)	ND (5)	47	---
TC-15	06/14/94	4.5	N	---	ND (5)	ND (5)	ND (5)	411	---
TC-16	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	277	---
TC-17	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	335	---
	06/14/94	8	N	---	ND (5)	ND (5)	ND (5)	323	---
TC-18	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
	06/14/94	7.5	N	---	ND (5)	ND (5)	ND (5)	159	---
TC-19	06/14/94	3	N	---	ND (5)	ND (5)	ND (5)	11,900	---
	06/14/94	13	N	---	ND (5)	ND (5)	ND (5)	1,040	---
TC-20	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	444	---
TC-21	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	267	---
	06/14/94	5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
	06/14/94	10	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-22	06/14/94	4.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-23	06/14/94	5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)					
Commercial Screening Level [1]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**540**	**540**	**NE**	**1,800**	**NE**
Background [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as kerosene**	**TPH as diesel**	**TPH as gasoline**	**TPH as heavy oil**	**TPH as motor oil**	**Oil and Grease**
Category3									
TC-24	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-25	06/14/94	9.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TC-26	06/14/94	2.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TG-1	06/13/94	0	N	---	ND (5)	ND (5)	ND (5)	797	---
TG-2	06/13/94	0	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TG-3	06/13/94	0	N	---	ND (5)	ND (5)	ND (5)	33,900	---
	06/13/94	2	N	---	ND (5)	ND (5)	ND (5)	46,900	---
TG-4	06/13/94	0	N	---	ND (5)	ND (5)	ND (5)	1,370	---
TG-5	06/13/94	2.5	N	---	ND (5)	ND (5)	ND (5)	214	---
TG-6	06/13/94	2.5	N	---	ND (5)	ND (5)	ND (5)	188	---
TG-7	06/13/94	1	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TG-8	06/13/94	2	N	---	ND (5)	ND (5)	ND (5)	1,780	---
TG-9	06/13/94	2.5	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TG-10	06/13/94	2	N	---	ND (5)	ND (5)	ND (5)	2,050	---
TG-11	06/13/94	2	N	---	ND (5)	ND (5)	ND (5)	ND (5)	---
TG-12	06/13/94	0.5	N	---	ND (5)	ND (5)	ND (5)	535	---
TG-13	06/13/94	1.5	N	---	ND (5)	ND (5)	ND (5)	519	---
TG-14	06/13/94	2	N	---	ND (5)	ND (5)	ND (5)	1,200	---
TG-15	06/13/94	3	N	---	ND (5)	ND (5)	ND (5)	1,800	---
TG-17	06/13/94	1.5	N	---	ND (5)	ND (5)	ND (5)	24	---
TG-18	06/13/94	3	N	---	ND (5)	ND (5)	ND (5)	31	---

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
RWQCB = California Regional Water Quality Control Board
CHHSL = California human health screening levels
TPH = Total Petroleum Hydrocarbon
-- = not analyzed
FD = Field Duplicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
mg/kg = milligrams per kilogram
N = Primary Sample
ND = not detected at the listed reporting limit

TABLE B11-5

Sample Results: General Chemistry Parameters

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				General Chemistry in mg/kg unless otherwise noted		
			Commercial Screening Level [1] :	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Level [2] :	**NE**	**NE**	**NE**
			Background [3] :	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**pH**	**Specific conductance**	**Total dissolved solids**
Category2						
BGCS-1	09/08/88	0.5	N	9.58	698	---
	09/08/88	1	N	9.53	566	---
	09/08/88	1.5	N	9.73	317	---
BGCS-2	09/08/88	0.5	N	8.64	213	---
	09/08/88	1	N	8.8	360	ND (300)
	09/08/88	1.5	N	8.7	111	---
BGCS-3	09/08/88	0.5	N	9.11	111	---
	09/08/88	1	N	8.96	435	320
	09/08/88	1.5	N	8.41	232	---
BGCS-4	09/08/88	0.5	N	8.48	329	---
	09/08/88	1	N	8.52	291	---
	09/08/88	1.5	N	8.54	345	---
BGCS-5	09/08/88	0.5	N	8.76	273	---
	09/08/88	1	N	8.79	221	---
	09/08/88	1.5	N	8.94	203	---
BGCS-6	09/08/88	0.5	N	8.78	66	---
	09/08/88	1	N	8.87	56	---
	09/08/88	1.5	N	8.78	56	---
Spill04162006_Sample1	04/26/06	0	N	8.25	320	---
Spill04162006_Sample2	04/26/06	0	N	8.41	610	---
Spill04292006_SS1	05/02/06	0	N	8.06	900	---

TABLE B11-5

Sample Results: General Chemistry Parameters

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

µS/cm = micro siemens per centimeter

ND = not detected at the listed reporting limit

pH is reported in pH units.

Specific conductance is reported in micro siemens per centimeter.

TABLE B11-6

Sample Results: Volatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile Organic Compounds (µg/kg)				
			Commercial Screening Level [1] :	**NE**	**NE**	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Level [2] :	**NE**	**NE**	**NE**	**NE**	**NE**
			Background [3] :	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Acetone**	**Chloroform**	**Methylene chloride**	**Toluene**	**Xylenes, total**
Category1								
Grab1	05/13/08	3	N	ND (55)	5.8	ND (5.5)	ND (5.5)	ND (5.5)
	05/14/08	5.5	N	ND (55)	ND (5.5)	5.7	ND (5.5)	ND (5.5)
	05/14/08	5.5	FD	ND (54)	ND (5.4)	ND (5.4)	ND (5.4)	ND (5.4)
Grab2	05/13/08	3	N	ND (56)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.6)
	05/13/08	4 - 4.5	N	ND (48)	ND (4.8)	5.6	ND (4.8)	ND (4.8)
PGE-LT5	03/08/07	0.5	N	ND (51J)	ND (5.1J)	ND (10J)	ND (5.1J)	ND (5.1J)
	03/08/07	3	N	ND (53J)	ND (5.3J)	ND (11J)	ND (5.3J)	ND (5.3J)
PGE-LT6	03/08/07	0.5	N	ND (54J)	ND (5.4J)	ND (11J)	ND (5.4J)	ND (5.4J)
	03/08/07	3	N	ND (52J)	ND (5.2J)	ND (10J)	ND (5.2J)	ND (5.2J)
PGE-LT7	03/08/07	0.5	N	ND (51J)	ND (5.1J)	ND (10J)	ND (5.1J)	ND (5.1J)
	03/08/07	3	N	ND (51J)	ND (5.1J)	ND (10J)	ND (5.1J)	ND (5.1J)
PGE-LT8	03/08/07	0.5	N	ND (52J)	ND (5.2J)	ND (10J)	ND (5.2J)	ND (5.2J)
	03/08/07	3	N	ND (55J)	ND (5.5J)	ND (11J)	ND (5.5J)	ND (5.5J)
PGE-LT9	03/08/07	0.5	N	ND (52J)	ND (5.2J)	ND (10J)	ND (5.2J)	ND (5.2J)
	03/08/07	3	N	ND (52J)	ND (5.2J)	ND (10J)	ND (5.2J)	ND (5.2J)
PGE-UT1	03/08/07	0.5	N	ND (55J)	ND (5.5J)	ND (11J)	ND (5.5J)	ND (5.5J)
	03/08/07	3	N	ND (52J)	ND (5.2J)	ND (10J)	ND (5.2J)	ND (5.2J)
PGE-UT2	03/08/07	0.5	N	650 J	ND (5.2J)	ND (10J)	5.8 J	ND (5.2J)
	03/08/07	3	N	ND (54J)	ND (5.4J)	ND (11J)	ND (5.4J)	ND (5.4J)
PGE-UT3	03/08/07	0.5	N	ND (52J)	ND (5.2J)	ND (10J)	5.9 J	ND (5.2J)
	03/08/07	3	N	ND (53J)	ND (5.3J)	ND (11J)	ND (5.3J)	ND (5.3J)
PGE-UT4	03/08/07	0.5	N	ND (52J)	ND (5.2J)	ND (10J)	ND (5.2J)	ND (5.2J)
	03/08/07	3	N	ND (53J)	ND (5.3J)	ND (11J)	ND (5.3J)	ND (5.3J)
Category2								
Spill03012004_Sample1	05/21/04	0	N	---	---	---	ND (3)	ND (3)
Spill03012004_Sample2	05/21/04	0	N	---	---	---	ND (3)	5.6

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

Only detected SVOCs and VOCs are presented.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

VOCs = Volatile Organic Compounds

-- = not analyzed

µg/kg = micrograms per kilogram

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

N = Primary Sample

ND = not detected at the listed reporting limit

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)						
			Commercial Screening Level 1 :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Level 2 :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Background 3 :	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**
Category2										
Spill03012004_Sample1	05/21/04	0	N	---	---	---	---	---	---	ND (300)
Spill03012004_Sample2	05/21/04	0	N	---	---	---	---	---	---	ND (300)
Category3										
COM-1	07/21/93	1.7	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-2	07/21/93	1	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-6	07/21/93	1	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-9	07/21/93	1.5	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-11	07/21/93	2.5	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-12	07/21/93	1.5	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-14	07/21/93	1.5	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-17	07/21/93	1.7	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
COM-20	07/21/93	2	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
G1	07/21/93	1	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
G2	07/21/93	1.7	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
G3	07/21/93	1	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
G4	07/21/93	0.83	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)
	07/21/93	2	N	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)

TABLE B11-8
Conceptual Site Model, AOC 13– Unpaved Areas within the Compressor Station
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station, Needles, California

Primary Source	**Primary Source Media**	**Potential Release Mechanism**	**Secondary Source Media**	**Potential Secondary Release Mechanism**
Incidental spills of lubricants and pipeline liquids, and cooling and wastewater	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B11-9

Constituent Concentrations in Soil Compared to Screening Values

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV) [1]		RWQCB Environmental Screening Levels (ESL) [2]		Commercial Screening Level (Com SL) [3]	
							# of Exceedences [4]	(BTV)	# of Exceedences [5]	(ESL)	# of Exceedences [5]	(Com SL)
Contract Laboratory Program Inorganics												
Iron	mg/kg	2 / 2 (100%)	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	17,500	0	(NE)	0	(NE)	0	(720,000)
Manganese	mg/kg	2 / 2 (100%)	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	311	0	(402)	0	(NE)	0	(23,000)
Metals												
Antimony	mg/kg	11 / 49 (22%)	2 / 24 (8.3%)	9 / 25 (36%)	0 / 0 (0%)	10	0	(NE)	0	(NE)	0	(380)
Arsenic	mg/kg	49 / 49 (100%)	24 / 24 (100%)	25 / 25 (100%)	0 / 0 (0%)	5.4	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	49 / 49 (100%)	24 / 24 (100%)	25 / 25 (100%)	0 / 0 (0%)	300	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	9 / 49 (18%)	1 / 24 (4.2%)	8 / 25 (32%)	0 / 0 (0%)	1	3	(0.672)	0	(NE)	0	(190)
Cadmium	mg/kg	14 / 49 (29%)	4 / 24 (17%)	10 / 25 (40%)	0 / 0 (0%)	14	2	(1.1)	0	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	11 / 52 (21%)	11 / 35 (31%)	0 / 17 (0.0%)	0 / 0 (0%)	12.2	7	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	59 / 60 (98%)	35 / 35 (100%)	24 / 25 (96%)	0 / 0 (0%)	743	9	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	45 / 49 (92%)	20 / 24 (83%)	25 / 25 (100%)	0 / 0 (0%)	18	3	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	45 / 60 (75%)	35 / 35 (100%)	10 / 25 (40%)	0 / 0 (0%)	760	25	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	75 / 75 (100%)	24 / 24 (100%)	25 / 25 (100%)	26 / 26 (100%)	330	37	(8.39)	0	(NE)	1	(320)
Mercury	mg/kg	44 / 66 (67%)	2 / 24 (8.3%)	42 / 42 (100%)	0 / 0 (0%)	3.4	0	(NE)	0	(NE)	0	(180)
Mercury, dissolved	mg/L	3 / 3 (100%)	0 / 0 (0%)	3 / 3 (100%)	0 / 0 (0%)	0.005	NA	(NE)	NA	(NE)	NA	(NE)
Molybdenum	mg/kg	16 / 49 (33%)	7 / 24 (29%)	9 / 25 (36%)	0 / 0 (0%)	16	13	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	60 / 60 (100%)	35 / 35 (100%)	25 / 25 (100%)	0 / 0 (0%)	56	5	(27.3)	0	(NE)	0	(16,000)
Selenium	mg/kg	15 / 49 (31%)	6 / 24 (25%)	9 / 25 (36%)	0 / 0 (0%)	3	4	(1.47)	0	(NE)	0	(4,800)
Silver	mg/kg	7 / 49 (14%)	0 / 24 (0.0%)	7 / 25 (28%)	0 / 0 (0%)	1	0	(NE)	0	(NE)	0	(4,800)
Thallium	mg/kg	8 / 49 (16%)	1 / 24 (4.2%)	7 / 25 (28%)	0 / 0 (0%)	10	0	(NE)	0	(NE)	0	(63)
Vanadium	mg/kg	49 / 49 (100%)	24 / 24 (100%)	25 / 25 (100%)	0 / 0 (0%)	46	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	60 / 60 (100%)	35 / 35 (100%)	25 / 25 (100%)	0 / 0 (0%)	315	22	(58)	0	(NE)	0	(100,000)
Polycyclic Aromatic Hydrocarbons												
Acenaphthene	µg/kg	1 / 24 (4.2%)	1 / 24 (4.2%)	0 / 0 (0%)	0 / 0 (0%)	10	0	(NE)	0	(NE)	0	(33,000,000)
Anthracene	µg/kg	2 / 24 (8.3%)	2 / 24 (8.3%)	0 / 0 (0%)	0 / 0 (0%)	17	0	(NE)	0	(NE)	0	(170,000,000)
Benzo (a) anthracene	µg/kg	7 / 24 (29%)	7 / 24 (29%)	0 / 0 (0%)	0 / 0 (0%)	160	0	(NE)	0	(NE)	0	(1,300)
Benzo (a) pyrene	µg/kg	6 / 24 (25%)	6 / 24 (25%)	0 / 0 (0%)	0 / 0 (0%)	210	0	(NE)	0	(NE)	1	(130)
Benzo (b) fluoranthene	µg/kg	8 / 24 (33%)	8 / 24 (33%)	0 / 0 (0%)	0 / 0 (0%)	580	0	(NE)	0	(NE)	0	(1,300)
Benzo (ghi) perylene	µg/kg	7 / 24 (29%)	7 / 24 (29%)	0 / 0 (0%)	0 / 0 (0%)	160	0	(NE)	0	(NE)	0	(17,000,000)
Benzo (k) fluoranthene	µg/kg	5 / 24 (21%)	5 / 24 (21%)	0 / 0 (0%)	0 / 0 (0%)	130	0	(NE)	0	(NE)	0	(1,300)
Chrysene	µg/kg	9 / 24 (38%)	9 / 24 (38%)	0 / 0 (0%)	0 / 0 (0%)	360	0	(NE)	0	(NE)	0	(13,000)
Dibenzo (a,h) anthracene	µg/kg	3 / 24 (13%)	3 / 24 (13%)	0 / 0 (0%)	0 / 0 (0%)	46	0	(NE)	0	(NE)	0	(380)
Fluoranthene	µg/kg	10 / 24 (42%)	10 / 24 (42%)	0 / 0 (0%)	0 / 0 (0%)	590	0	(NE)	0	(NE)	0	(22,000,000)
Indeno (1,2,3-cd) pyrene	µg/kg	7 / 24 (29%)	7 / 24 (29%)	0 / 0 (0%)	0 / 0 (0%)	140	0	(NE)	0	(NE)	0	(1,300)
Phenanthrene	µg/kg	5 / 24 (21%)	5 / 24 (21%)	0 / 0 (0%)	0 / 0 (0%)	150	0	(NE)	0	(NE)	0	(17,000,000)
Pyrene	µg/kg	10 / 24 (42%)	10 / 24 (42%)	0 / 0 (0%)	0 / 0 (0%)	490	0	(NE)	0	(NE)	0	(17,000,000)
B(a)P Equivalent	µg/kg	10 / 24 (42%)	10 / 24 (42%)	0 / 0 (0%)	0 / 0 (0%)	320	0	(NE)	0	(NE)	2	(130)
Total Petroleum Hydrocarbons												
Oil and Grease	mg/kg	17 / 18 (94%)	0 / 0 (0%)	17 / 18 (94%)	0 / 0 (0%)	2,775	NA	(NE)	NA	(NE)	NA	(NE)
Total Recoverable Hydrocarbons	mg/kg	24 / 24 (100%)	0 / 0 (0%)	0 / 0 (0%)	24 / 24 (100%)	83,200	NA	(NE)	NA	(NE)	NA	(NE)
TPH as heavy oil	mg/kg	2 / 52 (3.8%)	0 / 0 (0%)	0 / 0 (0%)	2 / 52 (3.8%)	102	NA	(NE)	NA	(NE)	NA	(NE)
TPH as kerosene	mg/kg	7 / 7 (100%)	0 / 0 (0%)	7 / 7 (100%)	0 / 0 (0%)	8,000	NA	(NE)	NA	(NE)	NA	(NE)

TABLE B11-9

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

							Background Threshold Value (BTV)[1]		RWQCB Environmental Screening Levels (ESL)[2]		Commercial Screening Level (Com SL)[3]	
Parameter	**Units**	**Frequency of Detection Total**	**Frequency of Detection Category 1**	**Frequency of Detection Category 2**	**Frequency of Detection Category 3**	**Maximum Detected Value**	**# of Exceedences[4]**	**(BTV)**	**# of Exceedences[5]**	**(ESL)**	**# of Exceedences[5]**	**(Com SL)**
Total Petroleum Hydrocarbons												
TPH as diesel	mg/kg	7 / 88 (8.0%)	7 / 24 (29%)	0 / 12 (0.0%)	0 / 52 (0.0%)	120	0	(NE)	0	(540)	0	(NE)
TPH as motor oil	mg/kg	57 / 88 (65%)	12 / 24 (50%)	11 / 12 (92%)	34 / 52 (65%)	240,000	0	(NE)	10	(1,800)	0	(NE)
TPH as gasoline	mg/kg	0 / 88 (0%)	0 / 22 (0%)	0 / 14 (0%)	0 / 52 (0%)	ND (16000)	NA	(NE)	0	(540)	NA	(NE)
Volatile Organic Compounds												
Acetone	µg/kg	1 / 22 (4.5%)	1 / 22 (4.5%)	0 / 0 (0%)	0 / 0 (0%)	650	0	(NE)	0	(NE)	0	(630,000,000)
Chloroform	µg/kg	1 / 22 (4.5%)	1 / 22 (4.5%)	0 / 0 (0%)	0 / 0 (0%)	5.8	0	(NE)	0	(NE)	0	(1,500)
Methylene chloride	µg/kg	2 / 22 (9.1%)	2 / 22 (9.1%)	0 / 0 (0%)	0 / 0 (0%)	5.7	0	(NE)	0	(NE)	0	(53,000)
Toluene	µg/kg	2 / 24 (8.3%)	2 / 22 (9.1%)	0 / 2 (0.0%)	0 / 0 (0%)	5.9	0	(NE)	0	(NE)	0	(45,000,000)
Xylenes, total	µg/kg	1 / 24 (4.2%)	0 / 22 (0.0%)	1 / 2 (50%)	0 / 0 (0%)	5.6	0	(NE)	0	(NE)	0	(2,700,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B11-10
Proposed Sampling Plan - AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 13-13	0-0.5 and 3, if feasible	Visitor Parking Area, east of new oil aboveground storage tanks; to resolve Data Gap #1 and #2 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-14	0-0.5 and 3, if feasible	Southeast of Lower Yard Scrubbers; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-15	0-0.5 and 3, if feasible	Southwest corner of Compressor Building; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-16	0-0.5, 3, 6, and 10	Southeast side of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-17	0-0.5 and 3, if feasible	Visitor parking area, east of wash rack sump; to resolve Data Gaps #1, #2, and #3 – Lateral and vertical extent of COPCs and potential impacts from potential burn area near AOC 17	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, asbestos, and dioxin and furans
AOC 13-18	0-0.5 and 3, if feasible	South of Cooling Tower A, within historical cooling water release area; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-19	0-0.5 and 3, if feasible	East of Welding Shop; to resolve Data Gap #1 and #2 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-20	0-0.5 and 3, if feasible	East of Maintenance Shop; to resolve Data Gap #1 and #2 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-21	0-0.5 and 3, if feasible	West of storage trailer; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-22	0-0.5 and 3, if feasible	Northwest of northern scrubbers; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of COPCs and potential impacts associated with surface soil discoloration in historical aerial photographs.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-23	0-0.5 and 3, if feasible	Northeast of northern scrubbers; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of COPCs and potential impacts associated with surface soil discoloration in historical aerial photographs.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-24	0-0.5 and 3, if feasible	West of northern scrubbers; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of COPCs and potential impacts associated with surface soil discoloration in historical aerial photographs.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos

TABLE B11-10
Proposed Sampling Plan - AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 13-25	0-0.5 and 3, if feasible	Southeast of northern scrubbers; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of COPCs and potential impacts associated with surface soil discoloration in historical aerial photographs.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-26	0-0.5 and 3, if feasible	West of Meter Building, within the 2004 Scrubber Release Area; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-27	0-0.5 and 3, if feasible	East of Meter Building, within the 2004 Scrubber Release Area; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-28	0-0.5 and 3, if feasible	West of Lower Yard Scrubbers, within the 2001 Oil Water Release Area; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-29	0-0.5 and 3, if feasible	West of Sludge Drying Beds, adjacent to transfer piping; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-30	0-0.5 and 3, if feasible	Lower Yard east of Waste Oil Holding Tank and west of Cooling Tower A, bottom of slope; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-31	0-0.5 and 3, if feasible	Northwest edge of “A” Valve Nest Area; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-32	0-0.5 and 3, if feasible	Lower Yard west of Cooling Tower A, along wastewater transfer pipeline; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-33	0-0.5 and 3, if feasible	Sample west of Cooling Tower B on slope above Lower Yard; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 13-34	0-0.5 and 3, if feasible	Sample west of Cooling Tower B on slope above Lower Yard; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos

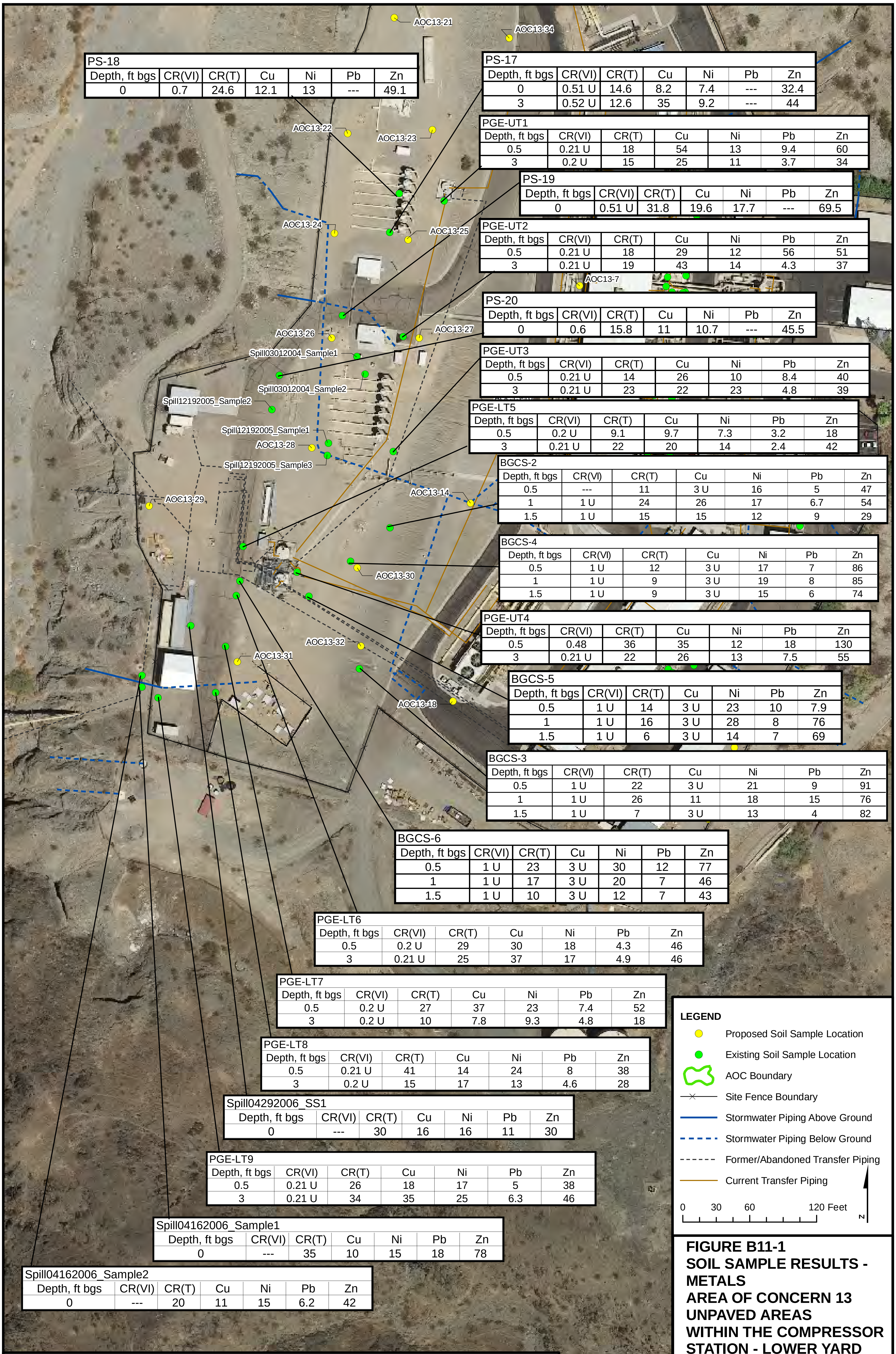
Notes:

Ten percent of samples collected during the investigation will be analyzed for Target Analyte List/Target Compound List constituents.VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

TABLE B11-10
Proposed Sampling Plan - AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 13-1	0-0.5 and 3, if feasible	North of Cooling Tower B; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of COPCs and potential impacts associated with surface soil discoloration in historical aerial photographs.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-2	0-0.5 and 3, if feasible	North of Cooling Tower B on paved road; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-3	0-0.5 and 3, if feasible	East of Cooling Tower B; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-4	0-0.5 and 3, if feasible	South of Cooling Tower B; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-5	0-0.5 and 3, if feasible	Northwest side of Compressor Building; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-6	0-0.5 and 3, if feasible	Northeast side of Compressor Building; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-7	0-0.5 and 3, if feasible	West side of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-8	0-0.5 and 3, if feasible	East side of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-9	0-0.5 and 3, if feasible	Jacket Water Cooling Pumps surface water runoff area; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-10	0-0.5 and 3, if feasible	Between Compressor Building and Lower Yard Scrubbers; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos
AOC 13-11	0-0.5 and 3, if feasible	West of Compressor Building; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation
AOC 13-12	0-0.5 and 3, if feasible	East of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1 – Lateral and vertical extent of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos

Figures



PS-18

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	0.7	24.6	12.1	13	---	49.1

PS-17

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	0.51 U	14.6	8.2	7.4	---	32.4
3	0.52 U	12.6	35	9.2	---	44

PGE-UT1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	18	54	13	9.4	60
3	0.2 U	15	25	11	3.7	34

PS-19

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	0.51 U	31.8	19.6	17.7	---	69.5

PGE-UT2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	18	29	12	56	51
3	0.21 U	19	43	14	4.3	37

PS-20

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	0.6	15.8	11	10.7	---	45.5

PGE-UT3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	14	26	10	8.4	40
3	0.21 U	23	22	23	4.8	39

PGE-LT5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.2 U	9.1	9.7	7.3	3.2	18
3	0.21 U	22	20	14	2.4	42

BGCS-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	---	11	3 U	16	5	47
1	1 U	24	26	17	6.7	54
1.5	1 U	15	15	12	9	29

BGCS-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	1 U	12	3 U	17	7	86
1	1 U	9	3 U	19	8	85
1.5	1 U	9	3 U	15	6	74

PGE-UT4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.48	36	35	12	18	130
3	0.21 U	22	26	13	7.5	55

BGCS-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	1 U	14	3 U	23	10	7.9
1	1 U	16	3 U	28	8	76
1.5	1 U	6	3 U	14	7	69

BGCS-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	1 U	22	3 U	21	9	91
1	1 U	26	11	18	15	76
1.5	1 U	7	3 U	13	4	82

BGCS-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	1 U	23	3 U	30	12	77
1	1 U	17	3 U	20	7	46
1.5	1 U	10	3 U	12	7	43

PGE-LT6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.2 U	29	30	18	4.3	46
3	0.21 U	25	37	17	4.9	46

PGE-LT7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.2 U	27	37	23	7.4	52
3	0.2 U	10	7.8	9.3	4.8	18

PGE-LT8

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	41	14	24	8	38
3	0.2 U	15	17	13	4.6	28

Spill04292006_SS1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	30	16	16	11	30

PGE-LT9

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	26	18	17	5	38
3	0.21 U	34	35	25	6.3	46

Spill04162006_Sample1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	35	10	15	18	78

Spill04162006_Sample2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	20	11	15	6.2	42

- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.
- Results for Spill04162006_Sample1,Spill04162006_Sample2, Spill04292006_SS1, BGCS-6, BGCS-2, BGCS-5, BGCS-4, BGCS-3 are category 2 data. All others are category 1 data.

FIGURE B11-1
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 13 UNPAVED AREAS WITHIN THE COMPRESSOR STATION - LOWER YARD

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC13_RESULT_METAL

FIGURE B11-2
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 13 UNPAVED AREAS WITHIN THE COMPRESSOR STATION - UPPER YARD

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

AOC13-1 / **TC-23**

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
5	---	---	---	---	3.5	---

TC-21

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	9.9	---

TC-22

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4.5	---	---	---	---	27	---

TC-19

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	---	---	---	---	52	---

TC-18

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	16	---

TC-17

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	24	---

TC-15

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4.5	---	---	---	---	16	---

TC-14

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
5	---	---	---	---	41	---

TC-24

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	8	---

Spill12242005_Sample4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	51	43	13	170	200

PS-10

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	0.51 U	20.5	6.8	6.4	---	52.4

Spill12242005_Sample3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	20	13	13	24	65

PS-9

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	1.3	66.7	40.4	12.2	---	169

Spill12242005_Sample2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	13	7.5	7.8	57	42

TC-13

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
5	---	---	---	---	19	---

TC-12

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	14	---

TC-9

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	8	---

TC-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	30	---

PS-8

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	12.2	743	76.6	12.9	---	315
3	1	17.3	30.2	6	---	26.9

TC-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	---	---	---	208	---

PS-11

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	5.2	154	18	17.6	---	43

PS-12

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	7.6	321	13.5	8.6	---	51.8

TC-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	---	---	---	---	10	---

TC-7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	2.7	---

TC-26

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	9	---

TG-14

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2	---	---	---	---	19	---

TC-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	---	---	---	---	85	---

TG-15

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	---	---	---	---	8	---

TG-13

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1.5	---	---	---	---	8	---

TG-11

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2	---	---	---	---	10	---

TG-9

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	16	---

BGCS-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	1 U	47	3 U	56	6	75
1	1 U	3 U	3 U	38	5	270
1.5	1 U	19	3 U	34	7	61

TG-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	---	---	---	31	---

TG-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	---	---	---	20	---

TG-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	18	---

- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.
- Results for PS-8, PS-9, PS-10, PS-11 and PS-12 are 1 category data. Results for BGCS-1, Spill12242005_Sample2, Spill12242005_Sample3, and Spill12242005_Sample4 are category 2 data. All others are category 3 data.

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
—×—	Site Fence Boundary
——	Stormwater Piping Above Ground
- - -	Stormwater Piping Below Ground
- - - - - -	Former/Abandoned Transfer Piping
——	Current Transfer Piping

0 25 50 100 Feet

N

CH2MHILL

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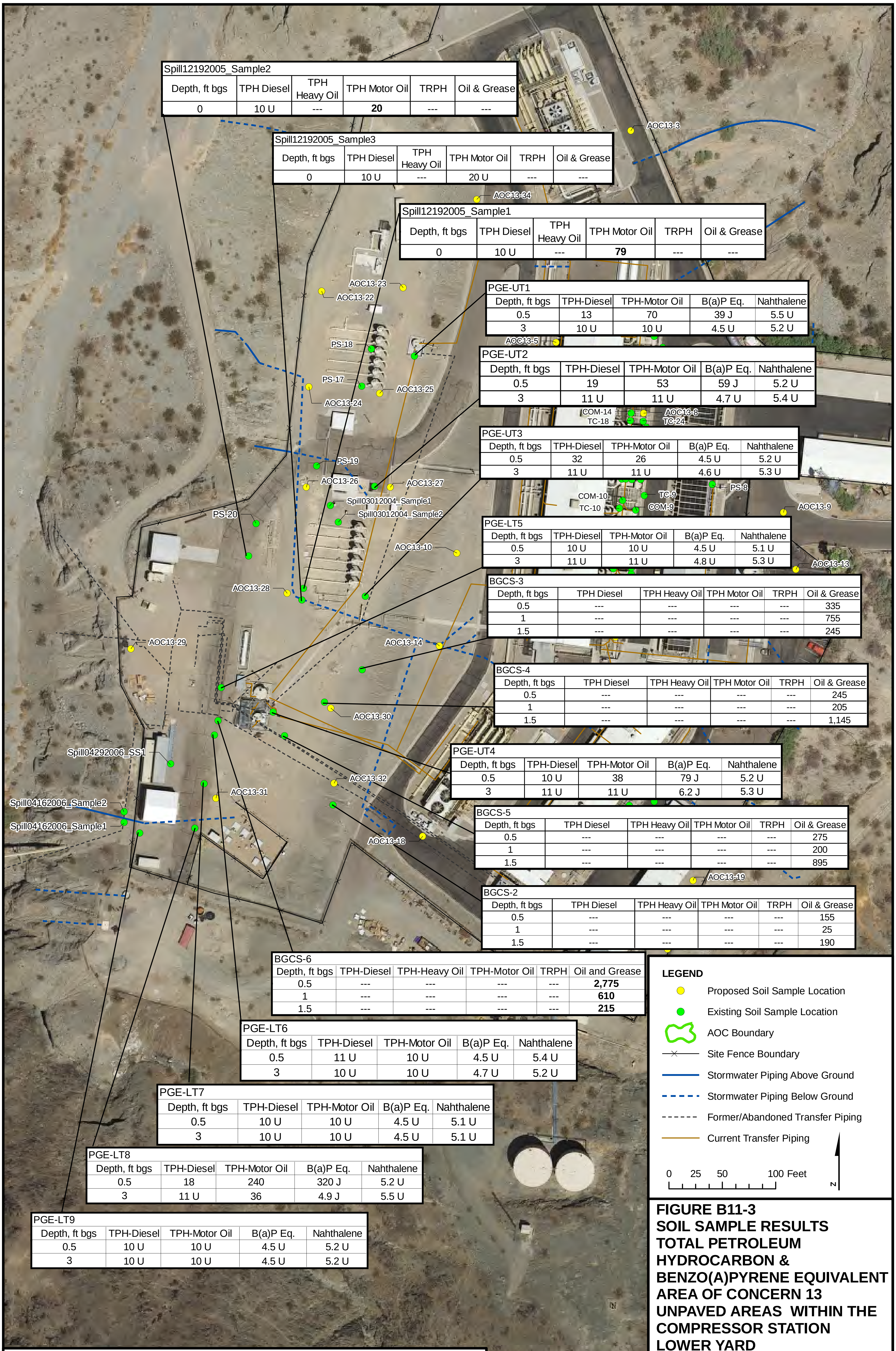

Spill12192005_Sample2

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	10 U	---	**20**	---	---

Spill12192005_Sample3

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	10 U	---	20 U	---	---

Spill12192005_Sample1

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	10 U	---	**79**	---	---

PGE-UT1

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	13	70	39 J	5.5 U
3	10 U	10 U	4.5 U	5.2 U

PGE-UT2

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	19	53	59 J	5.2 U
3	11 U	11 U	4.7 U	5.4 U

PGE-UT3

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	32	26	4.5 U	5.2 U
3	11 U	11 U	4.6 U	5.3 U

PGE-LT5

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	10 U	10 U	4.5 U	5.1 U
3	11 U	11 U	4.8 U	5.3 U

BGCS-3

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0.5	---	---	---	---	335
1	---	---	---	---	755
1.5	---	---	---	---	245

BGCS-4

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0.5	---	---	---	---	245
1	---	---	---	---	205
1.5	---	---	---	---	1,145

PGE-UT4

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	10 U	38	79 J	5.2 U
3	11 U	11 U	6.2 J	5.3 U

BGCS-5

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0.5	---	---	---	---	275
1	---	---	---	---	200
1.5	---	---	---	---	895

BGCS-2

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0.5	---	---	---	---	155
1	---	---	---	---	25
1.5	---	---	---	---	190

BGCS-6

Depth, ft bgs	TPH-Diesel	TPH-Heavy Oil	TPH-Motor Oil	TRPH	Oil and Grease
0.5	---	---	---	---	**2,775**
1	---	---	---	---	**610**
1.5	---	---	---	---	**215**

PGE-LT6

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	11 U	10 U	4.5 U	5.4 U
3	10 U	10 U	4.7 U	5.2 U

PGE-LT7

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	10 U	10 U	4.5 U	5.1 U
3	10 U	10 U	4.5 U	5.1 U

PGE-LT8

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	18	240	320 J	5.2 U
3	11 U	36	4.9 J	5.5 U

PGE-LT9

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.	Nahthalene
0.5	10 U	10 U	4.5 U	5.2 U
3	10 U	10 U	4.5 U	5.2 U

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
🟩	AOC Boundary
—×—	Site Fence Boundary
—	Stormwater Piping Above Ground
- - -	Stormwater Piping Below Ground
- - -	Former/Abandoned Transfer Piping
—	Current Transfer Piping

- Results greater than or equal to the CHHSLs/Industrial Soil PRG are circled.
- Results for PGE-LT9, PGE-LT8, PGE-LT7, PGE-LT6, PGE-UT4, PGE-LT5, PGE-UT3, PGE-UT2, and PGE-UT1 are category 1 data. All others are category 2 data.

FIGURE B11-3
SOIL SAMPLE RESULTS TOTAL PETROLEUM HYDROCARBON & BENZO(A)PYRENE EQUIVALENT AREA OF CONCERN 13 UNPAVED AREAS WITHIN THE COMPRESSOR STATION LOWER YARD

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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TC-23

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
5	5 U	5 U	5 U	---	---

COM-20

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2	---	---	---	**111**	---

TC-22

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
4.5	5 U	5 U	5 U	---	---

COM-18

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.3	---	---	---	**2,690**	---

COM-17

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.7	---	---	---	**3,930**	---

TC-21

Depth, ft bgs	TPH-Diesel	TPH-Heavy Oil	TPH-Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	267	---	---
5	5 U	5 U	5 U	---	---
10	5 U	5 U	5 U	---	---

TC-19

Depth, ft bgs	TPH-Diesel	TPH-Heavy Oil	TPH-Motor Oil	TRPH	Oil & Grease
3	5 U	5 U	11,900	---	---
13	5 U	5 U	1,040	---	---

TC-17

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	335	---	---
8	5 U	5 U	323	---	---

COM-15

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	**4,120**	---

TC-15

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
4.5	5 U	5 U	**411**	---	---

TC-24

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	5 U	---	---

COM-13

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	**2,950**	---

Sample12242005_Sample3

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	200 U	---	4,800	---	---

Sample12242005_Sample4

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	200 U	---	3,900	---	---

TC-13

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
5	5 U	5 U	66	---	---

Spill12242005_Sample2

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	10 U	---	220	---	---

Spill04232006_Sample3K6

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	1,000 U	---	25,000	---	---

Spill04232006_Sample4K6

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	20 U	---	510	---	---

TC-11

Depth, ft bgs	TPH-Diesel	TPH-Heavy Oil	TPH-Motor Oil	TRPH	Oil & Grease
5	5 U	5 U	1,670	---	---

Spill04232006_Sample2K6

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	8,000 U	---	**240,000**	---	---

COM-11

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	---	---	---	**7,900**	---

TC-9

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	5 U	---	---

COM-16

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	**750**	---

TC-20

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	444	---	---

COM-14

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	**2,800**	---

TC-18

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	5 U	---	---
7.5	5 U	5 U	159	---	---

TC-14

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
5	5 U	5 U	47	---	---

TC-16

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	277	---	---

COM-12

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	54	---

TC-25

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
9.5	5 U	5 U	5 U	---	---

TC-12

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	**69**	---	---

COM-10

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1	---	---	---	**20,800**	---

TC-10

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
3	5 U	5 U	5 U	---	---

TC-8

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
3.5	5 U	5 U	5 U	---	---

COM-8

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	**49**	---

TC-26

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	5 U	---	---

COM-6

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1	---	---	---	**6,290**	---

TC-6

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	**102**	5 U	---	---
6.5	5 U	5 U	5 U	---	---

COM-4

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.3	---	---	---	**874**	---

COM-2

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1	---	---	---	**9,130**	---

TG-17

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	5 U	5 U	24	---	---

TG-14

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2	5 U	5 U	**1,200**	---	---

TG-12

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0.5	5 U	5 U	**535**	---	---

TG-10

Depth, ft bgs	TPH-Diesel	TPH-Heavy Oil	TPH-Motor Oil	TRPH	Oil & Grease
2	5 U	5 U	**2,050**	---	---

TG-8

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2	5 U	5 U	**1,780**	---	---

BGCS-1

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0.5	---	---	---	---	460
1	---	---	---	---	10 U
1.5	---	---	---	---	**120**

TG-6

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	**188**	---	---

TG-1

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	5 U	5 U	**797**	---	---

TG-2

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	5 U	5 U	5 U	---	---

G1

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1	---	---	---	**83,200**	---

TG-3

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	5 U	5 U	33,900	---	---
2	5 U	5 U	46,900	---	---

G2

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.7	---	---	---	57,600	---

TG-4

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	5 U	5 U	**1,370**	---	---

TG-5

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	**214**	---	---

COM-9

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	8,400	---

COM-7

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	---	---	---	5,930	---

TC-7

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	5 U	---	---
8	5 U	**43**	**37**	---	---

TC-5

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	**119**	---	---

COM-5

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.3	---	---	---	**631**	---

TC-3

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	**144**	---	---

TC-4

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0	5 U	4 U	**3,830**	---	---
3	5 U	5 U	**370**	---	---

COM-3

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.7	---	---	---	2,610	---

TC-2

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
3	5 U	5 U	834	---	---

COM-1

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.7	---	---	---	13,500	---

TC-1

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1	5 U	5 U	390	---	---

TG-18

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
3	5 U	5 U	**31**	---	---

TG-15

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
3	5 U	5 U	**1,800**	---	---

TG-13

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1.5	5 U	5 U	**519**	---	---

TG-11

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2	5 U	5 U	5 U	---	---

TG-9

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
2.5	5 U	5 U	5 U	---	---

TG-7

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1	5 U	5 U	5 U	---	---

G4

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
0.83	---	---	---	**25,300**	---
2	---	---	---	**44,600**	---

G3

Depth, ft bgs	TPH Diesel	TPH Heavy Oil	TPH Motor Oil	TRPH	Oil & Grease
1	---	---	---	**10,100**	---

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
—×—	Site Fence Boundary
━	Stormwater Piping Above Ground
- - -	Stormwater Piping Below Ground
- - -	Former/Abandoned Transfer Piping
—	Current Transfer Piping

TRPH = Total Recoverable Petroleum Hydrocarbons

- **Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.**
- **Results for BGCS-1, Spill04232006_Sample2K6, Spill04232006_Sample3K6, Spill04232006_Sample4K6, Spill04232006_Sample2, Spill04232006_Sample3, Spill04232006_Sample4 are category 2 data. All others are category 3 data.**

FIGURE B11-4
SOIL SAMPLE RESULTS TOTAL PETROLEUM HYDROCARBON AREA OF CONCERN 13 UNPAVED AREAS WITHIN THE TOPOCK COMPRESSOR STATION UPPER YARD

SOIL INVESTIGATION PART B
PHASE 1 WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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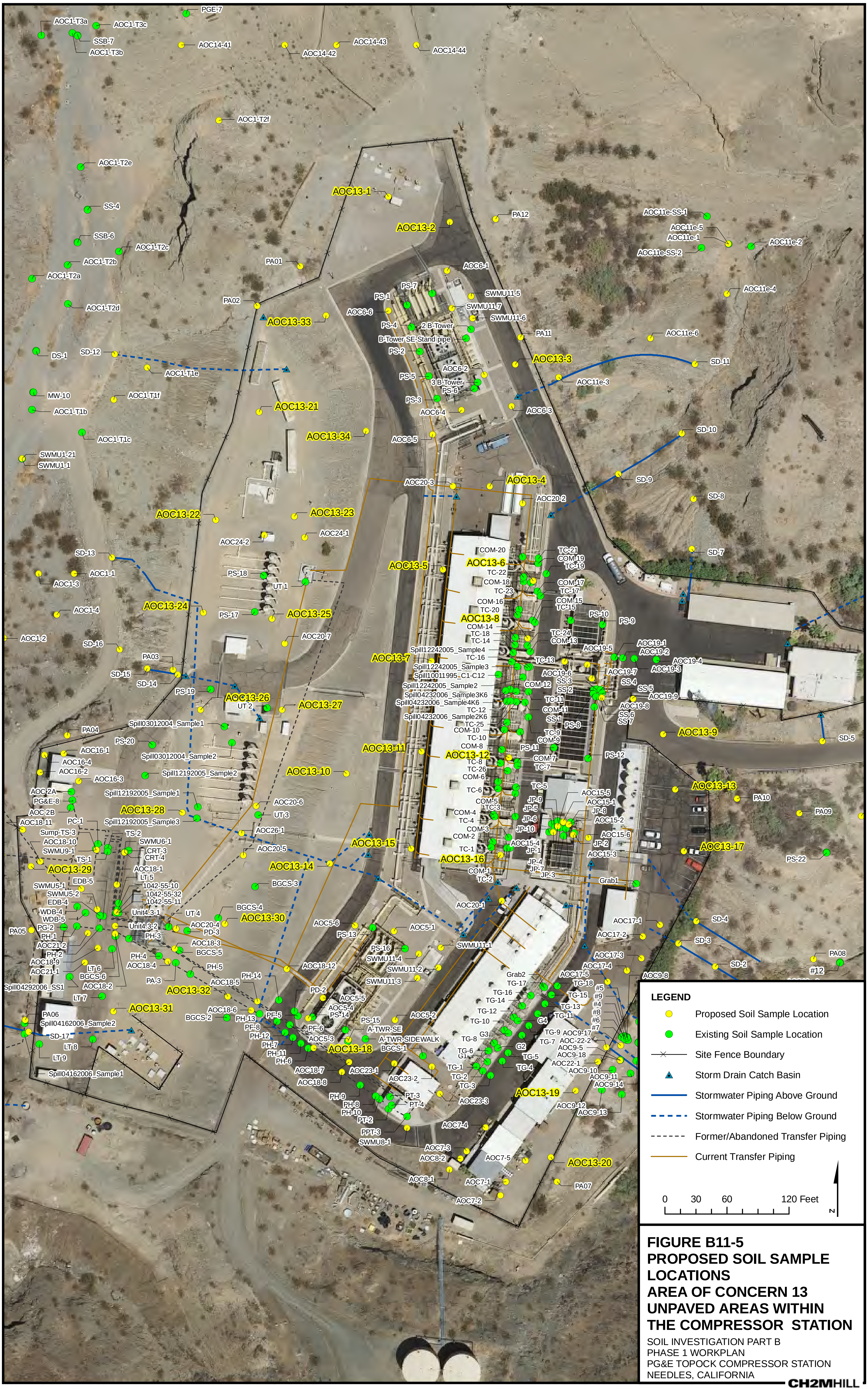

FIGURE B11-5
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 13
UNPAVED AREAS WITHIN THE COMPRESSOR STATION

SOIL INVESTIGATION PART B
PHASE 1 WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix B12
AOC 15 – Auxiliary Jacket Cooling Water Pumps Investigation Program

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Acronyms and Abbreviations

AJCW	auxiliary jacket cooling water
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
COPC	chemical of potential concern
mg/kg	milligrams per kilogram
RSL	regional screening level

APPENDIX B12

AOC 15 Investigation Program

1.0 Introduction and Background

1.1 Background

The auxiliary jacket cooling water (AJCW) pumps are part of the AJCW system and are located within the facility fence line north of the Auxiliary Building, as shown in Figure B15-1. (All tables and figures appear at the end of this sub-appendix). The AJCW system is a closed-loop cooling water system for the generator engines. The pumps are used to circulate the cooling water through the system. The AJCW system was subject to occasional leaks due to failure of pump and valve seals.

The ground surface in the immediate vicinity of the pumps is unpaved but covered with gravel; the area outside the raised area where the pumps are located is paved. The area around the pumps is currently covered with gravel. Chromium-based cooling water additives were used in ACJW system from 1951 through 1985. In 1985, the system was converted to using non-hazardous, molybdate-based cooling water additives. Incidental leaks and spills have occurred and may have resulted in impacts to the soil beneath the pumps. Historical information indicates that cooling water concentrations of molybdenum as molybdate (MoO_4) typically ranged from 300 to 800 parts per million (Betz, 1987, 1989, 1990, 1991); cooling water concentrations of chromium as chromate ranged from several hundred to over 1,000 parts per million (concentrations decreased with time).

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for Area of Concern (AOC) 15 based on the above site history and background, as shown in Figure B12-2. Table B12-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 15. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 15 are likely to be historical liquid discharges (leaks) from the pumps and valves. The quantity of liquid released from the pumps and associated valves are unknown; however, periodic leaks are known to have occurred. If a large release from the pumps or valves occurred, it could have resulted in AJCW reaching the storm drain system. Releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D of this of the main report.

The primary source medium at AOC 15 is surface soil. Because the area around the pumps is covered with gravel, liquids released in AOC 15 would have been released to surface soil and would have infiltrated shallow soil. Liquids released to shallow soils could have infiltrated to deeper soils. Because the entire AOC is covered with gravel or concrete pavement, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway.

2.0 Summary of Past Soil Characterization

Seventeen historical surface and shallow soil samples (sample depths of 0, 3, and 4.5 feet below ground surface [bgs]) were collected from 10 locations (JP-1 through JP-10) in AOC 15, as shown in Figure B12-1. Historical soil samples were analyzed for seven constituents: hexavalent chromium, total chromium, copper, lead, molybdenum, nickel, and zinc. Two rounds of sampling were conducted. Locations JP-1 through JP-7 were installed in April 1997, and locations JP-8 through JP-10 were installed in November 1998. Surface soil samples were collected from all April 1997 locations. In addition, three subsurface samples were collected in April 1997. At location JP-1, samples were collected at 3 feet bgs and 4.5 feet bgs. At location JP-2, a sample was collected at 3 feet bgs. The November 1998 samples were collected from the ground surface and at 3 feet bgs at all three locations and also at 2 feet bgs JP-10. Samples from the initial round were not analyzed for copper and nickel; samples from the second round were not analyzed for lead and molybdenum. Laboratory analytical results for the historical soil samples are presented in Table B12-2. Table B12-3 presents a statistical summary of soil analytical results for chemicals of potential concern (COPCs) and chemical of potential ecological concern (COPECs) that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value.

All historical data are considered Category 1 and were used as inputs to the five data quality objective decisions for AOC 15. As described in Appendix B, there is insufficient information to conduct a data gaps analysis for Decisions 3 and 4. Because the risk assessment will be conducted for the entire area within the fence line, the data gaps evaluation for Decision 2 was conducted for the entire area within the fence line as a whole. Decision 5 data gaps analysis was also conducted for the entire area within the fence line. The data gaps evaluation for Decision 2 through 5 is presented in Appendix B, and additional sampling for these decisions, if necessary, is included in this sub-appendix.

All constituents analyzed were detected in every soil samples in which they were analyzed. Table B12-2 lists the seven detected constituents. Nickel was the only constituent that did not exceed its background threshold value (BTV). Three of the constituents, total chromium, hexavalent chromium, and lead, each exceeded the applicable commercial screening values (California human health screening levels [CHHSLs] for commercial use or the United States Environmental Protection Agency Region 9 regional screening levels [RSLs] for commercial use) one time.

3.0 AOC 15 Nature and Extent Data Gaps Evaluation

The following subsection discusses the nature and extent of detected COPCs detected above screening levels at AOC 15. As discussed in Appendix B, multiple factors were considered to assess whether the nature and extent of a specific constituent have been adequately delineated. Constituents that may require further evaluation are summarized in Section 3.1

through 3.6, and Section 4.0 of this sub-appendix provides the recommended sampling for this unit.

3.1 Total Chromium

Total chromium was detected in 17 of 17 soil samples collected at AOC 15. Detected concentrations of total chromium in these samples ranged from 25.7 to 2,100 milligrams per kilogram (mg/kg). Detected concentrations in 15 of the samples exceeded the BTV (39.8 mg/kg). Detected concentrations of total chromium exceeded the commercial screening level (1,400 mg/kg) (RSL) one time (detected concentration of 2,100 mg/kg at JP-2-S at 0 feet bgs), as shown in Table B12-2 and Figure B12-1. Detected concentrations at the surface ranged from 81 to 2,100 mg/kg; detected concentrations in shallow soils (1 to 3 feet bgs) ranged from 25.7 to 135 mg/kg; and the deepest sample, collected at 4.5 feet bgs, contained 35 mg/kg total chromium. The lateral and vertical extents of concentrations exceeding the screening level have not been fully delineated.

3.2 Hexavalent Chromium

Hexavalent chromium was detected in 17 of 17 soil samples collected at AOC 15. Detected concentrations of hexavalent chromium ranged from 0.47 to 53 mg/kg. Detected concentrations in 15 of the samples exceeded the BTV (0.83 mg/kg). The commercial screening level (37 mg/kg) (CHHSL) was exceeded in one sample (detected concentration of 53 mg/kg at JP-2 at 0 feet bgs), as shown in Table B12-2 and Figure B12-1. Detected concentrations at the surface ranged from 0.47 to 53 mg/kg; detected concentrations in shallow soils (1 to 3 feet bgs) ranged from 0.8 to 8.3 mg/kg; and the deepest sample, collected at 4.5 feet bgs, had a reported hexavalent chromium concentration of 3.4 mg/kg. One of the deeper soil samples had an estimated (J-flagged) concentration. The lateral and vertical extents of hexavalent chromium concentrations exceeding the screening level have not been fully delineated.

3.3 Copper

Copper was detected in seven of seven soil samples collected at AOC 15. Detected concentrations of copper ranged from 7.6 to 316 mg/kg. Detected concentrations in five of the samples exceeded the BTV (16.8 mg/kg). None of the detected concentrations exceeded the commercial screening level (38,000 mg/kg) (CHHSL), as shown in Table B12-2 and Figure B12-1. Detected concentrations in the three surface soil samples ranged from 33.5 to 316 mg/kg; detected concentrations in the four shallow soil samples (1 to 3 feet bgs) ranged from 7.6 to 27.1 mg/kg. The lateral and vertical extents of copper concentrations exceeding the screening level have not been fully delineated.

3.4 Lead

Lead was detected in 10 of 10 soil samples collected at AOC 15. Detected concentrations of lead ranged from 5.4 to 820 mg/kg. Detected concentrations in seven of the samples exceeded the BTV (8.39 mg/kg). The commercial screening level (320 mg/kg) (CHHSL) was exceeded in one sample (detected concentration of 820 mg/kg at JP-2 at 0 feet bgs), as shown in Table B12-2 and Figure B12-1. Detected concentrations in the seven surface soil samples ranged from 28 to 820 mg/kg; detected concentrations in the two shallow soil samples (1 to 3 feet bgs) and the subsurface soil sample (collected at 4.5 feet bgs) were all well below the BTV. The lateral extent of lead concentrations exceeding the screening level has not been fully delineated. The vertical extent of lead concentrations exceeding the screening level has been delineated.

3.5 Molybdenum

Molybdenum was detected in 10 of 10 soil samples collected at AOC 15. Detected concentrations of molybdenum ranged from 24 to 720 mg/kg. Detected concentrations in all 10 samples exceeded the BTV (1.37 mg/kg). None of the detected concentrations exceeded the commercial screening level (4,800 mg/kg) (CHHSL), as shown in Table B12-2 and Figure B12-1. Detected concentrations in the seven surface soil samples ranged from 25 to 720 mg/kg; detected concentrations in the two shallow soil samples (1 to 3 feet bgs) were 24 and 310 mg/kg, respectively, and the concentration in the subsurface soil sample (collected at 4.5 feet bgs) was 52 mg/kg. The lateral and vertical extents of molybdenum concentrations exceeding the screening level have not been fully delineated.

3.6 Zinc

Zinc was detected in 17 of 17 soil samples collected at AOC 15. Detected concentrations of zinc ranged from 20 to 57 mg/kg. Detected zinc concentrations did not exceed the BTV (58 mg/kg). Detected concentrations of zinc also did not exceed the commercial screening level (100,000 mg/kg) (CHHSL), as shown in Table B12-2 and Figure B12-1. The lateral and vertical extents of zinc concentrations exceeding the screening level have been defined.

3.7 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review of the historical data indicates that lateral delineation of all metals analyzed is incomplete, and that the vertical delineation of total chromium, hexavalent chromium, copper, and molybdenum is also incomplete. Data gaps remain with regard to other metals.

4.0 AOC 15 Data Gaps and Proposed Sampling

4.1 AOC 15 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gaps were identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination of Title 22 metals.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes polycyclic aromatic hydrocarbons, has been added to all soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.
- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.2 AOC 15 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 15 is located in Area 13 on the Topock Compressor Station Accessibility Map (Figure B-2). Sixty-three utility risers, consisting of auxiliary cooling water and electrical lines, were identified in Area 13. In addition, this area contains two large vaults, a cathodic protection anode, and a bank of SCADA cabinets. Photographs 17 through 24 in sub-Appendix B25 show the accessibility constraints in AOC 15. As can be seen in the photos, the AOC is completely blocked to equipment access. The eastern portion of the unit is raised approximately 3 feet above grade, and major aboveground utilities are present in front of the area. The control building is present to the north, jacket coolers are present to the south, and extensive control panel cabinets (SCADA cabinets) are present to the west. Only hand sampling is feasible in this unit. Sample locations and depths identified for AOC 15 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

4.3 AOC 15 Proposed Sampling

Table B12-4 summarizes the proposed AOC 15 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B12-3. The proposed AOC 15 sample locations are Pacific Gas and Electric Company’s initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Based on the historical use of chromium-based cooling water additives in this system and California Environmental Protection Agency, Department of Substances Control requirements, the COPCs associated with AOC 15 are Title 22 metals, hexavalent chromium, and pH as the COPCs for soil associated with AOC 15. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007).

Samples will be collected at six locations: AOC 15-1 through AOC 15-6. Because of limited access, numerous subsurface utilities and pipelines, and proximity to operational structures, only hand tools can be used to collect samples in AOC 15; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. All samples will be analyzed for Title 22 metals, hexavalent chromium, and pH. As required by the United States Department of the Interior, 10 percent of all samples collected during this investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

To address the data needs associated with Decision 5, one samples will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B12-4); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

Betz, Inc. 1987. *Topock Cooling Water Analyses Report*. March 12.

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CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*. August 10.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Tables

TABLE B12-1
Conceptual Site Model, AOC 15 – Auxiliary Jacket Water Cooling Pumps
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental Spills and Releases around Auxiliary Jacket Water Cooling Pumps	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B12-2

Sample Results: Metals

Area of Concern 15 – Auxiliary Jacket Water Cooling Pumps Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)							General Chemistry in mg/kg unless otherwise noted	
Commercial Screening Level [1]:				**37**	**1,400**	**38,000**	**320**	**4,800**	**16,000**	**100,000**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**0.83**	**39.8**	**16.8**	**8.39**	**1.37**	**27.3**	**58**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium Hexavalent**	**Chromium**	**Copper**	**Lead**	**Molybdenum**	**Nickel**	**Zinc**	**pH**	**Total dissolved solids**
Category1												
JP-1-3	04/25/97	3	N	**8.3 J**	**72**	**---**	6	**310**	---	44 --	-	91
JP-1	04/25/97	4.5	N	**3.4**	35	**---**	4.4	**52**	---	20 --	-	94
JP-1	04/24/97	0	N	**1.2**	**81**	**---**	**28**	**300**	---	39 --	-	92
JP-2	04/25/97	3	N	**1.4**	**41**	**---**	5.4	**24**	---	57 --	-	93
JP-2	04/24/97	0	N	**53**	**2,100**	**---**	**820**	**720**	---	**180**	---	97
JP-3	04/24/97	0	N	**16**	**330**	**---**	**200**	**710**	---	**150**	---	99
JP-4	04/24/97	0	N	**3.8**	**86**	**---**	**60**	**330**	---	**94**	---	99
JP-5	04/24/97	0	N	**10**	**89**	**---**	**28**	**260**	---	49 --	-	89
JP-6	04/24/97	0	N	**12**	**730**	**---**	**52**	**210**	---	**180**	---	90
JP-7	04/24/97	0	N	0.47	**270**	**---**	**28**	**25**	---	**100**	---	96
JP-8	11/13/98	3	N	**3.5**	**48.1**	9.4	**---**	**---**	12.2 28.4 9.51			---
JP-8	11/13/98	0	N	**5.9**	**920**	**316**	**---**	**---**	16.6	**133**	8.62 ---	
JP-9	11/13/98	3	N	**4**	**135**	**27.1**	**---**	**---**	17 42.7		9.44	---
JP-9	11/13/98	0	N	**13.7**	**1,340**	**40.2**	**---**	**---**	12	**158**	9.27 ---	
JP-10	11/13/98	2	N	**2.5**	**117**	**22.3**	**---**	**---**	19.6 46.9 9.36			---
JP-10	11/13/98	3	N	0.8 25.	7	7.6	**---**	**---**	6.1 42.3		8.7	---
JP-10	11/13/98	0	N	**32.3**	**930**	**33.5**	**---**	**---**	11.8 53.4 9.16			---

TABLE B12-2

Sample Results: Metals
Area of Concern 15 – Auxiliary Jacket Water Cooling Pumps Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

TABLE B12-3

Constituent Concentrations in Soil Compared to Screening Values

Area of Concern 15 – Auxiliary Jacket Water Cooling Pumps Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV)[1]		RWQCB Environmental Screening Levels (ESL)[2]		Commercial Screening Level (Com SL)[3]	
							# of Exceedences[4]	(BTV)	# of Exceedences[5]	(ESL)	# of Exceedences[5]	(Com SL)
General Chemistry												
pH	pH units	7 / 7 (100%)	7 / 7 (100%)	0 / 0 (0%)	0 / 0 (0%)	9.51	NA	(NE)	NA	(NE)	NA	(NE)
Total dissolved solids	%	10 / 10 (100%)	10 / 10 (100%)	0 / 0 (0%)	0 / 0 (0%)	99	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Chromium, Hexavalent	mg/kg	17 / 17 (100%)	17 / 17 (100%)	0 / 0 (0%)	0 / 0 (0%)	53	15	(0.83)	0	(NE)	1	(37)
Chromium, total	mg/kg	17 / 17 (100%)	17 / 17 (100%)	0 / 0 (0%)	0 / 0 (0%)	2,100	15	(39.8)	0	(NE)	1	(1,400)
Copper	mg/kg	7 / 7 (100%)	7 / 7 (100%)	0 / 0 (0%)	0 / 0 (0%)	316	5	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	10 / 10 (100%)	10 / 10 (100%)	0 / 0 (0%)	0 / 0 (0%)	820	7	(8.39)	0	(NE)	1	(320)
Molybdenum	mg/kg	10 / 10 (100%)	10 / 10 (100%)	0 / 0 (0%)	0 / 0 (0%)	720	10	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	7 / 7 (100%)	7 / 7 (100%)	0 / 0 (0%)	0 / 0 (0%)	19.6	0	(27.3)	0	(NE)	0	(16,000)
Zinc	mg/kg	17 / 17 (100%)	17 / 17 (100%)	0 / 0 (0%)	0 / 0 (0%)	180	7	(58)	0	(NE)	0	(100,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

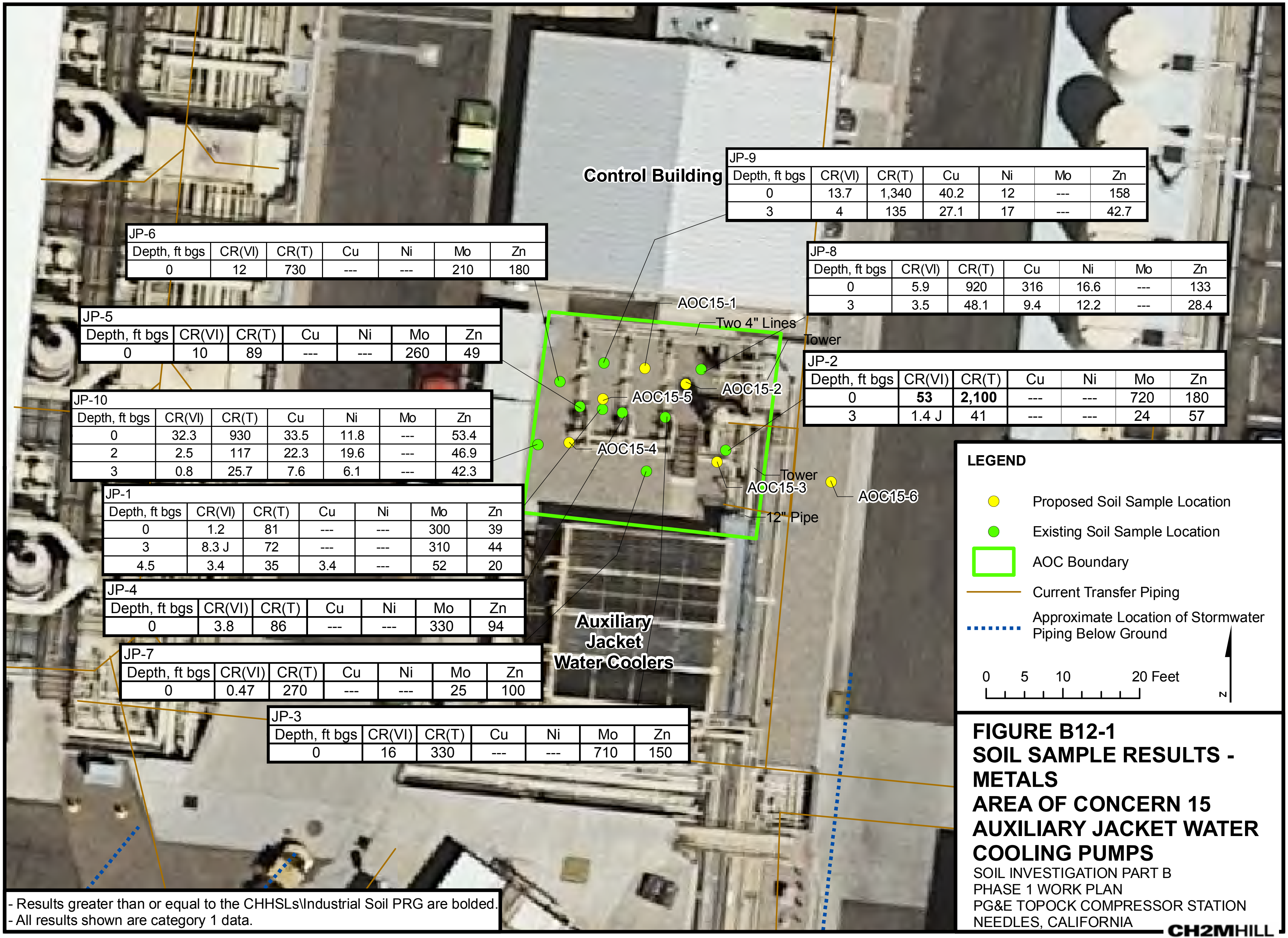
TABLE B12-4
Proposed Sampling Plan
AOC 15 – Auxiliary Jacket Water Cooling Pumps
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 15-1	0-0.5 and 3, if feasible	Along the south side of the Control Building, north of the 4” pipes; to resolve Data Gap #1 - Lateral and vertical extent of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH
AOC 15-2	0-0.5 and 3, if feasible	Along the eastern edge of the AOC, east of the larger tower; to resolve Data Gap #1 - Lateral and vertical extent of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH
AOC 15-3	0-0.5 and 3, if feasible	Along the south side of the eastern pump line; to resolve Data Gap #1 - Lateral and vertical extent of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 15-4	0-0.5 and 3, if feasible	Along the south side of the western pump line; to resolve Data Gap #1 - Lateral and vertical extent of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH
AOC 15-5	0-0.5 and 3, if feasible	Between the western and center pump lines on the north side; to resolve Data Gap #1 - Lateral and vertical extent of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH
AOC 15-6	0-0.5 and 3, if feasible	East of the AOC to address unpaved area; to resolve Data Gap #1 - Lateral and vertical extent of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH

Note:

Ten percent of samples collected during the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

Figures



JP-9

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	13.7	1,340	40.2	12	---	158
3	4	135	27.1	17	---	42.7

JP-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	12	730	---	---	210	180

JP-8

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	5.9	920	316	16.6	---	133
3	3.5	48.1	9.4	12.2	---	28.4

JP-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	10	89	---	---	260	49

JP-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	**53**	**2,100**	---	---	720	180
3	1.4 J	41	---	---	24	57

JP-10

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	32.3	930	33.5	11.8	---	53.4
2	2.5	117	22.3	19.6	---	46.9
3	0.8	25.7	7.6	6.1	---	42.3

JP-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	1.2	81	---	---	300	39
3	8.3 J	72	---	---	310	44
4.5	3.4	35	3.4	---	52	20

JP-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	3.8	86	---	---	330	94

JP-7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	0.47	270	---	---	25	100

JP-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn
0	16	330	---	---	710	150

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
🟩	AOC Boundary
—	Current Transfer Piping
······	Approximate Location of Stormwater Piping Below Ground

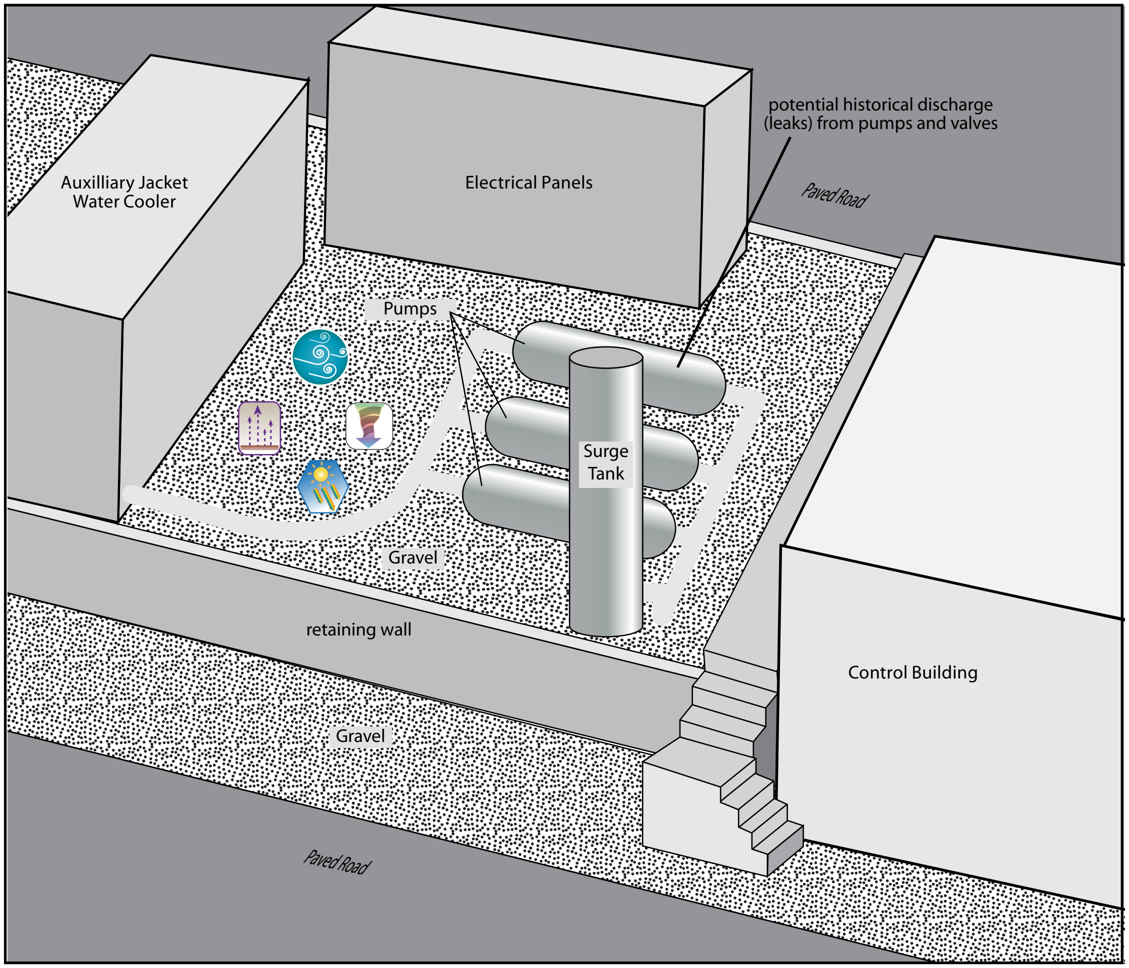
- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- All results shown are category 1 data.

FIGURE B12-1
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 15
AUXILIARY JACKET WATER COOLING PUMPS

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC15_Result_Metal



NOT TO SCALE

LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration

FIGURE B12-2
Conceptual Site Model for AOC15 –
Auxilliary Jacket Water Cooling Pumps
PG&E Topock Compressor Station
Needles, California

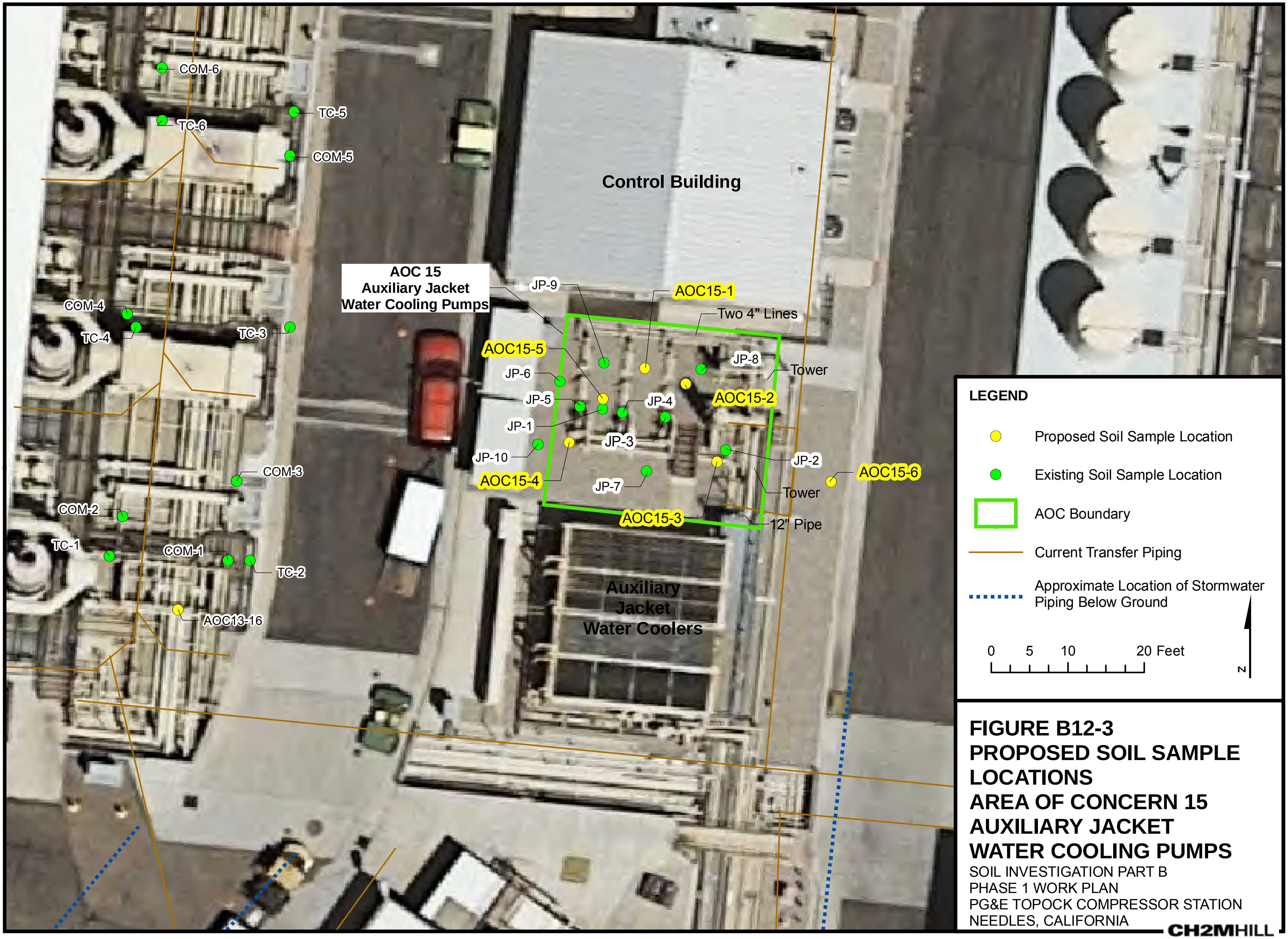


FIGURE B12-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 15
AUXILIARY JACKET WATER COOLING PUMPS

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC15_Proposed_sample_Locs

Appendix B13
AOC 16 – Sandblast Shelter Investigation Program

Contents

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
MSDS	Materials Safety Data Sheet
PAH	polycyclic aromatic hydrocarbon

APPENDIX B13

AOC 16 Investigation Program

1.0 Introduction and Background

1.1 Background

The sand blast shelter is located in the lower yard near injection well PGE-08 (Solid Waste Management Unit 2), as shown in Figure B13-1. (All tables and figures appear at the end of this sub-appendix.) The area immediately surrounding the shelter is currently and historically has been unpaved, except for the concrete driveway between the eastern edge of the shelter and the paved roadway. The sandblast shelter was installed in the early 1990s. The sand blast shelter is used to prepare metal items at the facility for protective coating. The shelter is constructed of four supports and a roof with open sides. The sandblasting operations were conducted by off-site personnel who followed the applicable air quality standards and BMPs of the time, including the use of tenting, drop cloths, and post-sandblasting cleaning to minimize the spreading of material during and after sandblasting operations.

During site walks with California Environmental Protection Agency, Department of Substances Control, two different colors of abrasive material were noted on the ground in the immediate vicinity of the sand blast shelter. The abrasive materials were brought onsite by the sandblasting operators and were specified to meet standards associated with the air permit for sandblast activities. Two types of sand blast material were typically been used in the past several years: KleenBlast® and Monterey 30 Mesh sand. KleenBlast is comprised mostly of iron oxide, silicon dioxide, silica, alumina, calcium, and 5.9 percent of other trace metals and oxides. Monterey sand is primarily (99%) silica (quartz) sand. Historically, lead-based paint and/or paint containing higher levels of other heavy metals may have been used at the facility and may be present in sand blast residue.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for Area of Concern (AOC) 16 based on the above site history and background, as shown in Figure B13-2. Table B13-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 16. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 16 are likely to be used sand blast grit, incidental spills of sand blasting materials, and potentially lead-based paint resulting from sand-blasting activities. The quantity of any used sand blast grit released in the area is unknown; however, as noted above, sand blast grit was noted on the ground in the vicinity of the structure.

The primary source medium at AOC 16 is surface soil. The area around the structure is unpaved. Any contaminated sand blast grit spilled from the shelter would have been released to surface soil. Contaminants could have leached from surface soils into underlying soils. Contaminated sand blast grit could also have been carried off the station in sheet flow during high rainfall events. Windblown dust contamination from small particles of sand blast grit or contaminated surface soil around AOC 16 is a potential secondary release mechanism. Windblown contamination, if any, is expected to be limited to surface soils. Surface runoff from AOC 16 to Bat Cave Wash could also have transported chemicals of potential concern/chemicals of potential ecological concern (COPCs/COPECs) in surface soil from AOC 16 to Bat Cave Wash.

2.0 Summary of Past Soil Characterization

Soil within AOC 16 has not been previously sampled. However, two soil samples associated with AOC 2 are located in proximity to AOC 16. These two historical surface soil samples (collected at 3 to 5 inches below ground surface [bgs]) were collected from two locations (AOC2A and AOC2B) in proximity to AOC 16. For the purpose of this work plan, these two samples have been included on Table B13-2 and Figure B13-1 for AOC 16. Historical soil samples were analyzed for total chromium, hexavalent chromium, copper, nickel, and zinc. Laboratory analytical results for the historical soil samples are presented in Table1 B13-2. Table B13-3 presents a statistical summary of soil analytical results for COPCs and COPECs that were either detected above the laboratory reporting limits or not detected but where the reporting limits for one or more samples was greater than the interim screening value.

All historical data are considered Category 1 and were used as inputs to the five data quality objective decisions for AOC 16. As described in Appendix B, there is insufficient information to conduct a data gaps analysis for Decisions 3 and 4. Because the risk assessment will be conducted for the entire area within the fence line, the data gaps evaluation for Decision 2 was conducted for the entire area within the fence line as a whole. Decision 5 data gaps analysis was also conducted for the entire area within the fence line. The data gaps evaluation for Decision 2 through 5 is presented in Appendix B, and additional sampling for these decisions, if necessary, are included in this sub-appendix.

Four of the five constituents (total chromium, copper, nickel, and zinc) analyzed were detected in soil samples collected near AOC 16. Table B13-2 lists the four detected constituents. All four constituents were only detected at concentrations at or below their respective background threshold values. All detections were well below their applicable commercial screening values (California human health screening level for commercial use or United States Environmental Protection Agency Region 9 regional screening levels for commercial use).

3.0 AOC 16 Nature and Extent Data Gaps Evaluation

This section discusses the nature and extent of detected COPCs detected above interim screening levels at AOC 16. As discussed in Appendix B, multiple factors were considered to assess whether the nature and extent of a specific constituent have been adequately delineated. Section 4.0 of this sub-appendix provides the recommended sampling for this unit.

Based on the site history, background, and conceptual site model, qualitative review of the historical data indicates that the lateral and/or vertical extent of potential contamination to the east, north, and west of this unit has not been defined, and the nature of the sand blast grit noted in the vicinity of the unit has not been evaluated.

4.0 Area of Concern 16 Data Gaps and Proposed Sampling

4.1 AOC 16 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gaps were identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination east, north and west of the structure.
2. Data Gap #2 – Nature of sandblast grit in the vicinity of the structure.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.
- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.2 AOC 16 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 16 is located in Area 4 on the Topock Compressor Station Accessibility Map (Figure B-2). Twenty-three utility risers, including water, electrical, telecommunications, and cooling water lines, were identified in Area 4. In addition, the area contains an active and an abandoned cathodic protection anode. Photograph 26in sub-Appendix B25 show the accessibility constraints in AOC 16. Sample locations and depths identified for AOC 16 reflect the identified access constraints, and will be modified. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less

4.3 AOC 16 Proposed Sampling

Table B13-4 summarizes the proposed AOC 16 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B13-3. The figure also shows proposed sample locations for surrounding solid waste management units and AOCs. The proposed AOC 16 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at four locations: AOC 16-1 through AOC 16-4. Because of limited access and numerous subsurface utilities and pipes, only hand tools can be used to collect samples in AOC 16; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs from locations AOC16-1 through AOC 16-3. Based on the available information, COPCs for soil associated with AOC 16 consist of some metals (e.g., lead from lead-based paint). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). All samples will be analyzed for Title 22 metals. Prior investigation in the area outside the fence line and available information regarding the site history indicate that volatile organic compounds and semivolatile organic compound other than PAHs should not be considered COPCs for this unit. As required by the United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

To address the data needs associated with Decision 5, one samples will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B13-4); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil*. July 1.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*. August 10.

___________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Tables

TABLE B13-1
Conceptual Site Model, AOC 16 – Sand Blast Shelter
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental Releases from Sand Blasting Area	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase I data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B13-2

Sample Results: Metals
Area of Concern 16 – Sand Blast Shelter Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)					
Commercial Screening Level [1]:				**37**	**1,400**	**38,000**	**16,000**	**100,000**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**0.83**	**39.8**	**16.8**	**27.3**	**58**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium Hexavalent**	**Chromium**	**Copper**	**Nickel**	**Zinc**	**pH**
Category1									
AOC 2A	02/20/03	0.4	N	ND (4.2)	26.1	10.2	12.4	**367**	9.6
AOC 2B	02/20/03	0.4	N	ND (3.8)	17.3	11.2	17	23.9	8.2

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

TABLE B13-3

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 16 – Sand Blast Shelter Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

							Background Threshold Value (BTV) [1]		RWQCB Environmental Screening Levels (ESL) [2]		Commercial Screening Level (Com SL) [3]	
Parameter	**Units**	**Frequency of Detection Total**	**Frequency of Detection Category 1**	**Frequency of Detection Category 2**	**Frequency of Detection Category 3**	**Maximum Detected Value**	**# of Exceedences [4]**	**(BTV)**	**# of Exceedences [5]**	**(ESL)**	**# of Exceedences [5]**	**(Com SL)**
General Chemistry												
pH	pH units	2 / 2 (100%)	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	9.6	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Chromium, Hexavalent	mg/kg	0 / 2 (0%)	0 / 2 (0%)	0 / 0 (0%)	0 / 0 (0%)	ND (4.2) ‡	0	(0.83)	NA	(NE)	0	(37)
Chromium, total	mg/kg	2 / 2 (100%)	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	26.1	0	(39.8)	0	(NE)	0	(1,400)
Copper	mg/kg	2 / 2 (100%)	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	11.2	0	(16.8)	0	(NE)	0	(38,000)
Nickel	mg/kg	2 / 2 (100%)	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	17	0	(27.3)	0	(NE)	0	(16,000)
Zinc	mg/kg	2 / 2 (100%)	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	367	1	(58)	0	(NE)	0	(100,000)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

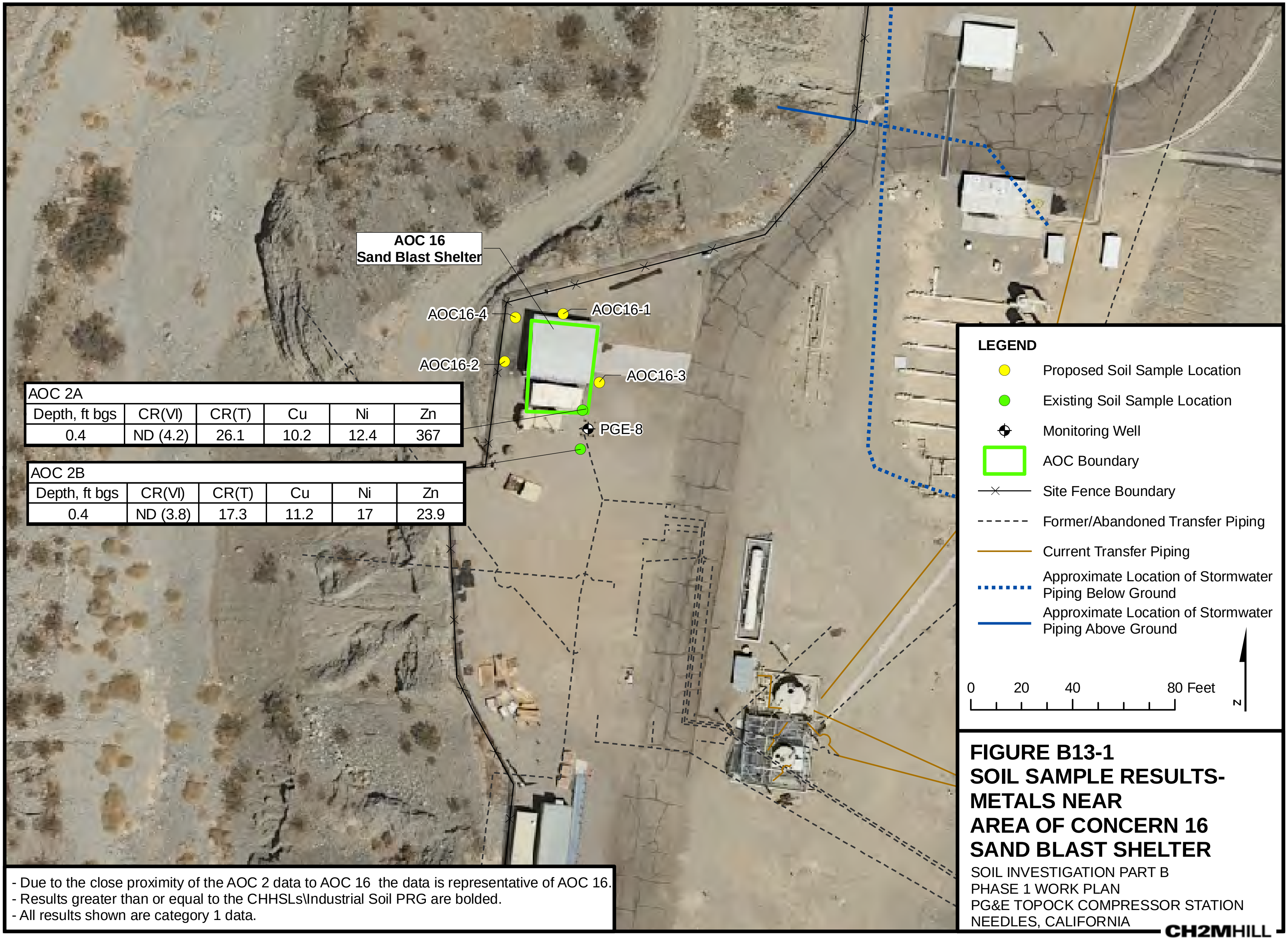
TABLE B13-4
Proposed Sampling Plan - AOC 16 – Sand Blaster Shelter
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 16-1	0-0.5 and 3, if feasible	North side of sand blast shelter; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of contamination north of the structure and nature of sand blast grit in the vicinity of the structure	Title 22 metals
AOC 16-2	0-0.5 and 3, if feasible	West side of sand blast shelter; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of contamination west of the structure and nature of sand blast grit in the vicinity of the structure	Title 22 metals
AOC 16-3	0-0.5 and 3, if feasible	East side of sand blast shelter; to resolve Data Gaps #1 and #2 – Lateral and vertical extent of contamination east of the structure and nature of sand blast grit in the vicinity of the structure	Title 22 metals; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation
AOC 16-4	0-0.5	Sample of sand blast grit; to Data Gap #2 - nature of sand blast grit in the vicinity of the structure	Title 22 metals

Note:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

Figures



AOC 2A					
Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0.4	ND (4.2)	26.1	10.2	12.4	367

AOC 2B					
Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0.4	ND (3.8)	17.3	11.2	17	23.9

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
⊕	Monitoring Well
🟩	AOC Boundary
—×—	Site Fence Boundary
- - - -	Former/Abandoned Transfer Piping
——	Current Transfer Piping
······	Approximate Location of Stormwater Piping Below Ground
——	Approximate Location of Stormwater Piping Above Ground

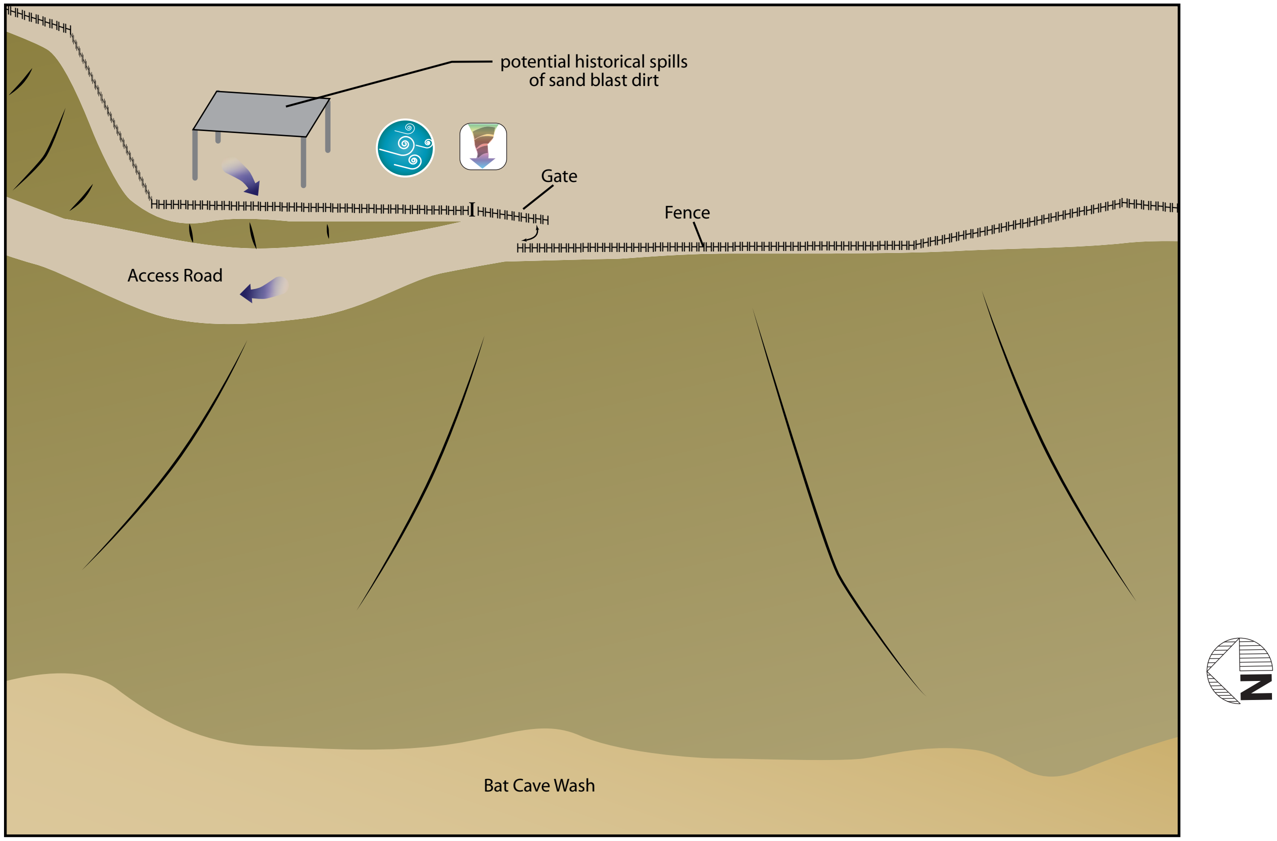
- Due to the close proximity of the AOC 2 data to AOC 16 the data is representative of AOC 16.
- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- All results shown are category 1 data.

FIGURE B13-1
SOIL SAMPLE RESULTS-METALS NEAR AREA OF CONCERN 16 SAND BLAST SHELTER

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC16_Results_Metal



NOT TO SCALE

LEGEND

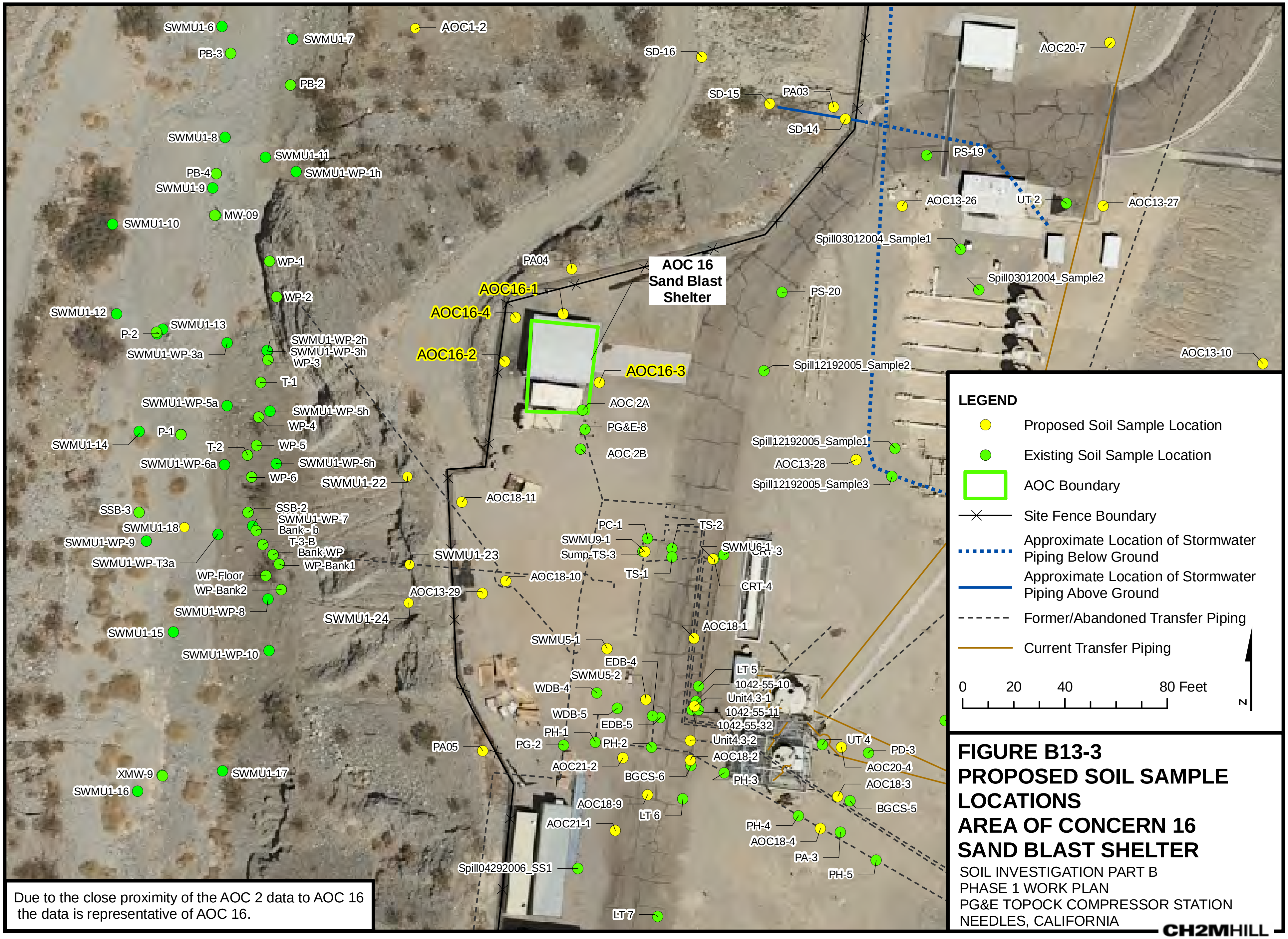
Potential Release Mechanisms

Windblown Dispersion

Infiltration

Infrequent Surface Water Runoff

FIGURE B13-2
Conceptual Site Model for AOC16 –
Sand Blast Shelter
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California



Due to the close proximity of the AOC 2 data to AOC 16 the data is representative of AOC 16.

FIGURE B13-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 16
SAND BLAST SHELTER

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC16_Proposed_sample_locs

Appendix B14
AOC 17 – Onsite Septic System Investigation Program

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B14-1 Conceptual Site Model – AOC 17 Onsite Septic System
B14-2 Proposed Sampling Program

Figure

B14-1 Proposed Soil Sample Locations
B14-2 Conceptual Site Model

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
PAH	polycyclic aromatic hydrocarbon
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B14

AOC 17 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 17 consists of the onsite septic system that serves the Auxiliary Building and other nearby buildings (the Technical Maintenance Building, Weld Shop, Garage, and Maintenance Shop), as shown in Figure B14-1(All tables and figures appear at the end of this sub-appendix.) The Auxiliary Building includes the electricity generator engines (P-Units), air compressors, electric switchgear, battery room, laboratory, mechanics' office, machine shop, locker room, and crew lunchroom.

One of the sources of waste water received by this septic system is the facility laboratory located in the Auxiliary Building. The plant cooling water was routinely sampled to monitor its chemical content and pH. Test chemicals consisted of indicator reagents, which were supplied by the cooling water treatment chemical company. Once the cooling water was tested, the laboratory waste (testing solutions and small amounts of cooling water) was discharged into the septic system. Approximately 1 pint per day of testing solutions and cooling water was disposed of into the septic system connected to the facility laboratory. This practice ended approximately five years ago. Incidental releases of maintenance-type chemicals could also have entered the septic system.

The septic system consists of a septic tank and associated leachfield. A plaque mounted on the wall of the Air Dryer Building indicates that the southwest corner of the septic tank associated with the laboratory is located 4 feet northeast of the Air Drying Building and is buried 4 feet deep (Russell, 2006). An undated hand sketch shows the approximate location of the leachfield in the location shown in Figure B14-1. Aerial photos from 1967 and earlier indicate that the area around the septic tank and leachfield was unpaved. While review of the aerial photograph from 2004 shows that the area was paved, aerial photographs between 1967 and 2004 do not have sufficient resolution to determine at what point the area was paved.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 17 based on the above site history and background, as shown in Figure B14-2. Table B14-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 17. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 17 are likely to be historical liquid discharges from the laboratory. The quantity of liquid released to the septic system is unknown.

Weekly testing of plant cooling water would have resulted in the disposal of approximately 6.5 gallons of liquid per year, whereas daily testing would have resulting in the disposal of approximately 45.5 gallons of liquid per year (assuming approximately one pint of liquid waste per test event). In addition to the laboratory waste, the septic system received, and continues to receive, sanitary waste from the Auxiliary Building.

The primary source medium at AOC 17 is subsurface soil. Although the exact depth of the leach lines is unknown, they would be located below the top elevation of the septic tank (i.e., more than 4 feet bgs). The continuous release of liquids in AOC 17 would have served as a possible driver for wastes to infiltrate to deeper soils. Because the liquids were discharged below the ground surface and the entire area is currently paved, there are no surface migration pathways for this AOC.

2.0 Summary of Past Soil Characterization

This AOC has not been previously sampled.

3.0 AOC 17 Data Gaps and Proposed Sampling

3.1 AOC 17 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gaps were identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination in the vicinity of the leach field.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemical of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data, and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 17 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 17 is located in Area 11 on the Topock Compressor Station Accessibility Map (Figure B-2). Thirty-two utility risers, consisting of wastewater, water and electrical lines, were identified in Area 11. Photograph 7in sub-Appendix B25 show the accessibility constraints in AOC 17. The primary access constraint for AOC 17 is the need to preserve the integrity of the septic system, which is currently operational. Sample locations and depths identified for AOC 17 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

3.3 AOC 17 Proposed Sampling

Table B14-2 summarizes the proposed AOC 17 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B14-1. A geophysical survey will be performed to attempt to locate the exact location of the leachfield to assist with sample location placement. The figure also shows proposed sample locations for surrounding solid waste management units and AOCs. The proposed sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation

Sampling is required near the septic tank and in the general vicinity of the leachfield. If feasible, without endangering the integrity of the septic system, samples will be collected from within the leachfield. Based on operational history and California Environmental Protection Agency, Department of Substances Control requirements, the COPCs associated with AOC 17 are Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), and semivolatile organic compounds (SVOCs), including PAHs. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007).

Samples will be collected at five locations: AOC 17-1 through AOC 17-5. Because of the active leachfield and numerous subsurface utilities, only hand tools can be used to collect samples in AOC 17; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, deeper samples will be collected at 2 to 3 and 5 to 6 feet bgs. Because the area to be sampled is covered with asphalt, the surface sampling interval will begin 6 inches below of the asphalt or gravel sub-base. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, and SVOCs, including PAHs. As required by the United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B14-2); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

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Tables

TABLE B14-1
Conceptual Site Model, AOC 17 – Onsite Septic System
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental Releases inform Septic System	Subsurface Soil	Percolation and/or infiltration	Subsurface Soil Potential Groundwater	Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B14-2
Proposed Sampling Plan - AOC 17 – Onsite Septic System
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 17-1	0-0.5, and 3 and 6 if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination in the vicinity of the leach field.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs
AOC 17-2	0-0.5, and 3 and 6 if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination in the vicinity of the leach field.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs
AOC 17-3	0-0.5, and 3 and 6 if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination in the vicinity of the leach field.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 17-4	0-0.5, and 3 and 6 if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination in the vicinity of the leach field.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs
AOC 17-5	0-0.5, and 3 and 6 if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination in the vicinity of the leach field.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs

Notes:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures

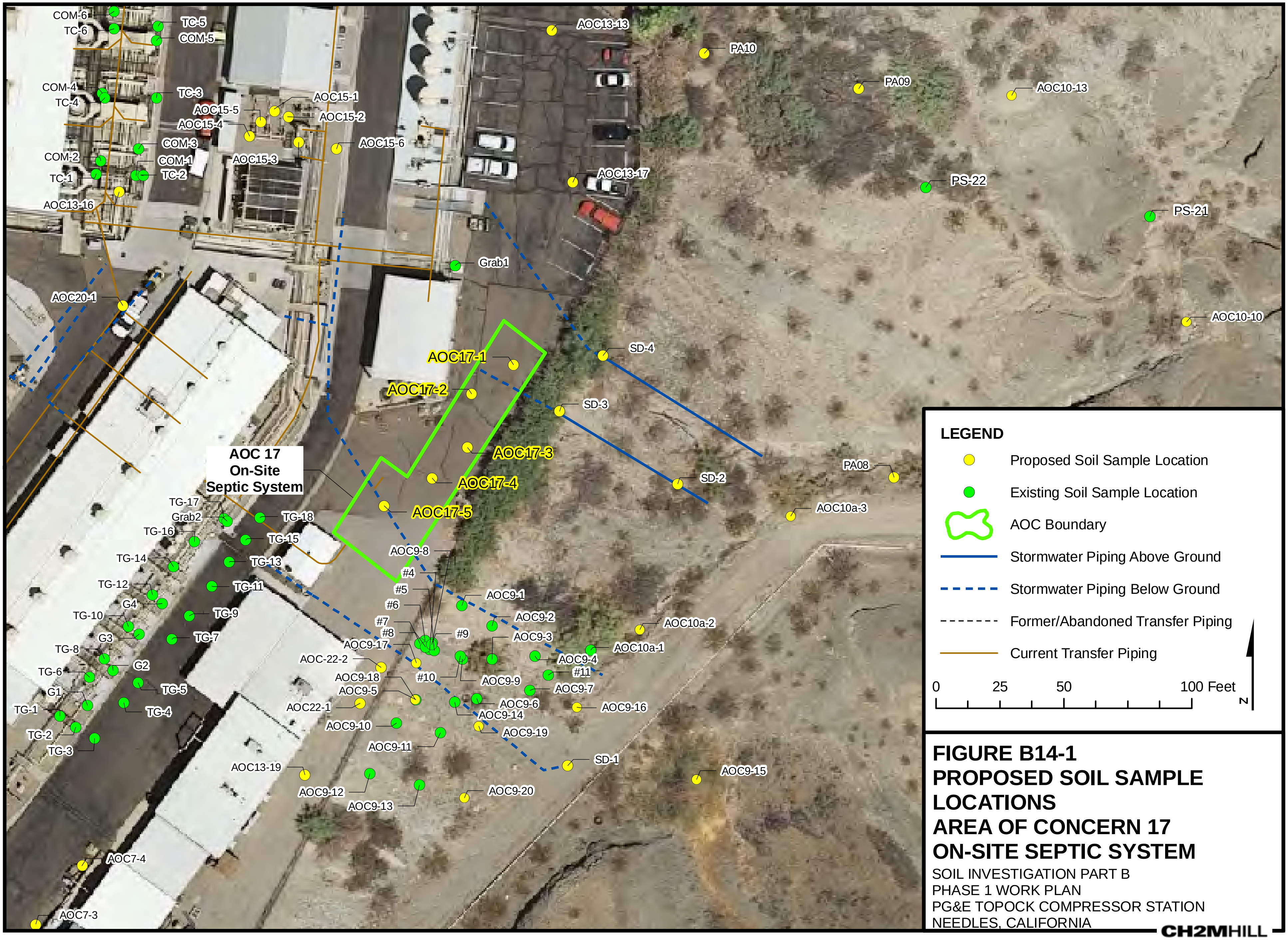
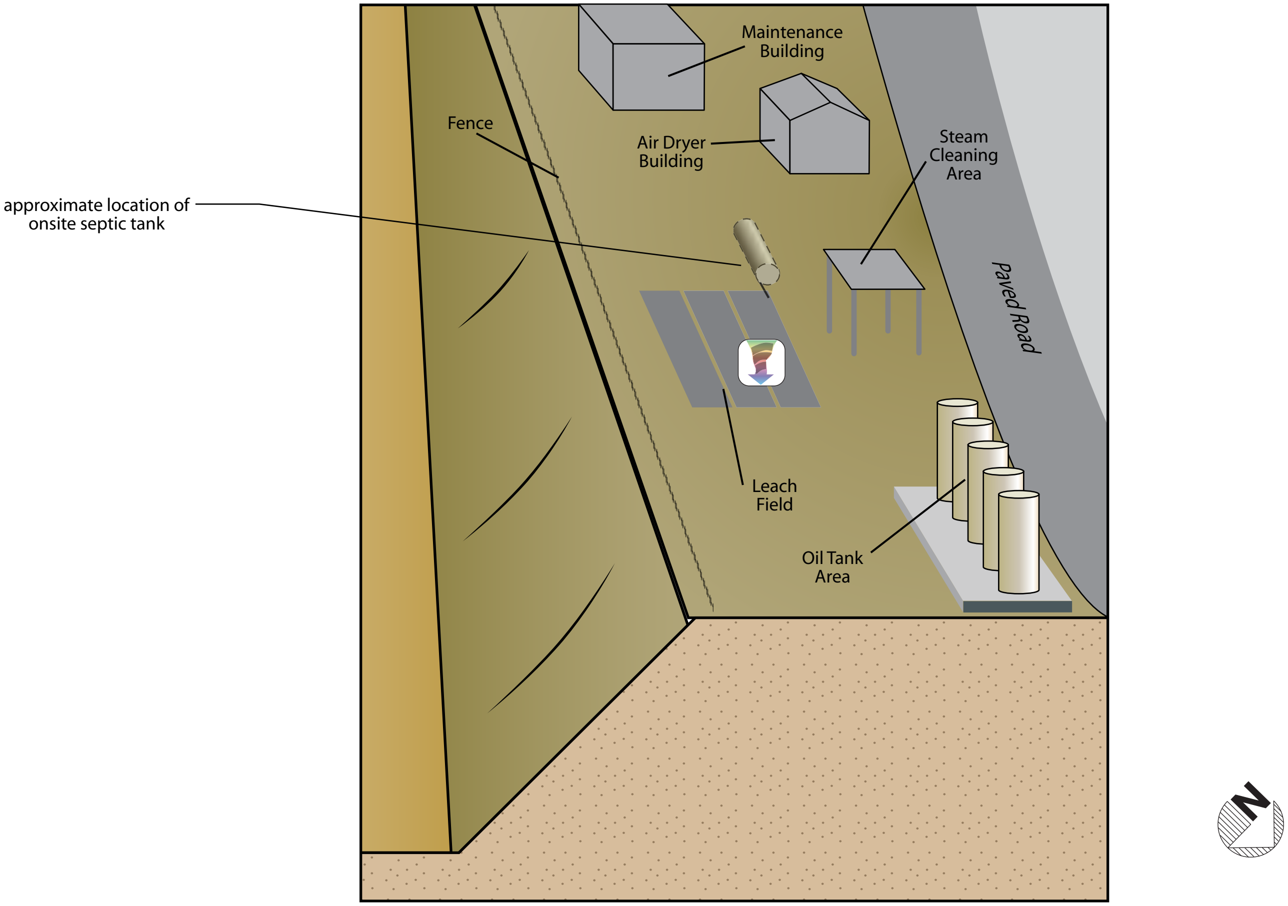


FIGURE B14-1
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 17
ON-SITE SEPTIC SYSTEM

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

D:\Projects\Topock_GIS\MapFiles\2007\SWP_B\AOC17_Proposed_Sample_Locs



NOT TO SCALE

LEGEND

Potential Release Mechanisms

Infiltration

FIGURE B14-2
Conceptual Site Model for AOC17 –
Onsite Septic System
PG&E Topock Compressor Station
Needles, California

CH2MHILL.

Appendix B15
AOC 18 – Combined Wastewater Transference Pipelines Investigation Program

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B15

AOC 18 Investigation Program

1.0 Introduction and Background

Area of Concern (AOC) 18 consists of the pipelines that were used to connect the cooling towers to the wastewater system including Solid Waste Management Unit (SWMU) 1 (Former Percolation Bed), SWMU 2 (Inactive Injection Well PGE-08), SWMU 5 (Sludge-drying Beds), SWMU 6 (Chromate Reduction Tank), SWMU 7 (Precipitation Tank), SWMU 8 (Process Pump Tank), SWMU 9 (Transfer Sump), SWMU 10 (Old Evaporation Ponds), and Units 4.3 (Oil/Water Holding Tank), 4.4 (Oil/Water Separator), and 4.5 (Portable Waste Oil Storage Tank). The hazardous waste management system and the related piping were closed, and piping was pressure tested for leaks as part of the closure process, as described in the *Phase 1 and 2 Closure Certification Report Hazardous Waste Management Facilities* (Mittelhauser, 1990).

The majority of the pipelines were removed at the time of the closure of the hazardous waste management system, inaccessible portions of the pipelines that were no longer needed were abandoned in place, and some lines were (and continue to be) in active use. There is limited information regarding these pipelines. No as-built drawings have been located. Wastewater pipelines at the site were made of polyethylene, polyvinyl chloride, aluminum, cast iron, and vitrified clay (Mittelhauser, 1986). These pipelines were used only to convey wastewater. Pipelines for stormwater and septic waste are separate systems.

The pipelines were removed in accordance with the hazardous waste treatment system closure plan (Mittelhauser, 1986). The closure plan designated each pipeline segment by letter; during the actual closure process, the segments were further subdivided where needed based upon length and other considerations. To accomplish the closure, the pipelines were uncovered, pressure tested, and inspected for visible leakage. Table B15-1 lists the pipeline segments, the pressure test results, and associated sample points, including the rational for sampling the specified locations. These segments are shown on Figure B15-1. (All tables and figures appear at the end of this sub-appendix.)

Pressure testing consisted of two static pressure tests. The pipes were filled with water, pressurized and maintained at pressure for a minimum of two 15-minute intervals, and the volume loss from the pipeline was measured in 0.001-gallon increments (approximately 4 milliliters). Due to air pockets and other difficulties, volume loss could not be measured at some locations. These locations were inspected visually for evidence of water release. Pipe segments in level areas were tested a pressure between 15 and 21 pounds per square inch, and pipe segments on slopes were pressure tested at pressures between 24 and 28 pounds per square inch to evaluate the higher pressure head these pipes would experience. One pipeline segment (F-3) failed the pressure test, one segment (F-4) could not be tested because it was damaged by a backhoe during work on another pipeline, and Segment H was not pressure tested because it was constructed of vitrified clay. Pipeline segments G-2 and G-3, which led from the compressor station to the former evaporation ponds, were partially aboveground and very long and were therefore air-tested.

Visibly contaminated soil was removed, confirmation samples were collected, the pipeline trench and any excavation area was then covered with plastic, and the pipeline trench was backfilled with clean backfill. Confirmation sample results for six areas indicated that metals were present above background levels as defined at the time, and additional excavation was conducted below the backfill (the clean fill was removed down to the level of the plastic, additional excavation was conducted, the plastic was replaced, and the trench backfilled again). Confirmation samples from all six locations showed that adequate soil had been removed during the second round of excavation.

During the closure process, Mittelhauser Corporation confirmed that some pipeline sections had already been removed during extensive excavation of the area associated with repairs of the underlying high pressure gas lines. Portions of lines D, F, and H had already been removed.

The wastewater from the pressure test was also analyzed. The wastewater samples were analyzed for Title 22 metals, pH, and fluoride, shown in Table B15-2. The interior of most of the pipelines had a visible green sludge and they were disposed of as hazardous waste. Portions of pipeline sections D-3, F-5, G-1, G-2, G-3, and all of A-3 were not removed because they were inaccessible, sufficiently decontaminated, and still active, or they were long and difficult to remove. The remaining portions of sections D-3 and F-5 were capped in place, and the remaining section of G-1 was encased in concrete. Sections G-2 and G-3 were closed in place without removal; these sections consisted of two long sections (approximately 1,500 feet) of 3-inch polyvinyl chloride and polyethylene piping that served to connect the former evaporation ponds with the compressor station. The piping passed the pressure test. The portion of the piping that crossed Bat Cave Wash on a high pipeline bridge was removed in 2007. Pipelines A-3, G-2, and G-3 have been extensively flushed extensively since 1985 when cooling water treatment with chromate ceased. Segment A-3 remains in use.

Because pipeline segment H, the vitrified clay pipeline, could not be pressured tested additional sampling was conducted to evaluate this segment. After contaminated soils (visible green and white soils) identified in the vicinity of the pipeline were removed, a second round of soil sampling was conducted for each section of the pipeline to confirm that the area was clean. A sample was also taken where a portion of the pipeline had been removed a few years earlier.

The original oil/water separator system (OWS) (Units 4.3 through 4.5) was closed around 1990 (Mittelhauser, 1990), and there was some characterization of leaks near the pipelines associated with the OWS system. The OWS system 3-inch-diameter underground piping was removed as part of the closure. Water from the OWS system flowed into this pipe and discharged into the Chromate Reduction Tank (this pipeline segment is referred to as segment I-2 in the closure report for the OWS). During the closure, leaks in the OWS system appeared to have occurred. Piping was removed where accessible, but some sections of the pipe were capped and left in place.

2.0 Summary of Past Soil Characterization

Eighteen historical soil samples were collected from 18 locations in AOC 18 (PA-3, PC-1, PF-6, PF-8, PG-2, and PH-1 through PH-13) at depths between 1 and 6 feet below ground surface (bgs), as shown in Figure B15-2. Historical soil samples were analyzed for antimony, arsenic, barium beryllium, cadmium, total chromium, trivalent chromium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. Laboratory analytical results for the historical soil samples are presented in Table B15-2. Table B15-3 presents a statistical summary of soil analytical results for chemicals of potential concern (COPCs) that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value.

All but one of the 19 constituents (thallium) analyzed were detected in soil samples collected in AOC 18. Table B15-2 lists the 18 detected constituents. Seven of these constituents (beryllium, total chromium, hexavalent chromium, lead, molybdenum, nickel, and zinc) were detected at concentrations exceeding their respective background threshold values. All 18 constituents were detected at concentrations below their respective California human health screening level for commercial use or United States Environmental Protection Agency Region 9 regional screening levels for commercial use (collectively referred to as the commercial screening levels).

Based on the confirmation soil sampling, the former treatment system piping was considered clean-closed (Mittelhauser, 1990). A closure certification acceptance letter dated June 26, 1995 was issued and included this portion of the former hazardous waste management facility (California Environmental Protection Agency, Department of Toxic Substances Control [DTSC] 1995). Although this unit was closed by DTSC in 1995 as part of the overall closure of the hazardous waste treatment system, DTSC subsequently requested that additional analysis be conducted for volatile organic compounds (VOCs), total petroleum hydrocarbon (TPH), and semivolatile organic compounds (SVOCs) in soil at AOC 18 (DTSC, 2006). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Section 4.0 provides the recommended sampling for this unit.

3.0 AOC 18 Data Gaps and Proposed Sampling

Based upon DTSC’s request, the following data gaps have been identified for Decision 1:

1. Data Gap #1 – Collect additional soil samples to analyze for organics.
2. Data Gap #2 – Define lateral and vertical extent of detected metals at historical sample location PH-2.
3. Data Gap #3 – Assess waste water transference piping near fence line.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values.

However, since SVOC analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) for additional analytes must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.
- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.0 AOC 18 Proposed Sampling

4.1 AOC 18 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 18 is located in multiple Areas: 3, 4, 6, 8, 9, and 15 (Figure B-2). Some of these areas have extensive utilities. In addition, a portion of the AOC (along the alignment of pipeline segments A-3 and alignments of former pipeline segments D-2, F-3, and H-2) is on the slope between the upper and lower yards. Sample locations and depths identified for AOC 18 reflect the identified access constraints, and will be modified. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

4.2 AOC 18 Proposed Sampling

Table B15-4 summarizes the proposed AOC 18 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B15-3. The figure also shows proposed sample locations for surrounding SWMUs and AOCs. The proposed AOC 18 sample locations are Pacific Gas and Electric Company’s initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at twelve locations: AC 18-1 through AOC 18-12. Because of limited access and extensive subsurface features, only hand tools can be used to collect samples in AOC 18; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, deeper samples will be collected at 2 to 3 and 5 to 6 feet bgs. Where the area to be sampled is covered with concrete or asphalt, the surface sampling interval will begin 6 inches below the bottom of the concrete/asphalt or gravel sub-base.

All samples will be analyzed for Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs. As required by United States Department of the Interior, 10 percent of all samples collected from the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

To address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 1995. Letter from Mohinder Sandhu/DTSC to Mel Wong/PG&E. "Closure Certification Acceptance: Hazardous Waste Management Units at PG&E Topock Compressor Station." June 26.

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Mittelhauser Corporation. 1986. *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station.* Revision 1. August.

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Tables

TABLE B15-1
Wastewater Pipelines Status Summary
AOC 18 – Combined Waste Water Transference Pipelines
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Sub-segment	Connection	Diameter (inches)	Material	Length (feet)	Pressure Test Results	Associated Samples	Sample Rationale	Segment Status
Pipeline Segment A								
	Cooling Towers to Chromate Reduction Tank	3	PVC	1,500 (750 feet per tower)				
A-1	Chromate Reduction Tank to east bend at former Oily Water Holding Tank				Pass			Not removed; active pipeline; wastewater had acceptable concentrations of chromium
A-2	End of A1 to east of new oily water treatment system				Pass			Removed; clean-closed
A-3	End of A2 to junction of Cooling Tower A and B wastewater lines					PA-3 (1042-S1-10)	Operating pipeline, sampled below joint (same sample as for F-3)	Active line; wastewater had acceptable concentrations of chromium; ample flushing has occurred; clean-closed for contamination.
Pipeline Segment B								
B-1	Chromate Reduction Tank to Transfer Sump	3	PVC	30	Pass			Removed; clean-closed
Pipeline Segment C								
C-1	Transfer Sump to transfer pumps	3	PVC	15	Pass, slight leak at gate valve	PC-1 (1042-51-03)	Sampled beneath slight leak at valve	Removed; clean-closed
Pipeline Segment D								
	Process Pump Tank to transfer pumps	3	PVC	500				
D-1[a]	Transfer pumps to east bend at former Oily Water Holding Tank				Pass			Removed; clean-closed
D-2	End of D1 to east of new oily water treatment system				Pass			Removed; clean-closed
D-3	End of D2 to Process Pump Tank				Pass			Portion not removed; clean-closed
Pipeline Segment E								
E-1	Precipitation Tank to Process Pump Tank	3	Steel	15	Short aboveground pipe, not tested, visual inspection			Removed; clean-closed
Pipeline Segment F								
	Transfer pumps to Precipitation Tank	4	PVC	500				
F-1[b]	to east bend at former Oily Water Holding Tank				Pass			Removed; clean-closed
F-2	End of F1 to east of new oily water treatment system				Pass			Removed; clean-closed
F-3	End of F2 to				Fail	PA-3 (1042-S1-10)	Section failed pressure test (same sample as for A-3)	Most of pipe and underlying soil removed; clean-closed.
F-4	10- to 15-foot section damaged by backhoe				Not tested; damaged by backhoe			Removed; clean-closed
F-5					Pass, slight seepage at coupling	PF-6 (1042-43-11 and duplicate sample 1042-43-12)	Sampled beneath slight leak at PVC slip joint	Portion of pipe removed; remainder abandoned in place (capped); clean-closed

TABLE B15-1
Wastewater Pipelines Status Summary
AOC 18 – Combined Waste Water Transference Pipelines
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Sub-segment	Connection	Diameter (inches)	Material	Length (feet)	Pressure Test Results	Associated Samples	Sample Rationale	Segment Status
Pipeline Segment G								
	Transfer Pumps to Old Evaporation Pond	3	PVC and aluminum (aboveground portion)	1,500				
G-1	Transfer Pumps to west bend in pipeline south of sludge-drying beds				Pass	PG-2	No evidence of leak; sampled white material around pipe; fizzes with HCl; probably calcium carbonate from water-softening process	Portions not removed; clean-closed
G-2	End of G1 to T at former evaporation Pond 1				Pass (air test)			Not removed; wastewater had acceptable concentrations of chromium; closed in place; section crossing Bat Cave Wash removed in 2007
G-3	End of G2 to end of pipe at former evaporation Pond 4				Pass (air test)			Not removed; wastewater had acceptable concentrations of chromium; closed in place
Pipeline Segment H								
	Precipitation Tank to Sludge-drying Beds	6	Vitrified clay; first 60 feet of H-1 were cast iron	500				
H-1					Not tested, visual inspection for leaks and contamination	PH-8 (1042-43-18)	Sampled 3 inches below pipe after removal of soil contaminated with green sludge	Removed; clean-closed
						PH-8 (1042-43-29)	Second confirmation sample following additional excavation	
						PH-9 (1042-43-19)	Sampled 3 inches below pipe after removal of soil contaminated with white sludge	
						PH-10 (1042-43-20)	Sampled 6 inches below pipe after removal of soil contaminated with green sludge	
						PH-10 (1042-43-26)	Second confirmation sample following additional excavation	
H-2[c]					Not tested, visual inspection for leaks and contamination	PH-6 (1042-43-14)	Sampled 1.5 feet beneath clay pipe after removal of soil contaminated with white sludge	Removed; clean-closed
						PH-6 (1042-43-28)	Second confirmation sample following additional excavation	
						PH-7 (1042-43-15) and Duplicate (1042-43-16)	Sampled 3 inches beneath clay pipe after removing soil where pipe was previously broken	
						PH-11 (1042-43-21)	Sampled 6 inches beneath clay pipe after removing soil where pipe was previously broken	
						PH-12 (1042-43-22)	Sampled 3 inches beneath clay pipe after removing soil where pipe was previously broken	
						PH-13 (1042-43-23)	Sampled off end of previous break in pipe; no visible evidence of leakage	

TABLE B15-1
Wastewater Pipelines Status Summary
AOC 18 – Combined Waste Water Transference Pipelines
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Sub-segment	Connection	Diameter (inches)	Material	Length (feet)	Pressure Test Results	Associated Samples	Sample Rationale	Segment Status
H-3[c]	East of new oily water treatment system				Not tested, visual inspection for leaks and contamination	PH-4 (1042-43-04) PH-5 (1042-43-105)	Sampled off end of previous break in pipe; no visible evidence of leakage Sampled 65 feet off end of previous break in pipe at probably location of former pipe	Removed; clean-closed
H-4[c]	West of new oily water treatment system to Sludge-drying Beds				Not tested, visual inspection for leaks and contamination	PH-1 (1042-43-01)1 PH-2 (1042-43-02) PH-2 (1042-43-30) PH-3 (1042-43-03) PH-3 (1042-43-31)	Sampled 3 inches below gate valve after removal of soil contaminated with green sludge Sampled below gate valve, no visible evidence of leakage Second confirmation sample following additional excavation Sampled beneath joint in clay pipe, no visible evidence of leakage Second confirmation sample following additional excavation	Removed; clean-closed
Pipeline Segment I[d]								
		NA	NA	NA	NA			
I-1	Oily Water Treatment System Influent from Valve Box east of New Oily Water Treatment System to former Oily Water Holding Tank			NA	NA	OWS-PI-1 (1042-55-4); OWS-Valve-PI-1 (1042-55-6)	Stained soil by valve	NA
I-2	Oil/Water Separator to Chromate Reduction Tank			Approx. same length as A-1	NA	NA	NA	Removed
Pipeline Segment J[e]								
J-2	Sludge-drying Beds to Transfer Sump	NA	NA	Est. 30 feet	NA	NA	NA	Removed

[a] This pipeline is shown as terminating just north of the Chromate Reduction Tank; the missing partial segment is interpreted as removed.

[b] This pipeline is shown as terminating just north of the Chromate Reduction Tank; the missing partial segment is interpreted as removed.

[c] Long section of pipe between H-2 and H-3 not shown in Mittelhauser drawing, interpreted as previously removed; similarly, a section of pipelines is shown as missing between H3 and H4, in the area where the new oily water treatment system was installed, this unit was also interpreted as removed.

[d] Pipeline segments listed in oily water treatment system closure report (Mittelhauser, 1990); see discussion for Units 4.3 to 4.5 in Appendix B24.

[e] Pipeline segment shown in figure in closure report, but not listed in tables.

NA = Not available.

TABLE B15-2

Sample Results: Metals and General Chemistry

Area of Concern 18 – Combined Waste Water Transference Pipelines Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																			General Chemistry in mg/kg unless otherwise noted		
Commercial Screening Level[1] :				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**NE**	**5,200**	**100,000**	**NE**	**NE**	**NE**
RWQCB Environ. Screening Level[2] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background[3] :				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**NE**	**52.2**	**58**	**NE**	**NE**	**NE**
Location	**Date**	**Depth[5] (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic[4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium Hexavalent**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Trivalent Chromium**	**Vanadium**	**Zinc**	**pH**	**Specific conductance**	**Fluoride**
Category2																									
PA-3	11/19/89	1	N	ND (0.3)	2.6	169	ND (1)	ND (0.5)	ND (1)	**49**	ND (3)	8	**14.8**	0.058	ND (1)	14	ND (0.5)	ND (1)	ND (5)	---	25	**91**	8.2	244	583
PC-1	11/14/89	1	N	ND (0.3)	2	123	ND (1)	ND (0.5)	ND (1)	10	6	10	**9.4**	0.032	ND (1)	16	ND (0.5)	ND (1)	ND (5)	---	10	26	8.59	120	310
PF-6	11/18/89	1	N	ND (1)	2	80	ND (1)	ND (0.5)	ND (1)	26	ND (3)	6.7	**28.5**	ND (0.02)	ND (1)	8	ND (0.5)	ND (1)	ND (5)	26	8	51	8.69	980	380
PF-8	11/18/89	1	N	ND (0.3)	1.9	92	ND (1)	ND (0.5)	ND (1)	12	ND (3)	7	**9**	0.007	0.82	7	ND (0.5)	ND (1)	ND (5)	---	ND (1)	27	8.5	98	519
PG-2	11/15/89		N	ND (0.3)	3	219	ND (1)	ND (0.5)	ND (1)	26	ND (3)	9	**10.6**	0.026	ND (1)	9.6	ND (0.5)	4.4	ND (5)	---	7	**92.8**	9	686	890
PH-1	12/05/88		N	ND (0.3)	3.19	180	ND (1)	ND (0.5)	ND (1)	23	5.1	ND (3)	**20**	0.061	ND (1)	8.5	ND (0.5)	ND (1)	ND (5)	---	15	33	8.57	---	502
PH-2	12/05/88		N	ND (0.3)	2.42	150	ND (1)	0.6	**1.9**	**510**	6	8.7	**38**	0.076	ND (1)	6.7	ND (0.5)	ND (1)	ND (5)	---	13	**210**	8.45	---	500
PH-3	11/14/89	3	N	ND (0.3)	2.1	199	ND (1)	ND (0.5)	**2**	25	7	9	4	0.032	ND (1)	16	ND (0.5)	ND (1)	ND (5)	---	23	37	9.96	320	520
PH-4	11/14/89	3	N	5.8	2.1	175	ND (1)	ND (0.5)	ND (1)	35	6	8	**9**	0.006	ND (1)	17	ND (0.5)	ND (1)	ND (5)	---	23	53	9.14	270	480
PH-5	11/14/89	6	N	ND (0.3)	2.7	216	ND (1)	ND (0.5)	ND (1)	12	7	5	6	0.172	ND (1)	9	ND (0.5)	ND (1)	ND (5)	---	8	29	8.42	160	570
PH-6	11/18/89	1.5	N	ND (0.3)	1.7	66	ND (1)	ND (0.5)	ND (1)	10	9	13	2.3	0.045	ND (1)	**32**	ND (0.5)	ND (1)	ND (5)	---	29	58	10.3	412	506
PH-7	11/18/89	5	N	ND (1)	1.7	79	ND (1)	ND (0.5)	ND (1)	**52**	7	11	**9.6**	0.034	ND (1)	25	ND (0.5)	ND (1)	ND (5)	27	23	34	9.6	810	650
PH-8	11/18/89	3	N	ND (0.3)	2.1	83	**1**	ND (0.5)	ND (1)	37	6	16	6.1	ND (0.002)	ND (1)	25	ND (0.5)	ND (1)	ND (5)	---	42	41	10.2	449	584
PH-9	11/20/89	3	N	ND (0.3)	1.7	56	ND (1)	ND (0.5)	ND (1)	34	ND (3)	15	6.4	0.011	ND (1)	24	ND (0.5)	ND (1)	ND (5)	---	40	**61**	9.7	368	851
PH-10	11/20/89	2	N	ND (0.3)	1.4	113	0.26	ND (0.5)	ND (1)	26	ND (3)	5.1	**20**	0.075	ND (1)	18	0.6	ND (1)	ND (5)	---	25	12	10.2	418	516
PH-11	11/21/89	4	N	ND (0.3)	1.7	111	**1**	ND (0.5)	ND (1)	26	5	12	8	ND (0.002)	ND (1)	18	ND (0.5)	ND (1)	ND (5)	---	33	47	8.6	225	617
PH-12	11/21/89	4	N	ND (0.3)	2.2	90	**1**	ND (0.5)	ND (1)	28	4	12	8	ND (0.002)	ND (1)	19	ND (0.5)	ND (1)	ND (5)	---	35	44	8.9	303	629
PH-13	11/21/89	6	N	ND (0.3)	2.5	216	ND (1)	ND (0.5)	ND (1)	37	ND (3)	8	**12.5**	0.009	ND (1)	9	ND (0.5)	ND (1)	ND (5)	---	24	**102**	8.5	328	670

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.

5 Samples were collected beneath pipelines located at varying depths. Confirmation samples were collected after excavation of contaminated soil surrounding the pipelines.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

Specific conductance is reported in micro siemens per centimeter.

TABLE B15-3

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 18 – Combined Waste Water Transference Pipelines Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV)[1] # of Exceedences[4]	(BTV)	RWQCB Environmental Screening Levels (ESL)[2] # of Exceedences[5]	(ESL)	Commercial Screening Level (Com SL)[3] # of Exceedences[5]	(Com SL)
General Chemistry												
Fluoride	mg/kg	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	890	NA	(NE)	NA	(NE)	NA	(NE)
pH	pH units	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	10.3	NA	(NE)	NA	(NE)	NA	(NE)
Specific conductance	µS/cm	16 / 16 (100%)	0 / 0 (0%)	16 / 16 (100%)	0 / 0 (0%)	980	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Antimony	mg/kg	1 / 18 (5.6%)	0 / 0 (0%)	1 / 18 (5.6%)	0 / 0 (0%)	5.8	0	(NE)	0	(NE)	0	(380)
Arsenic	mg/kg	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	3.19	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	219	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	6 / 18 (33%)	0 / 0 (0%)	6 / 18 (33%)	0 / 0 (0%)	1	3	(0.672)	0	(NE)	0	(190)
Cadmium	mg/kg	3 / 18 (17%)	0 / 0 (0%)	3 / 18 (17%)	0 / 0 (0%)	0.6	0	(1.1)	0	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	2 / 18 (11%)	0 / 0 (0%)	2 / 18 (11%)	0 / 0 (0%)	2	2	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	510	3	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	12 / 18 (67%)	0 / 0 (0%)	12 / 18 (67%)	0 / 0 (0%)	9	0	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	17 / 18 (94%)	0 / 0 (0%)	17 / 18 (94%)	0 / 0 (0%)	16	0	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	38	11	(8.39)	0	(NE)	0	(320)
Mercury	mg/kg	14 / 18 (78%)	0 / 0 (0%)	14 / 18 (78%)	0 / 0 (0%)	0.172	0	(NE)	0	(NE)	0	(180)
Molybdenum	mg/kg	4 / 18 (22%)	0 / 0 (0%)	4 / 18 (22%)	0 / 0 (0%)	15	1	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	32	1	(27.3)	0	(NE)	0	(16,000)
Selenium	mg/kg	1 / 18 (5.6%)	0 / 0 (0%)	1 / 18 (5.6%)	0 / 0 (0%)	0.6	0	(1.47)	0	(NE)	0	(4,800)
Silver	mg/kg	1 / 18 (5.6%)	0 / 0 (0%)	1 / 18 (5.6%)	0 / 0 (0%)	4.4	0	(NE)	0	(NE)	0	(4,800)
Thallium	mg/kg	0 / 18 (0%)	0 / 0 (0%)	0 / 18 (0%)	0 / 0 (0%)	ND (5)	NA	(NE)	NA	(NE)	0	(63)
Trivalent Chromium	mg/kg	2 / 2 (100%)	0 / 0 (0%)	2 / 2 (100%)	0 / 0 (0%)	27	NA	(NE)	NA	(NE)	NA	(NE)
Vanadium	mg/kg	17 / 18 (94%)	0 / 0 (0%)	17 / 18 (94%)	0 / 0 (0%)	42	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	18 / 18 (100%)	0 / 0 (0%)	18 / 18 (100%)	0 / 0 (0%)	210	6	(58)	0	(NE)	0	(100,000)

TABLE B15-3

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 18 – Combined Waste Water Transference Pipelines Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

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Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B15-4
Proposed Sampling Plan
AOC 18 – Combined Waste Water Transference Pipelines
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

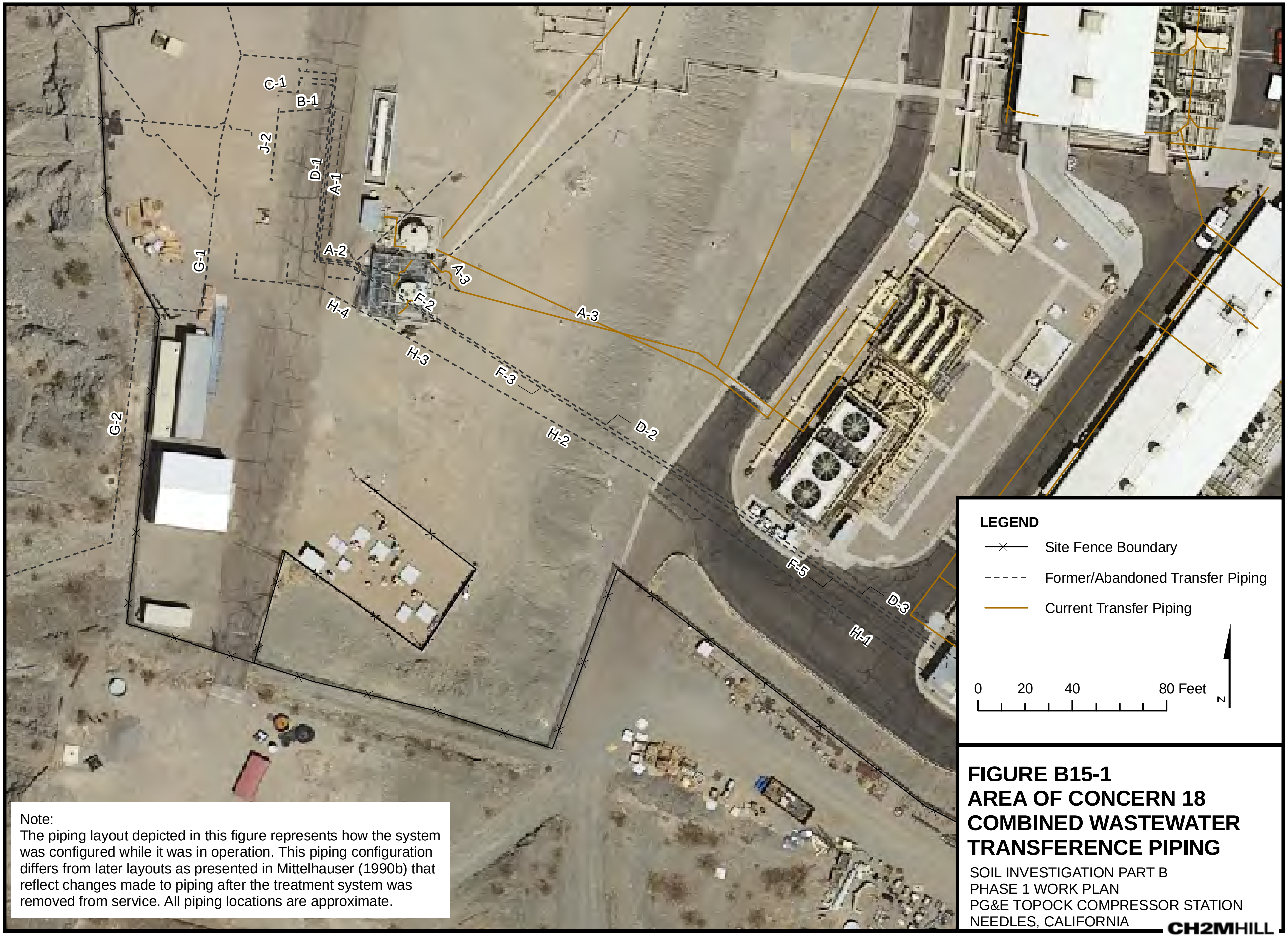
Location	Depths (feet)	Description/Rationale	Analytes
AOC 18-1	0-0.5, and 3 and 6, If feasible	North side of pipeline between Former Chromate Reduction Tank and Oil Water Separator; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-2	0-0.5, and 3 and 6, If feasible	South side of pipeline, west of aboveground storage tank; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-3	0-0.5, and 3 and 6, If feasible	North side of pipeline, east of aboveground storage tank; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-4	0-0.5, and 3 and 6, If feasible	South side of pipeline, east of aboveground storage tank; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-5	0-0.5, and 3 and 6, If feasible	North of pipeline, west of Cooling Tower A; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-6	0-0.5, and 3 and 6, If feasible	South side of pipeline, west of Cooling Tower A; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-7	0-0.5, and 3 and 6, If feasible	North side of pipeline, south of Cooling Tower A; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-8	0-0.5, and 3 and 6, If feasible	South side of pipeline, south of Cooling Tower A; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-9	0-0.5, and 3 and 6, If feasible	Data Gap #2 – Define lateral and vertical extent of detected metals at historical sample location PH-2.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-10	0-0.5, and 3 and 6, If feasible	At junction of the waste water pipeline; to resolve Data Gap #3 – Assess waste water transference piping near fence line.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC 18-11	0-0.5, and 3 and 6, If feasible	Between waste water pipeline and fence line; to resolve Data Gap #3 – Assess waste water transference piping near fence line.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
AOC18-12	0-0.5, and 3 and 6, If feasible	At junction of waste water pipeline west of Cooling Tower A; to resolve Data Gap #1 – Collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs

Notes:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



LEGEND

Site Fence Boundary

Former/Abandoned Transfer Piping

Current Transfer Piping

Note:
The piping layout depicted in this figure represents how the system was configured while it was in operation. This piping configuration differs from later layouts as presented in Mittelhauser (1990b) that reflect changes made to piping after the treatment system was removed from service. All piping locations are approximate.

FIGURE B15-1
AREA OF CONCERN 18
COMBINED WASTEWATER TRANSFERENCE PIPING

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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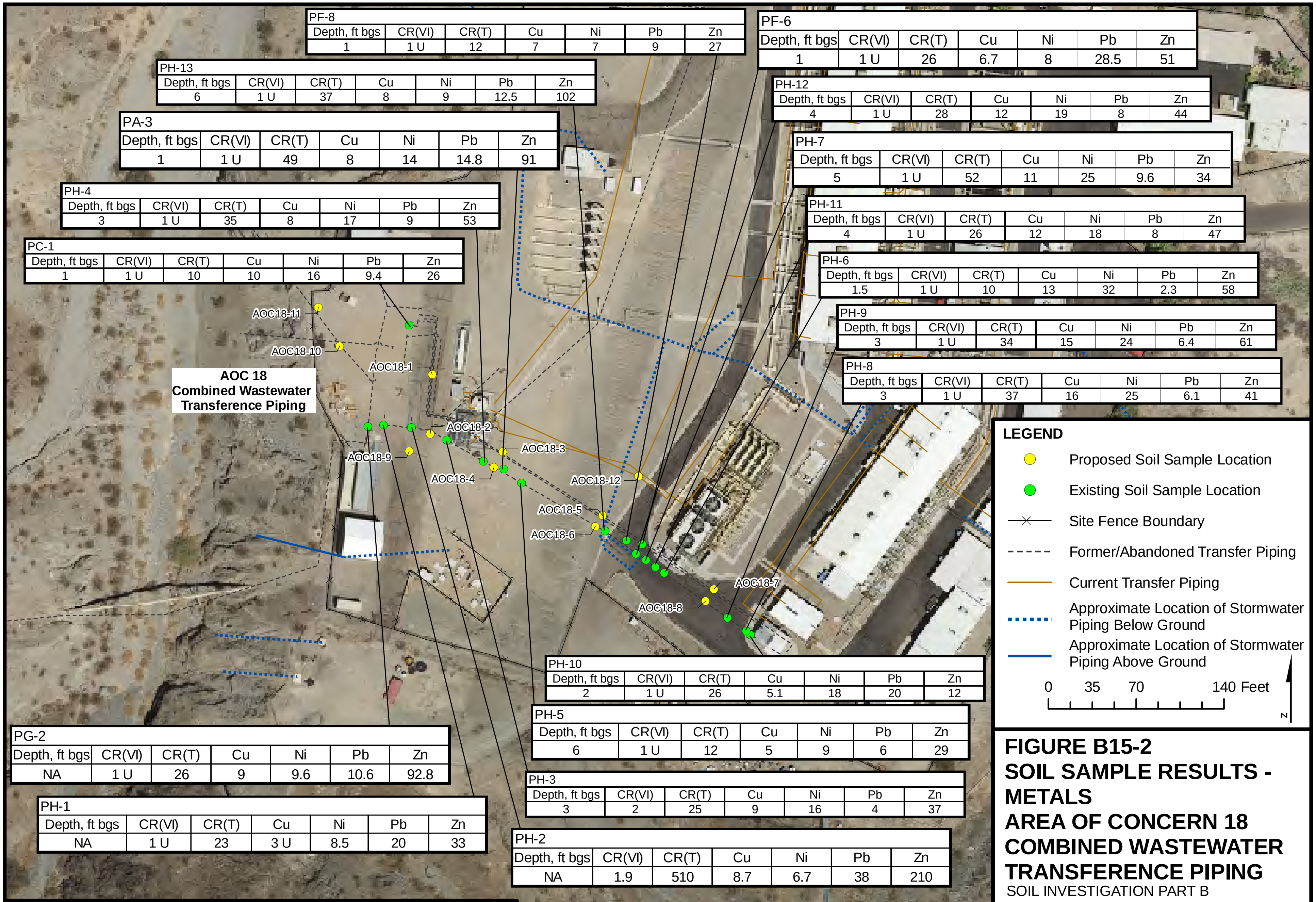

PF-8

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	1 U	12	7	7	9	27

PF-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	1 U	26	6.7	8	28.5	51

PH-13

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
6	1 U	37	8	9	12.5	102

PH-12

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4	1 U	28	12	19	8	44

PA-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	1 U	49	8	14	14.8	91

PH-7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
5	1 U	52	11	25	9.6	34

PH-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	1 U	35	8	17	9	53

PH-11

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4	1 U	26	12	18	8	47

PC-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	1 U	10	10	16	9.4	26

PH-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1.5	1 U	10	13	32	2.3	58

PH-9

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	1 U	34	15	24	6.4	61

PH-8

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	1 U	37	16	25	6.1	41

PH-10

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2	1 U	26	5.1	18	20	12

PH-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
6	1 U	12	5	9	6	29

PG-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
NA	1 U	26	9	9.6	10.6	92.8

PH-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	2	25	9	16	4	37

PH-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
NA	1 U	23	3 U	8.5	20	33

PH-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
NA	1.9	510	8.7	6.7	38	210

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- All results shown are category 2 data.

FIGURE B15-2
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 18 COMBINED WASTEWATER TRANSFERENCE PIPING

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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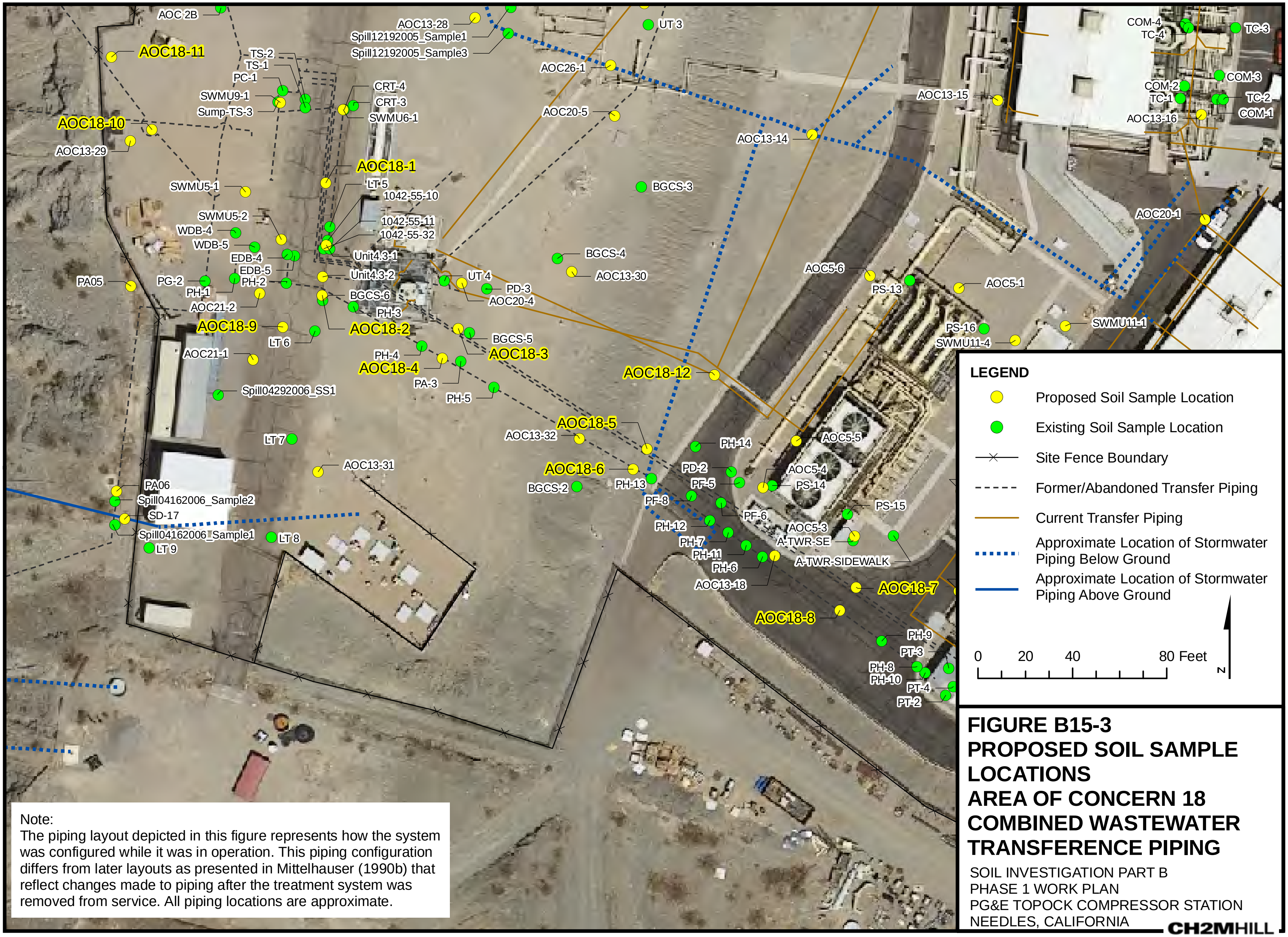

LEGEND

● Proposed Soil Sample Location

● Existing Soil Sample Location

—×— Site Fence Boundary

- - - - Former/Abandoned Transfer Piping

—— Current Transfer Piping

······ Approximate Location of Stormwater Piping Below Ground

—— Approximate Location of Stormwater Piping Above Ground

0 20 40 80 Feet

N

Note:
The piping layout depicted in this figure represents how the system was configured while it was in operation. This piping configuration differs from later layouts as presented in Mittelhauser (1990b) that reflect changes made to piping after the treatment system was removed from service. All piping locations are approximate.

FIGURE B15-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 18
COMBINED WASTEWATER TRANSFERENCE PIPING

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix B16
AOC 19 – Former Hotwell Investigation Program

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
COPC	chemical of potential concern
JCW	jacket cooling water
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
PAH	polycyclic aromatic hydrocarbon
RSL	regional screening level
STLC	soluble threshold limit concentration
TCLP	toxicity characteristic leaching procedure
WET	Waste Extraction Test

APPENDIX B16

AOC 19 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 19 is the Former Cooling Liquid Mixing Area located directly east of the Compressor Building (Figure B16-1). (All tables and figures appear at the end of this sub-appendix.) AOC 19 was initially defined as the concrete pad area associated with the former cooling additive mixing shed, however, subsequent information regarding potential leaks from the Jacket Cooling Water (JCW) system (Russell, 2006a) led to the inclusion of the adjacent pumps and tank area in AOC 19. The pad from the former shed currently exists and is located adjacent to a smaller concrete pad that presently serves as a base for an exterior employee emergency safety shower.

AOC 19 was identified by routine inspection in January 2006. During a test of the eyewash shower located in this area in January 2006, droplets of green liquid were observed on the concrete pad below the eyewash shower (PG&E, 2006). A sample of the greenish water droplets was analyzed for Title 22 metals on January 20, 2006. Results showed a total chromium concentration of 770 milligrams per liter (mg/L).

The JCW system was originally designed with a hotwell (a large rectangular concrete structure, partially below grade) that acted as a surge tank for the JCW system. Cooling water additives for this system were chromium-based until October 1985; since 1985, the additive has been molybdenum-based. Historic records (Betz, 1987, 1989, 1990, 1991) indicate that concentrations of molybdenum as molybdate typically ranged from 300 to 800 parts per million. The water was pumped from the hotwell into the heat exchangers. There was no control system to adequately prevent overflow on the hotwell, and employees stated that the hotwell periodically overflowed. The hotwell was approximately 10 feet deep, with about 5 feet above ground. The area covered by the hotwell was about twice the area covered by the current concrete containment area for the aboveground temporary compressor engine oil holding tanks. The hotwell was abandoned in place and replaced with JCW tanks (which still exist) prior to 1990. The JCW tanks are located immediately to the south of the former hotwell location. In the early 1990s, a construction project began to provide secondary containment for the temporary compressor engine oil storage tanks in the area. During the construction, remnants of the old hotwell were discovered.

A cleanup project was conducted to remove the hotwell remnants. The remaining concrete and the soil contained in the former hotwell were removed, and the concrete debris and soil were sampled (Technical and Ecological Services, 1994). Total chromium and hexavalent chromium were detected in all soil and concrete samples and the concrete was characterized as hazardous waste. No soil samples were collected underneath the footprint of the former hotwell, nor were any soil samples collected from soils adjoining the former hotwell.

The JCW system was also subject to occasional leaks from pump and valve seal failure. The cooling water would flow onto the graveled area near the hotwell and pumps. Larger leaks from the hotwell or pumps could sometimes result in releases onto the paved area between the JCW system and the visitor parking lot/warehouse and potentially down the main entrance road leading to the station (Russell, 2006). The area around the former hotwell and the JCW pumps is unpaved but covered with gravel. The area of the former hotwell is elevated approximately 3 feet above grade (and above the pumps and JCW surge tanks) on east side of the AOC; the former cooling additive mixing shed is located at the same grade as the pumps and surge tanks.

The chemical additive shed was located south of the JCW pumps and southeast of the former hotwell. At some time in the past, powdered coolant chemicals were mixed here and reportedly hand-added to the hotwell (Russell, 2006). The pad from the shed remains; it is adjacent to an eyewash station/emergency shower. Upon discovery of the droplets of green-colored water, sampling was conducted in the area. The affected area was covered with visqueen to minimize employee contact, and a wooden pad was installed over the concrete pad to minimize human exposure and to allow the safety shower to remain in operation. The area around the former shed/concrete pad is unpaved. The former shed/concrete pad will be removed and properly disposed to facility soil sampling beneath this former structure.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 19 based on the above site history and background, as shown in Figure B16-2. Table B16-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 19. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 19 are likely to be historic liquid discharges (spills) from the former JCW hotwell and leaks from the JCW pumps. In addition, incidental spills during the mixing of the chemicals, and potentially during the manual addition of the chemicals, could have impacted the soil in this area. The quantity of liquid released from the hotwell and pumps is unknown; however, periodic overflows and leaks are known to have occurred. The integrity of the concrete from former hotwell is also unknown; it is possible that small quantities of JCW could have been released directly to subsurface soil through small cracks in the concrete. The potential quantity of chemicals released in the vicinity of the former cooling additive mixing shed is also unknown; however, is expected to be relatively small, as any spills would have been small. If a large release from the hotwell occurred, it could have resulted in cooling water reaching the storm drain system and/or station access road and being discharged outside the fence line. Releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D of this work plan.

The primary source medium at AOC 19 is surface soil. Because the majority of the area around the former hotwell and former cooling additive mixing shed is covered with gravel, liquids released in AOC 19 would have been released to surface soil and would have infiltrated shallow soil. Liquids released to shallow soils could have infiltrated to deeper soils. If the concrete of the former hotwell lacked integrity, subsurface soil may be a secondary source medium. Because the entire AOC is covered with gravel or pavement, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway.

2.0 Summary of Past Soil Characterization

Seven historical surface soil samples (SS#1 to SS#7) were collected from six locations in AOC 19, as shown in Figure B16-3. SS#1 through SS#6 were collected at 0 feet below ground surface (bgs); SS#7 was collected at 4 inches bgs). The samples were collected along the edge of the concrete pad. Soil samples SS#2, SS#3, and SS#4 were collected along the north side of the pad, and samples SS#1 and SS#5 were collected along the southwest and southeast corners, respectively. Soil samples SS#6 and SS#7 were collected from the same location along the west side of the pad. A small section of the darkly stained concrete pad along the southwest corner was also removed and submitted for analysis. All samples were tested for Title 22 metals. Waste Extraction Tests (WETs) for total chromium and hexavalent chromium were also performed for all the samples. In addition, the concrete sample was tested for soluble chromium using the toxicity characteristic leaching procedure (TCLP).

Samples have not been collected in the immediate vicinity of the former hotwell. Laboratory analytical results for the historical samples are presented in Tables B16-2 and B16-3. Table B16-4 presents a statistical summary of soil analytical results for chemicals of potential concern (COPCs) that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value.

The samples were analyzed for antimony, arsenic, barium beryllium, cadmium, total chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc (the samples were not analyzed for hexavalent chromium). All 17 constituents were detected in soil samples collected in AOC 19. Table B16-2 lists the 17 detected constituents. Six of these constituents (cadmium, chromium, copper, lead, molybdenum, and zinc) were detected at concentrations exceeding their respective background threshold values (BTVs) in all seven samples. Selenium was the only other compound detected above its BTV; it was detected at a concentration of 2 milligrams per kilogram (mg/kg) in one sample (compared to the BTV of 1.47 mg/kg).

Total chromium and lead were also detected at concentrations exceeding their respective commercial screening levels (California human health screening levels [CHHSLs] for commercial use or United States Environmental Protection Agency Region 9 regional screening levels [RSLs] for commercial use).

The concrete debris from the former hotwell and the soil contained in the hotwell were sampled and analyzed for total chromium and hexavalent chromium. Five concrete samples were analyzed. The two concrete samples with the highest total chromium concentrations were analyzed for soluble total chromium and hexavalent chromium using the WET, as well as soluble total chromium using the TCLP. Since the concrete debris and soil samples collected from the former hotwell have been removed and are not representative of current site conditions, these data are not presented on tables and figures in this sub-appendix, but are discussed in the following nature and extent discussion for context.

All historical data are considered Category 2 and were used as inputs to Decision 1 for AOC 19. The data are not suitable for use for the remaining decisions, which require Category 1 data.

3.0 2011 Trench Sampling Results

In January 2011, a utility trench was dug across the asphalt-covered compressor station entryway between AOC 19 and the compressor station office. Eight opportunistic soil samples were collected from four locations (AOC19-1 through AOC 19-4) within the trench located along the northern boundary of AOC 19 and to the northeast of the AOC. The samples were collected at 0.5 and 2 feet bgs, and soil samples were analyzed for Title 22 metals, hexavalent chromium, polycyclic aromatic hydrocarbons (PAH), and pH. Laboratory analytical results for the historical samples are presented in Table B16-2. Table B16-4 presents a statistical summary of soil analytical results for COPCs that were either detected above the laboratory reporting limits or not detected and reporting limits for one or more samples was greater than the interim screening value.

Eleven metals (arsenic, barium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, and zinc), 12 PAHs (2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene), and one calculated value (benzo(a)pyrene equivalent) were detected in the trench soil samples collected near AOC 19. Table B16-2 lists the detected constituents. Hexavalent chromium, lead, and molybdenum were the only metals detected at concentrations exceeding their respective BTVs, but none of the metals concentrations was detected above respective commercial screening levels.

None of the detected concentrations of PAHs or the calculated values of benzo(a)pyrene equivalent was above respective commercial screening levels.

All 2011 trench sampling data are considered Category 1 and were used as inputs to the five data quality objective decisions for AOC 19. As described in Appendix B, there is insufficient information to conduct a data gaps analysis for Decisions 3 and 4. Because the risk assessment will be conducted for the entire area within the fence line, the data gaps evaluation for Decision 2 was conducted for the entire area within the fence line as a whole. Decision 5 data gaps analysis was also conducted for the entire area within the fence line. The data gaps evaluation for Decision 2 through 5 is presented in Appendix B, and additional sampling for these decisions, if necessary, are included in this sub-appendix.

4.0 AOC 19 Nature and Extent Data Gaps Evaluation

The following subsection discusses the nature and extent of detected COPCs detected above interim screening levels at AOC 19. As discussed in Appendix B, multiple factors were considered to assess whether the nature and extent of a specific constituent have been adequately delineated. Constituents that may require further evaluation are summarized in

Section 4.8, and Section 5.0 of this sub-appendix provides the recommended sampling for this unit.

4.1 Total Chromium

Total chromium was detected in eight of eight Category 1 samples and seven of seven Category 2 samples. Detected concentrations of total chromium in soil ranged from 6.8 to 4,300 mg/kg, as shown in Table B16-2 and Figures B16-3. The concentrations of total chromium in seven samples were above the BTV (39.8 mg/kg), but all concentrations were below commercial screening levels, and concentrations in six samples exceeded the commercial RSL (1,400 mg/kg).

All seven of the soil samples exceeded the Title 22 WET soluble threshold limit concentration (STLC) limit for chromium and/or trivalent chromium compounds (5 mg/L). The removed concrete sample did not exceed the total threshold limit concentration limit for chromium and other Title 22 metals. However the STLC and TCLP limits were exceeded, again for chromium and/or trivalent chromium compounds.

The two removed hotwell soil samples contained total chromium at 280 and 220 mg/kg, respectively. The removed five hotwell concrete samples contained total chromium at concentrations ranging from 530 to 2,300 mg/kg. All samples exceed STLC criterion of 5 mg/L. The TCLP analysis showed soluble total chromium at 40 mg/L and 68 mg/L, respectively, while the WET indicated soluble total chromium at 78 mg/L and 110 mg/L, respectively.

The lateral and vertical extents of total chromium concentrations exceeding the screening have not been defined.

4.2 Hexavalent Chromium

Hexavalent chromium was detected in four of eight Category 1 samples. Detected concentrations of hexavalent chromium in soil ranged from 0.91 to 1.1 mg/kg, as shown in Table B16-2 and Figure B16-3. The concentrations of hexavalent chromium in five samples were above the BTV (0.83 mg/kg), but all concentrations were below commercial screening levels.

Hexavalent chromium in historical soil samples SS#1 through SS#7 was only analyzed to determine its soluble concentrations. Soluble hexavalent chromium concentrations in all soil samples were below the STLC limit of 5 mg/L. The concrete sample from the former cooling additive mixing shed also contained soluble hexavalent chromium but again below the STLC limit.

The two removed hotwell soil samples contained hexavalent chromium at 4 and 3.6 mg/kg, respectively. The five hotwell concrete samples contained hexavalent chromium at concentrations ranging from 37 to 330 mg/kg. The soluble hexavalent chromium concentrations in the hotwell concrete samples determined using the WET were 64 mg/L and 80 mg/L, respectively.

The lateral and vertical extents of hexavalent concentrations exceeding the screening level have not been defined.

4.3 Cadmium

Cadmium was detected in 0 of eight Category 1 samples and seven of seven Category 2 samples. Detected concentrations of cadmium in soil ranged from 1.5 to 4.5 mg/kg, as shown in Table B16-2 and Figure B16-3. The concentrations of cadmium in all seven samples were above the BTV (1.1 mg/kg). None of the detected concentrations exceeded the commercial CHHSL (500 mg/kg). The lateral and vertical extents of cadmium concentrations exceeding the screening level have been defined.

4.4 Copper

Copper was detected in seven of eight Category 1 samples and seven of seven Category 2 samples. Detected concentrations of copper in soil ranged from 2.9 to 84 mg/kg, as shown in Table B16-2 and Figure B16-3. The concentrations of copper in seven samples were above the BTV (16.8 mg/kg). None of the detected copper concentrations exceeded the commercial CHHSL (3,800 mg/kg). The lateral and vertical extents of copper concentrations exceeding the screening level have been defined.

4.5 Lead

Lead was detected in eight of eight Category 1 samples and seven of seven Category 2 samples. Detected concentrations of lead in soil ranged from 3.7 to 890 mg/kg, as shown in Table B16-2 and Figure B16-3. The concentrations of lead in eight samples were above the BTV (8.39 mg/kg). In addition, five of the detected lead concentrations exceeded the commercial CHHSL (320 mg/kg). The lateral and vertical extents of copper concentrations exceeding the screening level have not been defined.

4.6 Molybdenum

Molybdenum was detected in four of eight Category 1 samples and seven of seven Category 2 samples. Detected concentrations of molybdenum in soil ranged from 8.8 to 300 mg/kg, as shown in Table B16-2 and Figure B16-3. The concentrations of molybdenum in 11 samples were above the BTV (1.37 mg/kg). None of the detected copper concentrations exceeded the commercial CHHSL (4,800 mg/kg). The lateral and vertical extents of copper concentrations exceeding the screening level have been defined.

4.7 Zinc

Zinc was detected in eight of eight Category 1 samples and seven of seven Category 2 samples. Detected concentrations of zinc in soil ranged from 16 to 480 mg/kg, as shown in Table B16-2 and Figure B16-3. The concentrations of zinc in seven samples were above the BTV (58 mg/kg). None of the detected copper concentrations exceeded the commercial CHHSL (100,000 mg/kg). The lateral and vertical extents of copper concentrations exceeding the screening level have been defined.

4.8 Benzo(a)pyrene

Benzo(a)pyrene was detected in three of eight Category 1 samples. Detected concentrations of benzo(a)pyrene in soil ranged from 12 to 50 micrograms per kilogram (µg/kg), and detected concentrations of benzo(a)pyrene equivalents in soil ranged from 4.5 to 84 µg/kg as shown in Table B16-3. The concentration of benzo(a)pyrene and calculated benzo(a)pyrene equivalent are below the commercial CHHSL (130 µg/kg).

The total number of samples with PAH data is relatively limited. The lateral and vertical extents of benzo(a)pyrene and benzo(a)pyrene equivalents concentrations exceeding the screening levels have not been defined.

4.9 Nature and Extent Conclusions

Based on the site history, background, and conceptual site model, qualitative review of the historical data indicates that the lateral and vertical extents of total and hexavalent chromium (both total and soluble forms), lead, benzo(a)pyrene, and benzo(a)pyrene equivalents have not been defined.

5.0 AOC 19 Data Gaps and Proposed Sampling

5.1 AOC 19 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gaps were identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination at AOC 19.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of PAHs in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data, and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

5.2 AOC 19 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 19 is located in Area 12 on the Topock Compressor Station Accessibility Map (see Figure B-2). Ninety-one utility risers, including cooling water, air, water, and electrical lines, were identified in Area 12. SCADA cabinets and three vaults were also identified in this area. Photographs 28 through 43 in sub-Appendix B25 show the accessibility constraints in AOC 19. As can be seen in the photos, the AOC is completely blocked to equipment access. The eastern portion of the unit is raised approximately 3 feet above grade, and major aboveground utilities, as well as the JCW pumps and the JCW surge tanks, are present in front of the area. Jacket coolers are present to the north and south, and the temporary compressor engine oil holding tanks and further utilities are present to the west. Only hand sampling is feasible in this unit. Sample locations and depths identified for AOC 19 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools).

5.3 AOC 19 Proposed Sampling

Table B16-5 summarizes the proposed AOC 19 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B16-4. The figure also shows proposed sample locations for surrounding solid waste management units and AOCs. The proposed AOC 19 sample locations are Pacific Gas and Electric Company’s initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at five locations (AOC19-5 through AOC19-9). Because of limited access and numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in AOC 19; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Where the area of sampling is covered with asphalt, the surface sampling interval will begin at the bottom of the asphalt or gravel sub-base. Based on the operations history, available data, and California Environmental Protection Agency, Department of Toxic Substances Control requirements, the COPCs associated with AOC 19 consist of Title 22 metals, hexavalent chromium, and pH. COPCs are anticipated to be limited to soil (CH2M HILL, 2007).

All samples will be analyzed for Title 22 metals, hexavalent chromium, and pH. As required by the United States Department of the Interior, 10 percent of all samples collected will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B16-5); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

6.0 References

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Tables

TABLE B16-1
Conceptual Site Model, AOC 19 – Former Cooling Liquid Mixing Area
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental spills/ releases from former Cooling Liquid Mixing Area	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B16-2

Sample Results: Metals

Area of Concern 19 – Former Cooling Liquid Mixing Area Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																		General Chemistry
Commercial Screening Level ^{1}:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**	**NE**
RWQCB Environmental Screening Level ^{2}:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background ^{3}:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic**[4]	**Barium**	**Beryllium**	**Cadmium**	**Chromium Hexavalent**	**Chromium**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**	**pH**
Category1																						
AOC19-1	01/12/11	0.5	N	ND (2)	4	130	ND (1)	ND (1)	**1.1**	25	3.5	5.9	7.3	ND (0.1)	**8.8**	7.5	ND (1)	ND (1)	ND (2)	19	25	9.7
	01/12/11	2	N	ND (2.1)	4.6	130	ND (1)	ND (1)	**0.91**	17	3.1	8.7	**15**	ND (0.1)	**18**	6.4	ND (1)	ND (1)	ND (2.1)	18	38	9.8
AOC19-2	01/12/11	0.5	N	ND (2.1)	4.2	100	ND (1)	ND (1)	**1**	18	3	4.6	5	ND (0.1)	**27**	7.2	ND (1)	ND (1)	ND (2.1)	18	18	10
	01/12/11	2	N	ND (2.1)	4.9	110	ND (1)	ND (1)	**0.92**	12	4	6.2	5.1	ND (0.1)	**110**	6.3	ND (1)	ND (1)	ND (2.1)	17	20	9.9
AOC19-3	01/12/11	0.5	N	ND (2)	4.7	140	ND (1)	ND (1)	ND (0.41)	7.9	2.9	ND (4.1)	5.1	ND (0.1)	ND (2)	5.7	ND (1)	ND (1)	ND (2)	17	17	8.7
	01/12/11	2	N	ND (2.1)	4.4	110	ND (1)	ND (1)	ND (0.41)	6.8	3.6	2.9	3.7	ND (0.1)	ND (1)	5.5	ND (1)	ND (1)	ND (2.1)	16	16	8.5
AOC19-4	01/12/11	0.5	N	ND (2.1)	4.9	130	ND (1.1)	ND (1.1)	ND (0.42)	12	3.3	5.3	4.8	ND (0.11)	ND (1.1)	7.7	ND (1.1)	ND (1.1)	ND (2.1)	20	19	8.9
	01/12/11	2	N	ND (2.1)	4.2	130	ND (1.1)	ND (1.1)	ND (0.43)	10	3	3.6	4.4	ND (0.11)	ND (1.1)	5.9	ND (1.1)	ND (1.1)	ND (2.1)	16	18	9.1
Category2																						
SS#1	01/30/06	0	N	12	3.4	150	0.5	**1.6**	---	**3,000**	3.8	**37**	**300**	0.051	**30**	10	**2**	0.99	0.99	15	**200**	---
SS#2	01/30/06	0	N	10	2.7	320	ND (0.48)	**2**	---	**2,300**	3.9	**50**	**790**	ND (0.05)	**61**	9.3	ND (1.9)	ND (0.96)	ND (0.96)	12	**350**	---
SS#3	01/30/06	0	N	12	3.8	370	ND (0.49)	**2.3**	---	**2,800**	4.7	**70**	**890**	0.095	**80**	10	ND (2)	ND (0.98)	1	15	**480**	---
SS#4	01/30/06	0	N	5.8	3.2	290	ND (0.5)	**2.7**	---	**2,100**	5	**84**	**600**	0.075	**300**	11	ND (2)	ND (1)	ND (1)	15	**380**	---
SS#5	01/30/06	0	N	3.8	3.2	180	ND (0.48)	**4.5**	---	**1,200**	5	**43**	**480**	0.1	**130**	12	ND (1.9)	ND (0.95)	ND (0.95)	13	**470**	---
SS#6	01/30/06	0	N	16	2.6	160	ND (0.5)	**1.5**	---	**4,300**	3.6	**49**	**290**	ND (0.049)	**70**	9.7	ND (2)	ND (0.99)	ND (0.99)	12	**320**	---
SS#7	01/30/06	4	N	14	2.3	220	ND (0.49)	**1.9**	---	**3,500**	4	**37**	**710**	0.1	**23**	10	ND (2)	ND (0.98)	ND (0.98)	12	**270**	---

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

pH is reported in pH units.

TABLE B16-3

Sample Results: Polycyclic Aromatic Hydrocarbons

Area of Concern 19 – Former Cooling Liquid Mixing Area Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acena phthylene**	**Acena phthene**	**Anthracene**	**Benzo (a) anthracene**	**Benzo (a) pyrene**	**Benzo (b) fluoranthene**	**Benzo (ghi) perylene**	**Benzo (k) fluoranthene**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Fluor anthene**	**Fluorene**	**Indeno (1,2,3-cd) pyrene**	**Naphthalene**	**Phen anthrene**	**Pyrene**	**B(a)P Equivalent**
Commercial Screening Level 1				**99,000**	**4,100,000**	**17,000,000**	**33,000,000**	**170,000,000**	**1,300**	**130**	**1,300**	**17,000,000**	**1,300**	**13,000**	**380**	**22,000,000**	**22,000,000**	**1,300**	**18,000**	**17,000,000**	**17,000,000**	**130**
RWQCB Environmental Screening Level 2				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background 3				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Category1																						
AOC19-1	01/12/11	0.5	N	ND (5.1)	6.5 J	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	12	9.2	8.8	10	ND (5.1)	5.8	ND (5.1)	ND (5.1)	7.1	ND (5.1)	ND (5.1)	ND (5.1)	17
	01/12/11	2	N	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	35	50	94 76	25 57			34	71	ND (10)	66	ND (10)	15 66		84
AOC19-2	01/12/11	0.5	N	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	35	ND (10)	ND (10)	26	ND (10)	ND (10)	28	ND (10)	ND (10)	ND (10)	18
	01/12/11	2	N	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	19	34	42	ND (10)	21	22	20	ND (10)	35	ND (10)	ND (10)	20	35
AOC19-3	01/12/11	0.5	N	ND (5.1)	5.8	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	4.5
	01/12/11	2	N	ND (5.2)	6.6	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	8.3	21	5.9	ND (5.2)	17	ND (5.2)	ND (5.2)	19	ND (5.2)	ND (5.2)	ND (5.2)	12
AOC19-4	01/12/11	0.5	N	ND (5.3)	5.6	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	4.6
	01/12/11	2	N	ND (5.3)	5.7	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	5.7	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	4.9

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

Calculations:

BaP equivalent = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all PAHs are nondetect, the final qualifier code is U.

-- = not analyzed

µg/kg = micrograms per kilogram

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

N = Primary Sample

ND = not detected at the listed reporting limit

TABLE B16-4

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 19 – Former Cooling Liquid Mixing Area Investigation Program
Soil Investigation Part B Phase 1 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Parameter	Units	Frequency of Detection Total	Frequency of Detection Category 1	Frequency of Detection Category 2	Frequency of Detection Category 3	Maximum Detected Value	Background Threshold Value (BTV)[1] # of Exceedences[4]	Background Threshold Value (BTV)[1] (BTV)	RWQCB Environmental Screening Levels (ESL)[2] # of Exceedences[5]	RWQCB Environmental Screening Levels (ESL)[2] (ESL)	Commercial Screening Level (Com SL)[3] # of Exceedences[5]	Commercial Screening Level (Com SL)[3] (Com SL)
General Chemistry												
pH	pH units	8 / 8 (100%)	8 / 8 (100%)	0 / 0 (0%)	0 / 0 (0%)	10	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Antimony	mg/kg	7 / 15 (47%)	0 / 8 (0.0%)	7 / 7 (100%)	0 / 0 (0%)	16	0	(NE)	0	(NE)	0	(380)
Arsenic	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	4.9	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	370	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	1 / 15 (6.7%)	0 / 8 (0.0%)	1 / 7 (14%)	0 / 0 (0%)	0.5	0	(0.672)	0	(NE)	0	(190)
Cadmium	mg/kg	7 / 15 (47%)	0 / 8 (0.0%)	7 / 7 (100%)	0 / 0 (0%)	4.5	7	(1.1)	0	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	4 / 8 (50%)	4 / 8 (50%)	0 / 0 (0%)	0 / 0 (0%)	1.1	4	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	4,300	7	(39.8)	0	(NE)	6	(1,400)
Cobalt	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	5	0	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	14 / 15 (93%)	7 / 8 (88%)	7 / 7 (100%)	0 / 0 (0%)	84	7	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	890	8	(8.39)	0	(NE)	5	(320)
Mercury	mg/kg	5 / 15 (33%)	0 / 8 (0.0%)	5 / 7 (71%)	0 / 0 (0%)	0.1	0	(NE)	0	(NE)	0	(180)
Molybdenum	mg/kg	11 / 15 (73%)	4 / 8 (50%)	7 / 7 (100%)	0 / 0 (0%)	300	11	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	12	0	(27.3)	0	(NE)	0	(16,000)
Selenium	mg/kg	1 / 15 (6.7%)	0 / 8 (0.0%)	1 / 7 (14%)	0 / 0 (0%)	2	1	(1.47)	0	(NE)	0	(4,800)
Silver	mg/kg	1 / 15 (6.7%)	0 / 8 (0.0%)	1 / 7 (14%)	0 / 0 (0%)	0.99	0	(NE)	0	(NE)	0	(4,800)
Thallium	mg/kg	2 / 15 (13%)	0 / 8 (0.0%)	2 / 7 (29%)	0 / 0 (0%)	1	0	(NE)	0	(NE)	0	(63)
Vanadium	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	20	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	15 / 15 (100%)	8 / 8 (100%)	7 / 7 (100%)	0 / 0 (0%)	480	7	(58)	0	(NE)	0	(100,000)
Polycyclic Aromatic Hydrocarbons												
2-Methyl naphthalene	µg/kg	5 / 8 (63%)	5 / 8 (63%)	0 / 0 (0%)	0 / 0 (0%)	6.6	0	(NE)	0	(NE)	0	(4,100,000)
Benzo (a) anthracene	µg/kg	1 / 8 (13%)	1 / 8 (13%)	0 / 0 (0%)	0 / 0 (0%)	35	0	(NE)	0	(NE)	0	(1,300)
Benzo (a) pyrene	µg/kg	3 / 8 (38%)	3 / 8 (38%)	0 / 0 (0%)	0 / 0 (0%)	50	0	(NE)	0	(NE)	0	(130)
Benzo (b) fluoranthene	µg/kg	5 / 8 (63%)	5 / 8 (63%)	0 / 0 (0%)	0 / 0 (0%)	94	0	(NE)	0	(NE)	0	(1,300)
Benzo (ghi) perylene	µg/kg	5 / 8 (63%)	5 / 8 (63%)	0 / 0 (0%)	0 / 0 (0%)	76	0	(NE)	0	(NE)	0	(17,000,000)
Benzo (k) fluoranthene	µg/kg	3 / 8 (38%)	3 / 8 (38%)	0 / 0 (0%)	0 / 0 (0%)	25	0	(NE)	0	(NE)	0	(1,300)
Chrysene	µg/kg	2 / 8 (25%)	2 / 8 (25%)	0 / 0 (0%)	0 / 0 (0%)	57	0	(NE)	0	(NE)	0	(13,000)
Dibenzo (a,h) anthracene	µg/kg	5 / 8 (63%)	5 / 8 (63%)	0 / 0 (0%)	0 / 0 (0%)	34	0	(NE)	0	(NE)	0	(380)
Fluoranthene	µg/kg	2 / 8 (25%)	2 / 8 (25%)	0 / 0 (0%)	0 / 0 (0%)	71	0	(NE)	0	(NE)	0	(22,000,000)
Indeno (1,2,3-cd) pyrene	µg/kg	5 / 8 (63%)	5 / 8 (63%)	0 / 0 (0%)	0 / 0 (0%)	66	0	(NE)	0	(NE)	0	(1,300)
Phenanthrene	µg/kg	1 / 8 (13%)	1 / 8 (13%)	0 / 0 (0%)	0 / 0 (0%)	15	0	(NE)	0	(NE)	0	(17,000,000)
Pyrene	µg/kg	2 / 8 (25%)	2 / 8 (25%)	0 / 0 (0%)	0 / 0 (0%)	66	0	(NE)	0	(NE)	0	(17,000,000)
PAH Low molecular weight	µg/kg	6 / 8 (75%)	6 / 8 (75%)	0 / 0 (0%)	0 / 0 (0%)	15	0	(NE)	0	(NE)	0	(NE)
PAH High molecular weight	µg/kg	6 / 8 (75%)	6 / 8 (75%)	0 / 0 (0%)	0 / 0 (0%)	570	0	(NE)	0	(NE)	0	(NE)
B(a)P Equivalent	µg/kg	8 / 8 (100%)	8 / 8 (100%)	0 / 0 (0%)	0 / 0 (0%)	84	0	(NE)	0	(NE)	0	(130)

Notes:

[1] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

[2] RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

[3] Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used. (PCBs are an exception to this rule since their final screening levels are equal to the EPA regional screening levels).

[4] Number of exceedences are the number of detections exceeding the background threshold value (BTV).

[5] Number of exceedences are the number of detections that are equal to or exceeds the screening level (commercial screening level or RWQCB Environmental Screening Levels)

* Number of exceedances are calculated using background threshold value because it is greater than the respective screening level.

‡ Maxiumum Reporting Limit greater than or equal to the Background value.

USEPA regional screening level - USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

CHHSL - California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
RWQCB	Regional Water Quality Control Board

TABLE B16-5
Proposed Sampling Plan - AOC 19 – Former Cooling Liquid Mixing Area
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC19-5	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination at AOC 19.	Title 22 metals, hexavalent chromium, and pH
AOC 19-6	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination at AOC 19.	Title 22 metals, hexavalent chromium, and pH
AOC 19-7	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination at AOC 19.	Title 22 metals, hexavalent chromium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 19-8	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination at AOC 19.	Title 22 metals, hexavalent chromium, and pH
AOC 19-9	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination at AOC 19.	Title 22 metals, hexavalent chromium, and pH

Note:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

Figures

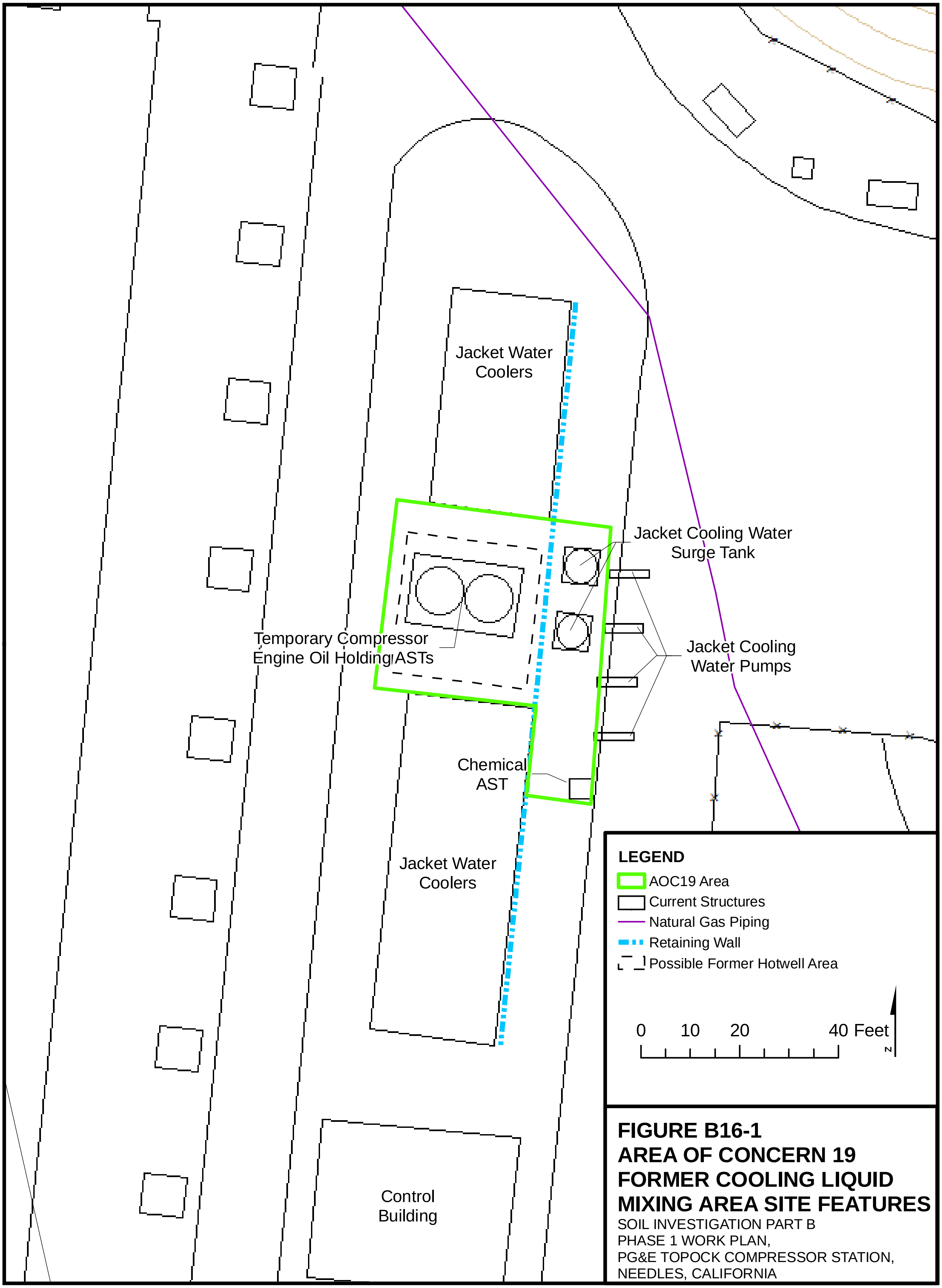

FIGURE B16-1
AREA OF CONCERN 19
FORMER COOLING LIQUID
MIXING AREA SITE FEATURES
SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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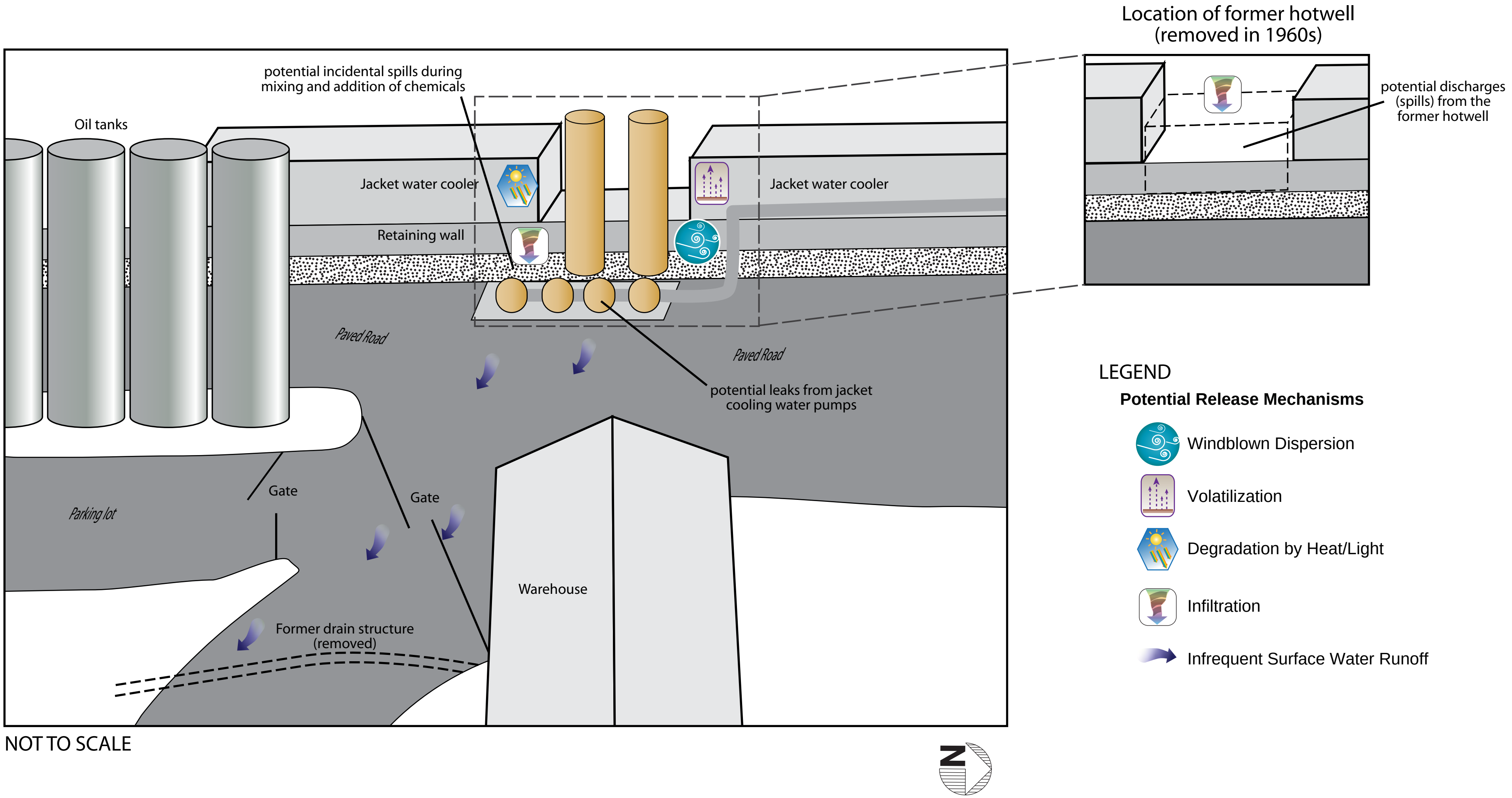
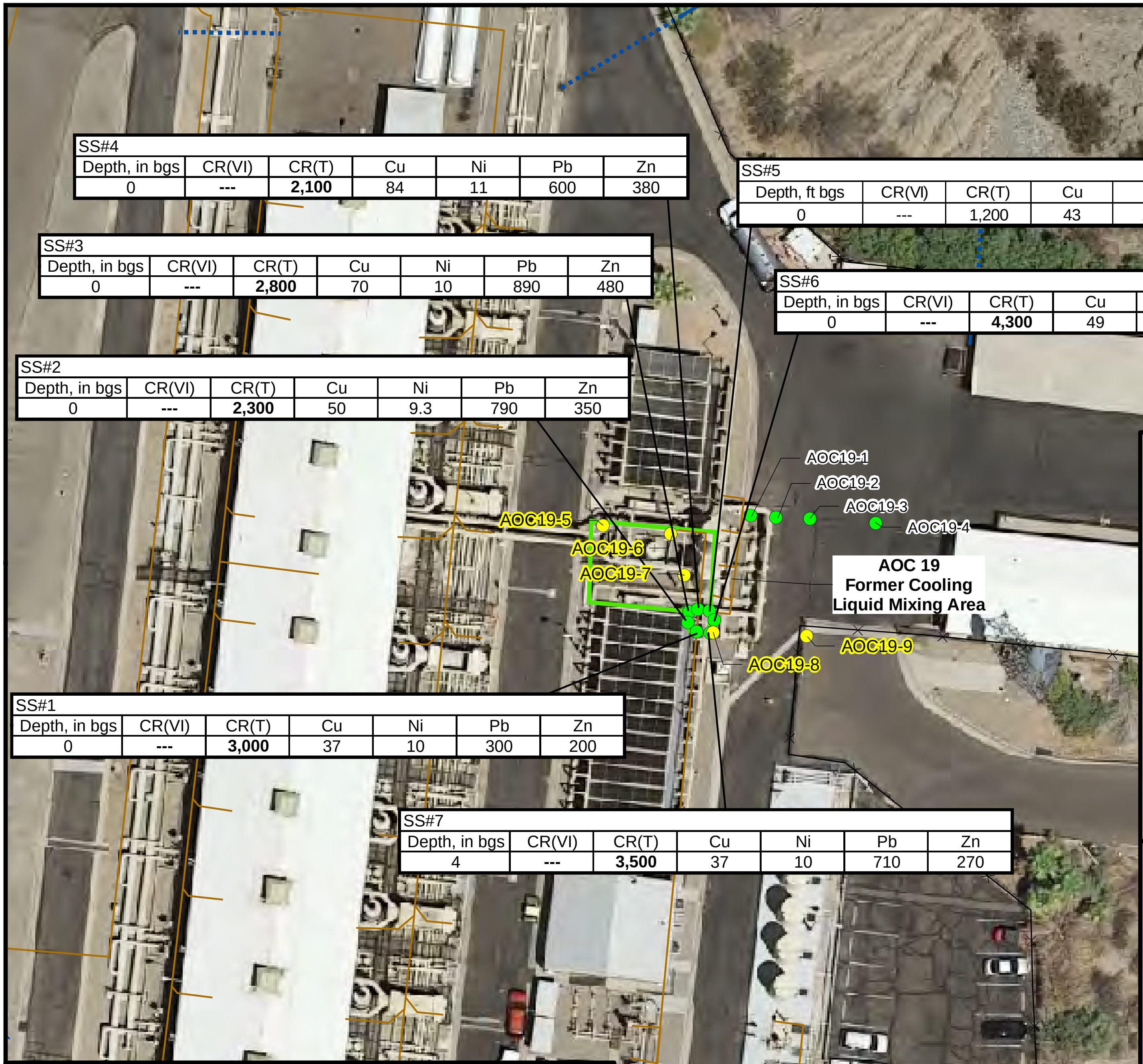


FIGURE B16-2
Conceptual Site Model for AOC19 –
Former Cooling Liquid Mixing Area
PG&E Topock Compressor Station
Needles, California



SS#4

Depth, in bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**2,100**	84	11	600	380

SS#5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	1,200	43	12	480	470

SS#3

Depth, in bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**2,800**	70	10	890	480

SS#6

Depth, in bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**4,300**	49	9.7	290	320

SS#2

Depth, in bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**2,300**	50	9.3	790	350

SS#1

Depth, in bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**3,000**	37	10	300	200

SS#7

Depth, in bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4	---	**3,500**	37	10	710	270

LEGEND

● Proposed Soil Sample Location

● Existing Soil Sample Location

AOC Boundary

Site Fence Boundary

Current Transfer Piping

Approximate Location of Stormwater Piping Below Ground

Approximate Location of Stormwater Piping Above Ground

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- All results shown are category 2 data.

FIGURE B16-3
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 19
FORMER COOLING LIQUID MIXING AREA

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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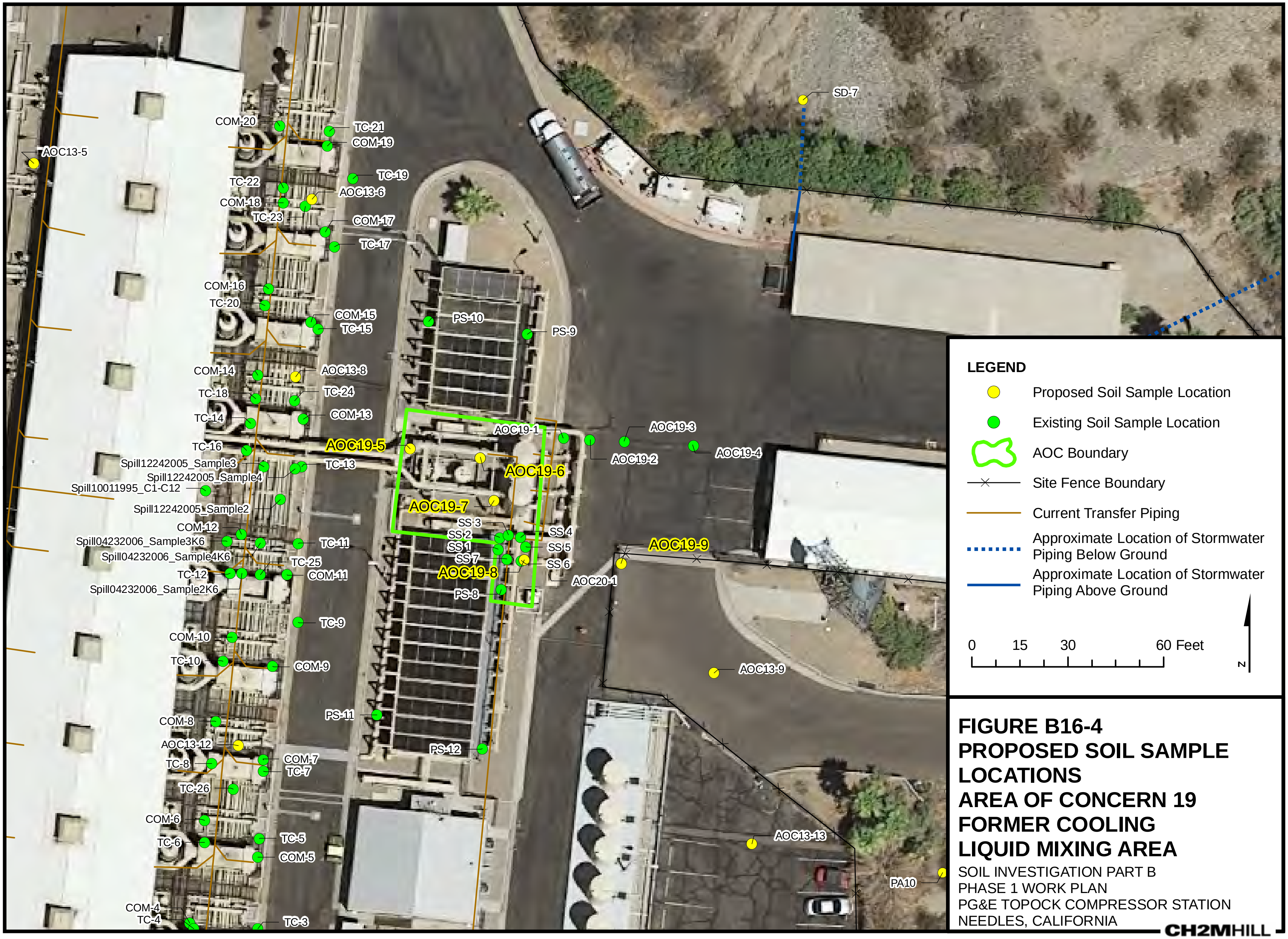

LEGEND

● Proposed Soil Sample Location

● Existing Soil Sample Location

AOC Boundary

Site Fence Boundary

Current Transfer Piping

Approximate Location of Stormwater Piping Below Ground

Approximate Location of Stormwater Piping Above Ground

FIGURE B16-4
PROPOSED SOIL SAMPLE LOCATIONS AREA OF CONCERN 19 FORMER COOLING LIQUID MIXING AREA

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix B17
AOC 20 – Industrial Floor Drains Investigation Program

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  1.2 Conceptual Site Model B17-2

2.0 Summary of Past Soil Characterization B17-2

3.0 AOC 20 Data Gaps and Proposed Sampling B17-3
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B17-2 Proposed Sampling Program

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B17-1 Proposed Soil Sample Locations
B17-2 Conceptual Site Model

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyls
PG&E	Pacific Gas and Electric Company
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B17

AOC 20 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 20 consists of the industrial floor drains within the compressor station buildings and other industrial structures and facilities within the upper yard of the compressor station that are routed to the oily water treatment system (Units 4.3, 4.4, and 4.5). AOC 20 was incorporated in the *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2007) at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2007). AOC 20 does not include the miscellaneous floor drains in areas such as lavatories that drain to one of the three septic systems on the station.

Several of the industrial buildings within the compressor station are equipped with floor drains that capture liquids released to the floor of the building and convey the liquid to Units 4.3, 4.4, and 4.5. In addition, other industrial facilities, such as the steam-cleaning area and the main jacket water surge tanks, are equipped with drains that capture overflow and spills. A pipe trench that extends from the sump next to the steam-cleaning area to the east side of the compressor building also drains to the Units 4.3, 4.4, and 4.5 and has been included in AOC 20. Collectively, these drains are referred to as industrial drains to distinguish their use and intent from the storm drains that are also present at the facility. As shown in Figure B17-1, industrial drains are found in the following buildings and facilities: Compressor Building, Auxiliary Building, Jacket Cooling Water Pumps, Oil Storage Tank Area, Steam Rack (steam-cleaning area), Fire Water Pump Building, and Former Water Softener Building (AOC 23).

Pipelines that are connected to the Units 4.3, 4.4, and 4.5 historically were made primarily of vitrified clay. Currently, the system contains a variety of pipe materials including reinforced fiberglass, polyvinyl chloride, cast iron, and acrylonitrile-butadiene-styrene. The aboveground lines are all welded carbon steel pipe (Pacific Gas and Electric Company [PG&E], 1991). No sampling of the industrial floor drains has been conducted; however, two samples located on piping segment I-1 were collected during closure of the former Units 4.3, 4.4, and 4.5 in 1989. Many of the pipes leading from the industrial floor drains to the Units 4.3, 4.4, and 4.5 system are located under building floors and machinery and/or are buried below ground and are largely inaccessible. Piping segment I-1 conveyed influent to Units 4.3, 4.4, and 4.5. Pressure testing conducted during closure of Units 4.3, 4.4, and 4.5 suggested that pipe segment I-1 may have been leaking. Because pressure testing suggested that this pipe may have leaked, accessible portions were exposed and visually inspected and then removed. Visibly stained soil from around the piping was also excavated and disposed of. Inaccessible piping was capped and left in place. One sample was collected underneath the piping and one sample was collected underneath a valve.

The liquids potentially discharged to the industrial drains would consist of liquids present within the industrial buildings and facilities. Liquids used in industrial buildings operations included lubricating oil, oily water from the steam-cleaning area and compressor and generator engine cleaning, jacket cooling water, and lubricating-oil cooling water. Drainage from the various cooling water systems would have contained chromium compounds and, later, molybdenum. No records exist of any specific releases to the industrial drains; however, the drains are expected to have captured incidental drips and spills during plant operations, as well as occasional washing liquid from floor cleaning within the buildings. Information collected during the facility assessment indicated that the oil/water holding tank (Unit 4.3) collected approximately 220,000 gallons of oily water per year from the compressor floor drainage (about 200,000 gallons per year), compressor engine cleaning operations (about 10,000 gallons per year), and steam-cleaning operations (about 10,000 gallons per year) (Kearny, 1987). In general, all oily water was discharged to the oily water system, as it is today.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 20 based on the above site history and background, as shown in Figure B17-1. (All tables and figures appear at the end of this sub-appendix.) Table B17-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 20. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 20 are likely to be incidental spills and leaks from the industrial drain system of lubricants and cooling water generated during plant operations. The quantity of liquid released from the industrial floor drains to the environment is unknown.

The primary source media at AOC 20 are shallow and/or subsurface soil, as the system consists primarily of underground piping. Short runs of aboveground piping overlying unpaved (gravel covered) soil are also part of this unit. In the gravel-covered areas with aboveground piping, liquids released in AOC 20 would have been released to surface soil and could have infiltrated shallow soil. Liquids released to shallow soils either directly from underground piping or through infiltration from the surface could have infiltrated to deeper soils. If present, organic constituents in surface soils could have been degraded by heat and light. Because the entire AOC is covered with gravel or pavement, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway.

2.0 Summary of Past Soil Characterization

As noted above, two samples were collected from the I-1 piping segment during the closure of the former Units 4.3, 4.4, and 4.5. The two I-1 pipelines segment samples were analyzed for total petroleum hydrocarbons as gasoline, diesel, motor oil, and jet fuel (TPH-gasoline, TPH-diesel, TPH-motor-oil, and TPH-jet-fuel). TPH-motor-oil was the only TPH constituent detected. This constituent was detected at concentrations of 850 and 1,200 milligrams per kilogram (mg/kg), respectively, in the two samples. These concentrations are below the applicable environmental screening level of 1,800 mg/kg promulgated by the California Regional Water Quality Control Board.

3.0 AOC 20 Data Gaps and Proposed Sampling

3.1 AOC 20 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gap was identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.
- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.
- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemicals of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.
- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 20 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 20 itself contributes to the access constraints within the compressor station, as a large portion of the piping associated with this unit is located underground. The only areas within the station that do not have any identified piping associated with AOC 20 are Areas 4, 5, 10, and 16 on the Topock Compressor Station

Accessibility Map (see Figure B-2). Access constraints for AOC 20 include numerous buildings and other utilities. Sampling may be feasible underneath aboveground portions of the system; no attempt will be made to locate and uncover underground piping as—it is operational equipment. Sample locations and depths identified for AOC 20 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

3.3 AOC 20 Proposed Sampling

Table B17-2 summarizes the proposed AOC 20 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B17-2. The proposed AOC 20 sample locations are PG&E's initial assessment of candidate locations for additional characterization. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Based on operational history and DTSC requirements, the COPCs associated with AOC 20 are Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), TPH, polychlorinated biphenyls (PCBs), and PAHs. COPCs are anticipated to be limited to soil (CH2M HILL, 2007).

Samples will be collected at eight locations: AOC 20-1 through AOC 20-8. Because of limited access, numerous subsurface utilities and pipelines, and operational features, only hand tools can be used to collect samples in AOC 20. Therefore, samples will only be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Where the area of sampling is covered with concrete or asphalt, the surface sampling interval will begin 6 inches below the bottom of the concrete/asphalt or gravel sub-base. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs. As required by the United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B17-2); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2007. Letter to Yvonne Meeks (PG&E). Comments on the RCRA Facility Investigation/Remedial Investigation, Volume 1 - Site Background and History Report, Pacific Gas and Electric Company (PG&E), Topock Compressor Station, Needles, California (EPA ID No. CAT080011729). May 9.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*. August 10.

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Pacific Gas and Electric Company (PG&E). 1991. Pacific Gas and Electric Company Drawing 387706: Elementary-Mechanical Drain and Sewer Systems, Topock Compressor Station, Gas Operations. March 29.

Tables

TABLE B17-1
Conceptual Site Model, AOC 20 – Industrial Floor Drains
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental spills/ releases within the Compressor Station and Floor Drains	Surface Soil	Percolation and/or infiltration	Subsurface Soil	Wind erosion and atmospheric dispersion of surface soil
		Potential entrainment in stormwater/ surface water runoff	Potential Groundwater	Potential volatilization and atmospheric dispersion
				Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B17-2
Proposed Sampling Plan - AOC 20 – Industrial Floor Drain Area
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC 20-1	0-0.5 and 3, if feasible	Northwest of machine shop within the auxiliary building; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation
AOC 20-2	0-0.5 and 3, if feasible	Northeast of compressor building; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs
AOC 20-3	0-0.5 and 3, if feasible	Northwest of compressor building; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs
AOC 20-4	0-0.5 and 3, if feasible	Lower Yard, east of oil/water collection aboveground storage tank; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs
AOC 20-5	0-0.5 and 3, if feasible	Lower Yard, east of former scrubber sump; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs
AOC 20-6	0-0.5 and 3, if feasible	Lower Yard, east of scrubbers; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs
AOC 20-7	0-0.5 and 3, if feasible	South of grit tank, in road; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs
AOC 20-8	0-0.5 and 3, if feasible	East of grit tank, in road ; to resolve Data Gap #1 – Lateral and vertical extent of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs

Notes:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures

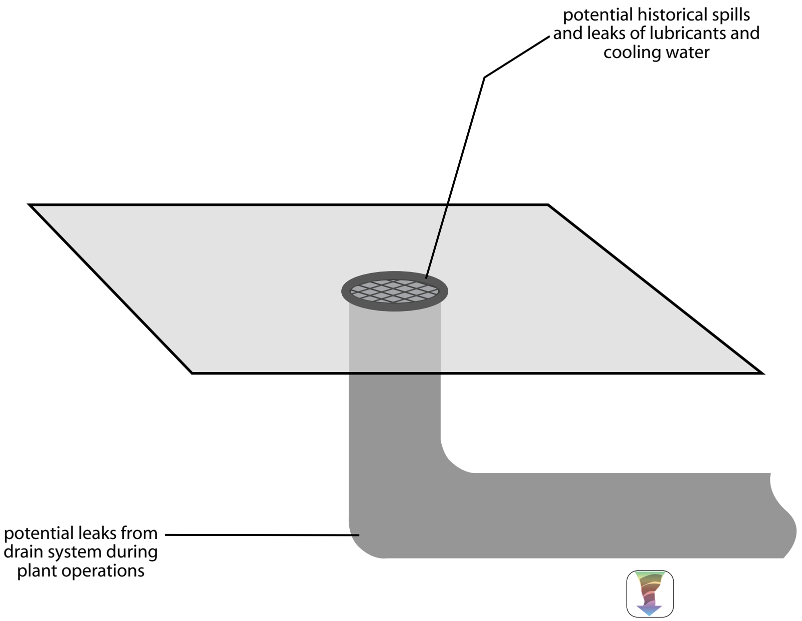
LEGEND

- 🟡 Proposed Soil Sample Location
- 🟢 Existing Soil Sample Location
- 🟧 Industrial Floor Drain
- 🟦 Pipe Trench Sump
- — Current Underground Piping
- — Current Above Ground Piping
- — Abandoned Line
- — Historic Piping
- ⋯ Approximate Location of Stormwater Piping Below Ground
- — Approximate Location of Stormwater Piping Above Ground

FIGURE B17-1
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 20

SOIL INVESTIGATION PART B
PHASE 1 WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC20_Proposed_sample_Locs



LEGEND

Potential Release Mechanisms

Infiltration

FIGURE B17-2
Conceptual Site Model for AOC20–
Industrial Floor Drains
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

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Appendix B18
AOC 21 – Unidentified Round Impoundment in Lower Yard Investigation Program

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern

APPENDIX B18

AOC 21 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 21 is a former round structure partially filled with white material adjacent to the sludge drying beds (Solid Waste Management Unit 5) that is visible in the May 19, 1955 aerial photographs. AOC 21 was incorporated into this Work Plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control based on a review of historical aerial photographs (DTSC, 2010). No interview or written information has been identified related to this structure. The structure appears to contain material of the same color as the material in the Sludge Drying Beds, and may have served as an overflow and/or storage area for the Sludge Drying Beds. During the 1950s and early 1960s, the sludge drying beds (Solid Waste Management Unit 5) were used to dry lime treatment sludge from the Permutit® water softening system. The available information indicates that at least a portion of the dried or partially dried sludge was transported to the Railroad Debris Site (AOC 14) (Russell 2006 a). Some apparent spillage of the white material is visible between the Sludge Drying Beds and the round structure.

The structure appears to consist of a circular earthen berm. No information is available regarding the materials of construction. The sludge drying beds were constructed to a depth of 2 feet below ground surface (bgs) (CH2M HILL 2007a), and from the aerial photos the structure appears to be similar in elevation to the deeper portions of the Sludge Drying Beds. The sludge drying beds were approximately 20 feet wide by 50 feet long; the round structure appears to have a diameter slightly greater than the width of the Sludge Drying Beds.

No samples have been collected in this area. The Permutit water softening system used a combination of lime and soda ash to remove excess minerals from Topock well water. Based on data from the white powdery material in AOC 14, it is possible that the material contains low levels of total and hexavalent chromium

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 21 based on the above site history and background, as shown in Figure B18-1. (All tables and figure appear at the end of this sub-appendix.) Table B18-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 21. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 21 are likely to be incidental spills of water-softener sludge during transfer of material from the sludge-drying beds to AOC 21 and/or during loading of material onto trucks to haul it to AOC 14. Some incidental spills apparently occurred, as there is some white coloration present between AOC 21 and the sludge-drying beds. The water-softener sludge likely contained some liquid, as former employees reported that it was sprayed onto the ground at AOC 14 (CH2M HILL, 2007). The potential quantity of solids sludge and/or associated liquid released in the vicinity AOC 21 is unknown. It is possible that the bottom of the structure consisted solely of soil, and that softened water may have been released to shallow soil directly beneath the structure.

The primary source media at AOC 21 are surface and shallow soil. Because the area around AOC 21 was unpaved, spilled sludge would have been released directly to surface soil and any associated liquids could have infiltrated shallow soil. Liquids released inside the round structure AOC 21 would have been released to directly to shallow soil. Liquids released to shallow soils could have infiltrated to deeper soils. Runoff of contaminated surface soil in rainwater is a potential migration pathway for soils located outside the structure.

2.0 Summary of Past Soil Characterization

This AOC has not been previously sampled.

3.0 AOC 21 Data Gaps and Proposed Sampling

3.1 AOC 21 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gap was identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to the round structure.

Data gaps for Decisions 2 through 5 are discussed in the main text of this appendix, and include the following:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes polycyclic aromatic hydrocarbons, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemicals of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data, and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 21 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 21 is located in Area 3 (Figure B-2). Twenty-three utility risers, including gas, odorant, waste water, electrical, SCADA, and an emergency shutoff device, are located in Area 3 on the Topock Compressor Station Accessibility Map (see Figure B-2). In addition, a utility trench, an anode, and three vaults were identified in Area 3. Sample locations and depths identified for AOC 21 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot below ground surface (bgs) or less.

3.3 AOC 21 Proposed Sampling

Table B18-2 summarizes the proposed AOC 21 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B18-2. The proposed AOC 21 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Based on the available information, COPCs for this unit consist of metals, potentially including hexavalent chromium. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Samples from this area will be analyzed for Title 22 metals, hexavalent chromium, calcium, sodium, and pH. Samples will be collected at two locations: AOC 21-1 and AOC 21-2. Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in AOC 21; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Ten percent of all samples collected during the investigation will also be analyzed for the full suite of Target Analyte List/Target Compound List constituents.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B18-2); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

CH2M HILL. 2007a. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

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California Department of Toxic Substances Control. 2010. "*Response to Comments to the Soil Part B Work Plan.*" July 20

Russell, Curt. 2006. Personal Communication in "Final Field Notes Memorandum, May 8 to 9, 2006." May.

Tables

TABLE B18-1
Conceptual Site Model, AOC 21– Round Depression near Sludge-drying Beds
Soil Investigation Part B Phase 1 Work Plan,
Investigation Program *PG&E Topock Compressor Station, Needles, California*

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Incidental Spills/ Releases of material stored in the depression	Surface Soil	Percolation and/or infiltration Potential entrainment in stormwater/ surface water runoff	Subsurface Soil Potential Groundwater	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion Potential extracted groundwater[a]

[a] Quantitative evaluation of the groundwater pathway completed in the Groundwater Risk Assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

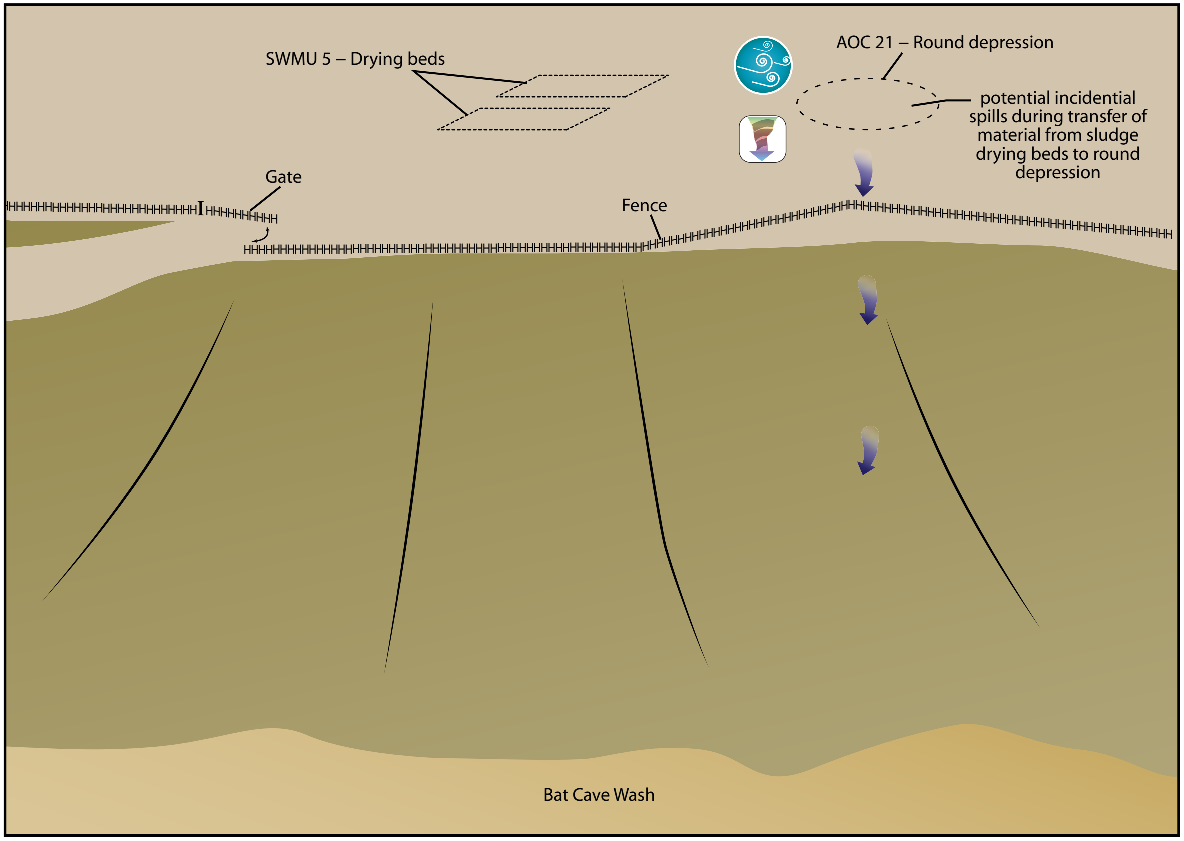
TABLE B18-2
Proposed Sampling Plan - AOC 21 – Round Depression near Sludge-drying Beds
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
AOC21-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to the round structure.	Title 22 metals, hexavalent chromium, calcium, sodium, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC21-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to the round structure	Title 22 metals, hexavalent chromium, calcium, sodium, and pH

Note:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

Figures



NOT TO SCALE

LEGEND

Potential Release Mechanisms

Windblown Dispersion

Infiltration

→ Infrequent Surface Water Runoff

FIGURE B18-1
Conceptual Site Model for AOC21 –
Former Round Structure
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

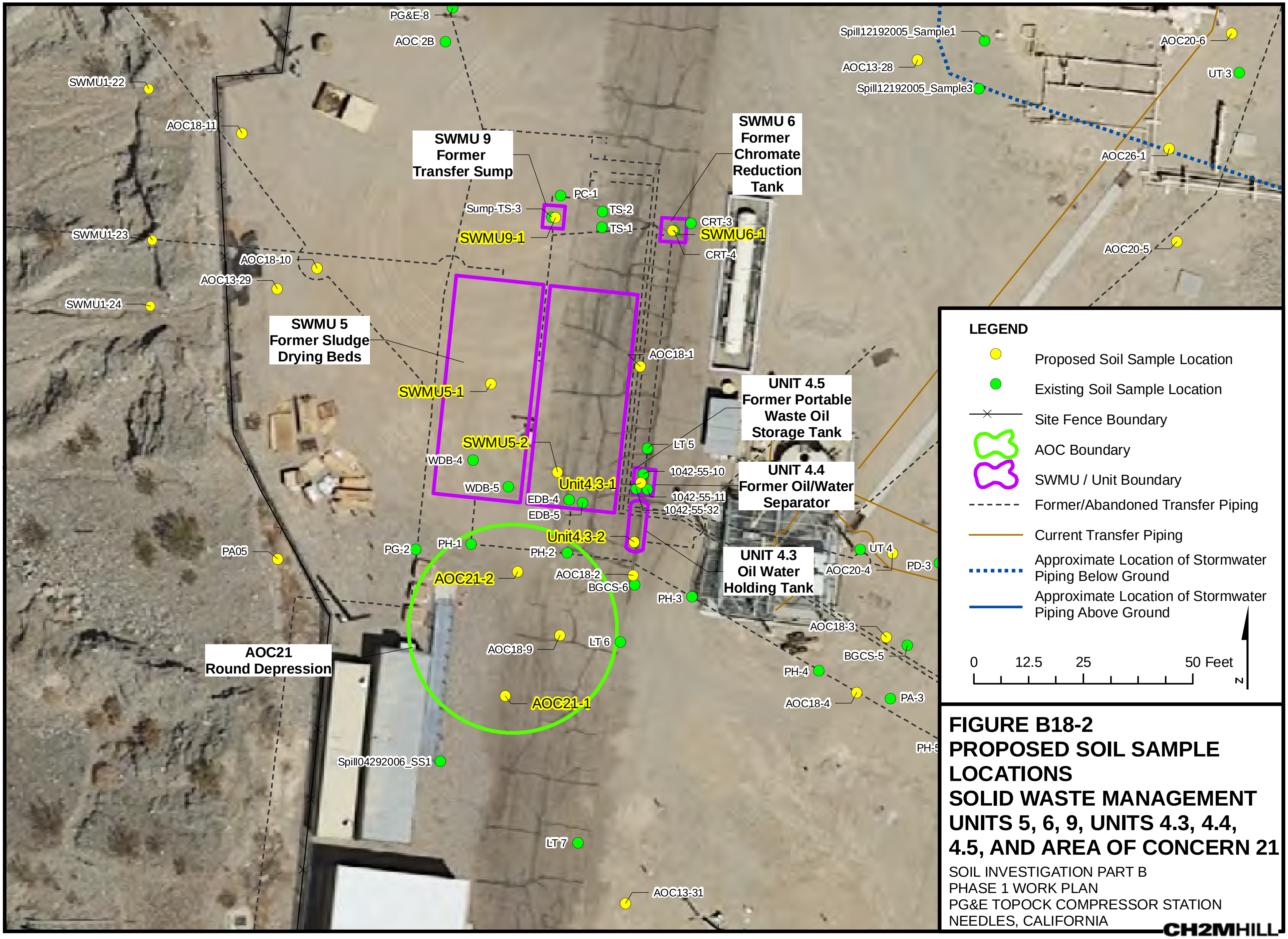


FIGURE B18-2
PROPOSED SOIL SAMPLE LOCATIONS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Appendix B19

AOC 22 – Three-sided Structure in Upper Yard Investigation Program

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B19-2 Proposed Soil Sample Locations

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
PAH	polycyclic aromatic hydrocarbon
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B19

AOC 22 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 22, which is visible in the May 19, 1955 aerial photographs (CH2M HILL, 2007), consists of a three-sided structure located in the upper yard, along what is now the compressor station fence line. AOC 22 was incorporated into this Work Plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2010). The northern end of the structure was slightly north of what is now the Tech Maintenance Shop (the Tech Maintenance Shop did not exist in the aerials that show the three-sided structure). Based on the aerial photo, it appears that the footprint of the structure would have been located within the current unpaved area adjacent to the fence line.

In the aerial photo, a container that appears to be a drum is located near this structure. There is no available information on the use of this structure or any materials that may have been stored at this structure or in its vicinity. The area around the structure is unpaved.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 22 based on the above site history and background, as shown in Figure B19-1. (All tables and figures appear at the end of this sub-appendix.) Table B19-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 22. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 22 are likely to be incidental spills of any materials stored in this area. The potential type and quantity any materials released in the vicinity this structure are unknown. The primary source medium at AOC 22 is surface soil. Because the area around AOC 22 is unpaved, liquids released in AOC 22 would have been released to surface soil and could have infiltrated shallow soil. Liquids released to shallow soils could have infiltrated to deeper soils. If present, organic constituents in surface soils could have been degraded by heat and light. In addition, contaminated surface soil runoff would have been a potential migration pathway to the east to the area outside the fence line.

2.0 Summary of Past Soil Characterization

There is no information regarding the purpose of this structure, and there are no current data in the immediate vicinity of the structure; however, several samples associate with AOC 9 (Southeast Fence Line) are located downslope from this structure. Sample locations AOC9-5 and AOC9-10 are immediately downslope from where the three-sided structure was located. Sample locations AOC9-6, AOC9-11, AOC9-13, and AOC9-14 are located further downslope (i.e., downslope from locations AOC9-5 and AOC9-10).

The six soil samples collected immediately downslope of this structure indicate that total chromium, hexavalent chromium, copper, lead, mercury, zinc, and benzo(a)pyrene exceeded the Part A screening values for areas outside the fence line one or more times in these samples. Detectable concentrations of mercury were found in four of the six samples.

3.0 AOC 22 Nature and Extent Data Gaps Evaluation

This AOC has not been previously sampled.

4.0 AOC 22 Data Gaps and Proposed Sampling

4.1 AOC 22 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gap was identified for Decision 1, as follows:

1. Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to former three-sided structure.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include the following:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemicals of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.2 AOC 22 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 22 is located in Area 16 on the Topock Accessibility Map (Figure B-2). Thirty-six utility risers, consisting of various water and electrical lines, are present in this area. Photograph 44 in sub-Appendix B25 show the accessibility constraints in AOC 22. Sample locations and depths identified for AOC 22 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot below ground surface (bgs) or less.

4.3 AOC 22 Proposed Sampling

Table B19-2 summarizes the proposed AOC 22 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B19-2. The figure also shows proposed sample locations for surrounding SWMUs and AOCs. The proposed AOC 22 sample locations are Pacific Gas and Electric Company’s initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Samples will be collected at two locations: AOC 22-1 and AOC 22-2. Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in AOC 22; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. COPCs have not been defined for this unit. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Samples from this area will be analyzed for Title 22 metals, hexavalent chromium, pH, volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), SVOCs, PCBs, and PAHs. Ten percent of all samples collected during the investigation will also be analyzed for the full suite of Target Analyte List/Target Compound List constituents.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B19-2); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

California Department of Toxic Substances Control. 2010. "*Response to Comments to the Soil Part B Work Plan.*" July 20.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Tables

TABLE B19-1
Conceptual Site Model – AOC 22 Unidentified Three-Sided Structure
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station, Needles, California

Primary Source	**Primary Source Media**	**Potential Release Mechanism**	**Secondary Source Media**	**Potential Secondary Release Mechanism**
Incidental Spills and Releases from possible hazardous material storage in structure	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/ enclosed space accumulation
				Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B19-2
Proposed Sampling Plan - AOC 22- Unidentified Three Sided Structure
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station, Needles, California

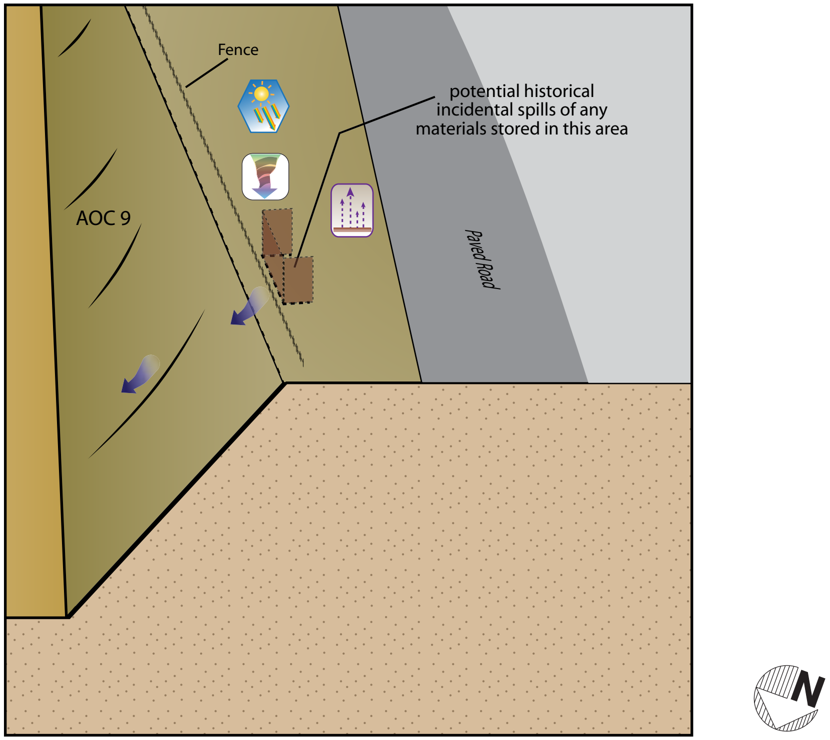
Location	Depths (feet)	Description/Rationale	Analytes
AOC 22-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to former three-sided structure.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 22-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to former three-sided structure.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs

Notes:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



NOT TO SCALE

LEGEND

Potential Release Mechanisms

Infiltration

Infrequent Surface Water Runoff

Volatilization

Degradation by Heat/Light

FIGURE B19-1
Conceptual Site Model for AOC22 –
Unidentified Three-Sided Structure
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

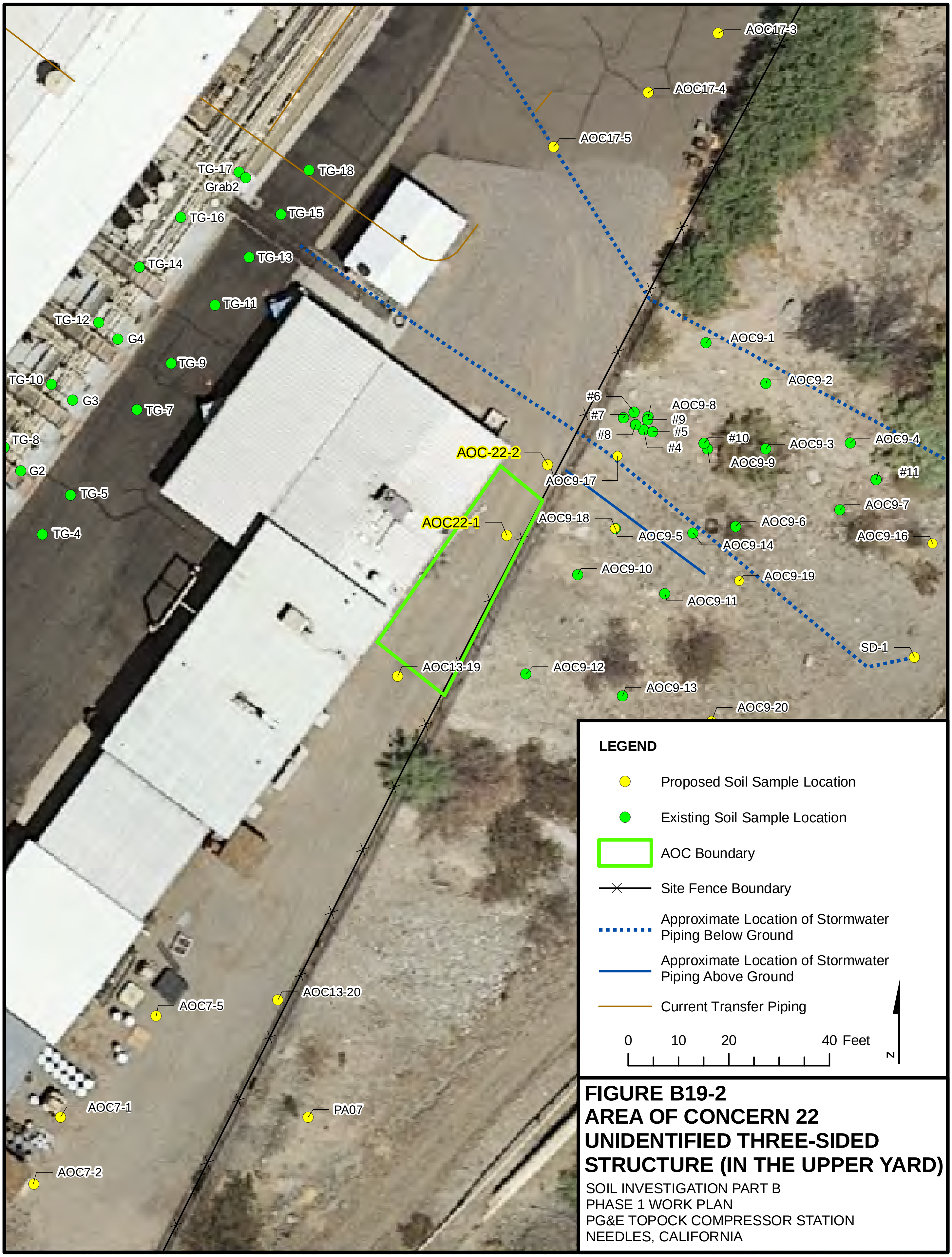


FIGURE B19-2
AREA OF CONCERN 22 UNIDENTIFIED THREE-SIDED STRUCTURE (IN THE UPPER YARD)

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Appendix B20
AOC 23 – Former Water Conditioning Building Investigation Program

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  1.2 Conceptual Site Model B20-1

2.0 Summary of Past Soil Characterization B20-2

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B20-2 Proposed Sampling Program

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B20-1 Conceptual Site Model
B20-2 Proposed Soil Sample Locations

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

ATTACHMENT B20

Area of Concern 23 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 23 is the former water conditioning building which is located in the southern portion of the upper yard. AOC 23 was incorporated into this Work Plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2010). Two solid waste management units (SWMUs)—SWMU 7 Precipitation Tank (closed), and SWMU 8 Process Pump Tank—are located immediately south of this building (the area occupied by the two former tanks is now covered by the Fire Pump Building). The tanks associated with these two units were removed in 1990 as part of the closure of the former hazardous waste treatment system. The Former Water Conditioning Building has also previously been identified as the “Water-Softening Building” and is currently identified as the “Storage Building.” AOC 23 is currently used for storage of dry materials; no hazardous materials are stored here.

Available information indicates that the Former Water Conditioning Building was used for dry storage of the chemicals used in the Permutit water-softening process used at the compressor station until approximately 1962 and also contained the treatment plant (water-softening process). The treatment plant consisted of one to two tanks that were used to handle a mixture of soda ash, lime, and sodium aluminate. Raw (incoming) well water was pumped through the plant to remove excess minerals and thereby soften the water. Minerals were removed from the raw well water to reduce the amount of cooling tower blowdown generated during plant operations. Since the Former Water Conditioning Building was part of the water softening system, it would have most likely contained pertinent structures to get chemicals into the system, which may have included hoppers and aboveground tanks.

From 1969 to 1985, the tanks formerly located outside the building (then called the Precipitation Tank [SWMU 7], and the Process Pump Tank [SWMU 8]) were used as part of the hazardous waste treatment system. Therefore, it is also possible that this building may have been used to store chemicals or house incidental equipment associated with the hazardous waste treatment system. The chemicals used in the hazardous waste treatment system at this location consisted of sodium hydroxide, Poly Floc II, and ferric sulfate in the Precipitation Tank. No chemical were known to have been added to the Process Pump Tank.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 23 based on the above site history and background, as shown in Figure B20-1. (All tables and figure appear at the end of this sub-appendix.) Table B20-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 23. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 23 are likely to be historical incidental spills of dry soda ash or lime, and/or water-softening sludge. If sodium hydroxide, Poly Floc II and ferric sulfate were stored in the building, incidental spills of these chemicals could also have occurred at AOC 23. The quantity any materials released is unknown; however, is expected to be relatively small, as spills of dry material would most likely have been contained in the building or cleaned up if needed, and spills of water softening sludge in the building would similarly have been cleaned up. Sodium hydroxide spills would have been cleaned up quickly due to the acute danger posed by the chemical. Any releases of sodium hydroxide to soil would have raised the pH of the soil and thereby reduced the solubility of metals in the soil. If a large release of water-softening sludge occurred, it could have resulted in water potentially containing some sludge reaching the storm drain system and being discharged outside the fence line. Because the area around the AOC was unpaved, dry chemicals deposited on the soil could also have been entrained in stormwater runoff and being discharged outside the fence line. Releases via the storm drain system are addressed by the storm drain investigation program described in Appendix D of this work plan. Finally, while there is no information indicating that the concrete floor in the building lacked integrity in the past, it is possible that small cracks are present and that small quantities of dissolved lime or soda ash may have been released to shallow soil directly beneath the building.

The primary source medium at AOC 23 is concrete within the building (the building floor). Secondary source media include surface soil adjacent to the building, and shallow soil underneath the building. If any liquids were released in AOC 23, they would have been released to surface soil and could have infiltrated shallow soil or been released to shallow soil directly. Liquids released to shallow soils could have infiltrated to deeper soils. Due to the high pH of the main chemicals used in the water softening process, release of the chemicals or sludge would have helped to fix any metals contained in the material, and prevent migration. No organic compounds were used in the water-softening process.

2.0 Summary of Past Soil Characterization

There are no current data in the immediate vicinity of AOC 23; however, inorganic compound data from the adjacent SWMUs 7 and 8 were collected during the closure of the SWMUs. Both tanks were open top tanks located on concrete pads. Confirmation samples were collected following removal of the tanks, concrete foundations, sub-soils, and approximately 1 foot of contaminated soils. A sample trench was excavated, and confirmation samples were collected from two locations in the wall of the trench for SWMU 7 and one location for SWMU 8. At location PT-3, samples were collected at approximately 4 and 6 feet below ground surface (bgs). At location PT-4, samples were collected at 3.5 feet bgs. At location PPT-4, samples were collected at 4 and 5 feet bgs. The samples were analyzed for Title 22 metals, hexavalent chromium, fluoride, and pH.

The results of the final confirmation samples (PT-3_2, PT-3_4, and PT-4_1.5, PPT4_2, and PPT 4_3) indicated that all chemicals of potential concern (COPCs) were at levels below cleanup objectives (i.e., established background concentrations at the time). Five constituents were detected above their respective background threshold values in these five samples and mercury was detected at a concentration of 0.015 mg/kg. A background concentration for mercury has not been established; however, the detected concentration is below the commercial screening level. Cobalt, copper, lead, nickel, and zinc samples each exceeded their respective background threshold values once. None of these concentrations exceeded respective commercial screening levels. The overall concentration and distribution of constituents in the five samples indicate that there has been no adverse impact to soil beneath the former tanks. Additional data will be collected at SWMU 8 in accordance with requirements defined by the California Environmental Protection Agency, Department of Toxic Substances Control (2006).

This AOC has not been previously sampled.

3.0 AOC 23 Data Gaps and Proposed Sampling

3.1 AOC 23 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gap was identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to the Water Conditioning Building.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 23 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 23 is located in Area 15 on the Topock Compressor Accessibility Map (Figure B-2). Thirty-five utility risers, including gas, electrical, SCADA, and water lines, are located in Area 3. In addition two anodes and a vault were identified in Area 15. Photographs 45 through 49 in sub-Appendix B25 show the accessibility constraints in AOC 23. The building has a two-level foundation: the western portion of the building has a foundation that is approximately 2 to 3 feet thick, and the eastern portion is approximately 1 foot thick. Sample locations and depths identified for AOC 23 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

Due to the active use of the building and difficult access into the building, no sampling is proposed within the building.

3.3 AOC 23 Proposed Sampling

Table B20-2 summarizes the proposed AOC 23 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B20-2. The figure also shows proposed sample locations for nearby SWMUs and AOCs. The proposed AOC 23 sample locations are Pacific Gas and Electric's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Based on the available information, COPCs for this unit consist of metals, potentially including hexavalent chromium. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Samples from this area will be analyzed for Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), SVOCs, PAHs, polychlorinated biphenyls (PCBs), and pH. Samples will be collected at three locations: AOC 23-1 through AOC 23-3. Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in AOC 23; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Ten percent of all samples from the investigation will also be analyzed for the full suite of Target Analyte List/Target Compound List constituents.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B20-2); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

California Department of Toxic Substances Control. 2006. Letter "Response to Comments Related to the Site History Position of the RCRA Facility Investigation Report, dated February 2005, Pacific Gas and Electric Company Topock Compressor Station, Needles, California." July 13.

__________. 2010. "*Response to Comments to the Soil Part B Work Plan.*" July 20.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Tables

TABLE B20-1
Conceptual Site Model – AOC 23 Former Water Conditioning Building
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	**Primary Source Media**	**Potential Release Mechanism**	**Secondary Source Media**	**Potential Secondary Release Mechanism**
Potential incidental spills of water conditioning products	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/enclosed space accumulation
				Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B20-2
Proposed Sampling Plan - AOC 23- Former Water Conditioning Building
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

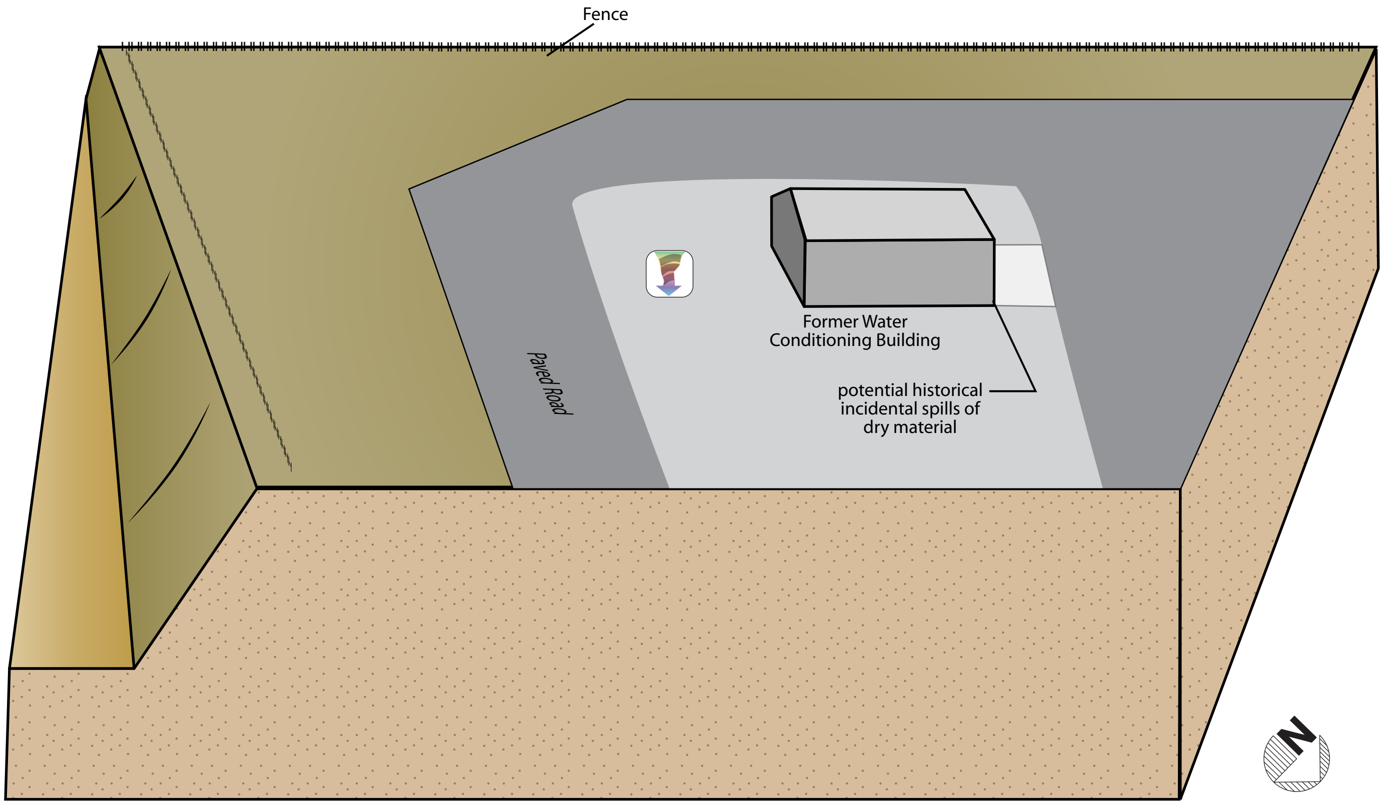
Location	Depths (feet)	Description/Rationale	Analytes
AOC 23-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to the Water Conditioning Building	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH
AOC 23-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to the Water Conditioning Building	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.
AOC 23-3	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination underneath and immediately adjacent to the Water Conditioning Building	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH

Notes:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



NOT TO SCALE

LEGEND

Potential Release Mechanisms

Infiltration

FIGURE B20-1
Conceptual Site Model for AOC23 –
Former Water Conditioning Building
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL.

LEGEND

● Proposed Soil Sample Location

● Existing Soil Sample Location

- - - - Former/Abandoned Transfer Piping

—— Current Transfer Piping

—×— Site Fence Boundary

▭ AOC Boundary

FIGURE B20-2
AREA OF CONCERN 23 FORMER WATER CONDITIONING BUILDING

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

D:\Projects\Topock\MapFiles\2011\SWP_B\AOC23_Proposed_sample_Locs

Appendix B21
AOC 24 – Staining and Potential Former API Oil/Water Separator Investigation Program

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2.0 Summary of Past Soil Characterization **B21-2**

3.0 AOC 24 Data Gaps and Proposed Sampling **B21-2**
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- 3.2 AOC 24 Access Constraints B21-2
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4.0 References **B21-3**

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B21-1 Conceptual Site Model – AOC 24 Stained Area near Potential Former Oil/Water Separator
B21-2 AOC 24 Stained Area near Potential Former Oil/Water Separator

Figures

B21-1 Conceptual Site Model
B21-2 Proposed Soil Sample Locations

Acronyms and Abbreviations

AOC	Area of Concern
API	American Petroleum Institute
bgs	below ground surface
COPC	chemical of potential concern
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

APPENDIX B21

AOC 24 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 24 is the stained area near the former structure found on the northern edge of the lower yard, and also includes the footprint of this former structure. AOC 24 was incorporated into this Work Plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2010). The May 19, 1955 aerial photographs show a narrow, elongated area of dark staining near a structure located on the northeast side of the lower yard. This structure is located near where the oily water treatment system piping currently exits (near the grit tank) and may have been an American Petroleum Institute (API) oil/water separator that preceded the installation of the oil/water separator in the southern portion of the lower yard. Subsequent to the 1955 aerial photo, additional grading was performed in the lower yard, and the northern portion of the lower yard was expanded. The unit is also visible in a January 26, 1954 photograph documenting the construction of the first three northern scrubbers, and a subsequent (May 27, 1954) photo showing the completed scrubbers (California Environmental Protection Agency, Department of Toxic Substances Control, 2008). No staining is visible in either of these photos. However, staining is visible in a June 25, 1954 photo. It appears that the staining is due to a discharge emanating from the potential former API separator. No written or interview information about this staining or the potential former API separator has been identified, and no other information is available.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for AOC 24 based on the above site history and background, as shown in Figure B21-1. (All tables and figures appear at the end of this sub-appendix.) Table B21-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 24. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2010).

The primary sources of contamination at AOC 24 are likely to be historical liquid discharges from the former structure. The quantity of liquid released from the structure is unknown. There is a potential for the discharge to have migrated past what was then the northern boundary of the lower yard; however, with the expansion of the compressor station, the affected area would now be covered by several feet of additional soil.

The primary source medium at AOC 24 was surface soil and may now be shallow or subsurface soil. Because the entire AOC is covered with additional soil, runoff of contaminated surface soil in rainwater is not considered a potential migration pathway.

2.0 Summary of Past Soil Characterization

No data have been collected in the vicinity of the stained soil or the potential former API separator.

3.0 AOC 24 Data Gaps and Proposed Sampling

3.1 AOC 24 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gap was identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination near the stained soil.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemicals of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 24 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 24 is located in Area 1 on the Topock Compressor Accessibility Map (see Figure B-2). Eighty-eight utility risers, including main gas, gas, odorant, waste water, and electrical lines, are located in Area 1. Photograph 50 in sub-Appendix B25 show the accessibility constraints in AOC 24. Sample locations and depths identified for AOC 24 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot below ground surface (bgs) or less.

3.3 AOC 24 Proposed Sampling

Table B21-2 summarizes the proposed AOC 24 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B21-2. The figure also shows proposed sample locations for nearby solid waste management units and AOCs. The proposed AOC 24 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Based on the available information, COPCs for this unit consist of metals, total petroleum hydrocarbons (TPH), and PAHs. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Samples from this area will be analyzed for Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), TPH, SVOCs, PAHs, polychlorinated biphenyls (PCBs), and pH. Samples will be collected at two locations: AOC 24-1 and AOC24-2. Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in AOC 24; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Ten percent of all samples collected during the investigation will also be analyzed for the full suite of Target Analyte List/Target Compound List constituents.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B21-2); the specific sample to be analyzed for these parameters will be confirmed in the field. -Data will be reviewed and evaluated as described in the main text of this appendix. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2008. *DTSC GSU Comments on RCRA Facility Investigation/Remedial Investigation Soil Investigation B Work Plan Part, PG&E Topock Compressor Station, Needle, California.* March 25.

__________. 2010. "*Response to Comments to the Soil Part B Work Plan*." July 20.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Tables

TABLE B21-1
Conceptual Site Model – AOC 24 Stained Area near Potential Former Oil/Water Separator
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Potential incidental leaks from former structure	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/enclosed space accumulation
				Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B21-2
Proposed Sampling Program - AOC 24 Stained Area near Potential Former Oil/Water Separator
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station, Needles, California

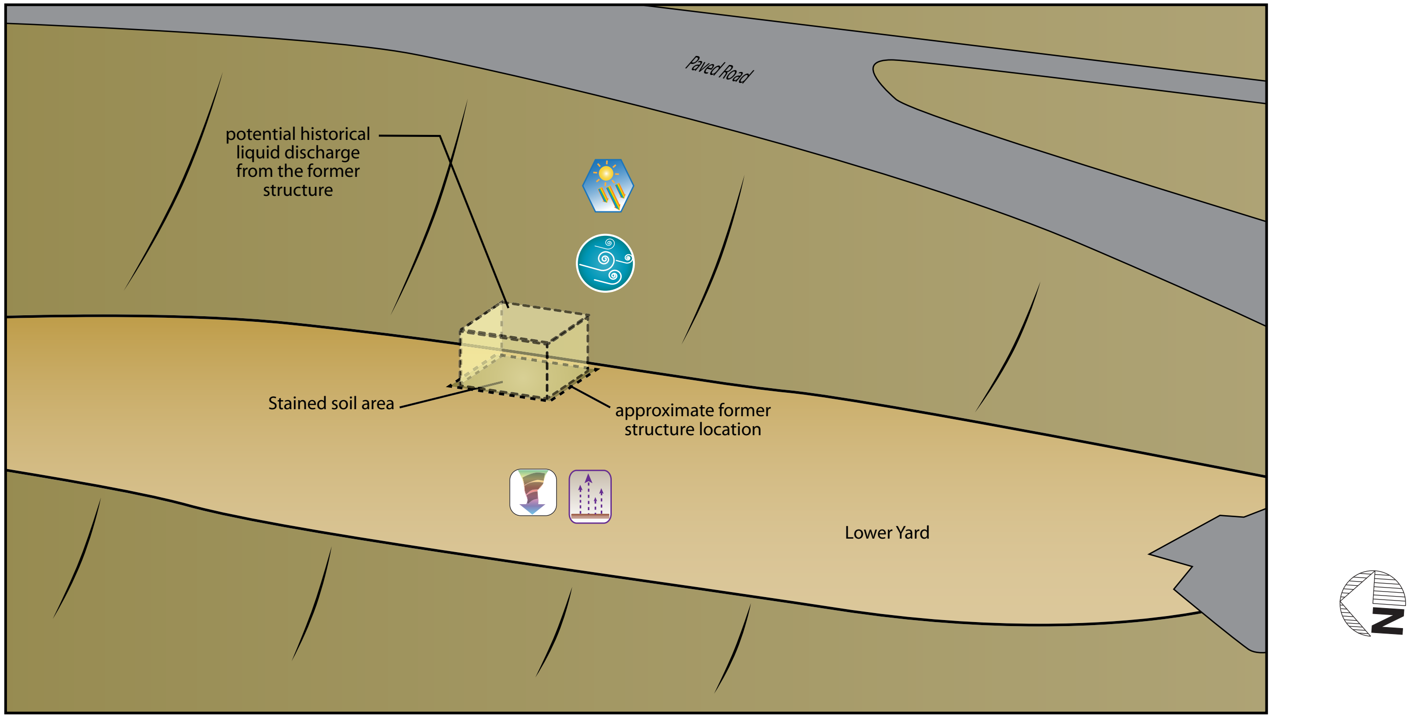
Location	Depths (feet)	Description/Rationale	Analytes
AOC 24-1	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination near the stained soil	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH
AOC 24-2	0-0.5 and 3, if feasible	To resolve Data Gap #1 – Lateral and vertical extent of contamination near the stained soil	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.

Notes:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



NOT TO SCALE

LEGEND

Potential Release Mechanisms

🌀	Windblown Dispersion
↑	Volatilization
☀	Degradation by Heat/Light
↓	Infiltration

FIGURE B21-1
Conceptual Site Model for AOC24 –
Potential Former Oil/Water Separator
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL.

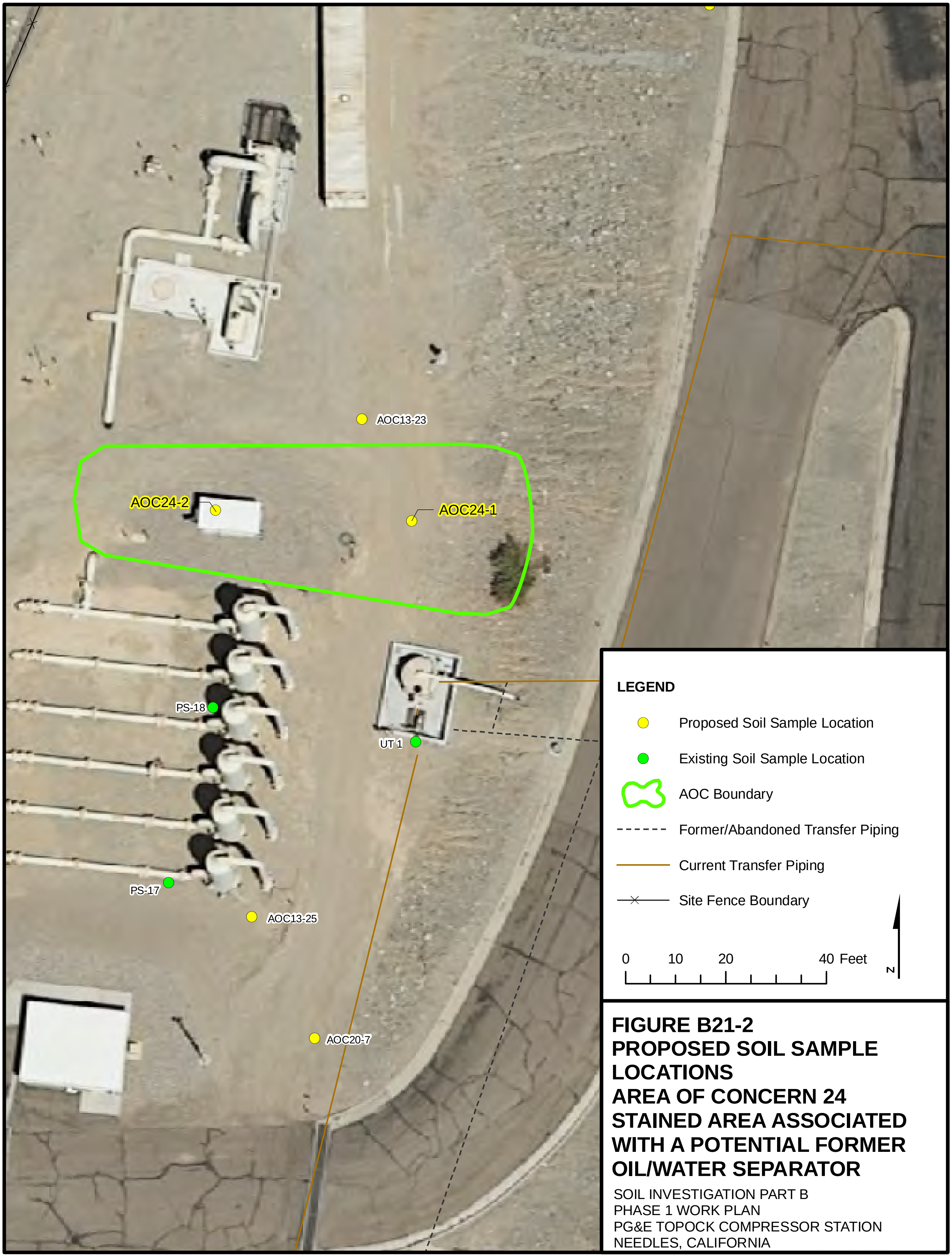


FIGURE B21-2
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 24
STAINED AREA ASSOCIATED WITH A POTENTIAL FORMER OIL/WATER SEPARATOR

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Appendix B22
AOC 25 – Compressor and Generator Engines and Basements Investigation Program

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3.0 AOC 25 Data Gaps and Proposed Sampling..B22-3
  3.1 AOC 25 Data Gaps B22-3
  3.2 AOC 25 Access Constraints..B22-4

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B22-1 Conceptual Site Model – AOC 25 Compressor and Auxiliary Engines and Associated Basements

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B22-1 Conceptual Site Model
B22-2 Location Map

Acronyms and Abbreviations

µg/kg	micrograms per kilogram
AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
CHHSL	California human health screening level
CMS/FS	corrective measures study/feasibility study
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DQO	data quality objective
ECV	ecological comparison value
EPC	exposure point concentration
mg/kg	milligrams per kilogram
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SPLP	synthetic precipitation leaching procedure
STLC	soluble threshold limit concentration
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	toxicity characteristic leaching procedure
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
VOC	volatile organic compound

APPENDIX B22

AOC 25 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 25 is the compressor station engines and associated basements and the auxiliary (generator) engines and associated basements. AOC 25 was incorporated into this Work Plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2010). The Topock Compressor Station contains 10 compressor engines; nine of these engines are currently active. The Auxiliary Building houses four generators that provide electricity to the station. The compressors and generators are fueled by natural gas and are housed inside the Compressor Building in the upper yard, respectively.

Each compressor engine is mounted on a concrete block; the top of the concrete pedestal is level with the floor of the building. Each concrete pedestal is surrounded by an open concrete trench. This open area is referred to as the compressor engine basement. The basements for each unit extend across the entire width of the Compressor Building, and have small openings (open air windows) on each side of the building to allow pipes to enter the basement. The lower edge of the openings is approximately 36 inches above the floor of the basement. Each compressor basement is also equipped with two drains that are connected to the oily water treatment system. The basements provide access to piping leading to and from the compressor engines, as well as to the lower portions of the compressor engines themselves. During normal operation, the basements are covered with solid trench plates. Incidental drips and leaks from the compressor engines would enter the basements and would be discharged to the drains connected to the oily water treatment system.

The generators are equipped with basements somewhat similar to the compressors. The generator basements are shallower, have only one drain, and only have an open air window on the east side of the Auxiliary Building. The bottom of the window opening is level with the basement floor. Incidental drips and leaks from the generator engines that collect in the basements would be discharged to drains connected to the oily water treatment system, and could also leak out through the basement window.

The basements were not intended or designed to serve as holding areas for large quantities of liquids. The two types of liquids present in the compressor and generator engines are lubricating oil and cooling water. When the lubricating oil is drained from the compressor or generator engines during engine maintenance, it is (and has historically) been drained directly to a holding tank via piping specifically installed for that purpose. Cooling water was contained in a closed-loop system. When this system was drained the water was combined with the oily water, and was routed to the oil/water separator. The oil/separator effluent was then combined with the cooling tower blowdown. Currently, the cooling water is still drained to the oil/water separator through the industrial drains. The engine basements are cleaned periodically to remove surface coatings of oil; the cleaning water is allowed to drain to the oily water treatment system.

Some site investigation and soil removal has been conducted adjacent to the east side of the Auxiliary Building in AOC 13. This area was formerly unpaved and is now covered with concrete. Prior to the installation of the concrete apron, visibly stained soil was removed, and 18 soil samples were collected and analyzed for TPH constituents (TPH-gasoline, TPH-diesel, TPH-motor oil, TPH-heavy oil); of these eight samples were also analyzed for lead. Samples were collected at depths ranging from 0 to 2.5 feet below ground surface (bgs). Five samples were analyzed for TRPH; these samples were collected at depths ranging from 1 to 3 feet bgs. All sample data are data quality Category 3, and are located in areas now covered by the concrete apron.

Lead was detected in all eight samples analyzed, at concentrations ranging from 8 to 31 mg/kg. None of these concentrations exceed the commercial screening value (California Human Health Screening Level for commercial use). TPH-motor oil and TRPH were the only TPH constituents detected. TPH-motor oil was detected in 13 of 17 samples analyzed for this constituent, and TRPH was detected in all five samples analyzed for this constituent. Detected concentration of TPH-motor oil ranged from 24 to 46,900 mg/kg; three samples exceeded the RWQCB Environmental Screening Level (ESL) of 1,800 mg/kg. TRPH was detected a concentrations ranging from 10,100 to 85,000 mg/kg; no screening level exists for this compound.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for Area of Concern (AOC) 25 based on the above site history and background, as shown in Figure B22-1. (All tables and figures appear at the end of this sub-appendix.) Table B22-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 25. A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 25 are likely to be small-scale historic liquid discharges from the compressor and generator engines, including small quantities of lubricating oil, cleaning fluids, and coolant. The estimated annual flow of oily waste water is 220,000 gallons (CH2M HILL 2007); a portion of this total derives from the drains in the Compressor and Auxiliary Buildings. The construction of the compressor basements largely precludes releases of fluids from the basements to the soil adjacent to the buildings. Only if there had been massive failure of an engine or a cooling water line would large quantities of liquids have been generated and had any potential to overflow out of the compressor basement to areas adjacent to the buildings. There are no records of any such events.

Unlike the compressor basements, the generator engine basements would have been more likely to have leaked oily water and cooling liquid to the area immediately outside the building, because the bottoms of the windows were at the same level as the basement floors. As discussed above, stained soil was removed from this area and the area was subsequently paved with concrete.

The primary source media at AOC 25 are surface soil, shallow soil and concrete. Liquids released to the drains could have entered shallow soils at breaks in the oily water system pipelines, and from shallow soil the liquid could have infiltrated to deeper soils. Leaks to surface soil outside the generator engine basements could have infiltrated to shallow soil, and from shallow soil the liquid could have infiltrated to deeper soils. Liquids released to the basements could also have impacted the concrete. However, the concrete is steam-cleaned periodically, and concrete is not considered a major source. Because the entire potential surface soil source area is covered by concrete or asphalt, runoff of contaminated surface soil is not considered a potential migration pathway.

2.0 AOC 25 Nature and Extent Data Gaps Evaluation

No data have been collected from the compressor engine or generator engine basements. Surface soil data are available for the areas immediately adjacent to the compressor and auxiliary buildings; however, these data address potential leaks and drips from the pipes and other equipment adjacent to the buildings, and are not related to the basements. These data are evaluated as part of AOC 13 in sub-Appendix B11.

3.0 AOC 25 Data Gaps and Proposed Sampling

3.1 AOC 25 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gap was identified for Decision 1:

1. Data Gap #1 – Lateral and vertical extent of contamination underneath the Compressor and Auxiliary Buildings and the associated basements.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound analysis, which includes polycyclic aromatic hydrocarbons, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with chemicals of potential concern (COPCs) and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

3.2 AOC 25 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 25 is located in Area 8 (Compressor Building) and 14 (Auxiliary Building), on the Topock Compressor Station Accessibility Map (see Figure B-2 of Appendix B). Eighty-nine utility risers, including main gas, gas, electrical, air, lubricating oil, lubricating oil cooling water, and jacket cooling water lines, are located in Area 8. Twenty-six utility risers, including main gas, gas, electrical, air, auxiliary lubricating oil cooling water, and water lines, are located in Area 14. In addition, a pipe trench and five vaults were identified in Area 14. Photographs 51 through 56 in sub-Appendix B25 show the accessibility constraints in AOC 25. The Compressor Building has a thick concrete foundation and use of equipment that may generate sparks is not permitted in the building. The Auxiliary Building also has a thick concrete foundation. Due to the active use of the buildings and physical danger associated with working in the buildings, no sampling is proposed within the buildings. Soil samples have been collected around the Compressor and Auxiliary Buildings (these samples are located in AOC 13; see sub-Appendix B11), and several more are proposed to be collected for AOC 13. These proposed and existing sample locations are shown on Figure B22-2. Detailed discussions of the existing and proposed sample locations are provided in sub-Appendix B11.

4.0 References

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

California Department of Toxic Substances Control. 2010. "*Response to Comments to the Soil Part B Work Plan.*" July 20.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Tables

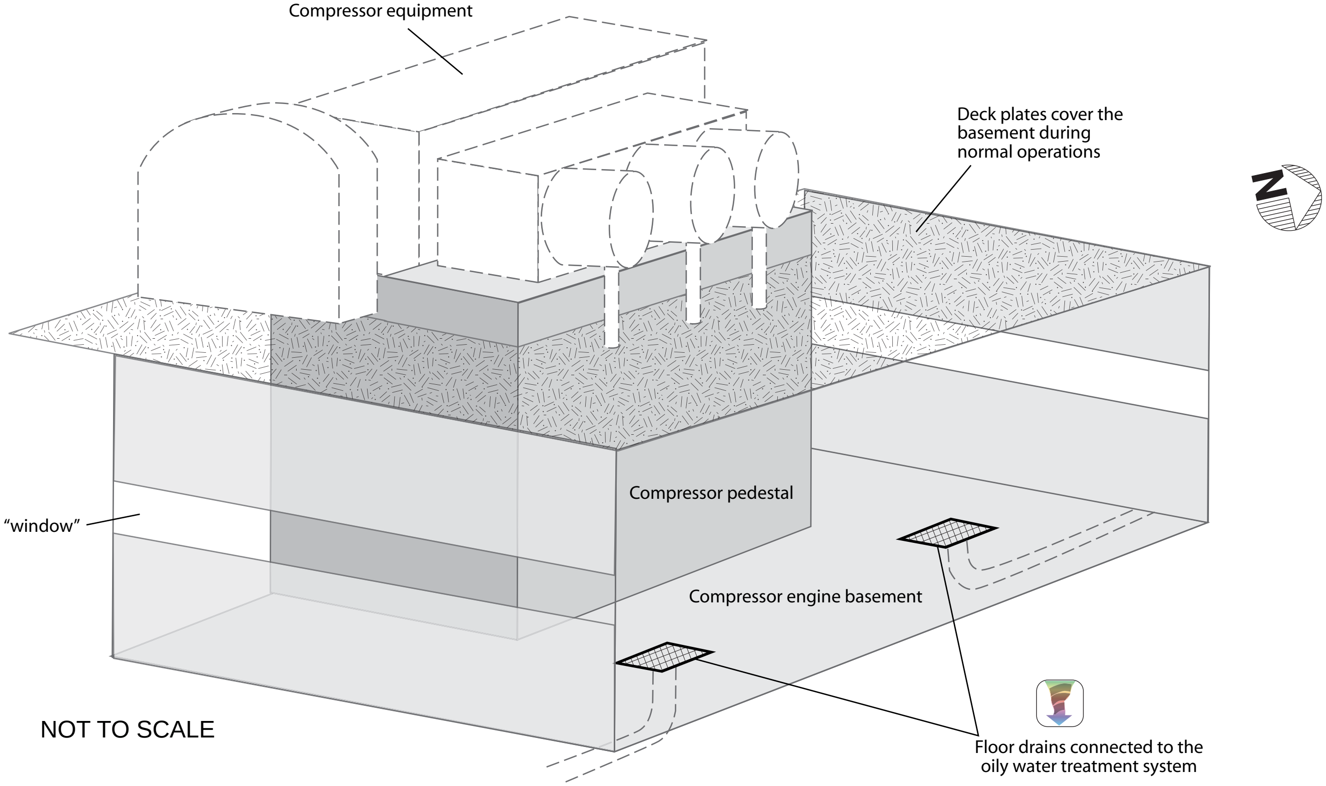
TABLE B22-1
Conceptual Site Model – AOC 25 Station Compressor and Auxiliary Engines and Associated Basements
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	Primary Source Media	Potential Release Mechanism	Secondary Source Media	Potential Secondary Release Mechanism
Potential historical liquids discharges (spills) and leaks (possible discharge to storm drain system and discharge offsite)	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/enclosed space accumulation
				Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B Phase 1data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

Figures



LEGEND

Potential Release Mechanisms

Infiltration

FIGURE B22-1
Conceptual Site Model for AOC25–
Compressor Building
PG&E Topock Compressor Station
Needles, California

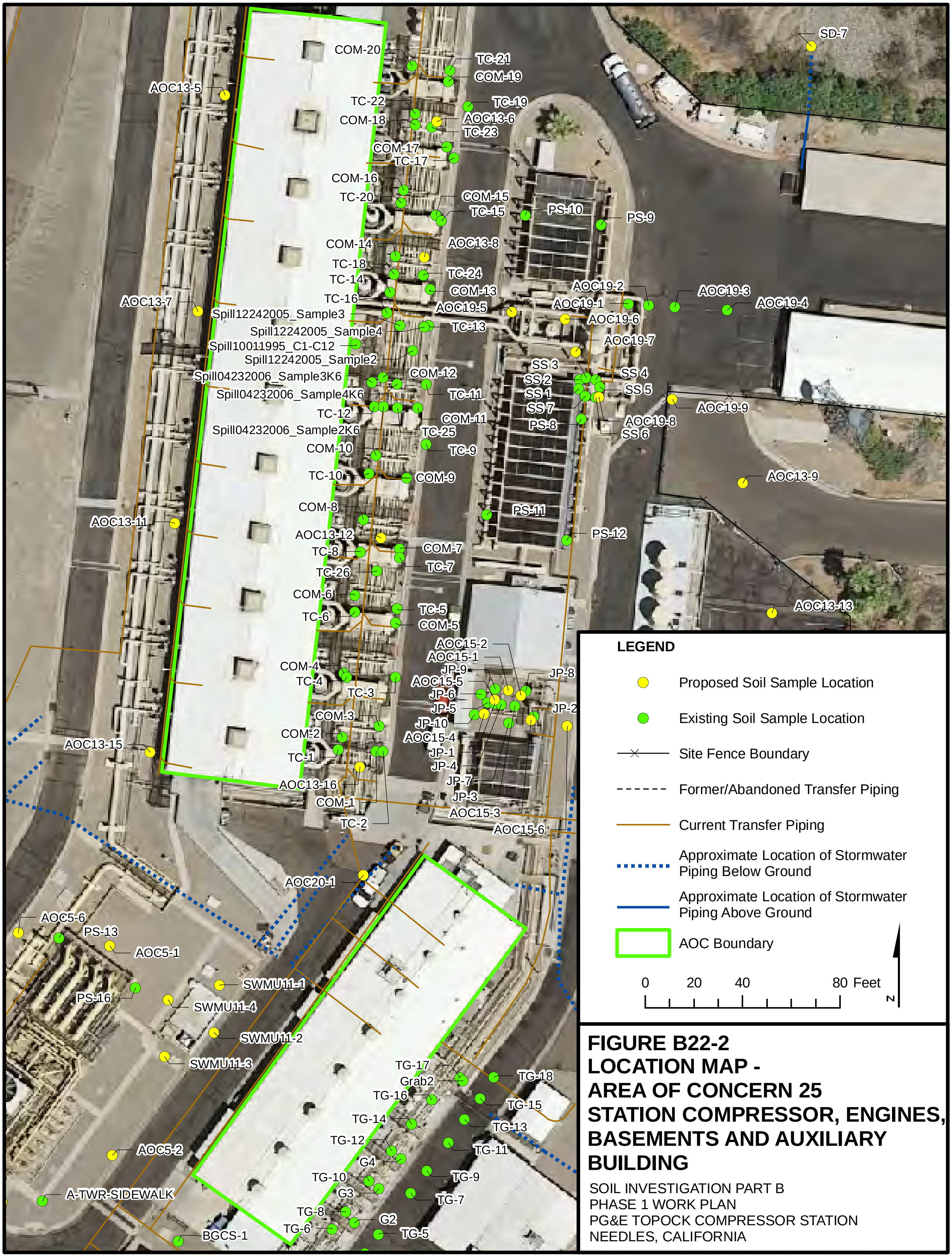


FIGURE B22-2
LOCATION MAP - AREA OF CONCERN 25 STATION COMPRESSOR, ENGINES, BASEMENTS AND AUXILIARY BUILDING

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Appendix B23
AOC 26 – Former Scrubber Sump Investigation Program

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    4.2 AOC 26 Access Constraints B23-5
    4.3 AOC 26 Proposed Sampling B23-5

5.0 References B23-6

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B23-1 Conceptual Site Model – AOC 26 Former Scrubber Sump
B23-2 Proposed Sampling Program

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B23-1 Conceptual Site Model
B23-2 Proposed Soil Sample Locations

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
CAM	California Assessment Manual
COPC	chemical of potential concern
mg/kg	milligrams per kilogram
mg/L	milligram per liter
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

APPENDIX B23

AOC 26 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 26, The Scrubber Oil Sump (Scrubber Sump) was located in the lower yard south of the South Scrubbers and was removed May 15, 1996. AOC 26 was incorporated into this Work Plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC, 2010). It was removed as part of an upgrade of the waste oil system and was replaced with a pipeline liquids collection point. The Scrubber Sump consisted of an underground concrete structure with three compartments, each measuring 5 feet wide by 5 feet long by 4 feet deep. The Scrubber Sump received pipeline liquids removed from two banks of natural gas scrubbers. When the northern compartment of the scrubber sump filled up, the pipeline liquids were either transferred to one of the other two compartments or was pumped directly to the Dirty Oil Sump (Trident, 1996a).

Closure of the sump consisted of the following steps:

- Piping was emptied, disconnected, and capped at abandoned ends.
- Residual liquid was removed from the sump by vacuum.
- Oily sludge in the sump was removed, placed into 55-gallon drums, and disposed of at a Class I landfill as non-RCRA hazardous waste.
- The sump was steam-cleaned after removal of the liquids and sludge and was completely removed from the site.
- Discolored soil was excavated and stockpiled.
- Stockpiled soils were analyzed for California Assessment Manual (CAM) 17 metals; total petroleum hydrocarbons (TPH) by United States Environmental Protection Agency (USEPA) Method 418.1; and benzene, toluene, ethylbenzene, and xylene (BTEX) by USEPA Method 5030/8020
- The sludge within the sump was also analyzed for polychlorinated biphenyls (PCBs).
- Additional soil excavation was performed, and four initial confirmation samples were collected at 6 feet below ground surface (bgs) and were analyzed for TPH by USEPA Method 418.1
- Supplemental excavation was conducted to 10 bgs, and four additional soil samples were collected.

Although TPH was present in the bottom of the excavation, safety considerations precluded further extending or deepening the excavation. High-pressure pipelines are present to the south and west of the excavation area, and the scrubber oil pump foundation and enclosed electrical conduits are present to the north. The electrical conduits prevented removal of the pump foundation. Upon receipt of the closure certification report, the County of San Bernardino requested further delineation of the residual contamination (sidewall samples) and additional data for metals. The results of the additional sampling were submitted in an addendum to the closure certification report (Trident, 1996b).

To further assess the extent of the remaining contamination, platforms were constructed at the corners of the excavation to allow use of a hand sampling tool without having workers enter the excavation. The success of the hand sampling was limited by the very rocky soil encountered in the bottom of the excavation; soil samples were successfully obtained from four locations at depths ranging from 10.4 to 11 feet bgs; at two locations, two soil samples were collected (Trident, 1996b). Although there was residual contamination, closure of the tank was proposed based on leaking underground fuel tank manual criteria, including low rainfall and depths to groundwater exceeding 100 feet, which lead to the conclusion that the residual contamination did not pose a threat. The conclusions presented in the closure certification report remained the same (Trident, 1996b). No information is available regarding the backfill used to fill the excavation.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for Area of Concern (AOC) 26 based on the above site history and background, as shown in Figure B23-1. Table B23-1 presents primary sources, primary source media, potential release mechanisms, secondary source media, and potential secondary release mechanisms for AOC 26. (All tables and figures appear at the end of this attachment.) A detailed discussion of the migration pathways, exposure media, exposure routes, and receptors is included in the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (CH2M HILL, 2011).

The primary sources of contamination at AOC 26 are likely to be incidental spills or leakage at fittings during transfer of the accumulated pipeline liquids, as well as potential leaks through the bottom of the sump. The quantity of pipeline liquids released from the scrubber sump is unknown; however, as documented in the Trident report, some releases known to have occurred because contamination was present in the excavation.

The primary source medium at AOC 26 is subsurface soil. While there is residual contamination, it is present at approximately 10 to 11 feet bgs, as discussed in Section 2.0.

2.0 Summary of Past Soil Characterization

As described in Section 1.1, sampling at AOC 26 included the soil stockpiled from the excavation and the sludge in the bottom of the sump, two sets of confirmation samples, and a final round of sampling designed to further characterize residual contamination. The stockpile samples were analyzed for CAM 17 metals; TPH by USEPA Method 418.1; benzene, ethylbenzene, toluene, and xylene. In addition to these parameters, the sludge sample was also analyzed for PCBs. Neither tabulated data nor laboratory data reports are included in the available copy of the closure report. The following information was provided in the text:

- Metals concentrations in the stockpile soil samples are near background.
- Benzene, ethylbenzene, toluene, and xylene test results were less than 1 milligram per kilogram (mg/kg).
- PCBs in the sludge sample were non-detect.
- TPH is the only chemical of concern.

Although the metals results were described as being near background, the maximum concentration of chromium detected was 139 mg/kg, and the maximum concentration of lead detected was 89 mg/kg (Trident, 2006b).

Based on the results of the soil stockpile and sludge testing, which concluded that “oil” (i.e., TPH) was the only constituent of concern, confirmation samples were consequently analyzed for TPH only. The test results from the initial round of confirmation sampling indicated that TPH concentrations in the four samples ranged from 8,400 mg/kg to 15,000 mg/kg, and additional excavation was performed to 10 feet bgs. Four additional confirmation samples were collected; TPH concentrations ranged from 2,000 mg/kg to 12,000 mg/kg.

As discussed in Section 1.1, because further excavation would not have been safe, an attempt was then made to characterize the remaining contamination; however, the rocky soil greatly limited the depth that could be achieved for these supplemental samples. Samples from the southern portion of the excavation were collected at 10.5 (two locations), 10.8, and 11.0 feet bgs and contained TPH at 1,300 mg/kg, 780 mg/kg, 570 mg/kg, and 400 mg/kg, respectively. Only two samples were obtained from the northern side of the excavation at 10.4 and 10.5 feet bgs. These two samples contained TPH concentrations of 3,700 mg/kg (“North” sample) and 15,000 mg/kg (“Northeast” sample). There was no visible discoloration of the soil.

At the request of San Bernardino County, additional metals analyses were performed on the stockpiled soil and high-TPH concentration samples from the bottom of the excavation. Sidewall samples were analyzed for TPH; however, the analytical results are not provided in the available copy of the report (Trident, 2006b). The testing of the stockpiled soil consisted of analysis for hexavalent chromium, waste extraction tests for total chromium and lead, and a fish bioassay to determine toxicity. Hexavalent chromium was non-detect, and waste extraction test results for both total chromium (1.9 milligram per liter [mg/L]) and lead (0.63 mg/L) were well below the soluble threshold limit concentrations (560 mg/L and 5 mg/L, respectively). The soil sample also passed the fish bioassay. In addition, three high-TPH concentration excavation bottom and sidewall samples (with TPH concentrations ranging from 6,700 mg/kg to 15,000 mg/kg) were analyzed for total chromium, lead, and hexavalent chromium. Hexavalent chromium was non-detect in all three samples, total chromium concentrations ranged from 14 to 22 mg/kg, and the samples with the highest detected TPH concentration (SS-NE-10.5) also contained a detectable concentration of lead (12 mg/kg). The detected lead concentration slightly exceeds the background threshold value for lead (8.39 mg/kg). Although the specific date of the additional metals analysis for the stockpile sample is uncertain, it is likely that the holding time for hexavalent chromium was exceeded.

3.0 AOC 26 Nature and Extent Data Gaps Evaluation

The following subsection discusses the nature and extent of detected chemicals of potential concern (COPCs) and chemicals of potential ecological concern detected above interim screening levels at AOC 26. As discussed in Appendix B, multiple factors were considered to assess whether the nature and extent of a specific chemical has been adequately delineated. Section 4.0 of this sub-appendix provides the recommended sampling for this unit.

Based on the site history, background, and conceptual site model, qualitative review of the historical data indicates that slightly elevated levels of metals and slightly to moderately elevated levels of TPH may be present in the subsurface below depths of approximately 10 feet bgs. In addition, the source of the backfill for the excavation is unknown.

4.0 AOC 26 Data Gaps and Proposed Sampling

4.1 AOC 26 Data Gaps

Based on the Part B data quality objectives, data gaps were identified for Decision 1:

1. Data Gap #1 - Vertical and lateral extent of contamination beneath and immediately adjacent to the former excavation.
2. Data Gap #2 – Quality of the backfill in the former excavation.

Data gaps for Decisions 2 through 5 are discussed in Appendix B and include:

- **Decision 2:** In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are adequate to support exposure point concentration development for detected chemicals that exceeded one or more comparison values. However, since semivolatile organic compound (SVOC) analysis, which includes PAHs, has been added to most soil samples collected within the fence line, this data gap has been addressed.

- **Decision 3:** Nature and extent (Decision 1) must be defined to fully assess Decision 3. Insufficient information is available to calculate soil screening levels protective of groundwater and to support screening-level groundwater modeling results, where necessary.

- **Decision 4:** Insufficient information is available to characterize the potential migration pathways from areas within the fence line to areas outside the fence line. An evaluation of the storm drain system and sheet flow runoff pathways is required. In addition, data are required to characterize surface soils in unpaved areas, to define locations with COPCs and chemicals of potential ecological concern above Part A interim screening levels that could become potential sources of COPCs and chemicals of potential ecological concern to areas outside the fence line.

- **Decision 5:** Various types of data will be needed to support the evaluation of technologies/remedial actions for the corrective measures study/feasibility study and potential interim measures, including soil physical parameters, constituent leachability data and, if remediation is required, waste characterization information and more detailed information on subsurface obstructions.

The proposed sample design is discussed below.

4.2 AOC 26 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. AOC 26 is located in Area 2 on the Topock Compressor Station Accessibility Map (Figure B-2). One hundred and thirty-four utility risers, including main gas, gas, electrical, odorant and water line, were identified in Area 2. In addition, this area contains an emergency shutoff device, five vaults, a control panel, a utility trench, and a pipe coming from the upper yard. Photographs 57 through 59 in sub-Appendix B25 show the accessibility constraints in AOC 26. Sample locations and depths identified for AOC 26 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

4.3 AOC 26 Proposed Sampling

Table B23-2 summarizes the proposed AOC 26 sample locations, depths, description/ rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B23-2. The proposed AOC 26 sample locations are Pacific Gas and Electric Company’s initial assessment of candidate locations for additional characterization to fill the data gaps. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

Based on the available information, COPCs for this unit associated with releases from the scrubber sump consist of metals and TPH; the quality of backfill is unknown. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007). Samples from this area will be analyzed for Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), TPH, SVOCs, PAHs, PCBs, and pH. Samples will be collected at one location: AOC 26-1. Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in AOC 23; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. Ten percent of all samples from the investigation will also be analyzed for the full suite of Target Analyte List/Target Compound List constituents.

To address the data needs associated with Decision 5, one sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified (see Table B23-2); the specific sample to be analyzed for these parameters will be confirmed in the field. Data will be reviewed and evaluated as described in Appendix B. In addition, to address potential concerns associated with leaching of COPCs to groundwater, select samples may be analyzed for soluble total chromium and hexavalent chromium using the SW1312 synthetic precipitation leaching procedure. Samples will be analyzed by synthetic precipitation leaching procedure only after initial sample results have been received, evaluated, and compared against the soil screening levels developed for Decision 3.

5.0 References

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__________. 1996b. *Addendum No. 1 to Scrubber Sump Closure Certification Report, PG&E Topock Compressor Station, Needles, California*. October 10.

Tables

TABLE B23-1
Conceptual Site Model – AOC 26 Former Scrubber Sump
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Primary Source	**Primary Source Media**	**Potential Release Mechanism**	**Secondary Source Media**	**Potential Secondary Release Mechanism**
Potential incidental Spills/ Releases from former sump	Surface Soil	Percolation and/or infiltration	Surface Soil	Wind erosion and atmospheric dispersion of surface soil
			Shallow Soil	Potential volatilization and atmospheric dispersion/enclosed space accumulation
				Potential extracted groundwater[a]

Notes:

[a] Quantitative evaluation of the groundwater pathway was completed in the groundwater risk assessment (ARCADIS, 2009); Part B Phase 1 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B23-2
Proposed Sampling Plan - AOC 26 - Former Scrubber Sump
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

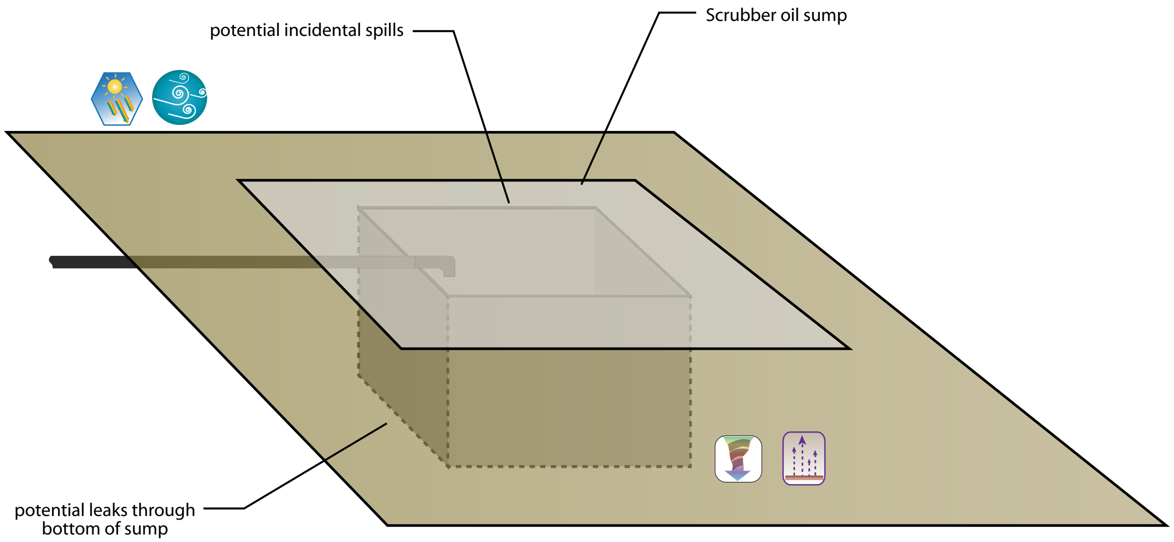
Location	Depths (feet)	Description/Rationale	Analytes
AOC26-1	0-0.5 and 3, if feasible	To resolve Data Gaps #1 and #2– Vertical and lateral extent of contamination beneath and immediately adjacent to the former excavation and assess quality of the backfill in the former excavation	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.

Note:

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures



NOT TO SCALE

LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration

FIGURE B23-1
Conceptual Site Model for AOC26–
Former Scrubber Oil Sump
Soil Investigation Part B Phase 1 Work Plan
PG&E Topock Compressor Station
Needles, California

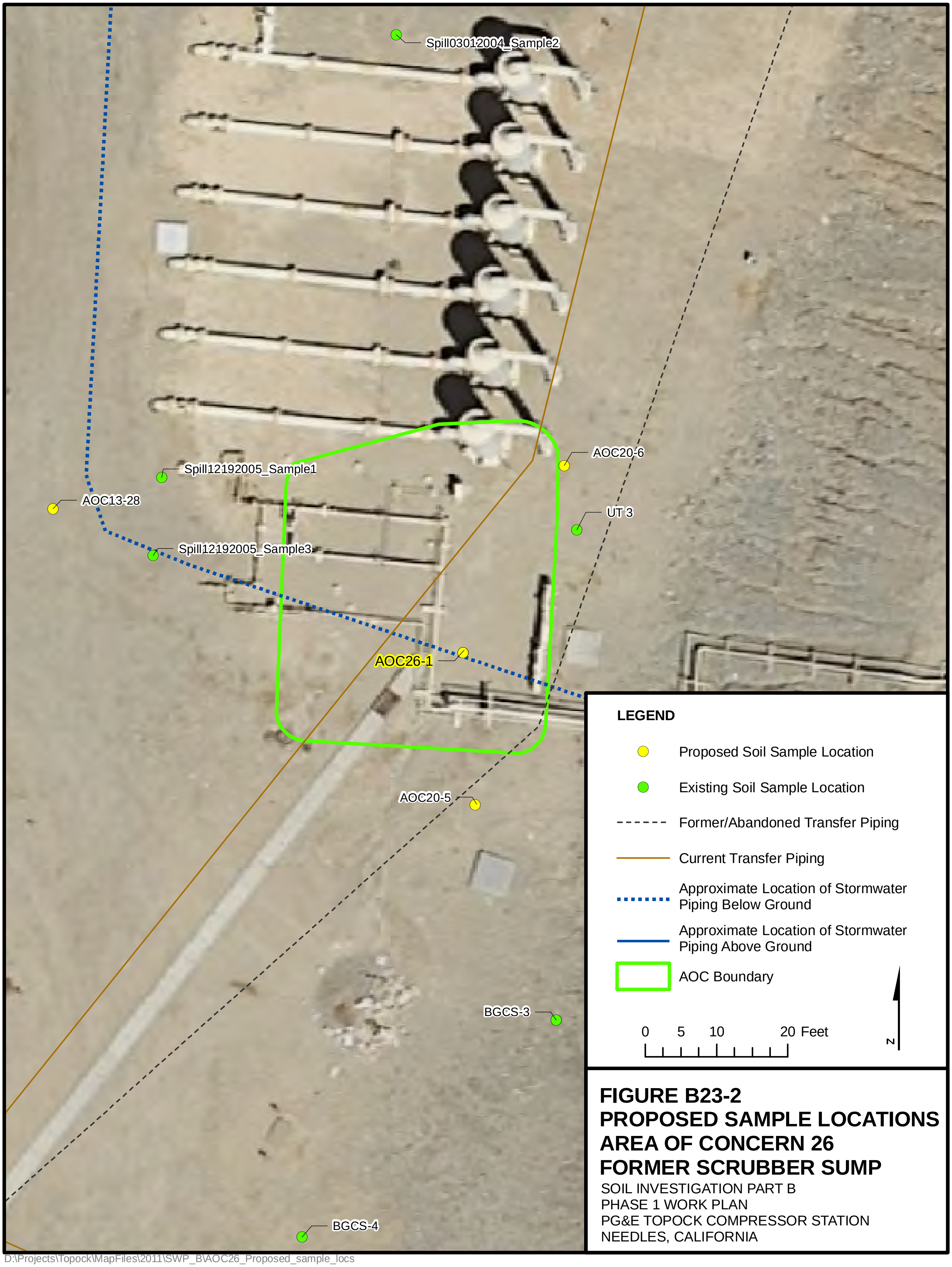


FIGURE B23-2
PROPOSED SAMPLE LOCATIONS
AREA OF CONCERN 26
FORMER SCRUBBER SUMP

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Appendix B24

Oily Water Holding Tank (Unit 4.3), Oil/Water Separator (Unit 4.4), and Portable Waste Oil Holding Tank (Unit 4.5) Investigation Program

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  1.2 Unit 4.4 Former Oil Water Separator B24-2
  1.3 Unit 4.5 Former Waste Oil Storage Tank B24-3

2.0 Summary of Past Soil Characterization **B24-4**

3.0 Units 4.3, 4.4, and 4.5 Proposed Sampling **B24-5**
  3.1 Units 4.3, 4.4, and 4.5 Access Constraints B24-5
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4.0 References **B24-6**

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B24-1 Soil Sample Results – Metals
B24-2 Soil Sample Results – Total Petroleum Hydrocarbons
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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
mg/kg	milligrams per kilogram
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
RFA	*RCRA Facility Assessment, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California*
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

APPENDIX B24

Units 4.3, 4.4, and 4.5 Investigation Program

1.0 Introduction and Background

The former oily water treatment system consisted of the oil/water holding tank (Unit 4.3), the oil/water separator (OWS) (Unit 4.4), the portable waste oil storage tank (Unit 4.5), and the interconnecting piping, located in the southern portion of the lower yard, as shown in Figures B24-1, and B24-2. Closure of these facilities was performed between November 1989 through March 1990 in general accordance with the *Work Plan for Removal of the Oil Water Separator System, Topock Compressor Station* (Mittelhauser, 1989). The former oil/water separator was located slightly further west than the current system, shown on Figure B24-1. (All tables and figures appear at the end of this sub-appendix.)

1.1 Unit 4.3 Former Oil/Water Holding Tank

The oil/water holding tank was identified by the United States Environmental Protection Agency (USEPA) in the *RCRA Facility Assessment, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California* (RFA) (Kearny, 1987) but was not subsequently designated as a Solid Waste Management Unit (SWMU) or Area of Concern (AOC) by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). The oil/water holding tank was reported to have been installed in 1970 (Kearny, 1987).[1] It consisted of a cylindrical steel tank about 15 feet long and 5 feet in diameter with a capacity of 3,000 gallons. The tank was mounted horizontally on two concrete supports; the area beneath the tank and around the OWS was unpaved.

The oil/water holding tank was used to collect oily water from the compressor floor drainage (about 200,000 gallons per year), compressor engine cleaning operations (about 10,000 gallons per year), and steam-cleaning operations (about 10,000 gallons per year) (Kearny, 1987). In general, all oily water was discharged to the oily water system, as is the case today (Russell, 2006). Wastewater that was collected in this tank was discharged by gravity flow via an aboveground 3-inch-diameter steel pipe to the adjacent Unit 4.4.

Chemical analysis data for wastewater processed through the oil/water holding tank indicate that the wastewater contained up to 48 milligrams per liter oil and grease (Brown and Caldwell, 1986). Detectable concentrations of some metals, including total chromium, were also present in the wastewater. No indication of a release was observed during a facility inspection performed as part of the RFA (Kearny, 1987).

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[1] The RFA (Kearny, 1987) indicates that the oil/water holding tank in place at the time of the RCRA facility investigation was installed in 1970. It is unknown whether the RFA information is correct, when the oily water treatment system may first have been installed in this area of the facility, whether another oil/water holding tank was in place prior to 1970, or whether prior to 1970, oily water flowed directly to an OWS. It appears that the oily water treatment system was not yet in place in 1955, although some type of equipment is discernable to the north of the eventual location in the May 1955 aerial photographs (CH2M HILL 2007).

The oil/water holding tank was removed in conjunction with the sludge-drying beds (SWMU 5) between November 1988 and February 1989 (Mittelhauser, 1990a). The steps taken during closure of the oil/water holding tank included:

- Hydroblasting of the steel tank; the hydroblast water was containerized and disposed of as hazardous waste.
- Removal of the tank from its foundation.
- The tank was cut up; due to the presence of oily sludge deposits in the tank that could not be removed, the tank was disposed of as hazardous waste.
- Removal of the concrete foundation; the tank foundation was not visibly contaminated and was therefore used as fill at the station.

Soils beneath the tank and concrete foundation were inspected and found not to be visibly contaminated; therefore, no confirmation samples were collected from this area.

1.2 Unit 4.4 Former Oil Water Separator

The former OWS (it was replaced with a new system) was identified by the USEPA in the RFA (Kearny, 1987) but was not subsequently designated as a SWMU or AOC by DTSC. The former OWS was part of the original oily water treatment system and was located adjacent to the oil/water holding tank (Unit 4.3) in the southern portion of the lower yard, as shown on Figure B24-1.

The former OWS was approximately 4.5 feet deep, 15 feet long, and 6 feet wide, and it was constructed of 6-inch-thick concrete (Kearny, 1987). The unit was set below grade (i.e., the top of the unit was at grade). The exact installation date for this unit is unknown. It received oily water from Unit 4.3 (Kearny, 1987). The unit was equipped with an underflow weir to control discharges and a suction pump on the effluent end to collect and remove floating oil. The floating oil was transferred by flexible hose to a portable waste oil storage tank (Unit 4.5). Prior to 1964, treated water from the OWS was directed to the transfer sump (SWMU 9) prior to discharge to Bat Cave Wash. From 1964 to 1969, effluent from the OWS may have been directed to the former sludge-drying beds and processed along with the cooling-water blowdown through the single-step chromium treatment system prior to discharge. From 1969 through October 1985, effluent from the OWS was routed to the chromate reduction tank and was processed along with the cooling-water blowdown through the two-step chromium treatment system prior to being discharged. In November 1985, the chromate reduction tank was converted into a holding tank (Kearny, 1987), and the discharge from the OWS was routed to either the holding tank or the transfer sump prior to discharge.

Chemical analysis data for wastewater processed through the OWS indicate that the wastewater contained up to 60 milligrams per liter oil and grease (Brown and Caldwell, 1986). Detectable concentrations of some metals, including total chromium, copper, and zinc, were also present in the wastewater. No indication of a release was observed during a facility inspection performed as part of the RFA (Kearny, 1987).

The OWS was closed and removed between November 1989 and March 1990 (Mittelhauser, 1990b). The steps taken during closure of the OWS included:

- Hydroblasting the concrete OWS was performed. The hydroblast water was containerized and disposed of as hazardous waste.
- Breaking up the concrete OWS. Due to oily sludge that could not be adequately removed, a majority of the concrete was disposed of as hazardous waste.
- Excavating approximately 14 cubic yards of visibly-stained soil. The soil was removed from the area around the former OWS and was disposed of as hazardous waste.
- Collecting three initial confirmation samples (OWS-10, OWS-11, and OWS-12).
- Removing another 5 cubic yards of soil in the vicinity of former sample 1042-55-12; the soil was disposed of as a hazardous waste.
- Collecting another confirmation sample (OWS-12-Deeper).
- Backfilling the pit with local material and performing final grading

After removal of the OWS and visibly-stained soil, three soil samples were collected from the excavation (OWS-10, OWS-11, and OWS-12) and were analyzed for total petroleum hydrocarbons (TPH) using USEPA Method 8015. Based on the work plan (Mittelhauser, 1989), the cleanup criterion for soil was established at 10,000 milligrams per kilogram (mg/kg) TPH. Sample 1042-55-12 contained TPH at a concentration exceeding the cleanup criterion, so an additional 5 cubic yards of soil were excavated from that area. A fourth confirmation sample (OWS-12-Deeper) was then collected. The locations of the samples are depicted in Figure B24-1.

1.3 Unit 4.5 Former Waste Oil Storage Tank

The portable waste oil storage tank was identified by the USEPA in the RFA (Kearny, 1987) but was not subsequently designated as a SWMU or AOC by DTSC. The portable waste oil storage tank was located in the southern portion of the lower yard adjacent to the OWS (Unit 4.4), as depicted in Figure B24-1.

The portable waste oil storage tanks consisted of an enclosed steel tank about 6 feet long and 2 feet in diameter, mounted horizontally on a trailer (Kearny, 1987). The tank was connected to a suction pump within the OWS with a flexible hose. The portable tank was stationed on a concrete pad that was bermed on three sides with a 6-inch-high curb. The fourth side of the pad was left open to allow removal of the unit.

The tank was used to collect floating oil from the OWS. When the tank was full, it was transported to the east side of the facility and placed next to the stationary waste oil storage tank (Unit 4.6). Oil within the portable tank was then transferred to the stationary tank. Starting in 1975, oil within the stationary tank was periodically removed, initially sold for reuse, and later transported offsite for recycling (Pacific Gas and Electric Company, 1980; Riddle, 2004).

The portable waste oil storage tank was removed from service in 1989. During the removal of the transfer sump (SWMU 9) and the OWS (Unit 4.4), the portable tank was used to temporarily hold waste oil removed from the sump and OWS. The waste oil was subsequently removed from the portable tank, and the tank was then transported offsite to

Chemical Transportation in Wilmington (Mittelhauser, 1990a). No indication of a release associated with the portable waste oil storage tank was observed during a facility inspection performed as part of the RFA (Kearny, 1987).

The steps taken during closure of the portable waste oil storage tank included:

- Waste oil in the tank was transferred to the waste oil storage tank (Unit 4.6) and was ultimately transported offsite for recycling.
- The empty tank was then transported offsite to Chemical Transportation for disposal or recycling.
- The concrete pad was demolished and disposed of along with the concrete from the OWS.

In addition to the OWS itself, the associated influent piping was closed. Pressure testing suggested that pipe segment I-1 may have been leaking. Complete details regarding the closure of this system are presented in the *Closure Activity Report, Oil Water Separator System, Topock Compressor Station* (Mittelhauser, 1990b). This report includes a description of the closure activities and contains the data from disposal characterization sampling, disposal manifesting information, and ultimate disposal locations. Soil sampling results are provided in Table B24-1.

2.0 Summary of Past Soil Characterization

Three historical subsurface soil samples were collected from three locations (OWS-10, OWS-11, and OWS-12-deeper) in Unit 4.4, as shown in Figure B24-1. The precise depth of the samples is not known; however they were collected below 4.5 feet below ground surface (bgs), as they were collected from the excavation below the former OWS. The former OWS was set 4.5 feet below grade, and approximately 19 cubic yards of soil were also removed from the excavation. Historical soil samples were analyzed for TPH- extractables only.

In addition to the samples collected from the excavation beneath the former OWS, two samples were collected underneath piping (I-1 segment) and a valve on the I-1 segment, respectively (OWS PI-1 and OWS Valve PI-1). The I-1 pipe segment was the pipe segment that carried the influent to the oil/water holding tank. Because pressure testing suggested that this pipe may have leaked, accessible portions were exposed and visually inspected, and then removed. Visibly stained soil from around the piping was also excavated and disposed of. Inaccessible piping was capped and left in place. The two I-1 pipelines segment samples were analyzed for TPH-gasoline, TPH-diesel, TPH-motor-oil, and TPH-jet-fuel. TPH-motor-oil was the only TPH constituent detected. This constituent was detected at concentrations of 850 and 1,200 mg/kg, respectively, in the two samples. These concentrations are below the applicable California Regional Water Quality Control Board environmental screening level of 1,800 mg/kg.

Laboratory analytical results for the historical soil samples are presented in Table B24-1. The historical data are considered Category 2.

This unit was closed by DTSC in 1995. Subsequent to this closure, DTSC requested that additional analysis be conducted for Title 22 metals, hexavalent chromium, pH, volatile organic compounds (VOCs), TPH, and semivolatile organic compounds (SVOCs) in soil at Units 4.3. 4.4, and 4.5 (DTSC, 2006). Chemicals of potential concern are anticipated to be limited to soil only (CH2M HILL, 2007). Section 3.0 provides the recommended sampling for this unit.

3.0 Units 4.3, 4.4, and 4.5 Proposed Sampling

3.1 Units 4.3, 4.4, and 4.5 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. Units 4.3, 4.4, and 4.5 are located in Area 3 on the Topock Compressor Station Accessibility Map (Figure B-2). Twenty-three utility risers, including gas, odorant, wastewater, electrical, SCADA, and an emergency shutoff device, are located in Area 3. In addition, a utility trench, a cathodic protection anode, and three vaults were identified in Area 3. Photographs 60 and 61 in sub-Appendix B25 show the accessibility constraints in Units 4.3, 4.4, and 4.5. Sample locations and depths identified for Units 4.3, 4.4, and 4.5 reflect the identified access constraints. As described in Appendix B, all sample locations in this area are limited to surface/shallow soils (depths that can be sampled using small hand tools). Generally, sampling using hand tools is limited to a depth of 1 foot bgs or less.

3.2 Units 4.3, 4.4, and 4.5 Proposed Sampling

Although this unit was closed in 1995, additional sampling for organic chemicals of potential concern and sampling of the fill used to backfill the excavation is proposed, as required by DTSC. Table B24-1 summarizes the proposed Units 4.3, 4.4, and 4.5 sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B24-1. The proposed Units 4.3, 4.4, and 4.5 sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for additional characterization. The figures are provided to facilitate planning for additional sampling that may be needed to meet agency requirements and further progress toward decision-making for soil remediation.

Samples will be collected at two locations (Unit 4.3-1 and Units 4.3-2). Because of numerous subsurface utilities and pipelines, only hand tools can be used to collect samples in Units 4.3, 4.4, and 4.5; therefore, samples will be collected at the surface (0 to 0.5 foot bgs). If possible, a deeper sample will be collected at 2 to 3 feet bgs. If the area of sampling is covered with asphalt (i.e., in the station road), the surface sampling interval will begin at the bottom of the asphalt or gravel sub-base. All samples will be analyzed for Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbon (PAHs). As required by the United States Department of the Interior, 10 percent of all samples collected during the investigation will be analyzed for the full Target Analyte List/Target Compound List constituent suite.

4.0 References

Brown and Caldwell. 1986. *Report of Analytical Results, Log No. E86-11-434*. December 16.

California Department of Toxic Substances Control. 2006. Letter "Response to Comments Related to the Site History Position of the RCRA Facility Investigation Report, dated February 2005, Pacific Gas and Electric Company Topock Compressor Station, Needles, California." July 13.

CH2M HILL. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

Kearny, A.T. 1987. *RCRA Facility Assessment, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California.* August.

Mittelhauser Corporation. 1989. *Work Plan for Removal of the Oil Water Separator System, Topock Compressor Station*. May.

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__________. 1990b. *Closure Activity Report, Oil Water Separator System, Topock Compressor Station*. July.

PG&E. 1980. Author unknown. Handwritten notes describing chemical and waste handling practices at Topock Compressor Station. November

Riddle, Glen. 2004. Personal communication between Rick Sturm/CH2M HILL and Glen Riddle/District Superintendent, Topock Compressor Station. September 15.

Russell, Curt. 2006. Personal Communication in "Final Field Notes Memorandum, May 8 to 9, 2006." May.

Tables

TABLE B24-1

Sample Results: Total Petroleum Hydrocarbons

Unit 4.3, 4.4, 4.5 – Oil/Water Holding and Portable Oil Storage Tank Investigation Program

Soil Investigation Part B Phase 1 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)				
			Commercial Screening Level [1]:	**NE**	**NE**	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Level [2]:	**NE**	**540**	**540**	**1,800**	**NE**
			Background [3]:	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as jet fuel**	**TPH as diesel**	**TPH as gasoline**	**TPH as motor oil**	**TPH-extractables**
Category3								
OWS PI-1	11/17/89		N	ND (3)	ND (5)	ND (8)	1,200	---
OWS Valve PI-1	11/17/89		N	ND (3)	ND (5)	ND (8)	850	---
OWS-10	11/18/89		N	---	---	---	---	ND (2)
OWS-11	11/18/89		N	---	---	---	---	ND (1)
OWS-12 Deeper	03/20/90		N	---	---	---	---	18

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

TPH = Total Petroleum Hydrocarbon

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

TABLE B24-2
Proposed Sampling Plan - Units 4.3, 4.4, and 4.5. Oil Water Holding Tank and Portable Storage Tank
Soil Investigation Part B Phase 1 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
Unit4.3-1	0-0.5 and 3, if feasible	Collect additional soil samples to analyze for organics	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs
Unit4.3-2	0-0.5 and 3, if feasible	Collect additional soil samples to analyze for organics	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, and PAHs

Notes:

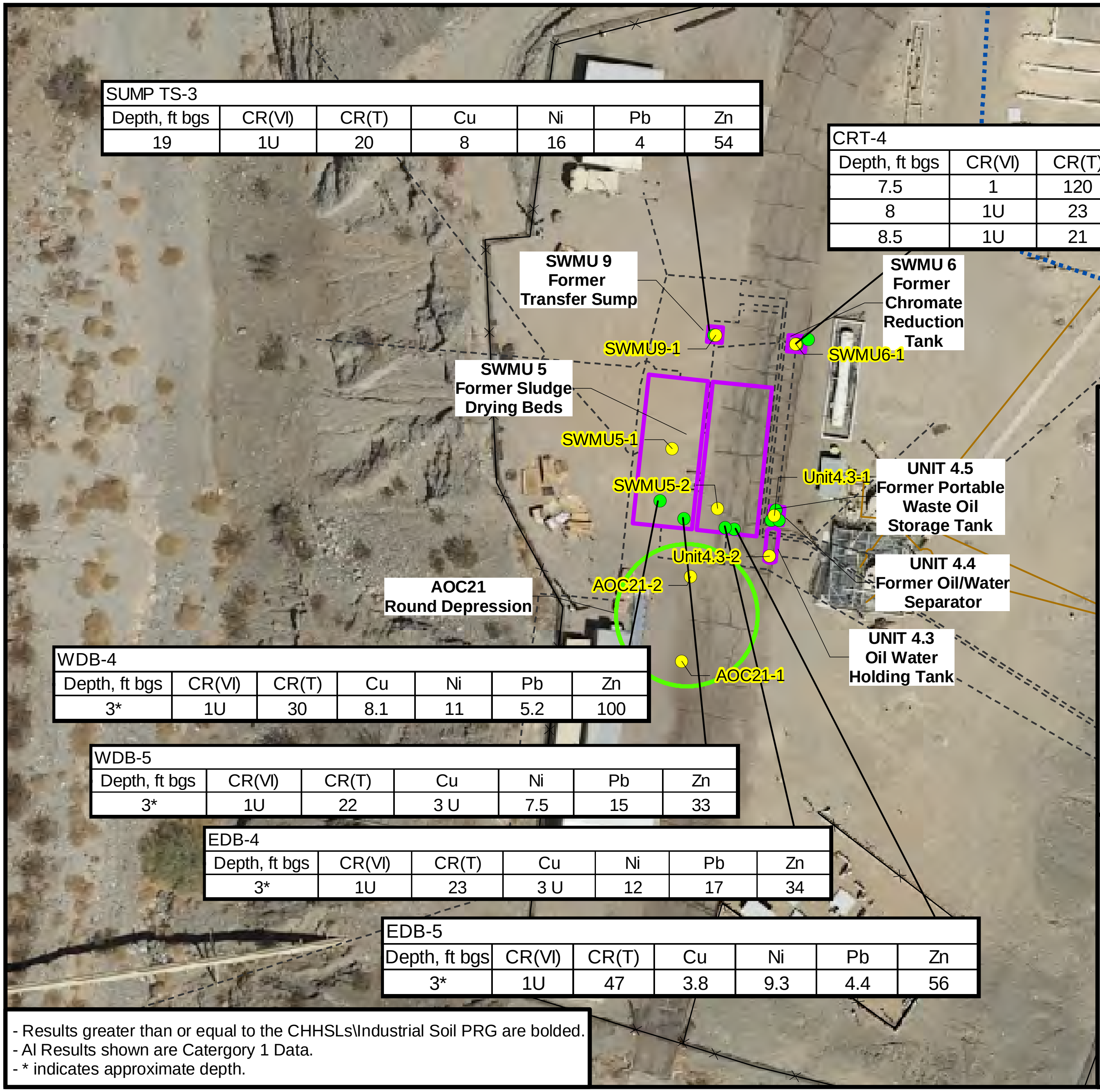
Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.
VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figures

FIGURE B24-1
SOIL SAMPLE RESULTS - METALS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



SUMP TS-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
19	1U	20	8	16	4	54

CRT-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
7.5	1	120	14	19	6	96
8	1U	23	7	14	2	47
8.5	1U	21	8	18	3	49

WDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	30	8.1	11	5.2	100

WDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	22	3 U	7.5	15	33

EDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	23	3 U	12	17	34

EDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	1U	47	3.8	9.3	4.4	56

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- Al Results shown are Catergory 1 Data.
- * indicates approximate depth.

LEGEND

●	Proposed Soil Sample Location
●	Existing Soil Sample Location
🟩	AOC Boundary
🟪	SWMU / Unit Boundary
—×—	Site Fence Boundary
- - -	Former/Abandoned Transfer Piping
——	Current Transfer Piping
······	Approximate Location of Stormwater Piping Below Ground

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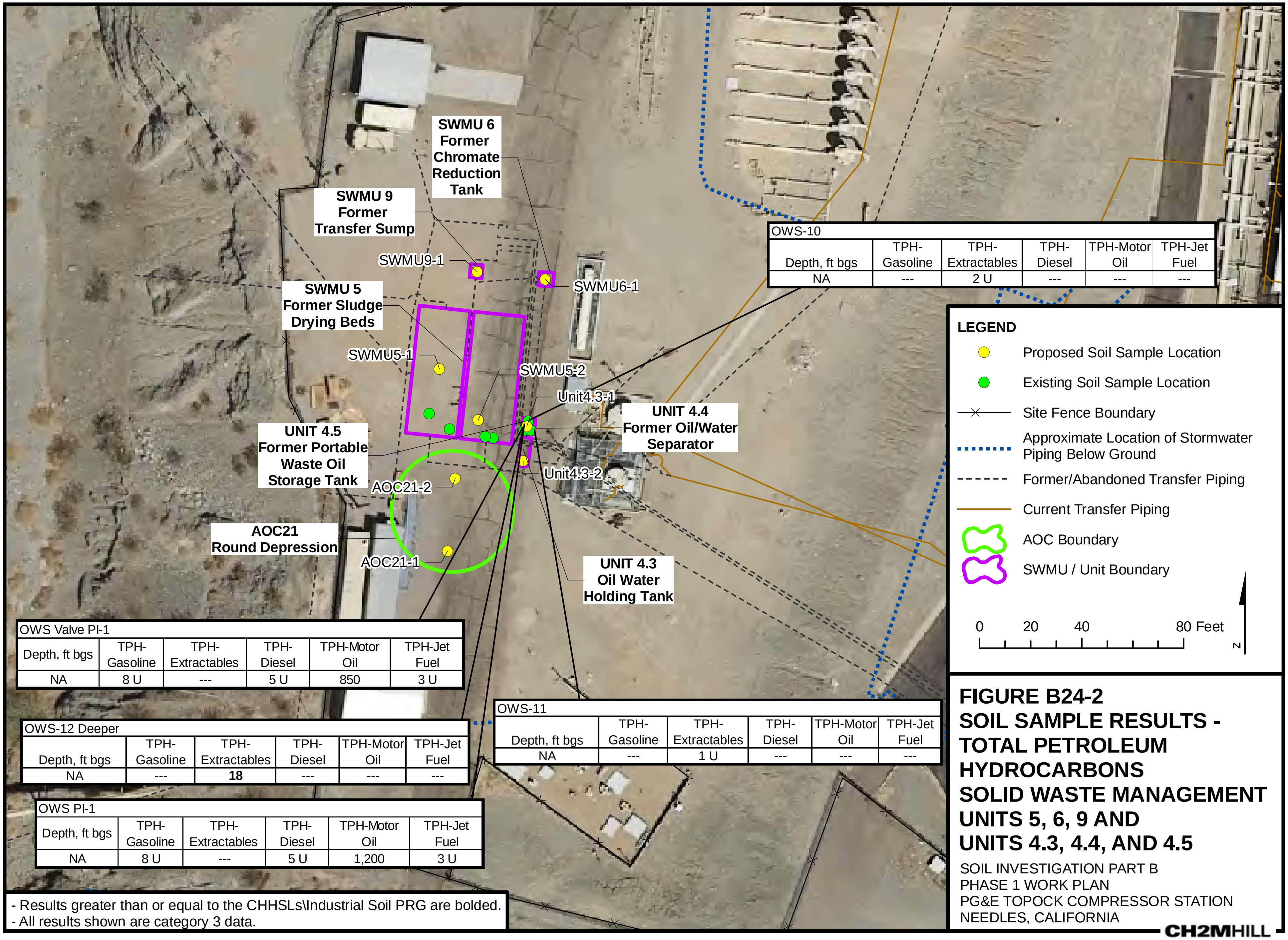

OWS-10

Depth, ft bgs	TPH-Gasoline	TPH-Extractables	TPH-Diesel	TPH-Motor Oil	TPH-Jet Fuel
NA	---	2 U	---	---	---

OWS Valve PI-1

Depth, ft bgs	TPH-Gasoline	TPH-Extractables	TPH-Diesel	TPH-Motor Oil	TPH-Jet Fuel
NA	8 U	---	5 U	850	3 U

OWS-11

Depth, ft bgs	TPH-Gasoline	TPH-Extractables	TPH-Diesel	TPH-Motor Oil	TPH-Jet Fuel
NA	---	1 U	---	---	---

OWS-12 Deeper

Depth, ft bgs	TPH-Gasoline	TPH-Extractables	TPH-Diesel	TPH-Motor Oil	TPH-Jet Fuel
NA	---	**18**	---	---	---

OWS PI-1

Depth, ft bgs	TPH-Gasoline	TPH-Extractables	TPH-Diesel	TPH-Motor Oil	TPH-Jet Fuel
NA	8 U	---	5 U	1,200	3 U

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- All results shown are category 3 data.

FIGURE B24-2
SOIL SAMPLE RESULTS - TOTAL PETROLEUM HYDROCARBONS SOLID WASTE MANAGEMENT UNITS 5, 6, 9 AND UNITS 4.3, 4.4, AND 4.5

SOIL INVESTIGATION PART B
PHASE 1 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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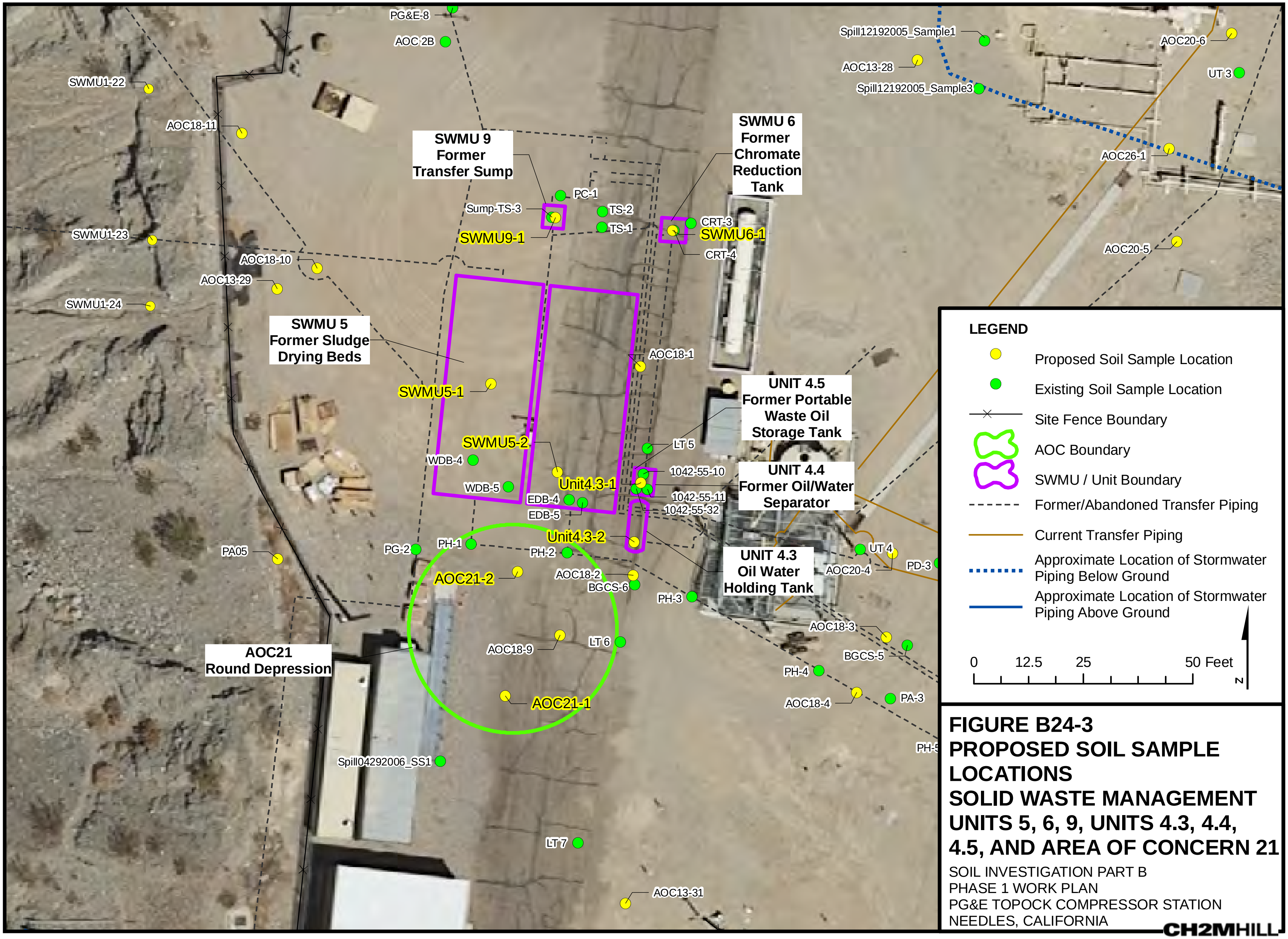

FIGURE B24-3
PROPOSED SOIL SAMPLE LOCATIONS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

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NEEDLES, CALIFORNIA

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Appendix B25
Accessibility Evaluation Photograph Log

Photograph 1: AOC 5 Cooling Tower A, southeast corner looking north, showing control cabinet

Photograph 2: AOC 5 Cooling Tower A, southwest corner looking north

Photograph 3: AOC 5 Cooling Tower A, south side, showing hotwell area

Photograph 4: AOC 5 Cooling Tower A, south side, showing sulfuric acid tanks

Photograph 5: AOC 5 Cooling Tower A, southwest corner, looking south, showing hotwell area

Photograph 6: AOC 5 Cooling Tower A, southwest corner, showing main gas line

Photograph 7: AOC 6 Cooling Tower B, east side looking north

Photograph 8: AOC 6 Cooling Tower B, west side, looking north

Photograph 9: AOC 6 Cooling Tower B, looking southeast to northwest

Photograph 10: AOC 6 Cooling Tower B east side, with southwest MU 11 sulfuric acid tanks

Photograph 11: AOC 6 Cooling Tower B, east side, with southwest MU 11 former sulfuric acid tank area

Photograph 12: AOC 7 Hazardous Materials Storage Area and Carpenter Shop east side, looking northwest

Photograph 13: AOC 7 Hazardous Materials Storage Area and AOC 8 Paint Locker, west side, looking southeast

Photograph 14: AOC 8 Paint Locker, south side, looking northwest

Photograph 15: AOC 13 Example of unpaved area on east side of Compressor Building

Photograph 16: AOC 13 Unpaved area with miscellaneous utilities, southeast portion of lower yard

Photograph 17: AOC 15 Auxiliary Jacket Cooling Water pump area, south side, looking east

Photograph 18: AOC 15 Auxiliary Jacket Cooling Water pumps, looking north to Control Building

Photograph 19: *AOC 15 Auxiliary Jacket Cooling Water pumps, looking northeast from southwest*

Photograph 20: *AOC 15 Auxiliary Jacket Cooling Water Pumps, looking north, Control Building in Background*

Photograph 21: SCADA cabinets west of AOC 15 Auxiliary Jacket Cooling Water Pump Area

Photograph 22: AOC 15 Auxiliary Jacket Cooling Water Pump, east access, looking west

Photograph 23: AOC 15 Auxiliary Jacket Cooling Water Pumps, looking west

Photograph 24: AOC 15 Auxiliary Jacket Cooling Water Pumps, looking southeast

Photograph 25: AOC 15 SCADA Cabinets west of Auxiliary Jacket Cooling Water Pumps, looking southeast

Photograph 26: AOC 16 Utilities along fence line by Sand Blast Shelter

Photograph 27: AOC 17 Steam-cleaning Area, southeast side, and part of Visitor Parking Lot and Leachfield Area, looking northeast

Photograph 28: AOC 19 unpaved area north of former hotwell, by jacket cooling water tanks

Photograph 29: AOC 19 Former Hotwell, northwest corner looking east-southeast

Photograph 30: AOC 19 Concrete pad area looking down and southeast from hotwell area

Photograph 31: AOC 19 Unpaved area north of former hotwell, second view

Photograph 32: AOC 19 Former Hotwell, west side, looking east

Photograph 33: Obstructions east of AOC 19, looking east from inside AOC 19

Photograph 34: AOC 19 Former Hotwell and Chemical Shed, east side, looking north, showing utilities, raised foundation in hotwell area and access

Photograph 35: AOC 19 Former Hotwell and Chemical Shed, east side, looking north, showing utilities and access

Photograph 36: AOC 19 Former Hotwell and Chemical Shed, east side, looking northwest, showing utilities, raised foundation in hotwell area, and access

Photograph 37: Former Hotwell, north side, looking west-southwest

Photograph 38: AOC 19 Former Hotwell, south side, looking northeast

Photograph 39: AOC 19, Former Hotwell, south side, looking west, showing part of inside of containment

Photograph 40: AOC 19, Former Hotwell, south side, looking west-southwest toward South Jacket Cooler Control Panel

Photograph 41: AOC 19, Former Hotwell, west side, looking east, showing access on north side of former hotwell area

Photograph 42: AOC 19, Former Hotwell, south side, looking west

Photograph 43: AOC 19, Former Hotwell, west side, looking east-northeast

Photograph 44: AOC 22 view, west fence line, south side of lower yard, looking toward former AOC 22 three-sided structure

Photograph 45: AOC 23 Former Water Conditioning Building, north side, looking southeast, showing variable foundation heights

Photograph 46: AOC 23 Fire Pump Building and Former Water Conditioning Building, east side, looking west

Photograph 47: AOC 23 Fire Pump Building and Former Water Conditioning Building, west side, looking east

Photograph 48: AOC 23 Closeup of Foundation of Water Conditioning Building and adjacent utilities, looking northeast

Photograph 49: Utilities between Fire Pump Building and AOC 23 Former Water Conditioning Building, looking west

Photograph 50: AOC 24 Grit Tank, looking down from upper yard; likely location of AOC 24 potential American Petroleum Institute (API) separator

Photograph 51: AOC 25 Pipes entering Compressor Engine Basement

Photograph 52: AOC 25 Compressor Building, east side looking north showing paved and unpaved areas under piping

Photograph 53: AOC 25 Auxiliary Building, east side, showing utilities, looking south

Photograph 54: AOC 25 Auxiliary Building, east side, looking south

Photograph 55: AOC 25 Auxiliary Building, west side, northern portion, looking northeast

Photograph 56: AOC 25 Auxiliary Building, west side, southern half, looking south-southeast

Photograph 57: South scrubbers looking southwest to northeast, approximate location of AOC 26 Former Scrubber Sump

Photograph 58: Valve nest west of south scrubbers, looking north, showing approximate area of AOC 26 former Scrubber Sump

Photograph 59: Valve nest south of south scrubbers, looking west from upper yard, approximate location of AOC 26 Former Scrubber Sump

Photograph 60: Old OWTS views southwest MU 5, southwest MU 6, AOC 21 9-22-10 from New Odorant Tank, lower yard, looking northwest

Photograph 61: Old OWTS views, southwest MU 5, southwest MU 6, southwest MU 9, AOC 21 from valve nest west of south scrubbers, looking southwest

Photograph 62: Overview, looking down on the lower yard from north to south

Photograph 63: Overview, lower yard, looking south from upper yard

Appendix B26
Documentation of Compliance and Response to California Department of Toxic Substances Control, Fort Mohave Indian Tribe, and Colorado River Indian Tribe Comments

TOPOCK COMPRESSOR STATION
DTSC GSU COMMENTS ON "RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION, SOIL INVESTIGATION WORK PLAN PART B, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA" dated 3/25/08

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
General 1	The Department of Toxic Substances Control (DTSC) has conducted an evaluation of historic site related photographs provided subsequent to the RFI Part B Work Plan and provided comments in a GSU memorandum dated February 12, 2008. Areas identified in the review memo which occur within the facility fence line should be evaluated as part of the Part B work plan. Please provide a response to address those concerns and revise the workplan accordingly.	Comment acknowledged. Responses to these comments have been included with this comment response document.	No response necessary.	No response necessary.
General 2	The (DTSC) understands the limitations of investigating operating industrial facilities. However, an identification, rationale and discussion of units which cannot be adequately investigated and characterized while the facility is in operation is required. Please provide an evaluation of adequacy of investigation for each Solid Waste Management Unit (SWMU) and Area of Concern (AOC) including the proposed investigation and historical investigation. Additionally, provide a discussion of areas which cannot be characterized under normal operation, but where investigation might be undertaken if operations are offline for maintenance, etc. Additionally, please discuss additional sampling that can be conducted currently at Compressor Number 1. It is understood that this unit no longer operates and will remain offline as it has been used for parts.	The requested information will be provided in the revised Part B Workplan. A map will be developed and included in the Revised Part B Work Plan that will identify various access limitations within the Compressor Station. PG&E recommends a site visit to review proposed sampling locations to understand safety and access limitations to sampling within the Compressor Station. With respect to investigation at Unit 1, the gas compression process was thoroughly evaluated in the Final RFI/RI Volume 1. This included documenting the chemical use and waste generation and management. The compressors were not identified as a SWMU or AOC in the RFI/RI.	Field observations have identified the Compressor Engines as an AOC and shall therefore be designated as AOC 26, Compressor Engines. Large oily sump reservoirs were noted below the engines that were not described in the RFI Volume 1. A field visit is requested to assist in better understanding the unit. PG&E's proposed site visit to address access limitations must be conducted early in the process to assist in developing the work plan.	The Compressor Engines were designated AOC 25.
General 3	Background upper threshold limits (UTLs) for soils are yet to be determined for this project. Prior to any comparisons of site investigation data to background thresholds, an agreement must be achieved on the background dataset and the resultant statistical evaluations. The existing background dataset is useful in assessing the relative concentrations of constituents of potential concern (COPCs) at the site and DTSC acknowledges that additional background investigation is proposed as part of the November 2006 RFI Part A Workplan, however, the timing relationship of the background investigation and the on site Part A investigation should be stated to provide assurance that	The additional background investigation has been completed. The revised final technical memorandum was submitted and accepted by DTSC (*Revised Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California*; CH2M HILL, May 2009).	DTSC acknowledges receipt of the 2009 background soil technical memorandum.	No response necessary.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	the background evaluation will be conducted first and soil data will be compared with the agreed upon background values.			
General 4	Sample depths proposed in the text of the document should be considered default values; however, significant lithologic changes, evidence of impact or other conditions warrant additional samples in place of or in addition to the defined depths.	During sampling if field conditions indicate that a greater sample depth is needed, PG&E will sample to a deeper depth as long as this meets the objectives of the work plan and the deeper samples can be collected safely. The maximum vertical sampling depth may be adjusted (up or down) based on field conditions.	Please note that the original DTSC comment is potentially requiring additional samples as well as potential adjustment of default sample depths. PG&E must ensure that this issue is documented in the text of the revised work plan.	A detailed accessibility evaluation was conducted as part of the work plan preparation process and is documented in Appendix B. Proposed sample locations and depths were determined based on the Part B DQOs evaluation and accessibility constraints.
General 5	If the results of the investigation indicate that contamination is present at any location in the deepest sample collected, additional sampling may be required by DTSC. The investigation will not be complete until the extent of contamination is adequately defined. Please provide a plan to address any areas in which the initial phase of sampling does not define the extent of contamination.	The data evaluation process illustrated in the draft Part B DQO decision flow charts (included in this comment response document) is designed to identify data gaps, if any, after the investigation described in the workplan is completed. Further sampling to fill the data gaps will be determined following the Part B data gaps evaluation and completion of DQO steps 6 and 7.	No response necessary.	No response necessary.
General 6	Each of the tables describing the proposed sampling programs (e.g., 5-3, 5-5, 5-7…) should include the rationale for each proposed boring, not just a description of the location. Please revise the applicable tables to include sampling rationale.	An additional column describing the rationale will be provided.	No response necessary.	No response necessary.
General 7	The work plan states that sampling for individual AOCs will be conducted to the currently defined boundary of the AOC. Any impacts beyond the boundary will be addressed as part of AOC 13. Characterization of AOCs and SWMUs should be completed specific to each unit. Sampling should continue in each area until the limits of impact are defined. The boundary can then be refined to include areas affected by the operation of the unit.	Comment noted. DTSC's proposed approach was agreed to by PG&E and DTSC during our discussion of the work plan assumptions in July 2007.	DTSC reiterates the original comment, characterization of AOCs and SWMUs should be completed specific to each unit. Sampling should continue for each unit, regardless of the current unit boundary, until the limits of impact are defined. The unit boundary can then be refined to include areas affected by the operation of the unit. Please revise the text of the work plan to ensure that the DTSC comment is addressed.	This text was removed from the work plan.
General 8	Uncertainty remains as to the usability of the historic data for characterization or risk assessment purposes. Evaluation of the Data Usability Assessment is ongoing and should be considered in the proposed sampling	Comment acknowledged. The Data Usability Assessment (DUA) has now been completed and accepted by DTSC and DOI (*Final Soil and Sediment Data Usability Assessment Technical Memorandum,*	No response necessary.	No response necessary.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	program to ensure that all data are sufficient and adequate for risk assessment purposes. Currently, Category 2 data are not being considered eligible for risk assessment purposes unless the nature of any data deficiencies is clearly specified. A separate table should be included in the work plan to summarize the categories of the historic data. The table will illustrate that Category 2 or 3 data exits for some AOCs (i.e., AOCs 13 and 19) not identified in previous data usability assessments. The work plan should explicitly identify why each data set is assigned to a specific category (this should also be added to the summary table).	*PG&E Topock Compressor Station*; CH2M HILL, 2008). The DUA provides the basis for assigning each historic data point to a specific category (Categories 1, 2, 3). PG&E will provide the data quality categories for the historic data in table format in the workplan. Over 70% of the data within the compressor station fenceline are Category 2 or 3. Only Category 1 will be used for risk assessment, and Category 1 and 2 data will be used for site characterization. Category 3 data will provide additional insights regarding the potential extent of COPCs, but will not be relied upon to define the boundaries of contamination. (See the August 29, 2008 *Final Soil and Sediment Data Usability Assessment Technical Memorandum, PG&E Topock Compressor Station).*		
General 9	Several units that were formerly closed for inorganic constituents are currently being investigated since organic constituents were not included in the original investigation. It is recommended that metals analyses be included along with the organics as part of the scope of the proposed investigation for those closures with existing Category 2 metals data. The Category 2 metals data may be problematic as it may be inappropriate to use those data to assess cumulative risk. Collecting Category 1 metals data for these units will ensure that a risk assessment can be conducted if necessary.	As part of the DQO process (included in this comment response document), a data sufficiency evaluation will be performed to determine if there is adequate Category 1 data to address the various DQO decision statements.	Please revise the text of the work plan to ensure that the DTSC comment is addressed.	Inorganics analysis has been added to the closed SWMUs.
General 10	Field techniques, including x-ray fluorescence (XRF) should be tested at the site to determine if they can assist in locating conventional borings. The Fort Mojave Indian Tribe has specifically requested that field techniques of this nature be considered for Part A soil sampling programs. Conceptually, XRF surface sample data would provide information to place borings to collect conventional samples at proposed depths. Further, a phased approach to sampling could be utilized to limit the number of samples collected as well. Once data are obtained that shows the relative concentrations of COPCs, boring locations can be	The use of various non-invasive field techniques including XRF, will be evaluated for its use to help guide the Part B sampling program and if viable, will be included in the Revised Part B Work Plan.	Please revise the text of the workplan accordingly. Please note that XRF is being used extensively for field screening soils associated with the AOC 4 removal action.	Use of XRF was added as a field investigation methodology for debris in AOCs 10 and 14, and for soil in MW-24.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	modified to ensure that additional samples obtain the data necessary for the investigation.			
General 11	Statements are provided that only one drill rig will likely be working within the facility fence line at any one time. The total amount of time for the investigation would be significantly reduced if additional drilling crews worked concurrently. Although drilling crew costs may be higher, savings may be realized for other factors related to the project including regulatory oversight costs. The DTSC recommends not limiting the workforce as part of the workplan process, but rather basing the number of crews on the needs of the investigation.	Due to the high risk posed by subsurface investigations within the boundaries of the compressor station, PG&E requires that 2 monitors be present at each subsurface investigation location. One monitor oversees the overall effort, the other monitor specifically evaluates the progress of the subsurface investigation effort. All boring locations must be hand-dug to 3 or more feet bgs to avoid potential damage to subsurface utilities. The Topock Compressor Station does not have sufficient available personnel or emergency response capability to support more than one investigation location at a time. Further, many of the proposed sample locations will require traffic to be restricted from various areas of the compressor stations and will require re-routing of traffic. Having two rigs working at the same time will not be possible due to internal compressor station traffic and access needs. The primary factor controlling the rate and progress of the investigation will be the need to hand dig every boring to a minimum of 3 feet bgs.	In an effort to increase drilling efficiency, an area can be pre-"cleared" by hand digging to clear an area prior to the arrival of a drill rig (a steel plate could be placed over open holes for safety). Additionally, DTSC notes that PG&E recently had several major pipeline retrofit excavations in 2008 occurring simultaneously onsite and assumes that they where completed safely. Multiple drill rigs on the site is certainly possible, but DTSC understands that one rig at a critical location can be problematic. DTSC again recommends not limiting the workforce as part of the work plan process, but rather basing the number of crews on the needs of the investigation. Please revise the text of the workplan accordingly.	The text was removed from the work plan. Field work will be scheduled as feasible based on PG&E staff resources.
General 12	The presence of above ground and below ground utilities in the vicinity of a proposed boring location may complicate the investigation, but will not automatically result in boring elimination. Relocating specific borings from proposed locations should only be conducted after DTSC approval. PG&E should have identified likely obstructions as part of the work plan preparation process and located proposed borings utilizing this information.	PG&E agrees that the presence of utilities will not necessarily result in boring elimination. PG&E is committed to obtaining DTSC approval to relocate borings, provided however, that such approval does not delay the progress of the field investigation. As described in General Comment 2, a map will be developed and included in the Revised Part B Work Plan that will identify various access limitations within the Compressor Station. Visible obstructions were located during an extensive site walk, and some proposed Part B areas were determined to be inaccessible. Many potential subsurface obstructions/utilities cannot be located via a utility or geophysical survey, therefore cannot be identified in advance and can only be identified during investigation implementation. Further, all boring locations will be hand-excavated to at least 3 feet bgs	DTSC staff will be accessible throughout the work plan implementation process. While DTSC may not be available onsite at all times throughout the implementation, communication via telephone and email will be available. DTSC disagrees that approval to relocate borings may cause a delay. It should be noted that the DQOs will address sample locations prior to mobilization. Unfortunately, if PG&E moves forward without DTSC concurrence, and the action is not consistent with the DQOs, then PG&E may be required to perform additional follow up investigations.	While DQOs were utilized to define proposed sample locations, and known accessibility constraints are also reflected in the proposed sample locations, subsurface obstructions may still be encountered. PG&E will work with DTSC to minimize any potential delays associated with the need to relocate sample locations.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
		for safety reasons, regardless of the results of a utility survey (see response to General Comment 11, above).		
General 13	Please ensure that the laboratory detection limits for polycyclic aromatic hydrocarbons allow for detection in the range of site specific risk assessment goals.	The laboratory reporting limits for PAHS are below all screening levels. Reporting limits and minimum detection limits may increase for certain samples due to potential of matrix interference and/or lack of resolution due to the presence of other organic compounds.	Please ensure that the revised work plan includes language stating that detection limits will strive to the meet the DQOs.	The proposed methods are the same as for the Part A investigation, and detection limits will be similar. Detection limits achieved for the Part A investigations resulted in usable data.
General 14	Based on a review of historical photographs, an additional AOC has been identified in the lower yard near SWMU 5. An apparent round impoundment area with white material is located to the south of the sludge drying beds. The use of this area is not documented. However, oblique aerial photos from 1955 appear to indicate the area was depressed with berms around the edges. This new AOC will be identified as AOC 21 and should be included in the sampling program within the revised work plan. The COPCs are the same as for SWMU 5.	PG&E proposes to investigate this as a newly identified area. Designation of this area as a new AOC will be evaluated once the sampling data are available (during the data evaluation phase).	Designation as an AOC is not contingent upon the findings of the investigation. Please include this area into the workplan, identified as AOC 21, Unidentified Round Impoundment Area, provide historical information and a proposed investigation specific to historic uses in a revised Part B Work Plan. Also see DTSC 2010 Response for DTSC GSU Comment 3 on the 1950s photographs.	This area was added as AOC 21.
General 15	Based on a review of historical information, an additional AOC has been identified in the upper yard east of the Auxiliary Building. A three sided building type structure with no roof appears in historic aerial photographs. Information is required as to the use of this structure to assess the potential effect on the environment. This AOC will be identified as AOC 22, Unidentified Building. Based on the current unknown historic use, the COPCs will include metals, pH, volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), and semi-volatile organic hydrocarbons (SVOCs).	PG&E proposes to investigate this as a newly identified area. Designation of this area as a new AOC will be evaluated once the sampling data are available (during the data evaluation phase).	Designation as an AOC is not contingent upon the findings of the investigation. Please include this area into the workplan, identified as AOC 22, Unidentified Building, provide historical information and a proposed investigation specific to historic uses in a revised Part B Work Plan. Also see DTSC Response for DTSC GSU Comment 12 on the 1950s photographs.	This area was added as AOC 22.
General 16	Based on a review of historical information, an additional SWMU in need of closure has been identified in the upper yard near the cooling towers. The former bulk sulfuric acid tanks at each of the cooling towers (A and B) will be added as one SWMU (two tanks at 2,600 gallons each). This SWMU will be identified as SWMU 11, Former Bulk Sulfuric Acid Tanks, and should be included in the sampling program within the revised work	These tanks are included within AOCs 5 and 6. Potential metals contamination resulting from sulfuric acid leaks will be evaluated as part of the overall sampling approach for AOCs 5 and 6.	SWMUs and AOCs are not handled the same from a regulatory perspective and will have to undergo a formal regulatory closure process. The former bulk sulfuric acid tanks are considered a SWMU due to their known historic hazardous material handling activities. Please include this new SWMU 11, Former Bulk Sulfuric Acid Tanks, into the work plan and	The sulfuric acid tanks were added as SWMU 11.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	plan. The COPCs will include metals and pH.		provide a proposed investigation specific to current and historic uses.	
General 17	More information is requested regarding past operations at the former Water Conditioning Building (currently identified as the "Storage Building") to determine if environmental samples should be collected from this area. Based on current information, sampling is suggested at this building as it is associated with the white powders at the site that can exhibit elevated chromium concentrations. The building was also adjacent and potentially connected to the Process Pump and Precipitation Tanks that yielded green sludge with high metals content during closure. The building has also treated water used in the closed-loop cooling systems.	PG&E does not have any additional information regarding the operations at this building. Water conditioning operations ceased in 1962, and hazardous waste treatment operations began in late 1968 or early 1969, and ceased in 1986. The available information pertaining to the operations that occurred in this building is discussed in the Final RFI/RI Volume 1. This included available information on chemical use and waste generation and management in the water conditioning process. PG&E has no knowledge that the building specifically treated water used in the closed-loop cooling system. Also, based on data collected from Soil Part A, the white powdery material associated with the water conditioning process (lime sludge) contains only low concentrations of metals (i.e., any metals in this material would be due to metals contained in the incoming well water).	PG&E does have knowledge that the building specifically treated water used in the closed-loop cooling system (see page 3-3 of the RFI/RI Volume 1). Based on PG&E's response, significant uncertainty exists regarding the operations at this building. Therefore, characterization of this area is requested to be included in the revised work plan. This area shall be designated as AOC 23, Former Water Conditioning Building. Also see DTSC Response for DTSC GSU Comment 3 on the 1950s photographs.	This area was added as AOC 23.
Specific 1	Section 1.1 – Background The section indicates that the 2007 RFI Volume 1 identifies all areas AOCs and SWMUs. The section should be revised to acknowledge additional units will be identified in a Volume 1 addendum.	Comment noted. The text will be revised to reflect that additional units will be identified in a Volume 1 RFI/RI addendum.	No response necessary.	No response necessary.
Specific 2	Section 3.5 – Step 4 – Study Boundaries When discussing the boundaries of the investigation, the workplan states "… in areas where bedrock is encountered at depths above 10 feet bgs and/or where subsurface utilities are generally absent below 6 feet bgs, the vertical study boundary will be shallower…". The DTSC is unclear as to the rationale for limiting the depth of investigation based on the current absence of deeper utilities in a particular area or due to the occurrence of bedrock. The drilling program should stay focused on the DQO objectives (e.g., nature and extent of contamination, satisfy risk assessment protocol).	Per DTSC request (via an email dated March 22, 2010), all comments pertaining to DQOs and the associated data evaluation (decision) process have been set aside, and no response is required. The Soil Part B DQOs will be redeveloped and presented to Agencies in a Soil Part B DQO Technical Memorandum similar to the Soil Part A Phase 1 DQO TM. A draft of the DQO table and associated decision flowcharts are included with this response to comments.	Revision of the work plan is still necessary to address and clarify this issue. Ultimately, DTSC expects the workplan to be revised in accordance with the DQOs.	The work plan has been prepared in accordance with the DQOs presented in the Soil Part B DQO Technical Memorandum.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	Revision of the work plan is requested to address this issue.			
Specific 3	Section 3.6 – Step 5 – Decision Rule The intent of the first complete paragraph on page 3-5 of the work plan is unclear and needs to be revised. The paragraph states that upper confidence (95 percent) limits of the mean for each unit of interest will be compared to risk-based thresholds (i.e., CHHSLs/PRGs). The work plan should clearly state that discrete sample data from individual locations will be compared to risk based comparison values and/or background soil concentrations to assess if sufficient data points have been collected to characterize risk and the extent of contamination.	See Response to DTSC Specific Comment 2	DTSC expects the workplan to be revised in accordance with the DQOs.	The work plan has been prepared in accordance with the DQOs; the data evaluation process is described in the Soil Part B DQO Technical Memorandum.
Specific 4	Table 3-1: Summary of Data Quality Objectives • AOC 5 should also be included with AOCs 6, 15, 17, and 19 for deeper sampling due to site history and similarity with AOC 6. • Clarification is requested regarding the intent of the Step 3 comment on cultural resource impacts associated with each remedial technology. It seems that this comment should be dismissed since a remedy has not yet been selected. • Problem 3, Step 4: Target analytes should also highlight and include soil constituents that have potential to impact groundwater. Step 5 should also consider potential for soil to impact groundwater. • Problem 5, Step 5, Decision Rule 5B and 5C: These decision rules imply that if migration pathway can be stopped, then there is no need to assess the extent of contamination from historic migration. This is contrary to Problem 6: Delineation to Characterize the Nature and Extent of COPCs. In practice, PG&E must identify the extent of contamination, define the current risk, then conclude if additional action is warranted, which includes evaluation of possible means of control.	See Response to DTSC Specific Comment 2.	DTSC expects the workplan to be revised in accordance with the DQOs.	The work plan has been prepared in accordance with the DQOs presented in the Soil Part B DQO Technical Memorandum.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	Under the RFI, PG&E can not and should not limit its investigation because the “migration pathways can be controlled by approved means.” The objective of an RFI is to define the nature and extent of contamination, not remedy. • Problem 6, Characterization of the Nature and Extent of COPCs: As identified in previous DTSC comments on Part B DQOs, characterization may require evaluating trends in data (e.g., three samples in linear array) especially where the source of a release is uncertain. The workplan should address this issue.			
Specific 5	Section 4.2.2 – Decision Process for Problem Statement 2 The groundwater recharge rate quoted in the text (<0.1 millimeters per year) does not agree with the findings of the United States Geological Survey (USGS) Water Resources Investigation Report 03-4090 of 2.8 millimeters per year. The sample calculation on page 4-5 does utilize an appropriate conversion (0.1 inches per year). Please ensure that the appropriate value is utilized in presentation of this data. Also, please note that this groundwater recharge rate has not been agreed upon by the DTSC. While the value provides an acceptable starting point, DTSC and other interested parties have not evaluated the USGS report and its applicability to the subject study area.	See Response to DTSC Specific Comment 2.	Response noted; DTSC expects the workplan to be revised in accordance with the DQOs; however, part of the original DTSC comment refers to an error in the units, please ensure that the appropriate value is utilized.	The work plan has been prepared in accordance with the DQOs presented in the Soil Part B DQO Technical Memorandum. The appropriate value will be used in the evaluation.
Specific 6	Section 4.2.6 – Decision Process for Problem Statement 6 Determinations of the adequacy of delineation will be made in concert with DTSC. The DTSC will evaluate the dataset and determine if it is sufficient to adequately demonstrate decreasing concentrations in soil. Further, DTSC and the federal agencies will ultimately determine if data collected as part of any additional soil investigation will affect decisions for the risk assessment or Corrective Measures Study/Feasibility Study.	See Response to DTSC Specific Comment 2.	DTSC expects the workplan to be revised in accordance with the DQOs	The work plan has been prepared in accordance with the DQOs presented in the Soil Part B DQO Technical Memorandum.

Comment No.	2008 DTSC Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
Specific 7	Section 5.3.2 – SWMU 5 – Sludge Drying Beds Review of historical site photos and aerial photos identifies the presence of white material extending beyond the boundaries of SWMU 5. Sampling programs for SWMUs and AOCs adjacent to this SWMU (SWMUs 5 and 9 and Units 4.3, 4.4 and 4.5) should include all of the same COPCs. This is to ensure that releases attributable to SWMU 5 that extended beyond its current boundary are evaluated.	SWMU 5 and units adjacent to this SWMU (SWMU 9, Units 4.3, 4.4, and 4.5) have been previously closed based on inorganic data. Sampling to further evaluate inorganic COPCs at SWMU 5 and units adjacent to it are not warranted. The approved RFI/RI Volume 1 documents the organic COPCs identified by PG&E and the additional COPCs identified by DTSC for these units.	As cited in the original comment, the additional information reviewed by DTSC as part of the Part B work plan evaluation indicates that additional investigation is warranted. Please include the additional COPCs for the SWMU and AOCs identified.	Inorganics analysis has been added to the closed SWMUs.
Specific 8	Section 5.3.2 – SWMU 5 – Sludge Drying Beds Per DTSC's March 29, 2006 letter, the COPCs for this unit shall include Title 22 metals, hexavalent chromium and pH in addition to total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs) and semi-volatile organic compounds SVOCs.	The referenced letter distinguishes between COPCs and constituents requiring further evaluation. The Final Soil Investigation Part B Workplan will be revised to more clearly describe this distinction. Furthermore, the approved RFI/RI Volume 1 documents the organic COPCs identified by PG&E and the additional COPCs identified by DTSC for these units.	The list of COPCs is the inclusive list of constituents expected to be potentially present in each SWMU or AOC. The constituents requiring further evaluation were generated based upon review of existing data. At this point, following the DQO process should yield the same list of compounds (identified in this DTSC comment) which require further evaluation.	Inorganics analysis has been added to the closed SWMUs.
Specific 9	Section 5.3.5 – SWMU 5 – Sludge Drying Beds The proposed boring locations do not adequately characterize the elevated historic COPC concentrations. PG&E should include additional borings to properly characterize the area.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs, once approved by the agencies.	DTSC will review proposed boring locations in a revised workplan to ensure historically elevated concentrations are evaluated.	Per DTSC direction, both organic and inorganic analysis has been proposed in the work plan. However, based on the conceptual site model, historical samples were collected in the appropriate locations and depth. No further sampling for inorganic constituents is merited.
Specific 10	Section 5.4.4 – SWMU 6 – Chromate Reduction Tank Per DTSC's March 29, 2006 letter, the COPCs for this unit shall include Title 22 metals, hexavalent chromium and pH in addition to TPH, VOCs and SVOCs.	See response to Specific Comment 8.	See DTSC's response to Specific Comment 8.	Per DTSC direction, both organic and inorganic analysis has been proposed in the work plan. However, based on the conceptual site model, historical samples were collected in the appropriate locations and depths. The lateral and vertical extents of inorganic constituents have been adequately defined. No further sampling for inorganic constituents is merited.
Specific 11	Section 5.5.4 – SWMU 8 (Unit 4.10) – Process Pump Tank Per DTSC's March 29, 2006 letter, the COPCs for this	See response to Specific Comment 8.	See DTSC's response to Specific Comment 8.	Per DTSC direction, both organic and inorganic analysis has been proposed in the work plan. However, based on the conceptual site model,

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	unit shall include Title 22 metals, hexavalent chromium and pH in addition to TPH, VOCs and SVOCs.			historical samples were collected in the appropriate locations and depths. The lateral and vertical extents of inorganic constituents have been adequately defined. No further sampling for inorganic constituents is merited.
Specific 12	Table 5-7 – SWMU 8 (Unit 4.10) – Process Pump Tank Footnote number 3 states that samples will not be collected at 0.5 to 1 foot bgs due to the previous excavation activities. This statement does not agree with the text in section 5.5.5 regarding sample collection. Due to unknown sources of backfill material during historic remediation activities, samples should be collected at 0.5 to 1 foot bgs related to SWMU 8 and analyzed per the text in section 5.5.5.	The text will be revised as requested by this comment.	No response necessary.	No response necessary.
Specific 13	Section 5.6.1 – SWMU 9 (Unit 4.8) – Transfer Sump The physical description of the tank appears inconsistent with the closure plan, which contains photographs depicting the tank as a box shape rather than the cylinder describe in the text. Please confirm the construction and assess the sampling program to ensure that the existing data and proposed sampling program are adequate.	This unit is closed, and any further sampling will be limited to organic constituents only. Available information regarding tank construction will be rechecked and verified in the Final Part B Work Plan to evaluate whether additional sampling is appropriate.	Limiting the proposed sampling based upon whether the unit was previously closed is not appropriate. Use of the DQO process is necessary to assess the adequacy of the investigation program. Based on the uncertainty in the description of the unit, additional sampling is necessary, including analysis of inorganic constituents. Include additional sampling for this unit.	Per DTSC direction, both organic and inorganic analysis has been proposed in the work plan. However, based on the conceptual site model, the historical sample was collected at the appropriate location and depth (immediately beneath the bottom of the former tank), and the lateral and vertical extents of inorganic constituents have been adequately defined. No further sampling for inorganic constituents is considered merited.
Specific 14	Section 5.6.4 – SWMU 9 (Unit 4.8) – Transfer Sump Per DTSC's March 29, 2006 letter, the COPCs for this unit shall include Title 22 metals, hexavalent chromium and pH in addition to TPH, VOCs and SVOCs.	See response to Specific Comment 8.	See DTSC's response to Specific Comment 8.	See response to Specific Comment 13.
Specific 15	Section 5.7.3 – AOC 5 – Cooling Tower A The proposed boring locations do not adequately characterize the elevated historic COPC concentrations. PG&E should include additional borings to provide proper lateral and vertical characterization of the area. Additionally, potential contaminant source material may exist below the cooling tower structures and will not be	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs. . All proposed locations will be evaluated based on access limitations and safety concerns. An assessment of conditions beneath the cooling towers will be	Include an evaluation of areas where limited or no sampling can be performed in the revised Part B work plan.	A detailed accessibility evaluation was conducted as part of the work plan preparation process and is documented in Appendix B. Proposed sample locations were determined based on the Part B DQOs evaluation and accessibility constraints.

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	evaluated based on the proposed sampling program. PG&E should evaluate methodologies, including angle borings, to assess beneath the cooling towers.	attempted only if it is feasible and safe.		
Specific 16	Figures 5-5 and 5-6 – AOC 5 – Cooling Tower A • The figures should be revised to depict: • location of the historic chemical storage shed • location of the identified stained soil • identify current and historic unpaved areas	The document will be revised to reflect this comment.	No response necessary.	No response necessary.
Specific 17	Figure 5-6 – AOC 5 Cooling Tower A Additional soil boring locations are required to more adequately characterize this area. The previously identified elevated chromium concentrations should be defined in both lateral and vertical directions. Please revise the proposed sampling program for AOC 5 to provide adequate lateral coverage.	See response to Specific Comment 15.	The work plan should be revised to address the DTSC Comment. Also see DTSC's response to Specific Comment 15	See response to Specific Comment 15.
Specific 18	Section 5.8.4 – AOC 6 – Cooling Tower B The proposed boring locations do not adequately characterize the elevated historic COPC concentrations. PG&E should include additional borings to properly characterize the area. Additional lateral coverage is warranted surrounding the tower. Potential source material may exist below the cooling tower structures and will not be evaluated based on the proposed samples. PG&E should also evaluate methodologies, including angle borings, to assess beneath the cooling towers.	See response to Specific Comment 15.	The work plan should be revised to address the DTSC Comment. Also see DTSC's response to Specific Comment 15.	See response to Specific Comment 15.
Specific 19	Figures 5-7 and 5-8 – AOC 6 – Cooling Tower B • The figures should be revised to depict: • location of the historic chemical storage shed • identify current and historic unpaved areas	The document will be revised to reflect this comment.	No response necessary.	No response necessary.

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Specific 20	Section 5.9.7 – AOC 7 and AOC 8 – Hazardous Materials Storage Area and Paint Locker Based on historical data, the current maintenance building was formerly used as the chemical storage building. This area should be investigated as part of AOC 7. Please include borings inside and around the maintenance building to address the historic chemical materials storage use.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	This is a known data gap that should be addressed as part of the revised Part B work plan.	The footprint of AOC 7 was expanded as requested. See also response to Specific Comment 15.
Specific 21	Section 5.9.7 – AOC 7 and AOC 8 – Hazardous Materials Storage Area and Paint Locker Although the alluvium/bedrock contact is anticipated to be shallow (less than 10 feet) in this area, the collection of a soil sample at 10 feet bgs should be included in the sampling program. The soil sampling program should not be limited prior to field mobilization based on expectations. If the actual depth to bedrock precludes collection of a soil sample at 10 feet bgs, comments should be included in the RFI Report. However, if sampling is possible, the data should be collected and reported in the report. Also see General Comment 4.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	This is a known data gap that should be addressed as part of the revised Part B work plan.	See response to Specific Comment 15.
Specific 22	Table 5-16 - AOC 13 – Unpaved Areas within the Fence Line The data category of the historic data should be confirmed. Some of the samples appear to indicate inconsistent notes (i.e., BGCS-2 at 0.5 feet is identified as Category 2, but BGCS-2 at 1 foot is identified as Category 1). Please confirm the sample data category and revise the table as necessary. Pages 5, 6, and 7 of Table 5-16 list samples, but the associated data have not been presented on the table. The table should be revised to address this issue. Text on page 5-28 indicates that two spill samples detected polychlorinated biphenyls (PCBs), yet the data contained Table 5-17 does not support this statement. Appropriate revisions should be made to the work plan to reconcile this discrepancy.	The data categories will be confirmed and the table revised as necessary.	No response necessary.	No response necessary.

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Specific 23	Figure 5-14 – AOC 13 – Unpaved Areas Within the Fence Line Additional rationale should be provided in the text and tables for the proposed sampling program. DTSC acknowledges the grid type sampling proposed (particularly in the lower yard), however, historic leaks, spills, drainages, low points, etc., should be preferentially sampled as well.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	This comment requested sampling rationale for samples to be collected within AOC 13 which should be provided as part of a revised Part B work plan.	Comment noted.
Specific 24	Section 5.11 – AOC 15 – Auxiliary Jacket Cooling Water Pumps In order for DTSC to fully assess the proposed sampling program, AOC 15 should be better described, including photographs, to illustrate unit configuration (e.g., illustrate pump and valve seals that have leaked in the past), surface drainage directions/low points, and relationships to trenches, storm drains, and historic data. Formerly unpaved areas mentioned in Section 5.11.1 should also be delineated on figures and samples should be proposed in the unpaved areas where releases from the unit would have traveled.	PG&E will redraw this figure to more clearly show the locations of pipelines and other nearby obstructions. PG&E will identify accessible and inaccessible areas on the figure for this AOC and provide the requested photographs. Specific information regarding which pump seals leaked is not available. The entire site, except the roads, was previously unpaved. All pumps are located within a small, contiguous area on an elevated pad. The area underneath pumps is covered by gravel as are the adjacent areas to the east and west.	No response necessary.	No response necessary.
Specific 25	Figure 5-15 and 5-16 – AOC 15 - Auxiliary Jacket Cooling Water Pumps The historic sample locations identified with green dots on Figures 5-15 and 5-16 are not plotted in the same locations on each figure and require confirmation of the true sample location. Additionally, the pipe trench and storm drain identified in Section 5.11.1 are not identified on either figure and should be added. The figures will need to be revised to properly address these issues.	To the degree this information is available, the figures will be revised to address these issues.	Ensure that various figures depicting the same boring location agree in location in figures submitted as part of the revised Part B work plan.	The figures have been made consistent.
Specific 26	Figure 5-16 – AOC 15 - Auxiliary Jacket Cooling Water Pumps Additional sample locations appear warranted based on the existing information presented in the text. The five historic samples with chromium exceeding industrial screening criteria are not adequately bounded with step out borings. Sampling along the pipe trench and storm	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	This is a known data gap that should be addressed as part of the revised Part B work plan.	AOC 15 is in a different location than the actual auxiliary jacket water coolers which were reported to have leaked. The auxiliary jacket water coolers are adjacent to the Auxiliary Building. The pipe trench and drain will be evaluated as part of the storm drain investigation program. See also response to

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	drain appears warranted, as leaks from AOC 15 have been documented to have entered these structures. The proposed sampling plan should be revised to address these issues			Specific Comment 15.
Specific 27	Section 5.12.1 – AOC 16 – Sandblast Shelter Additional information is required related to the age of the sandblast shelter. Please provide an approximate date when the feature was installed. Further, discuss where similar operations were conducted prior to construction of the sandblast shelter.	The sandblast shelter was installed in about 1995. Some sandblasting activity had occurred in this area in the past. As described in the RFI/RI, however, sandblasting also occurred in situ, as much of the painted equipment at Topock cannot be moved. The age of the sandblast shelter will be added to description of this unit in the workplan.	Include COCs associated with sandblasting activity to all AOCs/SWMUs in which the activity was conducted as part of the revised Part B work plan. Please identify where similar operations were conducted prior to construction of the 1995 sandblast shelter, and evaluate these areas for characterization.	Title 22 metals are the COPCs associated with sandblasting and are included in all sample analyses proposed for the Part B investigation. Prior to 1995, ex situ sand blast activities occurred in the same area as the sand blast shelter.
Specific 28	Section 5.12.1 – AOC 16 – Sandblast Shelter Additional information is required as to the abrasive materials used at the sandblast shelter. During recent site visits to the area, at least two distinct materials were present. One light colored and one dark colored. The composition of each and potential effect on the environment should be presented in the background information for this unit.	These questions will be researched and if this information is available in existing reports, it will be added to the revised work plan.	DTSC awaits PG&E's response.	Two types of sand blast material have typically been used in the past several years: KleenBlast and Monterey 30 Mesh. , PG&E has not found any historical Topock-specific records regarding the use of sand blast grit. Information regarding the two types of sand blast grit has been included in the work plan.
Specific 29	Section 5.12.4 – AOC 16 – Sandblast Shelter The actual soil surface with sandblast grit should be sampled. For this AOC, the 0.5 to 1 foot samples proposed should be revised to true surface samples collected from the soil sandblast grit mixture on the surface. This is requested to address potential risk associated with loose surface material that may be more accessible and more easily transported via wind or storm events.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	This is a known data gap that should be addressed as part of the revised Part B work plan.	Four surface soil samples total will be collected from the areas with apparent sand blast grit. Three of the samples will be collected from the 0.0 to 0.5-foot interval in association with the previously proposed sample locations; a fourth surface (0.0 – 0.5 foot bgs) sample was added to further assess the constituents potentially present in the sand blast grit.
Specific 30	Section 5.13.1 – AOC 17 – Onsite Septic System A geophysical survey or other technique should be conducted to establish the actual location of the subsurface leach lines. A single historic source of a hand drawn sketch does not provide the certainty necessary to conduct a useful investigation. Please	Comment noted. A geophysical survey will be performed in an attempt to more precisely locate the septic system leach field.	No response necessary.	No response necessary.

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	provide for the more precise location of the septic system leach field.			
Specific 31	Section 5.14.1 – AOC 18 - Combined Wastewater Transference Pipeline Additional information is required to describe the pathway of the waste water pipelines related to Cooling Towers A and B. The wastewater pipelines from the towers do not appear to be described in the text or identified on figures. Please provide a discussion and route of the pipelines. Additional piping layout from the 1990 Closure Plan and 2004 RFI Report should be incorporated into the work plan.	This information will be provided where available but available pipeline information is limited and schematic.	In the absence of a known location of piping, an expanded investigation program may be necessary to properly evaluate this AOC. A pipeline location survey may also need to be conducted.	Additional information regarding the pipelines was added to the work plan.
Specific 32	Section 5.14.1 – AOC 18 - Combined Wastewater Transference Pipeline Pages 5-35 and 5-36 of the work plan discussing the letter / number designation of pipelines (pipe sections A to H) are confusing. A figure similar to that presented in the 1990 Closure Plan or 2007 RFI, Volume 1 should be used to link the pipeline designations to site locations. Pages 5-35 and 5-36 indicate that Pipeline H is vitrified clay pipe, yet Table 5-28 indicates that it is cast iron. This discrepancy should be resolved.	A figure equivalent to those referenced will be included in the workplan. The discrepancy in pipe materials will be researched, and any additional or more definitive information found will be added to the revised work plan.	DTSC awaits PG&E's response.	A figure similar to the 2007 RFI has been added to the work plan. In addition, most of pipeline H was vitrified clay; the first 60 feet of H-1 were cast iron. The information about pipeline H has been added to the work plan.
Specific 33	Section 5.14.1 – AOC 18 - Combined Wastewater Transference Pipeline The original rationale for sample collection during closure should be evaluated. That evaluation should be taken into account when proposing additional investigation to ensure that the AOC is properly characterized. Additionally, elevated concentrations at PH-2 should be further characterized to determine the extent of contamination.	The rationale for sampling during closure is discussed in Section 5.14.3. The sample locations targeted points along the pipelines with the highest likelihood of a release based on results of pressure testing, locations of valves and joints, and visual evidence of leaking (e.g., visibly stained soils). Soil found during the closure activities to be impacted was removed during the pipeline closure work, as documented in the closure report, the 2005 RFI/RI and the Final RFI/RI Volume 1. This information was taken into account in the work plan.	This is a known data gap that should be addressed as part of the revised Part B work plan.	All samples associated with AOC 18 were collected from beneath pipelines. The majority of the pipelines were uncovered and removed. Impacted soils were then removed, and confirmation samples were collected after removal of impacted soil. Another location has been added in the vicinity of AOC18-2 to address this request. Samples associated with Units 4.3 – 4.5, SWMU 5, and AOC 21 will also provide information on the possible nature and extent of contamination associated with location PH-2.

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Specific 34	Section 5.14.1 – AOC 18 - Combined Wastewater Transference Pipeline Sampling should be conducted on the "outlet" side of the wastewater treatment system. Historic sampling has all occurred on the "inlet" side of the units. For the purposes of the Part B Workplan, samples should be collected from the units to the fence line.	The outlet side of the wastewater treatment system was Bat Cave Wash (i.e., a pipeline discharged directly to Bat Cave Wash, as is visible in Figure 3-14 of the Final Volume 1 RFI). The area in Bat Cave Wash beneath the discharge pipe location is within the boundary of SWMU1, and has been extensively sampled. The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	PG&E needs to adequately respond to the comment. The area between the wastewater treatment system and the fenceline is a known data gap that should be addressed as part of the revised Part B work plan.	Three sample locations AOC 13-29, AOC18-10, and AOC18-11 are proposed in the area between the waste water treatment system and the fence line.
Specific 35	Figure 5-20 and 5-21 – AOC 18 - Combined Wastewater Transference Pipeline The method of differentiation between removed pipelines and in place pipelines should be revised. The text provides discussion of the pipe removal and sampling program; however, for ease of evaluation, distinction should be made visually as well on the figures.	The figures will be revised.	No response necessary.	No response necessary.
Specific 36	Section 5.14.4 – AOC 18 - Combined Wastewater Transference Pipeline An effort should be made to ensure existing sample data is adequate in areas where previous pipe removal operations identified stained soil or soil was removed. Some data does exist for these pipelines, however, it is not clear if an evaluation has been made on the adequacy of the dataset. Please provide detailed justification for omitting specific samples in areas previously identified as impacted.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	Please note that additional boring locations may be necessary.	Comment noted.
Specific 37	Section 5.14.4 – AOC 18 - Combined Wastewater Transference Pipeline The section indicates that the pipelines were below-grade structures. The depths of the lines will need to be disclosed to ensure appropriate sample horizons are selected for characterization. If the depths or locations of the pipelines are uncertain, then trenching should be considered to adequately locate sample points relative to a pipeline.	The closure reports indicate that sampling occurred below some pipes and joints. Some (but not all) depths are provided in the reports and will be included in a table in the workplan. This available information was considered when establishing proposed sampling depths. Additional assessment of pipeline depths will be evaluated and if feasible, will be proposed in the revised work plan.	Manual excavation of pipelines may be necessary to uncover pipelines and ensure that samples are collected at appropriate depths.	All samples associated with AOC 18 were collected from beneath pipelines or were confirmation samples collected after removal of impacted soil. Depths are shown on Table B15-2. None of the samples were collected beneath 6 feet bgs, indicating all pipelines and subsequent excavations were in the top 6 feet. Based on the information in the transference pipeline closure report (Mittlehauser, 1990), all pipes were installed above – 6 feet. A detailed

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				accessibility evaluation was conducted as part of the work plan preparation process and is documented in Appendix B. Proposed sample locations were determined based on the Part B DQOs evaluation and accessibility constraints. Manual excavation of the pipelines was not proposed in the work pan.
Specific 38	Table 5-27 – AOC 18 - Combined Wastewater Transference Pipeline It is unclear whether the single asterisk referring to sample collection after soil removal applies to this table. Please confirm the applicability of the single asterisk for this table.	This information will be revised in the work plan.	No response necessary.	No response necessary.
Specific 39	Table 5-30 – AOC 19 - Former Cooling Liquid Area Page 5-40 and Table 5-30 of the work plan indicate that all seven AOC 19 samples are Category 2. Specific deficiencies and limitations of the seven Category 2 samples should be stated in this section of the work plan to allow assessment on how the data can be used. In general, additional samples would be warranted if the existing Category 2 data have significant deficiencies.	To avoid redundancy, PG&E chose to not restate the limitations on data use for each investigation area. PG&E will prepare a table with this information per the response to General Comment #8.	No response necessary.	No response necessary.
Specific 40	Figures 5-22 and 5-23 – AOC 19 - Former Cooling Liquid Area The proposed sampling plan cannot be adequately evaluated without an accurate depiction of the AOC. Revised or additional figures are requested at appropriate scales so that site features and sample locations can be accurately depicted (e.g., at a scale similar to Figure 5-15). Currently, site features are not illustrated and historic boring locations overlap one another. At a minimum, the figure(s) should identify: the former Hot Well; Jacket Cooling Water (JCW) tanks; JCW pumps and valves (especially ones that have leaked); the former cooling additive mixing shed/current pad; unpaved areas; the two current 1,426 gallon above ground reusable engine oil tanks; the three existing	PG&E will provide a more detailed figure to show placement of pipelines and other obstructions, and include available information regarding the former locations of various features. Known underground piping will be shown in the figure, however, other underground piping may be present as well. Photographs will also be included in the workplan..	No response necessary.	No response necessary.

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	above ground chemical storage tanks (one 200 gallons and two 400 gallons); underground and aboveground piping; surface drainage directions and depressions; and potential or known routes of former releases and leaks especially ones that would travel to the visitors parking lot/warehouse and down the main entrance road. Photographs of the AOC are also suggested.			
Specific 41	AOC 19 - Former Cooling Liquid Area The proposed sampling plan appears focused on the eyewash pad (see the “Description” column on Table 5-31) and not the other units within the area (see comment above). Certainly, samples from around and beneath the Hot Well and around leak areas are warranted. Based on evaluation of Figure 5-22 and 5-23, additional samples east of the AOC appear warranted to bound eastward contamination and to characterize documented releases towards the visitors parking lot, warehouse, and entrance road.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	This is a known data gap which should be addressed as part of the revised Part B work plan.	Samples have been added in the vicinity of the hot well. See also response to Specific Comment 15.
Specific 42	AOC 19 - Former Cooling Liquid Area Section 5.15.2 - Summary of Soil Characterization: The first paragraph discusses results of a Hot Well cleanup project. The work plan should include a table of all Hot Well cleanup sampling data from this particular project including the Title 22 metals for the greenish liquid sample discussed in the second paragraph of section 5.15.2. If a Hot Well cleanup document exists, it should be provided to DTSC. The first paragraph of section 5.15.2 also inappropriately refers to Figure 5-22 regarding the Hot Well cleanup data. This should be corrected in the revised work plan.	The hotwell closure report will be provided to DTSC. Most of the hot well cleanup data pertain to disposal characterization. The hot wells were removed and the sampling and clean up were focused on remnants of the hot well that were to be disposed of, i.e., concrete from the former hot well and sediments contained within the remnant hot well. No data were collected outside of the hot well footprint. It should be noted that most of the requested information is provided in the Final RFI/RI Volume 1. The text will be corrected.	DTSC awaits PG&E’s submittal of the closure report.	The Hotwell Closure Report was submitted to DTSC on May 3, 2011
Specific 43	AOC 19 - Former Cooling Liquid Area The section mentions darkly stained concrete and concrete with elevated chromium that has exceeded hazardous waste criteria. PG&E should indicate how stained concrete and asphalt will be managed and if it plans to characterize the stained materials during this investigation. If so, the work plan should be modified	To prevent access to the affected area, PG&E has covered the stained concrete as described in the workplan. There is no asphalt located in the AOC 19 footprint; asphalt is present in plant roads east and west of AOC 19. There is no visible staining emanating from AOC 19 onto this asphalt. PG&E is planning to conduct additional characterization	No response necessary.	No response necessary.

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	accordingly.	to determine whether the remainder of the concrete exceeds hazardous waste criteria, and is currently evaluating the feasibility of removing the pad. If feasible, PG&E will seek DTSC's permission to remove the pad.		
Specific 44	Section 5.16.1 – AOC 20 - Industrial Floor Drains The last paragraph of this section should indicate that approximately 220,000 gallons a year of oily waste water is transmitted through the floor drain system. The section could be misread to suggest the floor drains only collect incidental drips and spills and occasional floor washing liquids.	The work plan will be revised to clarify this information. It should be noted that this equates to a very low flow system (220,000 gallons per year implies an average flow of 0.4 gpm from all sources combined).	No additional response necessary. It should be noted that 220,000 gallons per year is substantial and over the course of several years the cumulative total would be in the millions of gallons.	No response necessary.
Specific 45	Section 5.16.3 – AOC 20 - Industrial Floor Drains Per DTSC's May 9, 2007 letter, the COPCs for this unit shall include PCBs in addition to Title 22 metals, hexavalent chromium, TPH, VOCs and polycyclic aromatic hydrocarbons.	Comment Noted, PCBs will be added to the analyte list for AOC 20.	No response necessary.	No response necessary.
Specific 46	Section 5.16.3 – AOC 20 - Industrial Floor Drains The section indicates that the floor drains are primarily below-grade structures located at varying depths. The depths of the drain lines will need to be disclosed to ensure appropriate sample horizons are selected for characterization.	The depths of most of the oily water lines are not known. Because sampling will be occurring in the immediate vicinity of a subsurface utility, hand excavation will be required until the lines are physically encountered, to ensure that the lines are not damaged by the sampling effort. Thus, although the general requirement is to hand excavate to a minimum depth of 3 feet bgs, hand-digging will be required to the oily water line depth(s) at AOC 20.	No response necessary.	No response necessary.
Specific 47	Figure 5-24 – AOC 20 – Industrial Floor Drains To ensure appropriate sample coverage for this feature, soil boring locations should be placed at approximately 100 foot centers along pipe runs and at each angle joint. Please revise the proposed boring locations to adequately address lateral coverage.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs.	The work plan should be revised to address the DTSC Comment.	See response to Specific Comment 15.
Specific 48	Section 5.18 – Monitoring Well Installation Area 1: If unsaturated alluvial conditions are encountered in the first borehole proposed in the area,	Per DOI and DTSC's direction on February 24, 2010 (*PG&E Topock Compressor Station Remediation Site – Groundwater Characterization Requirements for the East Ravine and Compressor Station Areas*),	The proposed groundwater monitoring investigation is no longer contained within the Part B soils investigation work plan and is being addressed as a separate groundwater	No response necessary.

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	then PG&E should contact DTSC for direction on whether a new borehole should be drilled to the north/northwest. DTSC may direct PG&E to complete the well in the shallow portion of the conglomerate in lieu of drilling an additional borehole depending on the proximity to the water table and the character of the conglomerate. While unlikely, if the alluvial sequence is much larger than anticipated, DTSC may require a shallow and deep well be completed in this area. Area 2: If the alluvial sequence is larger than anticipated, DTSC may require a shallow and deep well be completed in this area. While unlikely, if significant saturated alluvial materials are encountered in Area 2, DTSC may direct PG&E to install a well further south closer to potential source areas (e.g., AOC 19). Area 3: To be consistent with the hydrogeologic characterization methodology used over the entire site, a shallow, middle, and lower well is requested for this area provided that the anticipated thickness of the saturated alluvial material is encountered in Area 3. Additionally, the work plan should include soil sample collection and analyses (for both COPCs and various soil parameters) from the deeper zones during borehole drilling for these wells.	groundwater investigation inside the compressor station will be combined with additional characterization at the East Ravine area. Therefore, no response to this comment will be provided in the Part B Soil Investigation Work Plan.	investigation.	
Specific 49	Section 6.3.1 – Monitoring Well Installation, Drilling requirements Borehole diameters should not be limited to eight inches in diameter. Nested wells will require, at a minimum, a 10-inch diameter borehole to allow emplacement of sufficiently thick annular seals. The text should be revised accordingly.	See response to Specific Comment 48.	See DTSC's response to Specific Comment 48.	No response necessary.
Specific 50	Section 6.3.3 – Depth-specific Groundwater Sampling When running chromium confirmation samples on Isoflow® samples at certified laboratories, hexavalent chromium should also be conducted as the 24-hour holding time should no longer be an issue due to	See response to Specific Comment 48.	See DTSC's response to Specific Comment 48.	No response necessary.

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	updated analytical methodologies.			
Specific 51	Section 6.3.4.1 – Monitoring Well Specifications Although the text specifies 2-inch Schedule 40 polyvinyl chloride (PVC) casing for wells less than 300 feet, DTSC may require alternative well construction materials based on site specific conditions.	See response to Specific Comment 48.	See DTSC's response to Specific Comment 48.	No response necessary.
Specific 52	Section 6.3.4.5 – Casing Grout Specifications As indicated in previous DTSC correspondence, Type I Portland cement is not recommended due to elevated sulfate concentrations on site. A Type II or V cement is necessary.	See response to Specific Comment 48.	See DTSC's response to Specific Comment 48.	No response necessary.
Specific 53	Section 6.3.6 – Well Completion Diagrams Please also include the borehole diameter on well completion diagrams.	See response to Specific Comment 48.	See DTSC's response to Specific Comment 48.	No response necessary.
Specific 54	Figure 6-3 The figure should be revised to incorporate the minimum 10-inch diameter borehole requirement previously discussed for nested wells.	See response to Specific Comment 48.	See DTSC's response to Specific Comment 48.	No response necessary.

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1	Photographs identified as PG 153, PG 154, PG 160, and PG 161 from the Photo File reveal what the GSU presumes is an aboveground wastewater clarifier within the lower yard of the compressor station. The figure below (PG 153) illustrates the clarifier within the northern scrubber area. This figure shows dark staining on the sides of the clarifier and in soils down slope of the unit. Figure 3-15 from RFI – Volume 1 (attached) illustrates prominent soil staining associated with this unit at least 40 to 50 feet in length. PG&E will need to identify the unit, and discuss its operation and closure as it is not described in the RFI – Volume 1 (CH2M HILL, 2007). Soil sampling below and around this unit is recommended due to observed releases.	This unit is most likely an API Oil/Water separator. The pipe exiting the bottom of the hill lines up with the routing of the current and historic oily water piping. It is possible that this OWS location preceded the known (current) OWS location. In 1958 or 1959, the three scrubbers shown in the photo were expanded to a bank of six scrubbers. The northern-most current scrubber appears to be located approximately where this OWS was formerly located. The existing workplan calls for two samples in this area. PG&E will increase the AOC 13 sample density by two sample locations in this area to address this concern.	PG&E has failed to properly identify this unit that has obviously released wastes to the environment. DTSC must now direct PG&E to include this unit as a separate AOC – AOC 24, Former Oil/Water Separator. Based on the limited input from PG&E, this AOC shall be identified as the “Former Oil/Water Separator” and will require evaluation and sampling as a unique AOC. It is not to be included as part of AOC-13 (Unpaved Areas at the Compressor Station) as it is a unique unit with documented releases. PG&E is again directed to gather more information on this unit and submit it to agencies as soon as possible including its operation and closure. Description of AOC 24, Former Oil/Water Separator shall also be included in the RFI – Volume 1 Addendum. PG&E needs to accurately locate and map the former OWS as well as the documented releases that emanated from the unit. Photograph PG 160-4 illustrates that the unit was located just north of the trench for the “scrubber inlet header”. PG&E must note that the unit is located some distance away from the bank of scrubbers. All six scrubber header lines (including the stubs of yet to be installed scrubbers) can be seen in PG 154. Figure 3-15 from the RFI – Volume 1 also illustrates the relative location of the unit and associated soil staining. The total number of samples needed for this unit will be based upon locating the unit with certainty. Trenching / potholing is also requested to find and track soil staining away from the unit. Additional sample locations and trenching are needed based on the minimal information provided by PG&E.	This unit and the associated staining were added as AOC 24. Available information was included in the work plan. Given the available photographic information PG&E does not believe that trenching or potholing is required to accurately locate potential sampling points.
2	The Photo File contains photographs (PG 154 – Photos 4 and 5) that exhibit discolored soil in the lower yard northern scrubber area. Photo 4 (PG 154) exhibits dark stained soil in a small area just north of the scrubbers (see red oval on the next page). This same area still exhibits stained soil one year later as illustrated in Figures 3-14 and 3-15 from RFI – Volume 1 (CH2M HILL, 2007). Photo 5 (PG 154) exhibits darkened soil around the northern scrubber unit with the majority of the darkened area south of the unit (see photo on next page).	The staining by the pole mentioned in this comment is apparent in Photo 4 and the 1995 aerial photos, but does not appear in Photo 5. The bigger staining is apparent only in Photo 5. This indicates that the “staining” in Photo 5 was of very short duration. It also appears that significant grading has occurred between the times associated with Photos 4 and 5; it is likely that the larger “staining” is water used to condition the soil and control dust during grading and/or aid in compaction of the soils. The smaller stain may be associated with the oil bath filters that were formerly part of the scrubbers. The proposed boring locations and sample depths	PG&E needs to describe the oil bath filter process that is suggested for causing the smaller soil staining noted in the comment. Samples will need to occur at this area (Photo 154-4) after an understanding of the process is documented by PG&E. No samples are currently proposed for this area. This stained area should be accurately located on a map/figure to aid in site characterization. Characterization is warranted as the staining noted in this area persisted for at least a years time and can be noted from aerial observations. Samples of the darkened soils from the groomed area in Photo 154-5 area are requested to ensure waste oil or other similar fluid was not used to prepare the site. No	Samples have been added in AOC 13 to address the larger discolored area, and the smaller stained area.

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	Soil sampling within the areas of discolored or darkened soil is recommended due to potential contamination associated with the discolored soils.	will be reviewed and adjusted as needed for consistency with the Part B DQOs.	samples are currently proposed for this area. PG&E should document that a portion of the darkened soil is still visible a year later in 1955 aerial photographs (Figure 5-13 and 5-14). Please note that photographs on the adjacent oil/water separator indicate that waste oil is being collected in a container and, therefore, could have been utilized for preparing or maintaining site soils.	
3	Photo 5 (PG 154) also pictures the white colored sludge drying beds in the background. Another white area and probable impoundment is located beyond the sludge drying bed in Photo 5 (PG 154). Figures 3-14 and 3-15 from RFI – Volume 1 (CH2M HILL, 2007) also illustrate this second white area. Soil sampling within the second white area is recommended due to potential contamination associated with the white material. PG&E should document the operation and any closure associated with this unit adjacent to the sludge drying beds.	This white area is described in Volume 1 of the RFI/RI. At the time of the aerial photo review for the RFI/RI, it was interpreted to be a mound of white material. It is important to distinguish between the two types of sludge that were dried in the sludge drying beds: lime softener sludge and hazardous waste treatment system sludge. The material in this area is most likely lime softener sludge from the plant water conditioning system. Until 1962, Topock used the Permutit® system to remove excess minerals from the plant water, and dried the sludge associated with this process in the sludge drying beds. As shown from the sampling conducted in AOC 14 (which received lime softener sludge), concentrations of Cr(T) and Cr(VI) in the softener sludge are low (well below industrial CHHSLs/PRGs). Because 2-phase treatment of the chromium-containing waste water did not begin until late 1968 or early 1969, it is not possible for the material in the photographs to be hazardous waste treatment system sludge. As reported in the RFI/RI Volume 1, lime softener sludge from the water conditioning system was transported to AOC 14 and sprayed on the ground for disposal. It is likely that the round area served as an interim storage area for the sludge. There is no record of any “secondary storage” associated with the hazardous waste treatment system. Because of the site history information described above, this area was not identified in the Final RFI/RI Volume 1 as a unit specifically requiring investigation.	PG&E cannot say with any certainty if the white sludge formerly located south of SWMU 5: Former Sludge Drying Beds is not contaminated. Please note that white powder sampled from AOC 14: Railroad Debris Site does contain elevated concentrations of hexavalent chromium. In fact, it exhibits the highest hexavalent chromium of all the 2008 AOC 14 soil samples. Additionally, other white powders sampled from both Bat Cave Wash and the East Ravine contain significantly elevated chromium concentrations. Therefore, soil sampling within this white area is warranted (see General Comment 14). The Final RFI/RI Volume 1 only briefly discusses this white area. Figure 3-14 from RFI – Volume 1 (CH2M HILL, 2007) clearly shows that the unit is a bermed, bowl-like, impoundment. PG&E should respond to the original comment and document the operation and any closure associated with this former unit.	This area was added as AOC 21. Available information was incorporated into the work plan.

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4	The Photo File contains two photographs (PG 40 – Photo 5 and PG 41 – Photo 1) that are titled "Cleaning interior of engine with solvent spray." As illustrated below, the photos show the large compressor engines being cleaned with a jet spray system. PG&E should attempt to determine how often this cleaning was performed and what type of solvent was used. These photographs appear to contradict the RFI – Volume 1 (CH2M HILL, 2007) which indicates that solvent use was only incidental and used in small quantities.	The standard practice during operations was to steam clean the exterior of the compressor engines. The referenced activity is part of the construction effort to remove a protective coating. The compressor engines typically were shipped to the station with a protective coating to prevent damage during transport after manufacture and before operation. There is no information from any former employees indicating that solvent spraying was a standard means of cleaning the compressor engines when the plant was in operation, and actually was prohibited by PG&E safety rules. Thus, this solvent cleaning was likely a one-time occurrence following the original installation of the compressor engines.	DTSC requests that PG&E fully respond to the comment by indicating what type of solvent was used and an estimate of the total volume that would have been used to clean one engine. Also describe how the solvents were disposed (e.g., Did they flow to the sump below the engine?).	There are no records regarding the precise type or volume of solvent used. Collection or management of solvents after spraying/use is unknown. VOC analysis is proposed at SWMUs 5, 6, 8, and 9, and AOCs 7, 8, 13, 17, 18, 20, 22, 23, 24, and 26, and Units 4.3. In addition, 10 percent of all samples on the station are being analyzed for TAL/TCL compounds, which includes VOCs; thus if any VOCs were released during this activity, they will be identified through the sampling program.
5	The Photo File contains several photographs (PG 110, 111, 164, 165, and 167) of gas headers being forcefully purged as illustrated below in PG 165 – Photo 1. PG&E should describe the purging operation including why and how the purging is conducted, how often it was/is done, and what fluids were injected/ejected during the process.	The purging of the lines depicted in this photo was done to remove all air and water from the lines prior to moving natural gas through the lines. Pipes were tested for leaks by filling them with water and pressurizing them. This was and continues to be the standard practice every time modifications are made to piping. The reason that the purging appears to discharge a waste material is because the high pressure and velocity during the purging aerosolize any water released, and the moisture contained in air purged from the pipelines is frozen due to the sudden decompression as it exits the pipeline. The purged material is always forced upward, because it is highly pressurized. Due to the high pressure and speed of the purged material, it would represent a significant danger to people if it where to hit somebody. If the line being purged was previously in use, the purged material could have contained small amounts of pipeline liquids. Although any associated impacts to the Topock Compressor Station are unlikely, they would be addressed by the sampling already proposed for AOC 13.	To complete the response, PG&E should indicate how often this practice is conducted and if it is done in specific areas.	This practice is infrequent during new construction to remove all air and water from the lines prior to moving natural gas through the lines. This type of purging has occurred an estimated five to 10 times since the start of station operations. Exact locations of these purges are unknown, but would be unique to each time a section of pipeline was repaired or constructed. In addition, pipeline purging or "blowing down" is also done as part of the compressor station operation and maintenance. These blow-downs occur several times a year at fixed stack-pipes for plant safety and maintenance.
6	The Photo File contains several photographs of transformers mounted to twin telephone poles (PG 18, 19, 126, 156, 157, and 163). It is assumed that these transformers would have used polychlorinated biphenyls (PCBs).	PCBs will be added to the analyte list for those AOCs where used transformers or used oil may have been stored or in exposed areas where oil may have been applied to the ground surface. As previously documented in the March 1, 2006 memorandum to DTSC (entitled *Background*	PG&E should document where PCB use and disposal occurred on the site in light of detecting PCBs in AOC 4: Debris Ravine and other AOCs. Documentation of the use of PCBs should be included as an Addendum to RFI/RI Volume 1 to appropriately update the PCB discussion currently contained in the RFI/RI Volume 1 document.	Documentation of the use of PCBs will be included as an Addendum to the RF/RI Volume 1. The reference to UA-1 should be to UA-2 (the Former 300B Pipeline Liquids Tank). The pipeline drip legs are simply valves with an unusual name, and there is no evidence of any leakage (e.g., staining) at the two drip

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	Additionally, and more importantly, PCB occurrence in natural gas pipelines and pipeline condensate is well documented (USEPA, 2004; Kennedy, 1993). In the past, PCBs were used in oils for some compressor lubricants, as valve sealants, and used in a pipeline process known as “oil fogging” during the 1940s through the 1960s (USEPA, 2004). Therefore, PG&E should include PCBs as a constituent of potential concern (COPC) and include soil samples for PCB analyses in the following areas: former transformer area; chemical storage areas; used oil storage areas; pipeline drip legs/tanks, and areas where used oil may have been applied to the ground surface.	*Information Concerning PCBs and Naturally-Occurring Radioactive Materials at PG&E’s Topock Compressor Station*), PCBs related to natural gas pipelines and pipeline condensate are not expected to be of concern at the Topock Compressor Station. DTSC has previously concurred with these findings. Therefore, PCB sampling is not proposed for areas associated with pipeline drip legs or tanks	New information cited in DTSC Comment 6 and the widespread detection of PCBs in AOC 4 warrant that sampling for PCBs occur at pipeline drip legs and tanks. UA-1 has already been sampled for PCBs in 2008 and in the 1990s.	legs that are within the area of potential effects (APE). PCB analysis has been proposed in applicable Part A and Part B SWMUs and AOCs.
7	The Photo File contains photographs of blasting that occurred during construction of the site (PG 2, 4, 80). PG&E should determine if explosives were stored in a designated area at the station for lengthy periods of time. If an explosives storage area is identified, PG&E should include explosives as a COPC for the storage unit and have soil samples collected from the area.	There is no record of any storage of explosives at the Topock Compressor Station, nor did any former employees mention any such practice during any of the interviews. Furthermore, blasting was not required during the operation of the station. Blasting would simply pose too much of a risk at an active gas compression facility.	Comment noted.	No response necessary.
8	The Photo File contains a photograph, dated April 16, 1951 (see Photo 4 - PG 86), of excavation activities for the waste oil sump that is located south of the tank farm. The RFI – Volume 1 describes this sump as measuring approximately 15 to 20 feet deep and 6 feet square. It was originally constructed as a concrete sump, but is now equipped with an inner steel liner and the original concrete structure acts as secondary containment (CH2M HILL, 2007). As this large waste sump has been in operation for over 50 years, it is recommended that environmental samples (soil matrix and/or soil gas) be collected to assess potential releases to the environment.	The tank farm and waste oil sump are active units, and therefore not part of the Corrective Action program. This request is similar to the inclusion of the Waste Oil Storage Tank in the RFA (it was identified as Unit 4.6). As documented in the Final RFI/RI Volume 1, the Waste Oil Storage Tank was removed from the Corrective Action program because it is an active unit. Neither the waste oil sump nor the tank farm were ever identified as SWMUs or AOCs. Furthermore, there is no exposed soil in these areas, groundwater is at a depth of 200 feet or more, the constituents in this area have low mobility, and bedrock may be present above first encountered groundwater. The tank farm currently has full containment and the tanks are fully above ground. There are no records of leaks from the tank farm; however, no records are kept to track inventory.	Based on PG&E’s response environmental samples are warranted for both the tank farm and waste sump. Both units have the potential for releases. DTSC will determine if the operation of a particular unit makes it problematic to characterize soils. Just because a unit is active, does not necessarily eliminate it from being investigated and characterized in a timely manner. As requested, PG&E should provide the scrubber sump closure report to DTSC as soon as possible.	A detailed accessibility evaluation was conducted as part of the work plan preparation process and is documented in Appendix B. The tank farm and waste sump area is identified as unsafe for collection of surface and subsurface soil samples, see Topock Compressor Station Accessibility Map Figure B-2. However, proposed soil sample locations are located to the east and north of this area as part of the AOC 13 and AOC 19 investigation. Additionally, a monitoring well is being installed downgradient of this area (Site 3 in the East Ravine/TCS monitoring well installation investigation) to assess groundwater conditions in this area. The scrubber sump closure report was provided to DTSC on January 18, 2011.At the direction of DTSC, the Scrubber Sump was added to the work plan as AOC 26.

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	Additionally, environmental sampling of the adjacent tank farm may be warranted as it has also been in operation for over 50 years. PG&E should provide information to DTSC regarding the tank farm (e.g., documents of tank conditions, inspections, replacement, releases) to properly assess the need to characterize potential releases from the unit. The complete closure report is also requested for the former scrubber sump to ensure an appropriate analytical suite was used during its closure. PG&E should consider investigation of this area absent information regarding its closure.	As DTSC is aware, the scrubber sump was located in the lower yard. The only potential COPCs associated with the scrubber sump were pipeline liquids drained from the scrubbers. Information on the scrubber sump was included in the 2005 Draft RFI and the Final RFI/RI Volume 1, and DTSC has previously received a copy of the closure report. Another copy of the closure report will be provided to DTSC.		
9	The Photo File contains photographs of a “Lube Oil Drain Tank” as it is being readied for underground installation (Photo 2, PG 39 - see next page). PG&E should determine if this tank has been accounted for in the RFI Volume 1 (CH2M HILL, 2007). If it hasn’t, then environmental sampling should be conducted for the unit. Photo File 95 (Photo 5) shows an emergency gasoline driven fire pump. PG&E should determine if the source of gasoline came from an underground storage tank that has not been previously identified.	The “Lube Oil Drain Tank” is one of the USTs referred to as the Reusable Engine Oil USTs in the RFI/RI Volume 1 (Section 3.1.5.1). These tanks were removed, closed, and replaced by ASTs. No further action is necessary. The emergency fire pump is incorrectly identified as a gasoline driven pump. The pump was a natural gas fueled pump that was decommissioned in the 1990’s	Based on review of section 3.1.5.1 of RFI/RI Volume 1, it is not clear if the “Lube Oil Drain Tank” is one of the three former oil USTs located adjacent to the compressor and auxiliary buildings. Clarification is requested. Closure reports for these former tanks should be provided. PG&E should double check if the fire pump was always powered by natural gas. In an emergency, it would seem that an alternate fuel source would be desired. The radiator cowling pictured on Photo File 95 (Photo 5) suggests that the engine is a “Buda” which certainly could have run on gasoline or diesel.	The Topock compressor station contained four fuel USTs as well as three below ground lube oil drain tanks. All seven USTs have been removed and replaced with ASTs. PG&E is unable to find the closure reports for the former USTs, and a record search at the San Bernardino County Fire Department also failed to turn up the files. The Buda fire pump used natural gas as its primary fuel source. The backup fuel source was a propane gas cylinder located along the north outside wall of the fire pump building.
10	The Photo File contains a photograph (see Photo 4 from PG 115 on the following page) describing a view of the “acid house” as it is being erected. This building appears to be located at the southern end of the southern cooling tower in 1955 Figures 3-14 and 3-15 of the RFI Volume 1 (CH2M HILL, 2007). A similar structure is noted in Figure 3-15 for the northern cooling tower. Page 3-23 of the RFI Volume 1 refers to chemical storage sheds located near the cooling towers which may be equivalent to the “acid house” noted on PG115. PG&E should ensure environmental samples are collected from the footprint of both “acid houses”.	These “acid houses” are the chemical sheds located in AOCs 5 and 6 and are included in the sampling plans for these units.	Comment noted.	No response necessary.

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11	The Photo File contains several 1953 photographs of the "chemical storage building" (PG 122, 123, 124, 125, and 126). The "chemical storage building" is visible in the 1955 Figures 3-14 and 3-15 of the RFI Volume 1 (CH2M HILL, 2007). It is the most southeasterly building in the 1955 photographs. Very close examination of Figure 3-15 illustrates storage, possibly drum storage, along a fence to the north of the "chemical storage building". Currently, the "chemical storage building" is identified as the "Maintenance Shop" in Figure 3-1 of the RFI Volume 1. Environmental samples in and around the "chemical storage building"/"Maintenance Shop" is warranted based on the findings discussed above. Area of Concern 7 - Hazardous Materials Storage Area identified in RFI Volume 1 is located adjacent and south of the "chemical storage building"/"Maintenance Shop".	The characterization approach to this building will be reviewed and adjusted as needed for consistency with the Part B DQOs.	Characterization of the chemical storage building and surrounding area is obviously required. The Work Plan must ensure appropriate samples are collected from this unit.	This area was added as AOC 23. Proposed sampling described for this unit is described in the work plan.
12	The 1955 Figures 3-14 and 3-15 of the RFI Volume 1 (CH2M HILL, 2007) illustrate an unknown structure northeast of the chemical storage building. The structure had three wooden walls and the soils associated with the unit were lighter in color than surrounding soils. PG&E staff have indicated that they are uncertain what operations occurred at the structure. Without further information, it is recommended that environmental samples be collected from this former unit.	The characterization approach to this building will be reviewed and adjusted as needed for consistency with the Part B DQOs	The location of this building should be accurately located in figures to ensure soil samples are appropriately collected from this AOC.	This structure was added as AOC 22. Proposed sampling to evaluate potential impacts associated with this structure is described in the work plan.
13	The Photo File includes photographs of the "Hot Well" including the one pictured on the next page that shows the concrete Hot Well structure (circled in red) to the right of the main jacket water cooling tower. As it has been documented that the Hot Well was constructed 5 feet below grade and periodically overflowed (CH2M HILL, 2007), PG&E should ensure that the unit is appropriately characterized.	The hot well is included in the description of AOC 19. The characterization of AOC 19 will be reviewed and adjusted as needed for consistency with the Part B DQOs.	The location of the former Hot Well should be accurately plotted on AOC 19 figures so that soil samples are appropriately collected for this unit.	The location of the hot well was added to the figure for AOC 19. Access for sampling in this area is extremely limited.

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14	The Photo File includes two photographs (PG 110 and PG165) of a lube oil flushing system. PG&E should describe the operation of this unit and indicate if it had potential to release COPCs to the environment.	The lube oil flushing system was an ad hoc system used during construction to flush out the lube oil transfer lines prior to operation. The photo on Pg 110 shows the system used for flushing the lube oil system for Units K-1 through K-6 in 1951. The flushing system was located next to the lube oil sump in the tank farm area. The photo on Pg 165 shows a similar ad hoc system used to flush the lube oil system for Units K-7 through K-9 a few years later. It was located in the access road area between K-8 and the fin fan coolers. PG&E does not have detailed information about the use of both of these temporary systems but believes that the basic mode of operation would be to discharge the waste oil collected into the readily available waste oil sump. PG&E has no reason to believe that any releases to the environment occurred during this short-term operation more than fifty years ago. In fact, this system is designed to prevent releases and capture the oil in the waste oil system.	Comment noted.	No response necessary.
15	The Photo File includes several photographs related to installation of transite siding, roofing, and pipe conduit during construction of compressor station buildings and pipe galleys. Transite is identified in the following photographs in the Photo File: pages PG 41, PG 56, PG 91/92, PG 99, and PG 102. This comment supplements the RFI – Volume 1 (CH2M HILL, 2007) which discusses asbestos and transite noted in debris around the facility, but makes no mention as to where this material originated. PG&E should evaluate all Areas of Concern (AOC) and Solid Waste Management Units and determine if asbestos should be included as a COPC. For example, it is recommended that AOC 13 include asbestos analyses as transite debris has been noted in the lower yard and site fill. Future RFI reports discussing transite should identify that the compressor station was constructed with transite and is a probable source.	ACM has been included as a COPC in areas with transite (e.g., AOC 4). The transite material can be easily identified when it is encountered in the field and it is generally in good condition (not friable). Sampling for asbestos in the lower yard in areas where transite has been observed will be added to the AOC 13 sampling plan.	Comment noted. PG&E should also include analyses for asbestos in other areas when transite is identified in the field (e.g., Bat Cave Wash, AOC 14).	Seventy-two samples from AOC 14, which is the most likely area to have received wastes containing ACM, were analyzed for ACM. Only 2 samples were confirmed to have ACM, both at trace levels (less than 0.1%). Further general sampling for ACM is not warranted; however, samples from the mouth of Bat Cave Wash will be analyzed for ACM.

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16	The following photographs have been repeated in the Photo File: pages PG 18/19, PG 23/24, PG 91/92, PG 98/100, and PG 99/101. It is assumed that one of the pages from each preceding pair has not been scanned and included in the Photo File. Therefore, PG&E should include the omitted pages in a revised Photo File to be submitted to DTSC.	PG&E has reviewed the Photo file and found that no photos were omitted from the historic photo binder at TCS. Apparently the individual who scanned the photos duplicated a few of the pages.	Comment noted.	No response necessary.
17	The Photo File does not contain pages PG 140, PG 143, and PG 151. PG&E should clarify if this was intentional and if any photographs were omitted. If photos were omitted, they should be included in the revised Photo File to be provided to DTSC.	PG&E has reviewed the Photo file and found that no photos were omitted from the historic photo binder at TCS. Apparently the individual who scanned the photos did not number all of the pages in sequence.	Comment noted.	No response necessary.
18	PG&E's cover letter to the Photo File, dated August 22, 2007, indicates that some of the photographs came from the draft Route 66 National Register of Historic Places nomination report. It is not apparent if any of the photos came from this source. PG&E should clarify, in the revised Photo File itself and/or the associated cover letter, the source of each photograph.	PG&E will provide the requested information.	DTSC awaits PG&E's response.	No response necessary.
19	Photographs A and B on the next page are included in this memorandum in hope of identifying the nature of the earthen structure DTSC staff observed on June 19, 2007. The structure is located along a wash that connects to the East Ravine. The East Ravine parallels the main access road leading up to the Topock Compressor Station. Some staining was noted inside the structure and a layer of asphalt occurs in front of the earthen hollow, but the asphalt is not visible in the photos. In June 2007, DTSC questioned both PG&E and federal agency representatives if they knew what the earthen structure might be. Formal responses are still pending. PG&E should determine if the structure was used as part of site operations to assist in determining if environmental analyses are now warranted.	No information is available about this structure, which is not on PG&E property and does not appear to have any connection to PG&E. A speculative theory for this structure is that it was for dynamite storage for Route 66 construction in 1931, Arch Bridge construction in 1931, or Red Rock Bridge construction in 1889. This structure had only been discovered by PG&E personnel a few weeks prior to DTSC's site visit.	Based on PG&E's response, the structure could also have been used to store explosives during the construction of the compressor station. Therefore, it is requested that this unit be characterized and include sampling for explosives and TPH. The unit shall be designated AOC 25, Potential Explosives Storage Area. This AOC shall be described in the RFI Volume 1 Addendum.	Per recent discussion DTSC and DOI, this unit will not be designated as an AOC. No further investigation is required.

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General	Overall, the development of the DQOs shows a significant improvement compared to the DQOs that were developed in the Soil Investigation Workplan, Part A.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.
Specific 1	**Section 2.2.2, Potentially Exposed Receptors** As stated in Section 2.2.1, chemicals of potential concern (COPCs) could potentially move outside the fence line via sheet flow. Therefore HERD recommends that potential exposures of ecological receptors outside the fence line be evaluated if it is determined that COPCs that this transport mechanism did occur. Table 3-1, Problem 1 should be modified to incorporate this comment.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.
Specific 2	**Section 2.2.3, Potential Exposure Depth Intervals** HERD recommends that the depth interval for surface soil exposures be from 0 to 0.5 foot below ground surface (bgs), rather than 0 to three feet bgs. If the site-specific potential exposures of the construction and maintenance workers would not be more than six feet bgs, then inclusion of chemical concentrations at depths deeper than six feet bgs could dilute the exposure point concentrations for subsurface depths. HERD recommends that potential exposures to soils at depths deeper than six feet bgs be included only if the chemical concentrations are higher than those detected from 0 to 3 feet bgs. By doing so, occasional exposures to soil at depths to 10 feet bgs are also addressed.	PG&E agrees with this recommendation, and it was incorporated into the Risk Assessment Workplan, which was approved by both DTSC and DOI	No response necessary.	No response necessary.
Specific 3	**Comments on Table 3-1** The following comments on Table 3-1 should be addressed and incorporated into the discussion in the text, wherever it is appropriate.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.

Comment No.	2008 HERD Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	Problem 1, Inputs to Decisions Cultural resources impacts associated with each remedial technology are not inputs to deciding whether sufficient data had been collected to evaluate human health risk within the fence line. This information is more relevant during the feasibility study, as stated in Section 3.4, and should be deleted from this section of Table 3-1.			
	Problem 1, Study Boundaries HERD defers to the Geological Services Unit (GSU) on how the lateral delineation will be determined. However, should industrial CHHSLs/PRGs be considered potential criteria for lateral delineation, HERD had previously indicated that the CHHSL/PRG for each individual constituent should be adjusted to account for cumulative risk/hazard index. **Problem 1, Decision Rule** Another option for Decision 1b is to use the maximum concentration, rather than additional data collection, if the number of samples is inadequate for calculating a statistically-based exposure point concentration. This comment is consistent with the statement in the first paragraph of Step 6. **Problem 2 Inputs to Decision** Since beneficial use of groundwater is the stated problem whereas human health risk and/or hazard associated with groundwater use is not, the contribution to carcinogenic and noncarcinogenic risk is not an appropriate input to the decision. The lateral and vertical extent of COPCs that contribute to an excess risk would be relevant if one of the stated problems is the unknown risk associated with a specific use of groundwater. HERD recommends that this specific input to decision be deleted.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.

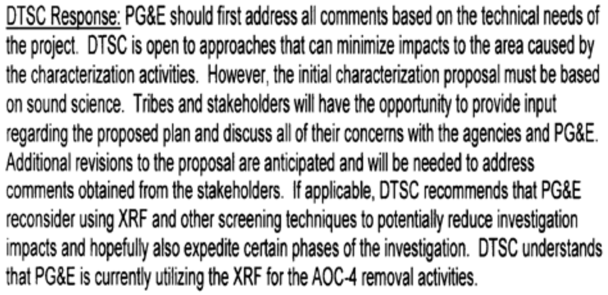
Comment No.	2008 HERD Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	Problem 4, Stated Problem The stated problem indicates that the standard for clean closure had not been defined. If so, PG&E should clarify whether the assumption that clean closure of SWMUS 5, 6, 8, or 9 will be based on industrial use standards (Step 2, Identify the Decisions) is being proposed for consideration by DTSC.			
	Problem 4, Inputs to the Decision Although one of the assumptions in Problem 1 implies that risk may be one of the factors in the RCRA closure of SWMUS 5, 6, 8, and 9 (Problem 4), this was not stated in Problem 4. Consequently, all inputs pertaining to risk should be deleted if health risk is not one of the decision criteria for RCRA Closure of SWMUs 5-9.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.
	Problem 6, Study Boundaries HERD does not agree with the statement that target analytes will be determined by the risk assessment. Target analytes are analytes that were detected in previous investigations. The risk assessment cannot identify COPCs that are significant contributors to risk unless the GSU has agreed that the characterization is adequate. In addition, the discussion on target analytes should be in “Inputs to the Decision” rather than in “Study Boundaries.”	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.
Specific 4	**Section 4.2** As indicated in the preceding comments, the CHHSLs/PRGs should be adjusted in order to account for cumulative risk and/or hazard index.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.
Specific 5	**Figure 4-3 and Section 4.2.2** Step 13B states that if there is a potential risk of leaching to groundwater, this pathway will be addressed through the risk assessment and/or remedial action. One of the Inputs to Decision	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.

Comment No.	2008 HERD Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	shown in Table 3-1, Problem 2, is "Beneficial Uses of Groundwater," which is usually the maximum contaminant level (MCL) in drinking water. Clarification should be provided whether addressing through risk assessment means that alternative use of groundwater will be proposed for concurrence and that risk-based concentrations based on this alternative use will be developed.			
Specific 6	**Figure 4-4A** It is HERD's understanding that each of the decision boxes (shaded in gray) indicates that the data set from each SWMU will be evaluated separately from the entire data set inside the fenceline. Clarification should be provided because the magnitude of the remediation, if any, to support closure of each RCRA SWMU could be different from the remediation required for the entire area inside the fenceline.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.
Specific 7	**Figure 4-5, Table 3-1, Problem 4, and Section 4.2.4** If the lateral study boundaries for SWMUs 5, 6, 8, 9 consist of the footprint of each SWMU, it would be more straightforward to evaluate the risk for each SWMUs rather than for the entire area within the fenceline, as shown in Step 3. Therefore, Steps 3 and 4, and the relevant discussion in Section 4.2.4 should be modified accordingly.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.

Comment No.	2008 HERD Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	The described approach is confusing. If the number and the locations of the samples to be collected in order to address Problem 4 were truly premised on the DQO process, the decision rule should specify whether the maximum concentration or a statistically-based concentration within the boundaries of each SWMU will be applied. Consequently, Steps 5 and 6 in Figure 4-5 can be eliminated. The discussion in Section 4.2.4 should be modified for consistency with the revisions to Figure 4-5 based on HERD's comments.			
Specific 8	**Figure 4-6, Problem Statement 5** Step 4 indicates that potential leaching to groundwater will be evaluated if there is a potentially complete migration pathway to areas outside the fenceline. However, this is not stated in the decision rule for Problem 5 and not clearly explained in Section 4.2.5. Additional discussion should be provided for clarification. It should also be explained whether the action to go to Figure 4-3A refers to Figure 4-3 or to Step 3A in Figure 4-3.	See Response to DTSC Specific Comment 2	No response necessary.	No response necessary.

DOI "TOPOCK COMPRESSOR STATION RFI/RI PROJECT DOCUMENT REVIEW SHEET" dated March 2008 (Kris Doebbler)

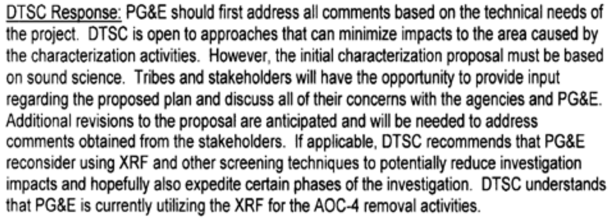
Comment No.	Comment Location	Type[a]	Comment	Comment Response
Per DOI Request, responses to DOI comments are not provided.				

Comment No.	2007 FMIT Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
1 (General)	Primarily, the Tribe wishes to express its concern over this incremental disturbance to sacred grounds. The Tribe has repeatedly provided comments relating to the offensiveness of the many, many intrusions, disturbances, and violations of the sacred grounds that have accrued to date. Indeed, this workplan represents yet another significant level of disturbance. In commenting on the Part A Soils Workplan, the Tribe strongly petitioned for the DTSC to apply an alternative approach to minimize sampling and to try in every way possible to minimize the number of samples to be collected.[1] In response, DTSC indicated that it did not understand why the Tribe would consider the number of samples proposed as excessive. DTSC pointed to the large number of non-contiguous sites covering “vast acreages” that were impacted historically by discharges.[2] Indeed, this characterization highlights the basis of the Tribe’s concern: that there seems to be no degree of characterization that the DTSC considers to be enough or excessive. Indeed, the Tribe is aware that “DTSC is mandated to evaluate any such potentially impacted areas to ensure protection of human health and the environment through reasonable science.” At the same time, the Tribe questions whether “reasonable science” is so prescriptive as to necessitate such a degree of inflexibility in DTSC’s approach to assessment. The DTSC further points out that it cannot “predetermine” a remedy without such information, yet the Tribe notes that the U.S. Environmental Protection Agency (EPA) has embraced the concept of presumptive remedies “… to streamline site investigations and accelerate the selection of cleanup actions….”[3] A presumptive remedy is defined as “… a technology that EPA believes, based upon its past experience, generally will be the most appropriate remedy for a specified type	The FMIT perspective expressed in this comment is that the work plan is too extensive and includes too many samples. This perspective is in conflict with the comments received from the other parties. Clarification was requested in an April 21, 2008 email from PG&E to DTSC and DOI. The following response was provided in the DTSC’s response dated March 10, 2010 (*Part B Soil Investigation Clarification Comments and Additional Direction, Pacific Gas and Electric Compressor Station Needles, California (EPA ID No. CAT080011729*):  <u>DTSC Response:</u> PG&E should first address all comments based on the technical needs of the project. DTSC is open to approaches that can minimize impacts to the area caused by the characterization activities. However, the initial characterization proposal must be based on sound science. Tribes and stakeholders will have the opportunity to provide input regarding the proposed plan and discuss all of their concerns with the agencies and PG&E. Additional revisions to the proposal are anticipated and will be needed to address comments obtained from the stakeholders. If applicable, DTSC recommends that PG&E reconsider using XRF and other screening techniques to potentially reduce investigation impacts and hopefully also expedite certain phases of the investigation. DTSC understands that PG&E is currently utilizing the XRF for the AOC-4 removal activities.	DTSC recognizes and respects the Tribe’s views regarding the sacredness of the area. DTSC understands the Tribe’s concern regarding the potential physical and cultural disturbance from the proposed sampling and will continue to work actively with all the tribes and stakeholders to minimize potential disturbances. DTSC notes that changes have occurred in the general approach for the soils investigation since the submittal of the draft 2007 Part B RFI Workplan. More emphasis will be given to the use of data quality objectives (DQOs) to guide the investigation. A DQO’s technical memorandum will be developed to help guide the formulation of a revised draft Part B RFI Workplan. DTSC believes that the DQO’s that are currently being developed, along with the comments on the draft 2007 Part B Workplan, will result in a revised workplan that may be substantially different from the draft 2007 Part B RFI Workplan. Regardless of the changes to the next version of the draft workplan, it will be distributed to all stakeholders to solicit additional comments. It is DTSC’s hope that the discussions with the tribes and stakeholders will result in a final workplan that will present a streamlined approach and minimize potential physical and cultural impacts.	No additional response necessary.

Comment No.	2007 FMIT Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	of site."4 If the concept of presumptive remedies can be used to facilitate remedy selection based on site to-site similarities at geographically different facilities, why can't the same concept be applied to the "non-contiguous" areas with similar operational histories across the Topock Site? It seems that this may lessen sampling requirements. With full recognition of the value of data abundance in decision making, the Tribe understands that there will be residual uncertainty with any level of characterization sampling. In its comments, the DTSC also stated that it "… must balance the need to properly define the nature and extent of contamination with minimal site disturbance." The Tribe is wondering how the DTSC in fact achieves this "balance," moreover how it views its performance along this line. As pointed out in EPA's principles for Superfund reauthorization: "The Administration's goals for Superfund reauthorization continue to be to: protect human health, welfare and the environment; maximize participation by responsible parties in the performance of cleanups; ensure effective State, Tribal and community involvement in decision making; and promote economic redevelopment or other beneficial reuse of sites, all in a manner that increases the pace of cleanups, improves program efficiency and decreases litigation and transaction costs, and which does not disrupt or delay ongoing progress." [emphasis added]5 From this policy, it would seem that human health, welfare, and the environment are all factors that must be appropriately weighed in the decision process. At this point, other than DTSC's claim, the Tribe does not understand how or at what point the DTSC exercises the balance between that it claims to be achieving. It seems that DTSC is not recognizing that the			

Comment No.	2007 FMIT Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
	issue that the Tribe is raising relates to the disruption of cultural values of the Tribe, not merely to "site disturbance." 1. Hargis + Associates, Inc., 2007. Comments to DTSC dated February 9, 2007 on Part A Soils Workplan. 2. DTSC, 2007. Response to Fort Mojave Indian Tribe (FMIT) Comments on the RFI / RI Soil Sampling Work Plan – Part A. June 2007. 3. EPA, 1999. "Presumptive Remedy for Metals-in-Soils Sites." EPA 540-F-98-054. URL accessed at: http://homer.ornl.gov/oepa/guidance/cercla/metalsinsoil.pdf 4. FRTR, no date. 2.1 Presumptive Remedies, Remediation Technologies Screening Matrix and Reference Guide, Version 4.0. URL accessed at: http://www.frtr.gov/matrix2/section2/2_1.html 5. EPA, 2007. Superfund Reauthorization Principles. URL accessed at: http://www.epa.gov/superfund/policy/congress/princple.htm			
2	In addition to the issues raised above regarding the number of samples, the Tribe is wondering if there is any estimate of the total number of soil characterization samples collected to date. Also, has there been any quantification with regard to the volume of soils removed and disturbed historically and with respect to this proposal? Finally, is there any plan to repatriate these soils?	An estimate of the total number of historic soil samples can be developed and will be included in the workplan; however repatriation of soils removed during historic sampling is not feasible. For soil removed from borings in the future, consistent with current practice, PG&E will collect the soil and stockpile it until the sample collection is completed and borings will be grouted. After the collected soil has been evaluated, PG&E will work with the Tribe to determine if another appropriate re-use of the soil is feasible.	DTSC defers to PG&E regarding the specific number and volume of samples collected. For future sampling, DTSC agrees with the proposal to potentially re-use soils to the extent possible.	An estimated 1,002 soil samples from 480 locations have been collected in and around the compressor station to date. This estimate does not include recent samples collected pursuant to maintenance activities within the fence line of the compressor station. The volume of samples collected and soil removed cannot be quantified. Quantities of investigation-derived waste have not been recorded during prior investigations.

FORT MOJAVE INDIAN TRIBE COMMENTS ON PACIFIC GAS & ELECTRIC CO. DECEMBER 20007 DOCUMENT TITLED *RCRA FACILITY INVESTIGATION SOIL INVESTIGATION WORK PLAN*, *PART B*, *PG&E TOPOCK COMPRESSOR STATION*, *NEEDLES*, *CA*

Comment No.	2007 FMIT Comment	2010 PG&E Response	2010 DTSC Response	2011 PG&E Response
3	It is unclear from Figure 6-1 whether the alternative staging areas are on already disturbed areas and if so, what the prior disturbances are. In any case, those staging areas seem to be larger than need be and may unnecessarily disturb additional land.	All staging areas were selected because they are already disturbed ground. The size of the areas was defined to ensure that all equipment that may be required (e.g., a long-reach excavator) could be located entirely within the staging area/on previously disturbed ground.	The Tribe's comment is noted. As indicated above, due to the anticipated substantial revision in the revised workplan, all issues, including staging areas, will be re-evaluated.	No additional response necessary.
4	As you are aware, the Tribe has already commented on the December 11, 2007, PG&E Work Plan for the East Ravine Groundwater Investigation. Comments were transmitted to you on December 28, 2008. Within those comments, the Tribe asserted its opposition to the proposal to drill new monitoring wells in the East Ravine area based on the violation that they represent to its sacred grounds. Specifically, the Tribe's comments indicated that "…the need to do further characterization at this time (as opposed to some time in the future that may indicate the need for a separate remedy component) is not fully justifiable." Noting that this work plan also includes a proposal to construct up to three additional monitor wells for investigating groundwater within the fenced area, the Tribe reasserts its opposition to the proposed additional wells on the same grounds as previously stated for the East Ravine area.	This comment is in conflict with the direction received from the agencies. Specifically, DTSC provided the following response in DTSC's response letter dated March 10, 2010 (*Part B Soil Investigation Clarification Comments and Additional Direction, Pacific Gas and Electric Compressor Station Needles, California (EPA ID No. CAT080011729*):  DTSC Response: PG&E should first address all comments based on the technical needs of the project. DTSC is open to approaches that can minimize impacts to the area caused by the characterization activities. However, the initial characterization proposal must be based on sound science. Tribes and stakeholders will have the opportunity to provide input regarding the proposed plan and discuss all of their concerns with the agencies and PG&E. Additional revisions to the proposal are anticipated and will be needed to address comments obtained from the stakeholders. If applicable, DTSC recommends that PG&E reconsider using XRF and other screening techniques to potentially reduce investigation impacts and hopefully also expedite certain phases of the investigation. DTSC understands that PG&E is currently utilizing the XRF for the AOC-4 removal activities.	DTSC notes that the groundwater investigation component of the Part B soils investigations have been removed and will be addressed separately in the East Ravine/Topock Compressor Station Groundwater Investigation. The Tribe's comment will be addressed as part of the East Ravine groundwater investigation.	No additional response necessary.
5	In recognition that these comments raise significant concerns and issues on behalf of the Tribe, we offer our availability for further discussion to facilitate resolution of these comments as well as the many related site activities that comprise the cumulative adverse impacts to the sacred grounds. Please contact me if I can provide further information and/or arrangements along these lines.	Comment acknowledged. PG&E appreciates the Tribe's willingness to participate in this manner. PG&E defers to the agencies on the detailed process for stakeholders and tribal involvement,	DTSC appreciates the Tribe's participation and looks forward to working with the tribes and stakeholders in resolving all concerns and issues.	PG&E will continue to notify the Tribe regarding proposed investigation activities to ensure that the Tribe has the opportunity to provide input.

Comment No.	Comment	2010 PG&E Response	2010 DTSC Response	
1	Overall EMC found the Work Plan to be well written, organized and followed a logical progression and presentation of information with well documented tables and figures.	Comment acknowledged.	No response necessary.	No additional response necessary.
2	Section 1.1 Background describes that the investigation and remedial activities at the Topock Compressor Station are being performed under both the Resource Conservation and Recovery Act (RCRA) corrective action process and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). In February 1996, PG&E and the California Department of Toxic substances Control (DTSC) entered into a Corrective Action Consent Agreement. It is further stated that the United States Department of Interior (DOI) is the lead agency on land under its jurisdiction, custody and control, and that the DOI is responsible for oversight of the response actions being conducted by PG&E pursuant to CERCLA. Not referenced in this document is the additional voluntary corrective action cleanup agreement that may exist with the Arizona Department of Environmental Quality (ADEQ) who is responsible for the investigation and clean up activities in Arizona. EMC understood that DTSC was the sole responsible regulatory agency and final decision maker related to all corrective action and technical activities being conducted at the Topock site, regardless if activities were on federal lands or activities being conducted in California or Arizona. It would be helpful to provide additional clarification regarding the authorities and responsibilities of each of the three regulatory agencies, since it appears that there may be three separate regulatory agencies with separate decision making authority and responsibilities. It would also be helpful to understand if a Memorandum of Understanding (MOU) has been executed between these agencies to streamline and expedite the corrective action process.	The Arizona Department of Environmental Quality (ADEQ) has accepted PG&E's application for the ADEQ Voluntary Remediation Program (VRP). The VRP is not mentioned in RFI/RI documents because the RFI/RI documents are specifically prepared to meet the requirements of the RCRA Corrective Action and CERCLA. Separate documents are required by the VRP. DOI and DTSC continue to oversee the larger study area as part of the RCRA and CERCLA investigations. The VRP remains active as a stakeholder in these investigative activities as they relate to potential future impacts that could affect water quality under the jurisdiction of the State of Arizona There is not a Memorandum of Understanding between the agencies enforcing RCRA Corrective Action, CERCLA, and the VRP.	DTSC is the lead regulatory agency under the Resource Conservation and Recovery Act (RCRA) for the corrective action activities related to the PG&E Topock facility. DTSC shares regulatory lead responsibility with DOI which operates under the authority of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). DTSC defers to PG&E regarding its voluntary agreement with the ADEQ. DTSC does not have any memorandum of agreement with the other agencies related to the PG&E Topock project; however, because RCRA and CERCLA requirements are often very similar, it is in the best interest of all parties that DTSC and DOI work closely to ensure that PG&E satisfy all regulatory requirements simultaneously to the extent possible.	No additional response necessary.
3	Section 3.1 describes the overall objectives of the soil	The DQOs process is being conducted in accordance with the requirements of DTSC and DOI. The Part B	DTSC agrees with the Tribe in expediting the investigation and remedial activities related to soils at	PG&E appreciates the Tribes' input on the Part A Data Gaps Evaluation and looks

Comment No.	Comment	2010 PG&E Response	2010 DTSC Response	
	investigation program as: 1. sufficiently characterize the investigation areas and; 2. minimize the number of samples and associated disturbance within the facility and facility operations. EMC noticed the absence of the significant basic objectives such as "expedite the final remedy selection" "reduce the length of time' or "eliminate delays in completing the investigation". It appears to the reader that the basic conceptual approach continues to be, minimize the samples and potentially conduct multiple phases of investigations over a long period of time. While EMC agrees that the Data Quality Objectives (DQO) process is a recognized procedure and the Environmental Protection Agency (EPA) has provided guidance on the DQO process, it appears that PG&E and the agencies are trying to fit the Topock project into the standard DQO process rather than using the DQO process to beneficially move the project forward and reach a final remedy as quickly as possible.	DQOs are being redrafted. The goal of the DQO process is to ensure that data collected at each stage of the investigation process are of sufficient quantity and quality to enable the specified decisions to be made.	the PG&E Topock facility. DTSC hopes that the soils-related activities will gain momentum now that the groundwater related activities are moving towards remedy design. DTSC believes that the DQO's that are currently being developed, along with the comments on the draft 2007 Part B Workplan, will result in a revised workplan that may be substantially different from the draft 2007 Part B RFI Workplan. It is DTSC's hope that the continuing discussions with the tribes and stakeholders will result in a final workplan that will present a streamlined approach and minimize potential physical and cultural impacts.	forward to continued participation by the Tribes.
4	Section 3.6 states that the existing values for background concentrations of metals are preliminary and that refined background concentrations will be evaluated pursuant to the Part A Work Plan. EMC agrees with this statement and believes that the previous background metal data set is not representative of actual background conditions and that separate background values should be developed for each lithologic unit within the study area.	The additional background investigation has been completed. The revised final technical memorandum was submitted and accepted by DTSC (*Revised Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California*; CH2M HILL, May 2009). Statistical evaluation of the background data indicated that the differences between the lithologic units were not significant enough to merit defining separate background data values for each unit. All background data were combined into one data set and used to develop the background threshold value (BTV) concentrations.	DTSC defers to PG&E's response to the Tribe's comment.	No additional response necessary.
5	EMC believes that direct active onsite participation by one of the regulatory agencies would greatly assist in	DTSC and DOI have the authority to be on-site for some or all of the sampling, and will make	DTSC agrees with the Tribe that expedited field decisions are valuable and will help streamline the	No additional response necessary.

Comment No.	Comment	2010 PG&E Response	2010 DTSC Response	
	expediting completion of the investigation activities. It would seem appropriate that an appropriate regulatory agency commit the necessary qualified professional staff and resources to actively observe drilling and sampling activities so that expedited field decisions could be made related to the inclusions of additional samples for analysis or the modification or addition of sample locations.	determinations regarding the value of having a representative in the field throughout the investigation program.	investigation process; however, DTSC unfortunately does not have the resources to commit staff to be present for all field activities. DTSC makes every effort to coordinate with DOI in sharing field oversight duties. In addition, DTSC is available via electronic mail and telephone should field personnel require immediate attention and response from DTSC.	
6	Section 5.7 (AOC 5 Cooling Tower) Considering the elevated chromium concentrations at PS-IS and PS-16, minimal sampling effort is being proposed in these areas. Additional sampling locations appear to be warranted.	The existing sampling data are classified as Category 1. The proposed sampling analysis will augment that sampling data and will provide sufficient data for characterization of the AOC.	DTSC concurs with the Tribe's comment and has provided comments to PG&E requesting additional sampling at the cooling towers.	Additional sampling at the cooling towers has been proposed in the work plan (see proposed sampling at AOCs 5 and 6).
7	Section 5.8 (AOC 6 Cooling Tower) Considering the elevated chromium concentration at PS-3, PS-4, and PS-S it would appear that additional sampling effort would be justified along the western boundary of the AOC.	The existing sampling data are classified as Category 1. The proposed sampling analysis will augment that sampling data and will provide sufficient data for characterization of the AOC.	DTSC concurs with the Tribe's comment and has provided comments to PG&E requesting additional sampling at the cooling towers.	Additional sampling at the cooling towers has been proposed in the work plan (see proposed sampling at AOCs 5 and 6).
8	Section 5.11 (AOC 15 Auxiliary Jacket Cooling Water Pumps) Elevated chromium concentration occur at JP-6 and JP-10 and show an increasing trend west of JP-5. Additional sampling locations along the western boundary appear to be appropriate. Elevated chromium concentrations occur at JP-9, JP-8 and JP-2. Additional sampling locations appear to be warranted. The sample locations on Figure 5-15 do not match Figure 5-16. Sample location JP-9 is shown to be located at a different location on each map.	The proposed boring locations and sample depths will be reviewed and adjusted as needed for consistency with the Part B DQOs. Figures 5-15 and 5-16 will be revised.	DTSC concurs with the Tribe's comment and also acknowledges PG&E's response to take the appropriate actions.	Proposed sampling at AOC 15 is described in the work plan.
9	While great effort was used to evaluate the Precision, Accuracy Representativeness, Comparability and Completeness of Laboratory data that ultimately placed the data into three usability categories, was there a similar QA/QC process to evaluate and determine the fundamental basic accuracy of previous sample locations.	The sample locations shown in the RCRA Facility Investigation (RFI) and RFI work plans are based on the best available information, including surveyed sample locations, descriptions of the sample locations, and/or sample locations shown in figures provided with published reports. In most cases, the approximate location is known, and sufficient additional samples are proposed in the Part A and Part B work plans to ensure that areas of potential concern are adequately	DTSC defers to PG&E's response to the Tribe's comment.	No additional response necessary.

Comment No.	Comment	2010 PG&E Response	2010 DTSC Response	
		evaluated and delineated. The degree of uncertainty as to the precise location of a historic sample must always be evaluated in conjunction with the degree of precision deemed appropriate for the original sampling. The inability to locate a precise sampling position does not, in itself, mean that the data from that sampling are unusable or of limited usability, provided that the location can be determined with confidence to exist within an area for which no one point was more or less appropriate to accomplish the goals of the original sampling.		
10	The Tribes would like to be notified, in advance, of any scheduled sensitivity training. The Tribes have previously requested to be contacted in advance of any field activities and may choose to provide Tribal Monitors.	PG&E is committed to involving the tribes in the RFI/RI program at the compressor station, and will notify the tribes in advance of any field activities. Furthermore, prior to each major phase of field activities, PG&E holds a project initiation meeting at the compressor station and invites tribes/stakeholders/agencies and pertinent contractors to attend. During these project initiation meetings, tribes and agencies are invited to discuss/ share their viewpoints relating to the project. Such open discussion of viewpoints and sharing of information have enhanced the understanding of the project sensitivity for all participants.	DTSC will continue to coordinate with PG&E in notifying the tribes, and all stakeholders, in advance of all field activities.	No additional response necessary.

Appendix C
Perimeter Area Investigation Program

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Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
DQO	data quality objective
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons

1.0 Perimeter Area Investigation Program

1.1 Perimeter Area Description and History

The Perimeter Area is defined as the area extending from the facility fence line to the toe of the slope, outside of the fence line. The areas of the perimeter area that are topographically lower than the Topock Compressor Station (i.e., toe of the slope) could have received stormwater runoff as well as incidental spills from the compressor station in areas that are currently and/or historically unbermed. In areas where the ground slopes upward toward the fence line from the interior of the station or where the ground slopes up outside the station, deposition of chemicals through sheet flow would not have occurred. The perimeter does not include any areas that are currently defined as being part of an existing unit (i.e., Areas of Concern [AOCs] 4, 9, 10, and 11 and Solid Waste Management Unit [SWMU] 1 are all located in part or in their entirety on the slope). The Perimeter Area has not been previously investigated.

The majority of the facility is currently bermed or curbed. Figure C-1 shows the current bermed, curbed, and unbermed/curbed areas. Some of the areas that are currently bermed with soil are known to be or were likely to have been unbermed in the past. In areas that are currently or may historically have been unbermed, perimeter samples will provide information on potential recent discharges to the area outside the fence line.

Perimeter sampling locations were originally selected during a field walk with California Department of Toxic Substances (DTSC) and United States Department of the Interior (DOI) on October 18, 2007. Fifteen perimeter sampling locations were identified and proposed in the Draft Part B Work Plan (CH2M HILL 2007). The sample locations were included in AOC 13 (unpaved areas at the compressor station), and were named proposed sample locations AOC13-36 through AOC13-50. The remaining perimeter area samples have been renamed to clearly identify them as perimeter sample locations.

Two of the 15 locations identified during the field walk are within the interior of station (AOC13-39 and AOC13-40) and have been shifted from the perimeter investigation and assigned to AOC 13 (renumbered to AOC 13-33 and AOC 13-34) and one former perimeter sample (AOC13-47) was redundant with a proposed storm drain sample location (SD-3), so this perimeter sample was deleted. The remaining perimeter area samples are identified as PA1 through PA12 (see Figure C1).

The location of the former Tea Pot Dome oil pit overlaps with the Perimeter Area investigation. Proposed sample location AOC PA12 is located in the immediate vicinity of the tentatively identified location of the former Tea Pot Dome oil pit. This sample location in an area identified as having a circular area of dark soil approximately 3 to 4 feet in diameter, and is therefore the most likely potential location of the former oil pit. Investigation of the former Tea Pot Dome oil pit has been incorporated into the Perimeter Area investigation.

1.2 Summary of Past Soil Characterization

No prior sampling has been conducted specifically to evaluate the Perimeter Area. Several samples were collected at AOC 9 in the vicinity of the fence line. Samples were also collected on the slope at AOCs 4, 9, 10, and 11, and SWMU 1. As discussed above, these areas are already being investigated and are not considered part of the Perimeter Area investigation.

1.3 Perimeter Area Data Proposed Sampling

Sampling is required to collect data to use as inputs for the Part B data quality objective (DQO) Decisions 1 through 5. Table C-1 summarizes the proposed Perimeter Area sample locations, depths, description/rationale for each location (i.e., the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure C-1. The proposed Perimeter Area sample locations are Pacific Gas and Electric Company's initial assessment of candidate locations for characterization of this area. The figures are provided to facilitate planning for additional sampling that may be needed to fill quantitative data gaps, meet agency requirements, and further progress toward decision-making for soil remediation.

During the site walk with DTSC in 2007, proposed perimeter samples were selected based on the appearance of the area (e.g., dark material and red-colored soil to the east of the Cooling Tower B area) and in areas where there is current surface water runoff via sheet flow or storm drains. Perimeter samples PA-1 through PA10 and PA12 are located in areas with visible discoloration or other potential direct impacts and/or that may experience or have experienced surface water runoff through sheet flow.

Only hand sampling will be feasible for most perimeter sample locations. As agreed in response to DTSC comments on the *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California* (Soil Part B DQO Tech Memo) (CH2M HILL, 2010), soil samples will be collected from the surface to 1.0 feet below ground surface (bgs). The surface sample interval is larger than for typical surface soil samples because of the potential for erosion at the perimeter. In locations accessible by mechanical equipment (i.e., PA12 in the vicinity of the Tea Pot Dome oil pit) samples will also be collected at 2 to 3, 5 to 6, and 9 to 10 feet bgs, if feasible. All samples will be analyzed for Title 22 metals, hexavalent chromium, semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), and polychlorinated biphenyls (PCBs). Ten percent of the samples will be analyzed for the United States Environmental Protection Agency Contract Laboratory Program Target Analyte List and Target Compound List. The proposed sample locations are shown in Figure C-1.

2.0 Data Evaluation

2.1 Data Evaluation Overview

The primary purpose of the Perimeter Area investigation is to establish whether there are existing concentrations of constituents immediately outside the fence line of the facility that could serve as ongoing sources to areas outside the fence line. The data evaluation process for the Perimeter Area will determine the unit(s) to which any portions of the Perimeter Area with detected concentrations of constituents above screening level will be assigned.

2.2 Evaluation of Perimeter Area Investigation Data

The data evaluation for the Perimeter Area will follow the general process established for soil samples collected at the compressor station. Once all samples have been analyzed, the data will be validated. The validated data will first be compared to the interim screening levels previously developed for areas outside the fence line (see Soil Part B DQO Tech Memo). The following steps will be followed when assessing the Perimeter Area data:

1. Identify perimeter locations with chemicals of potential concentrations (COPCs) above Part A screening levels.
2. Incorporate downslope soil areas with COPC concentrations above Part A screening levels into the appropriate Part A AOC.
3. Incorporate soil areas with COPC concentrations above Part A screening levels located in flat areas adjacent to compressor station fence into the appropriate Part B AOC or AOC 13.

The data will be further evaluated for the need for migration control based on the concentrations and types of constituents detected, the accessibility of the affected Perimeter Area, and the specific downslope area that may receive runoff from the affected Perimeter Area. Additionally, locations from within the fence line will be evaluated to assess if detected constituents around perimeter are likely to have originated from runoff within the fence line. If the detected constituents appear to have originated within the fence line of the compressor station, the apparent source will also be evaluated to assess any necessary steps to minimize the potential for further migration.

3.0 References

CH2M HILL. 2006. *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A PG&E Topock Compressor Station*. November.

__________. 2007. *Draft RCRA Facility Investigation Soil Investigation Work Plan Part B, PG&E Topock Compressor Station, Needles, California.* November.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Tables

TABLE C-1
Proposed Sampling Plan
Perimeter Area Investigation Program
Soil RCRA Facility Investigation/Remedial Investigation Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
PA1	0-1	Northwest of Cooling Tower B/surface sample in vegetated area	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA2	0-1	West of Cooling Tower B in drainage below PA-1	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA3	0-1	West of Chromatograph Building in area of potential runoff from lower yard access road	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA4	0-1	North of sandblast shelter to assess potential impacts	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs and pH
PA5	0-1	Assess potential runoff from lower yard	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA6	0-1	Assess potential runoff from lower yard	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA7	0-1	At discharge pipe from Maintenance Shop evaporate cooler	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA8	0-1	Downslope of visitor’s parking lot	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA9	0-1	Downslope from visitor’s parking lot and in drainage below access road	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA10	0-1	Downslope from visitor’s parking lot and in drainage below access road	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA11	0-1	East of Cooling Tower B/surface sample of red-stain material, and underlying soil	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs
PA12	0-1, 3, 5, and 10	To assess offsite migration and nature and extent of impacts related to Teapot Dome former oil pit	Title 22 metals, hexavalent chromium, TPH, SVOCs, PAHs, and PCBs

Notes:

Ten percent of samples will be analyzed for Target Analyte List/Target Compound List.

Figures

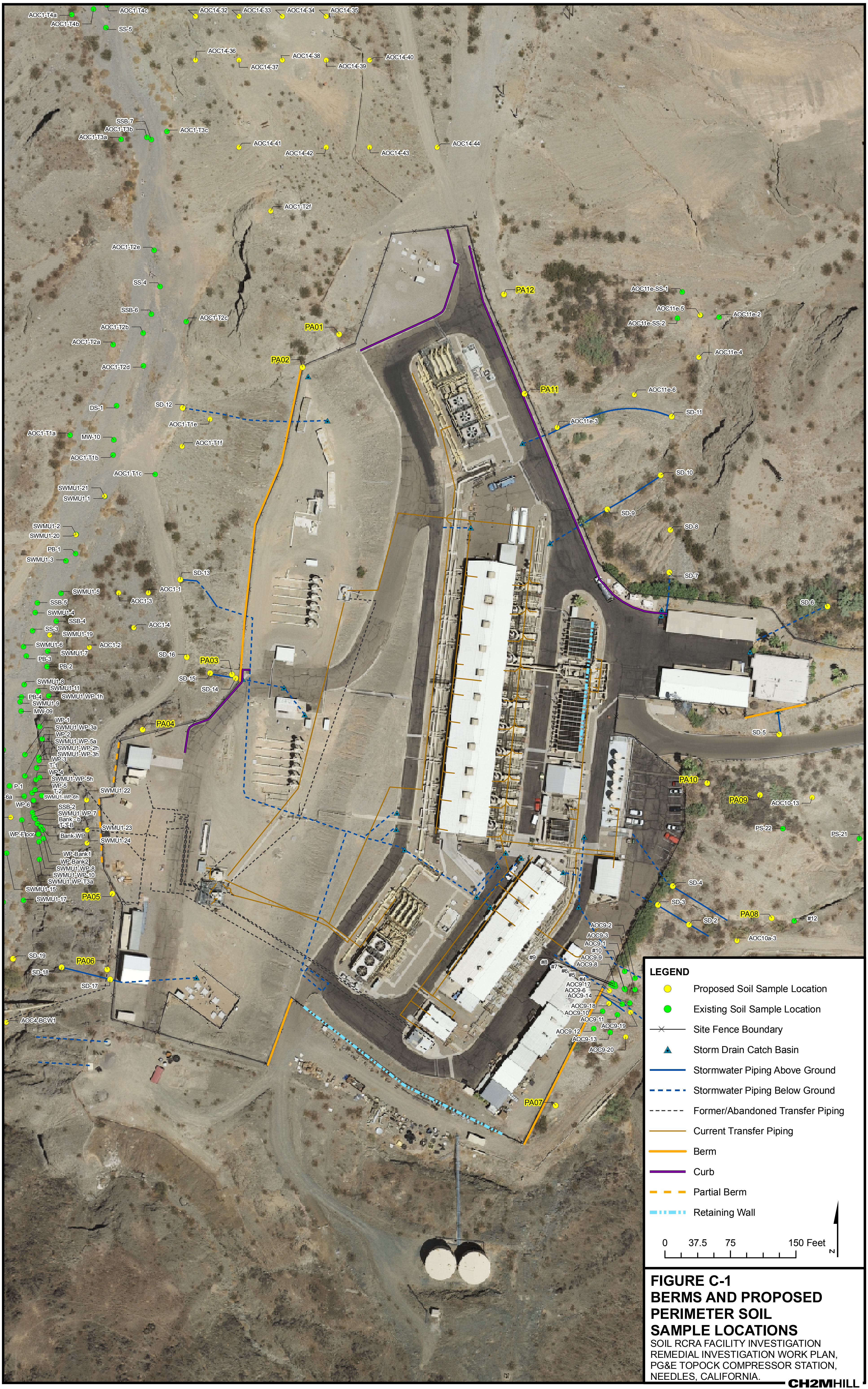

FIGURE C-1
BERMS AND PROPOSED PERIMETER SOIL SAMPLE LOCATIONS

SOIL RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION WORK PLAN,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA.

CH2MHILL

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Appendix D
Storm Drain Investigation Program

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D-1 Storm Drain System and Proposed Sample Locations

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
CCTV	closed-circuit television
COPC	chemical of potential concern
DQO	data quality objective
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
TAL	Target Analyte List
TCL	Target Compound List
TPH	total petroleum hydrocarbons

1.0 Storm Drain System Investigation Program

In addition to the hazardous waste treatment system piping (Area of Concern [AOC] 18) and industrial floor drain piping (AOC 20) described in Appendices B15 and B17, storm drain lines are present throughout the compressor station. This appendix describes the proposed investigation program for the storm drain system at the Topock Compressor Station.

1.1 Storm Drain Description and History

Storm drain lines are both potential sources and potential pathways for contaminant migration. The conceptual site model for the storm drain system includes releases of hazardous constituents into the storm drains as a result of contaminated soil carried in surface water runoff and/or liquid spills. Contaminants released to storm drains could then be released to surface soils via direct discharge at an outfall, or to the subsurface if the piping is degraded. Hazardous constituents may also be present in soil accumulated in the storm drains during station operations.

Only limited information is available regarding the locations of storm drain lines at the Topock Compressor Station. Thirteen active and inactive storm drain outfalls have been visually identified outside the fence line. Some portions of storm drain lines leading to these lines are also visible outside the fence line. Catch basins are visible within the compressor station. Written records (i.e., engineering drawings and updates to drawings) are limited. Available written information is summarized in Table D-1. Available written information was supplemented with employee interviews and on-the-ground surveys of outfalls and catch basins. Figure D-1 shows the 15 identified storm drain outfalls, as well as known and inferred storm drain alignments associated with these outfalls.

Employee interviews indicate that historically, storm drain lines were added when needed, for example when a storm drain line stopped draining and could not be unplugged. Similar to other abandoned underground utilities within the compressor station, abandoned storm drains were commonly abandoned in place rather than risk the additional dangers associated with removal (CH2M HILL, 2011a).

Some storm drain lines outside the compressor station were buried for their entire run (to the bottom of the slope); others were buried only to the edge of the top slope and are exposed for the remaining run. Exposed drain lines were repaired when they corroded; covered lines were often repaired or replaced when it became apparent that a leak had developed (this would typically be due to erosion along the line).

1.2 Summary of Past Storm Drain Characterization

No physical investigation has been conducted to specifically target the storm drains. A records review was conducted for the *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles,* *California* (CH2M HILL, 2007) and during subsequent phases of soil investigation work plan preparation. Some soil samples have been collected in the vicinity of or downslope from storm drain outfalls. The pertinent sample areas near various storm drain lines have been evaluated, and data gaps have been addressed in Appendices A and B to the main report.

1.3 Storm Drain System Data Needs

Two types of information will be generated by the storm drain investigation: information on the alignments of various storm drain lines, and soil sample information outside the fence line. Information on storm drain line alignments is required to satisfy Decision 4 of the Part B data quality objectives (DQOs) (CH2M HILL, 2011b). Because storm drains provide a potential transport pathway for constituents released within the fence line to areas outside fence lines, the potential for constituents in soil and spilled liquids to migrate to areas outside the fence line is dependent upon which catch basins discharge to the various outfalls.

In addition, to satisfy Part A and Part B DQO Decision 1, data are needed to characterize potential discharges from storm drains to soil. Finally, both types of information are required to satisfy Part A Decision 4 and Part B DQO Decision 5 (i.e., to ensure that there is sufficient information to proceed with the development of the corrective measures study/feasibility study, remedial design, and/or interim measures). The primary transport pathway associated with the storm drain system would be discharge of contaminants into the storm drains, followed by runoff from the storm drains to areas outside the fence line. Consequently, an important consideration in the storm drain alignment investigation is not only the physical location of the storm drains but the drainage pathways (i.e., assessing which storm drains discharge to specific outfalls).

No intrusive sampling is proposed alongside or underneath storm drains within the compressor station. Unless the investigation effort proposed in this appendix indicates that substantial releases of contaminants have occurred from the storm drain system, the potential risk associated with intrusive investigation along the storm drain lines within the fence line is not justified by the value of the information that would be obtained from the information. Furthermore, rainfall at the station is low and highly episodic. The episodic nature of flow events would minimize the likelihood of lateral migration along the storm drain bedding material, as it would be atypical for runoff to be present in the lines.

1.4 Storm Drain Alignment Investigation

1.4.1 Storm Drain Alignment Investigation Scope

As noted above, storm drains have been identified as potential sources as well as potential transport pathways. To assess whether a potential storm drain line may act as a transport pathway, it is valuable to understand which storm drain catch basins are currently connected to the various identified outfalls.

1.4.2 Storm Drain Alignment Investigation Process

The storm drain investigation process will consist of five steps:

1. Verification and expansion of the previous record search
2. Visual field verification of the record search results (as feasible)
3. Geophysical investigation
4. Flow testing
5. Video camera tracing(as feasible)

No intrusive investigation (i.e., uncovering of lines to trace them) will be performed to identify storm drain alignments.

The five steps will be performed in sequence so that each step benefits from the information collected during the previous steps. The output from this task will be a map showing all information collected during the alignment investigation. The map will show catch basins and visible pipes/outfalls. Connections between catch basins and outfalls will also be provided; some of the connections between outfalls and catch basins will most likely continue to be inferred. The majority of the storm drain alignment investigation will occur within the compressor station; accurately locating subsurface storm drain lines outside the compressor station is likely to be infeasible in most instances.

Because the tasks must be performed in sequence to maximize the value of the storm drain alignment investigation, the storm drain alignment investigation will span several months. Intrusive sampling (see Section 1.4.3) will be conducted after the alignment investigation has been completed, to verify that appropriate sample locations and analytical parameters have been selected. Each of the tasks is described in more detail below.

1.4.2.1 Record Search

Existing information regarding storm drain alignments is taken from available documentation pertaining to storm drains, past employee interviews, and visual observations at the station. This information consists primarily of one as-built drawing of the original system with very limited annotations regarding subsequent modifications. The most recent of the modifications on this drawing are dated 1993. It is unknown whether the many engineering drawings available at Topock contain further information on the storm drain system. While these drawings have been inventoried, it is possible that some of the drawings may contain information that is not reflected in the document title in the document inventory.

Pacific Gas and Electric Company (PG&E) will review engineering drawings on file at the Topock Compressor Station and at the Hinkley Station District Office for further information regarding modifications to the storm drain system. Any information found will be summarized in written form and will be reflected on the final storm drain system map.

1.4.2.2 Visual Field Verification

Any new information uncovered during the record search will be visually verified in the field to the degree feasible. This step will include consultation with knowledgeable employees currently employed at the station, as applicable. Items that cannot be verified visually will be further evaluated in subsequent phases of the storm drain alignment investigation, if feasible. The visual field verification may be an iterative process if additional information is located.

The current storm drain map included with this work plan shows all known catch basins. If accumulated soil material is encountered in any catch basin during the visual field verification, a sample will be collected and analyzed for Title 22 metals, hexavalent chromium, total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). If more than five samples of accumulated soil material are collected, at least one sample or 10 percent of all samples, whichever is more, will be analyzed for the full suite of Target Analyte List/Target Compound List (TAL/TCL) constituents. Should there be insufficient accumulated material to run the desired suite of chemical analyses, preferred analytical parameters will be determined based on available information regarding historical activities in the vicinity of the specific catch basin.

1.4.2.3 Geophysical Investigation

PG&E anticipates that there will still be various gaps in the information regarding the location of storm drain lines following the records review and visual verification. The next step in the storm drain alignment investigation will be a geophysical survey. The survey will attempt to trace lines between catch basins and outfall pipes for those areas where written records are incomplete. Due to the extensive presence of metallic equipment, buildings, and underground lines, there is a high likelihood of interference with geophysical methods causing uncertainty in the line tracing effort. For example, while it may be possible to trace a storm drain line for a certain distance, other lines may cross and/or join the line being traced, and it may be impossible to determine which direction the storm drain line takes at that point. In addition, tracing lines composed of a variety of pipe materials, both metallic and non-metallic, may also be necessary. Finally, as described earlier, because the historical practice at the station was to simply abandon blocked storm drain lines in place, distinguishing between active and inactive lines may not be feasible.

PG&E will attempt the geophysical survey; however, if the contractor and/or PG&E determine that the survey is yielding little or no usable information, the survey will be terminated and PG&E will proceed with the flow testing described in Section 1.4.2.4.

Currently, some of the visible storm drain outfall pipes are constructed of galvanized steel; however, subsurface portions of the storm drain lines may also be constructed of other materials. The specific materials of construction for each underground storm drain line segment are unknown. However, as a basis of comparison, available information indicates that underground piping associated with AOCs 18 and 20 may have been constructed from some of the following materials: polyethylene, polyvinyl chloride, aluminum, carbon steel, cast iron, vitrified clay, reinforced fiberglass, and acrylonitrile-butadiene-styrene. Consequently, various non-intrusive methods may be used as applicable. These include ground-penetrating radar, electromagnetic induction, and vertical magnetic gradient scans. There are likely to be some surface obstructions to the geophysical survey. The survey will avoid areas where access or other conditions (e.g., sparks) could create a hazard.

A survey grid will first be established to provide horizontal control for data acquisition. The grid size will be determined based on the size of the area being surveyed, presence of surface obstructions, and expected density of all subsurface utilities. Potential storm drain pipes will first be identified using vertical magnetic gradient and electromagnetic induction scans and may then be confirmed using ground-penetrating radar.

An attempt will be made to locate subsurface storm drain lines outside the fence line using geophysical survey methods; however, due to the topography, locating subsurface storm drain lines outside the compressor station using geophysical methods is likely to be largely infeasible. Equipment that has to be moved over the ground surface and/or bulky hand-carried equipment will not be usable on the steep slopes outside the station.

Geophysical instruments must be field tested frequently to ensure that they are operating properly. The field tests may include equipment warm-up, positioning systems accuracy, personnel test, vibration test (Cable Shake), static background and static spike, Azimuthal Test (magnetometer only), and Octant Test (Heading Error Test) (magnetometer only).

1.4.2.4 Flow Testing

The most direct method for establishing which catch basins are connected to specific outfalls is to discharge water to individual catch basins and determine where the water exits. In addition, by selecting the most "upstream" catch basin as the location to receive the test water and watching nearby catch basins, the investigation will be able to confirm that various catch basins are in fact located on the same line. In addition to verifying flow paths, the investigation will also identify drain lines that are blocked, as water will not discharge and will eventually fill up the storm drain line being tested. The amount of water to be discharged to specific catch basins will be determined based on available information regarding the size(s) of the pipeline and the length of the pipeline run to the outfall. Discharge of test water will be discontinued once the applicable outfall location has been verified.

The majority of the flow testing is expected to be performed using TCS water. It is possible, however, that it would be beneficial to conduct dye testing to enable PG&E to more completely understand the storm drain connections. Dye testing, if needed, would be performed using non-toxic dyes that are approved for discharge into sensitive aquatic environments.

Samples of discharge water will be collected from accessible outfalls, and analyzed for Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs. Prior to flow testing activities, PG&E will collect a source water sample from the water pipeline or truck providing the flow test water. The source water sample(s) will also be analyzed it for Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs to determine chemicals of potential concern (COPCs) concentrations in the source water, if any, and to allow comparison between source water and discharge water samples. If elevated concentrations of COPCs are present in the discharge water, some contamination can be presumed to be present in the storm drain line.

1.4.2.5 Video Camera Tracing

The final step in the storm drain alignment investigation will consist of confirming pipeline runs, and locating breaks, obstacles and known and unknown service connections using closed circuit television (CCTV) inspection techniques, if feasible. Each accessible segment of the storm drain lines will be viewed by panning and tilting a CCTV camera so that sags, connections, breaks, and potential accumulated soil material are clearly shown. To optimize the usefulness of the inspection, it will be conducted during dry weather only. The self-propelled camera will not be able to operate on the extremely slopes outside the fence line, so CCTV inspection is not proposed for storm drain lines on the slopes outside the compressor station.

The inspection will be completed on one storm drain pipe section at a time (i.e., catch basin to catch basin). The camera will travel through the line in either direction at a slow and uniform rate, stopping when necessary to ensure proper documentation of the storm drain pipe condition. The maximum speed of camera travel will be no greater than 30 feet per minute. It is likely that the CCTV camera will encounter obstructions that will interfere with the completion of the CCTV log. If obstructions are encountered, the survey crew will relocate to a catch basin downstream and attempt to survey the storm drain pipe from the opposite direction.

The location of defects, sags with or without soil accumulation, laterals, and physical location of the storm drain pipe will be marked above ground with a meter device capable of communicating with and locating the camera. If the video survey of the line shows no defects and no accumulation of soil material within a specific pipe segment, no additional evaluation will be required during the current investigation. Information on identified defects will be retained by PG&E to assist with future maintenance and engineering activities as well as remediation to be conducted following closure of the compressor station.

PG&E will attempt the video surveys; however, if the contractor and/or PG&E determine that the survey is yielding little or no usable information, the survey will be terminated and PG&E will proceed with producing the storm drain alignment maps based on available data.

Field observations may be recorded in up to three formats, as outlined below. A comprehensive summary of the relevant inspection results will be included with the investigation report.

Television Inspection Logs: Each segment inspection will have a separate inspection report, describing the direction of view, direction of flow relative to direction of view, pipe section length, pipe size, pipe material, lateral connections and a detailed logging of defects encountered. The inspection report will clearly show the location of defects, in relation to adjacent catch basins. In addition, other data of significance including joints, unusual condition, cracked or collapsed sections, presence of scale and corrosion, presence of accumulate soil material, and any pipe sections that the camera failed to pass through and reasons for failure will be included in the report.

Photographs: During the CCTV inspection, the camera will stop at all significant observations to provide a clear and focused view of the pipe condition.

DVD Recordings: The DVD recordings will supply a visual and audio record of the problem areas of the storm drain pipes in color.

1.4.2.6 Storm Drain Alignment Map

The information collected from the five steps described above will be used to compile a comprehensive map showing the known storm drain system on the compressor station and the locations of known outfalls. Abandoned storm drain alignments will be shown to the degree they can be identified from the records search. PG&E anticipates that the precise configuration of some storm drain lines cannot be determined (e.g., lines that are blocked and cannot be traced using geophysical methods); however, the discharge point(s) for each catch basin should be able to be identified using the flow test. Knowing the discharge location of each storm drain is adequate to determine whether the line poses a potential pathway for off-site migration. If uncertainties remain with regard to the precise alignment of any storm drains, the uncertainties will be captured in the storm drain investigation summary. Intrusive investigation of the storm drain system (i.e., uncovering of lines) will not be conducted.

1.4.3 Storm Drain Soil Investigation

Soil sampling along storm drains will be limited to areas outside the fence line. Samples will be collected at the storm drain outfalls and along visible storm drain lines. Sample locations shown on Figure D-1 are approximate and will be verified in the field, depending on the results of the storm drain alignment investigation.

Sampling below each storm drain outfall will consist of one sample location immediately below (downslope of) the outfall and lateral/downslope samples. The lateral/downslope sample locations are designed to evaluate soil conditions in the expected flow path from the storm drain to the bottom of the slope. Where pipes have broken off due to degradation, a sample will be collected at the end of the existing pipe, and an effort will be made to evaluate where the outfall may have been located historically, and a sample will be collected in that area. Lateral/downslope samples will be collected between the outfall and the bottom of the slope or the closest downslope sample locations (i.e., there are existing soil sample data downslope of storm drain locations in AOCs 1, 10, and 11). In some areas, adequate lateral/downslope samples may already have been collected during the Part A Phase 1 investigation; these areas will not be resampled. Samples will be collected at 0.0 to 0.5 foot below ground surface (bgs) unless it is apparent that erosion has occurred in the vicinity of the outfall, in which case a sample will be collected from 0.0 to 1 foot bgs to capture a larger potential interval of affected soil. Where feasible, based on the subsurface conditions and topography at the outfall (and downslope location, if applicable) samples will also be collected at 2 to 3, 5 to 6, and 9 to 10 feet bgs.

In addition to samples collected at and downslope of the outfalls, samples will be collected along the alignment of each visible storm drain line outside the fence line, where feasible. Samples will be collected at 0.0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs, if possible. If pipeline bedding material is encountered that is obviously different from the surrounding native soil, the bedding material will be sampled as well. Samples will be collected at the edge of the slope (i.e., where the line bends), and every 50 feet, or at obvious breaks or other bends in the pipeline, if any bends or breaks were identified during the storm drain alignment investigation. The visible portion of the storm drain line at Outfalls 5, 6, 10, and 11 is less than 25 feet; therefore, no samples will be collected along the storm drain line in this area (a sample will be collected at the edge of the slope). Samples along the storm drain lines will be collected from alternating sides of the pipe. All sample locations will be recorded using a global positioning system.

Sampling within the fence line will be limited to any accumulated material encountered in catch basins. No intrusive sampling will be conducted.

All soil samples will be analyzed for Title 22 metals, hexavalent chromium, PAHs, TPH, and PCBs. Ten percent of all samples collected along the storm drains and below the storm drain outfalls will be analyzed for the full suite of TAL/TCL constituents. Samples of accumulated soil material collected from catch basins within the compressor station will be analyzed as described in Section 1.4.2.2 of this appendix. The proposed sample locations are shown on Figure D-1, and the sample ID, rationale, analytical suite, and sampling method are shown in Table D-2 and Appendix F of this work plan.

Sampling, sample analysis, data validation, and data management will follow standard operating procedures for this work plan, and investigation-derived waste associated with the storm drain soil sampling program will be managed in the same manner as for all other soil sampling efforts to be conducted pursuant to this work plan. The data evaluation process is described in Section 2.0.

2.0 Sample Data Evaluation

The sample data evaluation process for the storm drain lines will follow the general process established for soil samples collected at the compressor station. Once all samples have been analyzed, the data will be validated. The validated data will be compared to the interim screening levels previously developed for areas outside the fence line (see Appendix A of this work plan). The three types of data that may be collected include data at and below the outfalls (including lateral/downslope samples), data along the storm drain lines outside the compressor station, and data for accumulated soil material (if any accumulated material is encountered in the catch basins).

2.1 Samples at Outfalls and Associated Lateral/Downslope Samples

If chemical constituents above interim screening levels are detected in samples from the outfalls and/or associated lateral/downslope samples, the sample data will be combined with the data from the closest downslope AOC (i.e., the AOC that would have received the discharge from the outfall). As shown in Figure D-1, Storm Drain Outfall 9, for example, is located above AOC 11.

The potential sources for constituents to the outfall will be assessed by determining the types of activities that have occurred in the vicinity of the catch basins associated with the specific storm drain line.

2.2 Samples along Visible Storm Drain Lines

Detected chemicals along storm drain lines outside the compressor station could be due either to releases from the storm drain line or from surface water flow from the compressor station. Data for samples with constituents above interim screening levels will be compared to the closest available outfall and perimeter sample data, to evaluate whether there is an apparent source for the constituents present above interim screening levels. The sample data will be then be combined with the appropriate data set (AOC receiving the storm drain runoff or perimeter samples).

2.3 Accumulated Soil Material Samples

If accumulated material is encountered in any storm drain catch basins, and any of these samples contains constituents above interim screening levels, the data will be compared with data from the outfall associated with that catch basin. Depending on the concentrations of chemicals in the outfall area (i.e., if the chemical concentrations in accumulated soil material are greater than the Part A interim screening levels), it may be necessary to remove accumulated soil material from the storm drain line in question.

3.0 References

CH2M HILL. 2006. *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A PG&E Topock Compressor Station,* November.

__________. 2007. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*. August 10.

__________. 2011a. Email from Curt Russel to Susanne von Rosenberg/Jamie Eby. " Re: Storm drain/utility abandonment (typical)". March 28.

__________. 2011b. *RCRA Facility Investigation/Remedial Investigation Soil Investigation Draft Work Plan Part B PG&E Topock Compressor Station.* May.

Tables

TABLE D-1
Available Written Records of Compressor Station Floor Drain,
AOC 18 Combined Waste Water Transference Pipelines
RCRA Facility Investigation/Remedial Investigation, Soil Investigation Part B Investigation Program,
PG&E Topock Compressor Station, Needles, California

Author	Drawing No.	Date	Notes
Bechtel	181317	04/23/1951	Detail of Floor Drains Compressor Building
Bechtel	481785	08/18/1888 (Revisions 03/29/1991, 02/14/1992 & 09/17/1993)	Sewers and Drains Topock Compressor Station
TA Engineering Co. Inc.	387706	01/05/1987 (Revisions 06/16/1988; & 03/29/1991)	Elementary-Mechanical Drain & Sewer Systems Topock Compressor Station Gas Operations

TABLE D-2
Proposed Sampling Plan, Storm Drain Investigation Program
RCRA Facility Investigation/Remedial Investigation, Soil Investigation Part B Investigation Program,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes
SD-1	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-2	0-0.5, 3, 5, and 10	To assess soil along degraded storm drain	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-3	0-0.5, 3, 5, and 10	To assess soil along degraded storm drain	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-4	0-0.5, 3, 5, and 10	To assess soil along degraded storm drain	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs and pH
SD-5	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-6	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-7	0-0.5, 3, 5, and 10	To assess soil along storm drain	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-8	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-9	0-0.5, 3, 5, and 10	To assess soil along storm drain	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-10	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-11	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-12	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-13	0-0.5*, 3, 5, and 10	To assess storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-14	0-0.5, 3, 5, and 10	To assess along storm drain	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-15	0-0.5, 3, 5, and 10	To assess soil storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-16	0-0.5*, 3, 5, and 10	To assess lateral/drownslope of storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-17	0-0.5, 3, 5, and 10	To assess along storm drain	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-18	0-0.5, 3, 5, and 10	To assess soil storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs
SD-19	0-0.5, 3, 5, and 10	To assess lateral/drownslope of storm drain outfall	Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs

Notes:

* Samples will be collected at 0 to 0.5 feet bgs unless it is apparent that erosion has occurred in the vicinity of the outfall, in which case, a sample will be collected from 0 to 1 foot bgs.

Ten percent of samples will be analyzed for TAL/TCL.

VOC analysis will not be conducted on surface soil samples (0 to 0.5 feet bgs).

Figure

LEGEND

- ● Proposed Soil Sample Location
- ● Existing Soil Sample Location
- —×— Site Fence Boundary
- ▲ Storm Drain Catch Basin
- —— Stormwater Piping Above Ground
- - - - Stormwater Piping Below Ground
- - - - Former/Abandoned Transfer Piping
- —— Current Transfer Piping

0 35 70 140 Feet

N

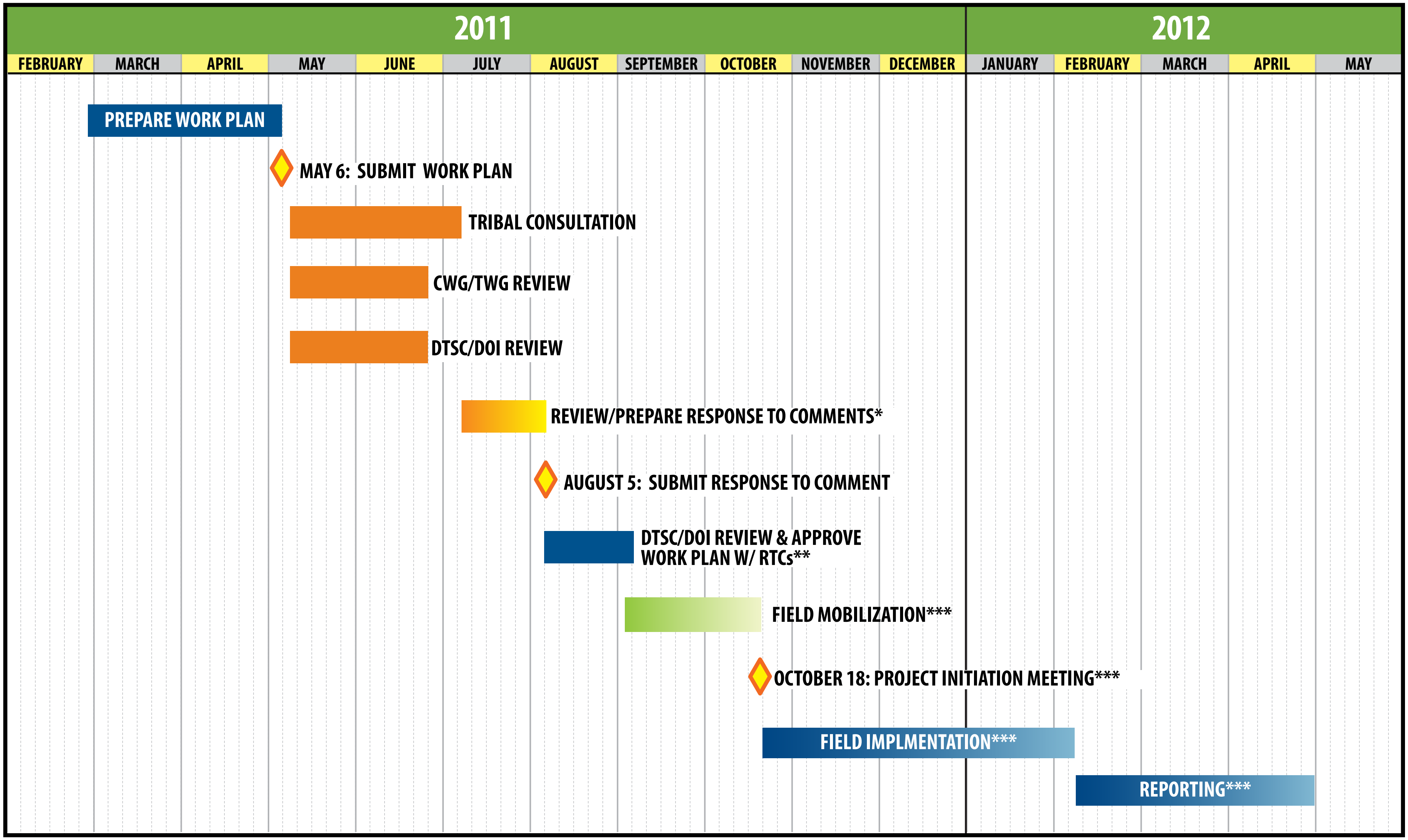
FIGURE D-1
PROPOSED STORM DRAIN SOIL SAMPLE LOCATIONS

SOIL RCRA FACILITY INVESTIGATION
REMEDIAL INVESTIGATION WORK PLAN,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA.

CH2MHILL

D:\Projects\Topock\MapFiles\2011\SWP_B\Storm_Proposed_sample_Locs

Appendix E
Preliminary Implementation Schedule for Complete Soil Work Plan



* Duration is estimated and will be refined after receipt of comments.

** Assume a revision of the Work Plan is not needed. If needed, additional time will be required to revise and resubmit for review and approval.

*** The timing and duration of the Field Implementation is estimated and will be refined following DTSC/DOI approval of the work plan.

FIGURE E1
Preliminary Implementation Schedule
Soil RCRA Facility Investigation/Remedial Investigation Work Plan
PG&E Topock Compressor Station
Needles, California

ES032009004BAO_Fig_E1_PreImplementation_Timeline.ai_042711_lho

Appendix F
Summary of Proposed Sampling Program (Planned Sample Table)

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

Perimeter Area Sampling

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	7	14	14	14	7	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	PH (9045)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TAL/TCL Analytical Suite (1)
PA-1	1		N	X	X		X	X	X	X	
PA-2	1		N	X	X		X	X	X	X	
PA-3	1		N	X	X		X	X	X	X	
PA-4	1		N	X	X	X	X	X	X	X	
PA-5	1		N	X	X		X	X	X	X	
PA-6	1		N	X	X		X	X	X	X	
PA-7	1		N	X	X		X	X	X	X	
PA-8	1		N	X	X		X	X	X	X	
PA-8	1		FD	X	X		X	X	X	X	
PA-9	1		N	X	X		X	X	X	X	
PA-10	1		N	X	X		X	X	X	X	
PA-11	1		N	X	X		X	X	X	X	X
PA-12	1		N	X	X		X	X	X	X	
PA-12	3		N	X	X		X	X	X	X	
PA-12	5		N	X	X		X	X	X	X	
PA-12	10		N	X	X		X	X	X	X	

NOTES:

NA	not applicable
TBD	to be determined

[1] These surface samples (0 to 0.5 feet) will be analyzed for the full inorganic and organic suites per Contract Laboratory Program Target Analyte List/Target Compound List (TAL/TCL), except VOCs and TPH-purgeables. Volatile organic compound and TPH-purgable analysis will only be performed on the 3 foot sample.

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC 1																			
AOC1-1	0	1	N	X				X		X				X	X				
AOC1-1	2	1	N	X				X		X				X	X				
AOC1-1	5	1	N	X				X		X					X				
AOC1-1	9	1	N	X				X		X					X				
AOC1-1	14	1	N	X				X		X					X				
AOC1-1	14	1	FD	X				X		X					X				
AOC1-1	20	1	N	X				X		X					X				
AOC1-1	30	1	N	X				X		X					X				
AOC1-2	0	1	N	X	X		X							X					
AOC1-2	2	1	N	X	X		X							X					
AOC1-2	5	1	N	X	X		X												
AOC1-2	9	1	N	X	X		X												
AOC1-2	14	1	N	X	X		X												
AOC1-2	20	1	N	X	X		X												
AOC1-2	20	1	FD	X	X		X												

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-2	30	1	N	X	X		X												
AOC1-3	0	1	N	X				X		X				X	X				
AOC1-3	60	1	N	X				X		X					X				
AOC1-3	70	1	N	X				X		X					X				
AOC1-3	80	1	N	X				X		X					X				
AOC1-3	2	1	N	X				X		X				X	X				
AOC1-3	5	1	N	X				X		X					X				
AOC1-3	9	1	N	X				X		X					X				
AOC1-3	14	1	N	X				X		X					X				
AOC1-3	14	1	FD	X				X		X					X				
AOC1-3	20	1	N	X				X		X					X				
AOC1-3	30	1	N	X				X		X					X				
AOC1-3	40	1	N	X				X		X					X				
AOC1-3	50	1	N	X				X		X					X				
AOC1-4	0	1	N	X				X		X				X	X				
AOC1-4	2	1	N	X				X		X				X	X				

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-4	5	1	N	X				X		X					X				
AOC1-4	9	1	N	X				X		X					X				
AOC1-4	14	1	N	X				X		X					X				
AOC1-4	20	1	N	X				X		X					X				
AOC1-4	20	1	FD	X				X		X					X				
AOC1-4	30	1	N	X				X		X					X				
AOC1-BCW7	0	1	N	X										X					
AOC1-BCW7	2	1	N	X										X					
AOC1-BCW7	2	1	FD	X										X					
AOC1-BCW7	2	1	N	X															
AOC1-BCW7	9	1	N	X															
AOC1-BCW7	14	1	N	X															
AOC1-BCW7	20	1	N	X															
AOC1-BCW7	20	1	FD	X															
AOC1-BCW8	0	1	N	X				X						X					
AOC1-BCW8	2	1	N	X				X						X					

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC1-BCW8	5	1	N	X				X											
AOC1-BCW8	9	1	N	X				X											
AOC1-BCW8	9	1	FD	X				X											
AOC1-BCW9	0	1	N	X				X						X					
AOC1-BCW9	2	1	N	X				X						X					
AOC1-BCW9	5	1	N	X				X											
AOC1-BCW9	9	1	N	X				X											
AOC1-BCW10	0	1	N	X				X						X					
AOC1-BCW10	2	1	N	X				X						X					
AOC1-BCW10	5	1	N	X				X											
AOC1-BCW10	9	1	N	X				X											
AOC1-BCW10	9	1	FD	X				X											
AOC1-BCW11	0	1	N	X				X						X					
AOC1-BCW11	2	1	N	X				X						X					
AOC1-BCW11	5	1	N	X				X											
AOC1-BCW11	9	1	N	X				X											

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-BCW12	0	1	N	X				X						X					
AOC1-BCW12	2	1	N	X				X						X					
AOC1-BCW12	5	1	N	X				X											
AOC1-BCW12	9	1	N	X				X											
AOC1-BCW13	0	1	N	X				X						X					
AOC1-BCW13	2	1	N	X				X						X					
AOC1-BCW13	5	1	N	X				X											
AOC1-BCW13	9	1	N	X				X											
AOC1-BCW14	0	1	N	X				X						X					
AOC1-BCW14	2	1	N	X				X						X					
AOC1-BCW14	5	1	N	X				X											
AOC1-BCW14	9	1	N	X				X											
AOC1-BCW15	0	1	N	X				X						X					
AOC1-BCW15	2	1	N	X				X						X					
AOC1-BCW15	5	1	N	X				X											
AOC1-BCW15	9	1	N	X				X											

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-BCW16	0	1	N	X				X						X					
AOC1-BCW16	2	1	N	X				X						X					
AOC1-BCW16	5	1	N	X				X											
AOC1-BCW16	9	1	N	X				X											
AOC1-BCW17	0	1	N	X				X						X					
AOC1-BCW17	2	1	N	X				X						X					
AOC1-BCW17	5	1	N	X				X											
AOC1-BCW17	9	1	N	X				X											
AOC1-BCW18	0	1	N	X				X						X					
AOC1-BCW18	2	1	N	X				X						X					
AOC1-BCW18	5	1	N	X				X											
AOC1-BCW18	9	1	N	X				X											
AOC1-BCW19	0	1	N	X				X						X					
AOC1-BCW19	2	1	N	X				X						X					
AOC1-BCW19	5	1	N	X				X											
AOC1-BCW19	9	1	N	X				X											

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

			Aqueous Sample Container	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
			Aqueous Preservatives	4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
			Filtered	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Lab	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
			Analysis Holding Time	14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-BCW20	0	1	N	X				X						X					
AOC1-BCW20	2	1	N	X				X						X					
AOC1-BCW20	5	1	N	X				X											
AOC1-BCW20	9	1	N	X				X											
AOC1-BCW21	0	1	N	X				X						X					
AOC1-BCW21	2	1	N	X				X						X					
AOC1-BCW21	5	1	N	X				X											
AOC1-BCW21	9	1	N	X				X											
AOC1-BCW22	0	1	N	X				X						X					
AOC1-BCW22	2	1	N	X				X						X					
AOC1-BCW22	5	1	N	X				X											
AOC1-BCW22	9	1	N	X				X											
AOC1-BCW23	0	1	N	X				X						X					
AOC1-BCW23	2	1	N	X				X						X					
AOC1-BCW23	5	1	N	X				X											
AOC1-BCW23	9	1	N	X				X											

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-BCW24	0	1	N	X				X						X					
AOC1-BCW24	2	1	N	X				X						X					
AOC1-BCW24	5	1	N	X				X											
AOC1-BCW24	9	1	N	X				X											
AOC1-BCW25	0	1	N	X										X					
AOC1-BCW25	2	1	N	X										X					
AOC1-BCW25	5	1	N	X															
AOC1-BCW25	9	1	N	X															
AOC1-BCW26	0	1	N	X				X						X					
AOC1-BCW26	2	1	N	X				X						X					
AOC1-BCW26	5	1	N	X				X											
AOC1-BCW26	9	1	N	X				X											
AOC1-BCW27	0	1	N	X				X						X					
AOC1-BCW27	2	1	N	X				X						X					
AOC1-BCW27	5	1	N	X				X											
AOC1-BCW27	9	1	N	X				X											

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-BCW28	0	1	N	X				X						X					
AOC1-BCW28	2	1	N	X				X						X					
AOC1-BCW28	5	1	N	X				X											
AOC1-BCW28	9	1	N	X				X											
AOC1-BCW29	0	1	N	X				X						X					
AOC1-BCW29	2	1	N	X				X						X					
AOC1-BCW29	5	1	N	X				X											
AOC1-BCW29	5	1	N	X				X											
AOC1-BCW30	0	1	N	X				X						X					
AOC1-BCW30	2	1	N	X				X						X					
AOC1-BCW30	5	1	N	X				X											
AOC1-BCW30	9	1	N	X				X											
AOC1-T1e	0	1	N	X				X		X				X	X				
AOC1-T1e	2	1	N	X				X		X				X	X				
AOC1-T1e	5	1	N	X				X		X					X				
AOC1-T1e	9	1	N	X				X		X					X				

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H_2O, - 7ºC	H_2O, - 7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-T1e	9	1	FD	X				X		X					X				
AOC1-T1e	14	1	N	X				X		X					X				
AOC1-T1f	0	1	N	X				X		X				X	X				
AOC1-T1f	2	1	N	X				X		X				X	X				
AOC1-T1f	5	1	N	X				X		X					X				
AOC1-T1f	9	1	N	X				X		X					X				
AOC1-T1f	14	1	N	X				X		X					X				
AOC1-T1f	14	1	FD	X				X		X					X				
AOC1-T2f	0	1	N	X				X		X				X					
AOC1-T2f	2	1	N	X				X		X				X					
AOC1-T2f	2	1	FD	X				X		X				X					
AOC1-T5D	0	1	N	X				X						X	X				
AOC1-T5D	2	1	N	X				X						X	X				
AOC1-T5D	2	1	FD	X				X						X	X				
AOC1-T5D	5	1	N	X				X							X				
AOC1-T5D	9	1	N	X				X							X				

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4°C	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC1-T5D	14	1	N	X				X							X				
AOC1-T5D	20	1	N	X				X							X				
AOC1-T5D	20	1	FD	X				X							X				
AOC1-T6D	0	1	N	X				X						X	X				
AOC1-T6D	2	1	N	X				X						X	X				
AOC1-T6D	5	1	N	X				X							X				
AOC1-T6D	9	1	N	X				X							X				
AOC1-T6D	9	1	FD	X				X							X				
AOC1-T6D	14	1	N	X				X							X				
AOC1-T6D	14	1	FD	X				X							X				
AOC1-T6D	20	1	N	X				X							X				

AOC 4

AOC4-17	2	1	N					X			X			X					
AOC4-17	5	1	N					X			X			X					
AOC4-17	9	1	N					X			X			X					
AOC4-18	2	1	N					X			X			X					

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC4-18	5	1	N					X			X			X					
AOC4-18	9	1	N					X			X			X					
AOC4-19	0	1	N					X			X			X	X				
AOC4-19	2	1	N					X			X			X	X				
AOC4-20	0	1	N					X			X			X	X				
AOC4-20	2	1	N					X			X			X	X				
AOC4-21	0	1	N					X			X			X	X				
AOC4-21	2	1	N					X			X			X	X				
AOC4-22	0	1	N					X			X			X	X				
AOC4-22	2	1	N					X			X			X	X				
AOC4-23	0	1	N					X			X			X	X				
AOC4-23	2	1	N					X			X			X	X				
AOC4-24	0	1	N					X			X			X	X				
AOC4-24	2	1	N					X			X			X	X				
AOC4-25	0	1	N					X			X			X	X				
AOC4-25	2	1	N					X			X			X	X				

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4°C	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC4-26	0	1	N					X			X			X	X				
AOC4-26	2	1	N					X			X			X	X				
AOC4-27	0	1	N					X			X			X	X				
AOC4-27	2	1	N					X			X			X	X				
AOC4-28	0	1	N					X			X			X	X				
AOC4-28	2	1	N					X			X			X	X				
AOC4-BCW1	0	1	N					X			X			X					
AOC4-BCW1	2	1	N					X			X			X					
AOC4-BCW1	5	1	N					X			X			X					
AOC4-BCW1	9	1	N					X			X			X					
AOC4-BCW2	0	1	N	X				X			X			X					
AOC4-BCW2	2	1	N	X				X			X			X					
AOC4-BCW2	5	1	N	X				X			X			X					
AOC4-BCW2	9	1	N	X				X			X			X					
AOC4-BCW2	9	1	FD	X				X			X			X					
AOC4-BCW3	0	1	N	X				X			X			X					

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC4-BCW3	0	1	FD	X				X			X			X					
AOC4-BCW3	2	1	N	X				X			X			X					
AOC4-BCW3	5	1	N	X				X			X			X					
AOC4-BCW3	9	1	N	X				X			X			X					
AOC4-BCW4	0	1	N	X				X			X			X					
AOC4-BCW4	2	1	N	X				X			X			X					
AOC4-BCW4	5	1	N	X				X			X			X					
AOC4-BCW4	9	1	N	X				X			X			X					
AOC4-BCW5	0	1	N	X				X			X			X					X
AOC4-BCW5	0	1	FD	X				X			X			X					X
AOC4-BCW5	2	1	N	X				X			X			X					
AOC4-BCW5	5	1	N	X				X			X			X					
AOC4-BCW5	9	1	N	X				X			X			X					
AOC4-BCW6	0	1	N	X				X			X			X					
AOC4-BCW6	2	1	N	X				X			X			X					
AOC4-BCW6	5	1	N	X				X			X			X					

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4°C	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC4-BCW6	9	1	N	X				X			X			X					
AOC 9																			
AOC9-15	0	1	N	X				X					X	X	X				
AOC9-15	2	1	N	X				X					X	X	X				
AOC9-15	5	1	N	X				X					X	X	X				
AOC9-15	5	1	FD	X				X					X	X	X				
AOC9-15	9	1	N	X				X					X	X	X				
AOC9-16	0	1	N	X				X					X	X	X				
AOC9-16	2	1	N	X				X					X	X	X				
AOC9-16	5	1	N	X				X					X	X	X				
AOC9-16	9	1	N	X				X					X	X	X				
AOC9-17	9	1	N	X															
AOC9-17	14	1	N	X															
AOC9-18	5	1	N	X				X							X				
AOC9-18	9	1	N	X				X							X				
AOC9-18	14	1	N	X				X							X				

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC9-19	0	1	N					X					X	X	X				
AOC9-19	2	1	N					X					X	X	X				
AOC9-19	5	1	N					X					X	X	X				
AOC9-19	9	1	N					X					X	X	X				
AOC9-20	0	1	N			X							X	X	X				
AOC9-20	2	1	N			X							X	X	X				
AOC9-20	2	1	FD			X							X	X	X				
AOC9-20	5	1	N			X							X	X	X				
AOC9-20	9	1	N			X							X	X	X				

AOC 10

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC10-16	0	1	N							X									
AOC10-16	2	1	N							X									
AOC10-16	5	1	N	X				X		X					X				
AOC10-16	9	1	N	X				X		X					X				
AOC10-9	0	1	N	X				X							X				
AOC10-9	2	1	N	X				X							X				

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

				Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type																
AOC10-9	5	1	N	X				X							X				
AOC10-9	9	1	N	X				X							X				
AOC10-10	0	1	N	X				X											
AOC10-10	2	1	N	X				X											
AOC10-10	5	1	N	X				X											
AOC10-10	9	1	N	X				X											
AOC10-10	9	1	FD	X				X											
AOC10-11	0	1	N	X				X		X	X	X		X	X	X			
AOC10-11	0	1	FD	X				X		X	X	X		X	X	X			
AOC10-11	2	1	N	X				X		X	X	X		X	X	X			
AOC10-11	5	1	N	X				X		X	X	X		X	X	X			
AOC10-11	9	1	N	X				X		X	X	X		X	X	X			
AOC10-12	0	1	N	X				X							X				
AOC10-12	2	1	N	X				X							X				
AOC10-12	5	1	N	X				X							X				
AOC10-12	9	1	N	X				X							X				

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC10-13	0	1	N	X				X		X					X				
AOC10-13	0	1	FD	X				X		X					X				
AOC10-14	0	1	N	X				X		X					X				
AOC10-17	0	1	N	X				X		X					X				
AOC10-16	0	1	N	X				X							X				
AOC10-16	2	1	N	X				X							X				
AOC10-15	0	1	N	X				X		X	X	X		X	X	X			
AOC10-15	0	1	FD	X				X		X	X	X		X	X	X			
AOC10-15	2	1	N	X				X		X	X	X		X	X	X			
AOC10-15	5	1	N	X				X		X	X	X		X	X	X			
AOC10-15	9	1	N	X				X		X	X	X		X	X	X			
AOC10a-2	0	1	N	X				X							X				
AOC10a-2	2	1	N	X				X							X				
AOC10a-2	5	1	N	X				X							X				
AOC10a-2	9	1	N	X				X							X				
AOC10a-3	0	1	N	X				X							X				

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC10a-3	2	1	N	X				X							X				
AOC10a-3	5	1	N	X				X							X				
AOC10a-3	9	1	N	X				X							X				
AOC10d-9	0	1	N	X				X							X				
AOC10d-9	2	1	N	X				X							X				
AOC10d-9	5	1	N	X				X							X				
AOC10d-9	9	1	N	X				X							X				

AOC 11

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC11c-3	14	1	N	X				X						X					
AOC11c-3	19	1	N	X				X						X					
AOC11c-3	29	1	N	X				X						X					
AOC11c-3	39	1	N	X				X						X					
AOC11c-3	49	1	N	X				X						X					
AOC11c-3	59	1	N	X				X						X					
AOC11c-3	69	1	N	X				X						X					
AOC11e-5	14	1	N	X				X						X	X				

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC11e-5	19	1	N	X				X						X	X				
AOC11e-5	29	1	N	X				X						X	X				
AOC11e-5	39	1	N	X				X						X	X				
AOC11e-5	49	1	N	X				X						X	X				
AOC11e-5	59	1	N	X				X						X	X				
AOC11e-5	69	1	N	X				X						X	X				
AOC11-1	0	1	N	X				X		X		X			X	X			
AOC11-1	0	1	FD	X				X		X		X			X	X			
AOC11-1	2	1	N	X				X		X		X			X	X			
AOC11-1	5	1	N	X				X		X		X			X	X			
AOC11-1	9	1	N	X				X		X		X			X	X			
AOC11-2	0	1	N	X				X		X	X	X			X	X			
AOC11-2	2	1	N	X				X		X	X	X			X	X			
AOC11-2	5	1	N	X				X		X	X	X			X	X			
AOC11-2	9	1	N	X				X		X	X	X			X	X			
AOC11-2	9	1	FD	X				X		X	X	X			X	X			

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC11-3	0	1	N	X				X		X	X	X			X	X			
AOC11-3	2	1	N	X				X		X	X	X			X	X			
AOC11-3	5	1	N	X				X		X	X	X			X	X			
AOC11-3	9	1	N	X				X		X	X	X			X	X			
AOC11-3	9	1	FD	X				X		X	X	X			X	X			
AOC11-4	0	1	N	X				X		X	X	X			X	X			
AOC11-4	2	1	N	X				X		X	X	X			X	X			
AOC11-4	5	1	N	X				X		X	X	X			X	X			
AOC11-4	9	1	N	X				X		X	X	X			X	X			
AOC11-5	0	1	N	X				X		X	X	X			X	X			
AOC11-5	2	1	N	X				X		X	X	X			X	X			
AOC11-5	5	1	N	X				X		X	X	X			X	X			
AOC11-5	9	1	N	X				X		X	X	X			X	X			
AOC11-6	0	1	N	X				X		X		X			X	X			
AOC11-6	2	1	N	X				X		X		X			X	X			
AOC11-6	5	1	N	X				X		X		X			X	X			

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, - 7ºC	H2O, - 7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC11-6	9	1	N	X				X		X		X			X	X			
AOC11-7	0	1	N	X				X		X		X			X	X			
AOC11-7	2	1	N	X				X		X		X			X	X			
AOC11-7	5	1	N	X				X		X		X			X	X			
AOC11-7	9	1	N	X				X		X		X			X	X			
AOC11-8	0	1	N	X				X		X		X			X	X			
AOC11-8	2	1	N	X				X		X		X			X	X			
AOC11-8	5	1	N	X				X		X		X			X	X			
AOC11-8	9	1	N	X				X		X		X			X	X			
AOC11-9	0	1	N	X				X		X		X			X	X			
AOC11-9	2	1	N	X				X		X		X			X	X			
AOC11-9	5	1	N	X				X		X		X			X	X			
AOC11-9	9	1	N	X				X		X		X			X	X			
AOC11c-3	0	1	N	X				X						X					
AOC11c-4	0	1	N	X				X						X	X				
AOC11c-4	2	1	N	X				X						X	X				

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC11c-4	5	1	N	X				X						X	X				
AOC11c-4	9	1	N	X				X						X	X				
AOC11c-4	9	1	FD	X				X						X	X				
AOC11c-4	14	1	N	X				X						X	X				
AOC11c-4	19	1	N	X				X						X	X				
AOC11e-3	0	1	N	X				X						X	X				
AOC11e-3	0	1	FD	X				X						X	X				
AOC11e-3	2	1	N	X				X						X	X				
AOC11e-3	5	1	N	X				X						X	X				
AOC11e-3	9	1	N	X				X						X	X				
AOC11e-3	14	1	N	X				X						X	X				
AOC11e-4	0	1	N	X				X						X	X				
AOC11e-4	2	1	N	X				X						X	X				
AOC11e-4	5	1	N	X				X						X	X				
AOC11e-4	9	1	N	X				X						X	X				
AOC11e-4		1	FD	X				X						X	X				

PM Signature: ______________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC11e-4	14	1	N	X				X						X	X				
AOC11e-5	0	1	N	X				X						X	X				
AOC11e-6	0	1	N	X				X	X	X									
AOC 14																			
AOC14-18	0	1	N	X				X			X			X	X	X			
AOC14-19	0	1	N	X				X			X			X	X	X			
AOC14-20	0	1	N	X				X			X			X	X	X			
AOC14-21	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-22	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-23	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-24	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-25	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-26	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-26	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-26	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-26	9	1	N	X				X		X		X	X	X	X	X		X	

PM Signature: ____________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC14-26	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-27	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-27	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-27	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-27	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-27	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-28	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-28	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-28	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-28	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-28	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-29	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-29	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-29	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-29	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-29	14	1	N	X				X		X		X	X	X	X	X		X	

PM Signature: ______________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC14-30	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-30	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-30	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-30	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-30	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-31	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-31	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-31	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-31	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-31	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-32	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-32	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-32	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-32	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-32	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-33	0	1	N	X				X		X		X	X	X	X	X		X	

PM Signature: ____________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC14-33	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-33	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-33	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-33	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-34	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-34	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-34	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-34	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-34	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-35	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-35	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-35	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-35	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-35	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-36	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-36	2	1	N	X				X		X		X	X	X	X	X		X	

PM Signature: ____________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4°C	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC14-36	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-36	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-36	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-37	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-37	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-37	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-37	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-37	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-38	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-38	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-38	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-38	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-38	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-39	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-39	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-39	5	1	N	X				X		X		X	X	X	X	X		X	

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC14-39	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-39	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-40	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-40	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-40	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-40	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-40	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-41	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-41	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-41	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-41	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-41	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-42	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-42	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-42	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-42	9	1	N	X				X		X		X	X	X	X	X		X	

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4°C	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
AOC14-42	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-43	0	1	N	X				X		X		X	X	X	X	X		X	
AOC14-43	2	1	N	X				X		X		X	X	X	X	X		X	
AOC14-43	5	1	N	X				X		X		X	X	X	X	X		X	
AOC14-43	9	1	N	X				X		X		X	X	X	X	X		X	
AOC14-43	14	1	N	X				X		X		X	X	X	X	X		X	
AOC14-14	0	1	N								X								
AOC14-14	2	1	N								X								
AOC14-14	5	1	N								X								
AOC14-14	9	1	N								X								
AOC14-14	14	1	N								X								
AOC14-15	0	1	N	X				X		X	X	X	X	X	X	X		X	
AOC14-15	2	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-15	2	1	FD	X				X		X	X	X	X	X	X	X	X	X	
AOC14-15	5	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-15	9	1	N	X				X		X	X	X	X	X	X	X	X	X	

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, - 7ºC	H2O, - 7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
AOC14-15	14	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-16	0	1	N	X				X		X	X	X	X	X	X	X		X	
AOC14-16	2	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-16	5	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-16	9	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-16	14	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-16	14	1	FD	X				X		X	X	X	X	X	X	X	X	X	
AOC14-17	0	1	N	X				X		X	X	X	X	X	X	X		X	
AOC14-17	2	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-17	5	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-17	9	1	N	X				X		X	X	X	X	X	X	X	X	X	
AOC14-17	14	1	N	X				X		X	X	X	X	X	X	X	X	X	

SWMU 1

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
SWMU1-18	0	1	N	X				X						X					
SWMU1-18	60	1	N	X				X											
SWMU1-18	70	1	N	X				X											

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4°C	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
SWMU1-18	80	1	N	X				X											
SWMU1-18	2	1	N	X				X						X					
SWMU1-18	5	1	N	X				X											
SWMU1-18	9	1	N	X				X											
SWMU1-18	14	1	N	X				X											
SWMU1-18	14	1	FD	X				X											
SWMU1-18	20	1	N	X				X											
SWMU1-18	30	1	N	X				X											
SWMU1-18	40	1	N	X				X											
SWMU1-18	50	1	N	X				X											
SWMU1-19	0	1	N	X				X						X					
SWMU1-19	60	1	N	X				X											
SWMU1-19	70	1	N	X				X											
SWMU1-19	80	1	N	X				X											
SWMU1-19	2	1	N	X				X						X					
SWMU1-19	5	1	N	X				X											

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
SWMU1-19	9	1	N	X				X											
SWMU1-19	14	1	N	X				X											
SWMU1-19	20	1	N	X				X											
SWMU1-19	20	1	FD	X				X											
SWMU1-19	30	1	N	X				X											
SWMU1-19	40	1	N	X				X											
SWMU1-19	50	1	N	X				X											
SWMU1-20	14	1	N	X				X											
SWMU1-20	14	1	FD	X				X											
SWMU1-20	20	1	N	X				X											
SWMU1-20	30	1	N	X				X											
SWMU1-20	40	1	N	X				X											
SWMU1-20	50	1	N	X				X											
SWMU1-20	60	1	N	X				X											
SWMU1-20	70	1	N	X				X											
SWMU1-20	80	1	N	X				X											

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Chromium (6010BCr)	Metals (6010B/7471A) Mercury,Lead	Metals (6010B/7471A) Molybdenum	Metals (6010B/7471A) Title 22 metals	General Chemistry (Ca,Mg,Mn,K,Na,Fe)	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	Pesticides (8081A)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar
Aqueous Preservatives				4ºC	none	4ºC	4ºC	4ºC	4ºC	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	180	180	180	7	14	14	14	14	14	7	14	14	NA
SWMU1-21	14	1	N	X				X											
SWMU1-21	20	1	N	X				X											
SWMU1-21	30	1	N	X				X											
SWMU1-21	40	1	N	X				X											
SWMU1-21	50	1	N	X				X											
SWMU1-21	60	1	N	X				X											
SWMU1-21	70	1	N	X				X											
SWMU1-21	80	1	N	X				X											
SWMU1-21	80	1	FD	X				X											
SWMU1-22	0	1	N	X				X	X					X					
SWMU1-22	0	1	FD	X				X	X					X					
SWMU1-23	0	1	N	X				X	X					X					
SWMU1-24	0	1	N	X				X	X					X					

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part A

NOTES:

NA	not applicable
TBD	to be determined

[1] These surface samples (0 to 0.5 feet) will be analyzed for the full inorganic and organic suites per Contract Laboratory Program Target Analyte List/Target Compound List (TAL/TCL), except VOCs and TPH-purgeables. Volatile organic compound and TPH-purgable analysis will only be performed on the 3 foot sample.

PM Signature:________________________

QC Signature:________________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC 5																
AOC5-1	0.5		N	X	X		X									X
AOC5-1	3		N	X	X		X									X
AOC5-2	0.5		N	X	X		X									
AOC5-2	3		N	X	X		X									
AOC5-3	0.5		N	X	X		X									
AOC5-3	3		N	X	X		X									
AOC5-4	0.5		N	X	X		X									
AOC5-4	3		N	X	X		X									
AOC5-5	0.5		N	X	X		X									
AOC5-5	3		N	X	X		X									
AOC5-6	0.5		N	X	X		X									
AOC5-6	0.5		FD	X	X		X									
AOC5-6	3		N	X	X		X									
AOC 6																
AOC6-1	0.5		N	X	X		X									

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC6-1	3		N	X	X		X									
AOC6-1	3		FD	X	X		X									
AOC6-2	0.5		N	X	X		X									
AOC6-2	3		N	X	X		X									
AOC6-3	0.5		N	X	X		X									
AOC6-3	0.5		FD	X	X		X									
AOC6-3	3		N	X	X		X									
AOC6-4	0.5		N	X	X		X									
AOC6-4	3		N	X	X		X									
AOC6-5	0.5		N	X	X		X									X
AOC6-5	3		N	X	X		X									X
AOC6-5	3		FD	X	X		X									X
AOC6-6	0.5		N	X	X		X									
AOC6-6	3		N	X	X		X									

AOC 7

AOC7-1	0.5		N	X	X		X		X	X	X	X				

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC7-1	3		N	X	X		X		X	X	X	X	X	X		
AOC7-2	0.5		N	X	X		X		X	X	X	X				
AOC7-2	0.5		FD	X	X		X		X	X	X	X				
AOC7-2	3		N	X	X		X		X	X	X	X	X	X		
AOC7-3	0.5		N	X	X		X		X	X	X	X				
AOC7-3	3		N	X	X		X		X	X	X	X	X	X		
AOC7-4	0.5		N	X	X		X		X	X	X	X				X
AOC7-4	3		N	X	X		X		X	X	X	X	X	X		X
AOC7-5	0.5		N	X	X		X		X	X	X	X				
AOC7-5	3		N	X	X		X		X	X	X	X	X	X		

AOC 8

AOC8-1	0.5		N		X							X				X
AOC8-1	3		N		X							X	X	X		X
AOC8-2	0.5		N		X							X				
AOC8-2	3		N		X							X	X	X		

AOC 13

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC13-1	0.5		N	X	X				X	X	X	X			X	
AOC13-1	0.5		FD	X	X				X	X	X	X			X	
AOC13-1	3		N	X	X				X	X	X	X	X	X	X	
AOC13-2	0.5		N	X	X				X	X	X	X			X	
AOC13-2	3		N	X	X				X	X	X	X	X	X	X	
AOC13-3	0.5		N	X	X				X	X	X	X			X	
AOC13-3	3		N	X	X				X	X	X	X	X	X	X	
AOC13-4	0.5		N	X	X				X	X	X	X			X	
AOC13-4	0.5		FD	X	X				X	X	X	X			X	
AOC13-4	3		N	X	X				X	X	X	X	X	X	X	
AOC13-5	0.5		N	X	X				X	X	X	X			X	
AOC13-5	3		N	X	X				X	X	X	X	X	X	X	
AOC13-6	0.5		N	X	X				X	X	X	X			X	
AOC13-6	3		N	X	X				X	X	X	X	X	X	X	
AOC13-7	0.5		N	X	X				X	X	X	X			X	
AOC13-7	3		N	X	X				X	X	X	X	X	X	X	

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC13-8	0.5		N	X	X				X	X	X	X			X	
AOC13-8	0.5		FD	X	X				X	X	X	X			X	
AOC13-8	3		N	X	X				X	X	X	X	X	X	X	
AOC13-9	0.5		N	X	X				X	X	X	X			X	
AOC13-9	3		N	X	X				X	X	X	X	X	X	X	
AOC13-10	0.5		N	X	X				X	X	X	X			X	X
AOC13-10	3		N	X	X				X	X	X	X	X	X	X	X
AOC13-11	0.5		N	X	X				X	X	X	X			X	
AOC13-11	0.5		FD	X	X				X	X	X	X			X	
AOC13-11	3		N	X	X				X	X	X	X	X	X	X	
AOC13-12	0.5		N	X	X				X	X	X	X			X	
AOC13-12	0.5		FD	X	X				X	X	X	X			X	
AOC13-12	3		N	X	X				X	X	X	X	X	X	X	
AOC13-13	0.5		N	X	X				X	X	X	X			X	
AOC13-13	3		N	X	X				X	X	X	X	X	X	X	
AOC13-14	0.5		N	X	X				X	X	X	X			X	

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC13-14	3		N	X	X				X	X	X	X	X	X	X	
AOC13-15	0.5		N	X	X				X	X	X	X			X	
AOC13-15	3		N	X	X				X	X	X	X	X	X	X	
AOC13-16	0.5		N	X	X				X	X	X	X			X	
AOC13-16	3		N	X	X				X	X	X	X	X	X	X	
AOC13-17	0.5		N	X	X			X	X	X	X	X			X	
AOC13-17	3		N	X	X			X	X	X	X	X	X	X	X	
AOC13-18	0.5		N	X	X				X	X	X	X			X	
AOC13-18	0.5		FD	X	X				X	X	X	X			X	
AOC13-18	3		N	X	X				X	X	X	X	X	X	X	
AOC13-19	0.5		N	X	X				X	X	X	X			X	
AOC13-19	3		N	X	X				X	X	X	X	X	X	X	
AOC13-20	0.5		N	X	X				X	X	X	X			X	
AOC13-20	3		N	X	X				X	X	X	X	X	X	X	
AOC13-21	0.5		N	X	X				X	X	X	X			X	
AOC13-21	0.5		FD	X	X				X	X	X	X			X	

PM Signature: ____________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4°C	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC13-21	3		N	X	X				X	X	X	X	X	X	X	
AOC13-22	0.5		N	X	X				X	X	X	X			X	X
AOC13-22	3		N	X	X				X	X	X	X	X	X	X	X
AOC13-23	0.5		N	X	X				X	X	X	X			X	
AOC13-23	3		N	X	X				X	X	X	X	X	X	X	
AOC13-24	0.5		N	X	X				X	X	X	X			X	
AOC13-24	0.5		FD	X	X				X	X	X	X			X	
AOC13-24	3		N	X	X				X	X	X	X	X	X	X	
AOC13-25	0.5		N	X	X				X	X	X	X			X	
AOC13-25	3		N	X	X				X	X	X	X	X	X	X	
AOC13-26	0.5		N	X	X				X	X	X	X			X	
AOC13-26	3		N	X	X				X	X	X	X	X	X	X	
AOC13-26	3		FD	X	X				X	X	X	X	X	X	X	
AOC13-27	0.5		N	X	X				X	X	X	X			X	
AOC13-27	3		N	X	X				X	X	X	X	X	X	X	
AOC13-28	0.5		N	X	X				X	X	X	X			X	

PM Signature: ______________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC13-28	3		N	X	X				X	X	X	X	X	X	X	
AOC13-29	0.5		N	X	X				X	X	X	X			X	
AOC13-29	0.5		FD	X	X				X	X	X	X			X	
AOC13-29	3		N	X	X				X	X	X	X	X	X	X	
AOC13-30	0.5		N	X	X				X	X	X	X			X	
AOC13-30	3		N	X	X				X	X	X	X	X	X	X	
AOC13-31	0.5		N	X	X				X	X	X	X			X	
AOC13-31	0.5		FD	X	X				X	X	X	X			X	
AOC13-31	3		N	X	X				X	X	X	X	X	X	X	
AOC13-32	0.5		N	X	X				X	X	X	X			X	
AOC13-32	3		N	X	X				X	X	X	X	X	X	X	
AOC13-33	0.5		N	X	X				X	X	X	X			X	X
AOC13-33	3		N	X	X				X	X	X	X	X	X	X	X
AOC13-34	0.5		N	X	X				X	X	X	X			X	
AOC13-34	3		N	X	X				X	X	X	X	X	X	X	
AOC13-34	3		FD	X	X				X	X	X	X	X	X	X	

PM Signature: ____________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
AOC 15																
AOC15-1	0.5		N	X	X		X									
AOC15-1	3		N	X	X		X									
AOC15-2	0.5		N	X	X		X									
AOC15-2	3		N	X	X		X									
AOC15-3	0.5		N	X	X		X									
AOC15-3	3		N	X	X		X									
AOC15-3	3		FD	X	X		X									
AOC15-4	0.5		N	X	X		X									
AOC15-4	3		N	X	X		X									
AOC15-5	0.5		N	X	X		X									X
AOC15-5	0.5		FD	X	X		X									X
AOC15-5	3		N	X	X		X									X
AOC15-6	0.5		N	X	X		X									
AOC15-6	0.5		FD	X	X		X									
AOC15-6	3		N	X	X		X									

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)

AOC 16

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC16-1	0.5		N		X											X
AOC16-1	3		N		X											X
AOC16-2	0.5		N		X											
AOC16-2	3		N		X											
AOC16-3	0.5		N		X											
AOC16-3	3		N		X											
AOC16-4	0.5		N		X											

AOC 17

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC17-1	0.5		N	X	X				X		X	X				
AOC17-1	0.5		FD	X	X				X		X	X				
AOC17-1	3		N	X	X				X		X	X	X	X		
AOC17-1	6		N	X	X				X		X	X	X	X		
AOC17-2	0.5		N	X	X				X		X	X				
AOC17-2	3		N	X	X				X		X	X	X	X		
AOC17-2	6		N	X	X				X		X	X	X	X		

PM Signature: ______________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
AOC17-3	0.5		N	X	X				X		X	X				
AOC17-3	0.5		FD	X	X				X		X	X				
AOC17-3	3		N	X	X				X		X	X	X	X		
AOC17-3	6		N	X	X				X		X	X	X	X		
AOC17-4	0.5		N	X	X				X		X	X				
AOC17-4	3		N	X	X				X		X	X	X	X		
AOC17-4	6		N	X	X				X		X	X	X	X		
AOC17-5	0.5		N	X	X				X		X	X				X
AOC17-5	3		N	X	X				X		X	X	X	X		X
AOC17-5	3		FD	X	X				X		X	X	X	X		X
AOC17-5	6		N	X	X				X		X	X	X	X		X

AOC 18

AOC18-1	0.5		N	X	X		X		X		X	X				
AOC18-1	0.5		FD	X	X		X		X		X	X				
AOC18-1	3		N	X	X		X		X		X	X	X	X		
AOC18-1	6		N	X	X		X		X		X	X	X	X		

PM Signature: ______________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC18-2	0.5		N	X	X		X		X		X	X				
AOC18-2	3		N	X	X		X		X		X	X	X	X		
AOC18-2	6		N	X	X		X		X		X	X	X	X		
AOC18-3	0.5		N	X	X		X		X		X	X				
AOC18-3	3		N	X	X		X		X		X	X	X	X		
AOC18-3	6		N	X	X		X		X		X	X	X	X		
AOC18-4	0.5		N	X	X		X		X		X	X				
AOC18-4	3		N	X	X		X		X		X	X	X	X		
AOC18-4	6		N	X	X		X		X		X	X	X	X		
AOC18-5	0.5		N	X	X		X		X		X	X				
AOC18-5	3		N	X	X		X		X		X	X	X	X		
AOC18-5	6		N	X	X		X		X		X	X	X	X		
AOC18-6	0.5		N	X	X		X		X		X	X				
AOC18-6	3		N	X	X		X		X		X	X	X	X		
AOC18-6	3		FD	X	X		X		X		X	X	X	X		
AOC18-6	6		N	X	X		X		X		X	X	X	X		

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

			Aqueous Sample Container	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
			Aqueous Preservatives	4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
			Filtered	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Lab	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
			Analysis Holding Time	14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC18-7	0.5		N	X	X		X		X		X	X				
AOC18-7	3		N	X	X		X		X		X	X	X	X		
AOC18-7	6		N	X	X		X		X		X	X	X	X		
AOC18-8	0.5		N	X	X		X		X		X	X				X
AOC18-8	3		N	X	X		X		X		X	X	X	X		X
AOC18-8	6		N	X	X		X		X		X	X	X	X		X
AOC18-8	6		FD	X	X		X		X		X	X	X	X		X
AOC18-9	0.5		N	X	X		X		X		X	X				
AOC18-9	0.5		FD	X	X		X		X		X	X				
AOC18-9	3		N	X	X		X		X		X	X	X	X		
AOC18-9	6		N	X	X		X		X		X	X	X	X		
AOC18-10	0.5		N	X	X		X		X		X	X				
AOC18-10	3		N	X	X		X		X		X	X	X	X		
AOC18-10	6		N	X	X		X		X		X	X	X	X		
AOC18-11	0.5		N	X	X		X		X		X	X				
AOC18-11	3		N	X	X		X		X		X	X	X	X		

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC18-11	6		N	X	X		X		X		X	X	X	X		
AOC18-12	0.5		N	X	X		X		X		X	X				
AOC18-12	3		N	X	X		X		X		X	X	X	X		
AOC18-12	6		N	X	X		X		X		X	X	X	X		

AOC 19

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC19-5	0.5		N	X	X		X									
AOC19-5	3		N	X	X		X									
AOC19-6	0.5		N	X	X		X									
AOC19-6	3		N	X	X		X									
AOC19-7	0.5		N	X	X		X									X
AOC19-7	0.5		FD	X	X		X									X
AOC19-7	3		N	X	X		X									X
AOC19-8	0.5		N	X	X		X									
AOC19-8	3		N	X	X		X									
AOC19-9	0.5		N	X	X		X									
AOC19-9	3		N	X	X		X									

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

			Aqueous Sample Container	8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
			Aqueous Preservatives	4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
			Filtered	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Lab	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
			Analysis Holding Time	14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC 20																
AOC20-1	0.5		N	X	X					X	X	X				
AOC20-1	3		N	X	X					X	X	X	X	X		
AOC20-1	3		FD	X	X					X	X	X	X	X		
AOC20-2	0.5		N	X	X					X	X	X				
AOC20-2	3		N	X	X					X	X	X	X	X		
AOC20-3	0.5		N	X	X					X	X	X				
AOC20-3	3		N	X	X					X	X	X	X	X		
AOC20-4	0.5		N	X	X					X	X	X				
AOC20-4	0.5		FD	X	X					X	X	X				
AOC20-4	3		N	X	X					X	X	X	X	X		
AOC20-5	0.5		N	X	X					X	X	X				
AOC20-5	3		N	X	X					X	X	X	X	X		
AOC20-6	0.5		N	X	X					X	X	X				
AOC20-6	3		N	X	X					X	X	X	X	X		
AOC20-7	0.5		N	X	X					X	X	X				

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC20-7	3		N	X	X					X	X	X	X	X		
AOC20-8	0.5		N	X	X					X	X	X				
AOC20-8	3		N	X	X					X	X	X	X	X		

AOC 21

AOC21-1	0.5		N	X	X	X	X									X
AOC21-1	3		N	X	X	X	X									X
AOC21-2	0.5		N	X	X	X	X									
AOC21-2	3		N	X	X	X	X									

AOC 22

AOC22-1	0.5		N	X	X		X		X	X	X	X				
AOC22-1	0.5		FD	X	X		X		X	X	X	X				
AOC22-1	3		N	X	X		X		X	X	X	X	X	X		
AOC22-2	0.5		N	X	X		X		X	X	X	X				
AOC22-2	3		N	X	X		X		X	X	X	X	X	X		

AOC 23

AOC23-1	0.5		N	X	X		X		X	X	X	X				

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
AOC23-1	0.5		FD	X	X		X		X	X	X	X				
AOC23-1	3		N	X	X		X		X	X	X	X	X	X		
AOC23-2	0.5		N	X	X		X		X	X	X	X				
AOC23-2	3		N	X	X		X		X	X	X	X	X	X		
AOC23-3	0.5		N	X	X		X		X	X	X	X				
AOC23-3	3		N	X	X		X		X	X	X	X	X	X		

AOC 24

AOC24-1	0.5		N	X	X		X		X	X	X	X				
AOC24-1	3		N	X	X		X		X	X	X	X	X	X		
AOC24-2	0.5		N	X	X		X		X	X	X	X				
AOC24-2	0.5		FD	X	X		X		X	X	X	X				
AOC24-2	3		N	X	X		X		X	X	X	X	X	X		

AOC 26

AOC26-1	0.5		N	X	X		X		X	X	X	X				
AOC26-1	3		N	X	X		X		X	X	X	X	X	X		

SWMU 5

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
SWMU5-1	0.5		N	X	X				X		X	X				X
SWMU5-1	3		N	X	X				X		X	X	X	X		X
SWMU5-2	0.5		N	X	X				X		X	X				
SWMU5-2	3		N	X	X				X		X	X	X	X		
SWMU5-2	3		FD	X	X				X		X	X	X	X		
SWMU 6																
SWMU6-1	0.5		N	X	X				X		X	X				X
SWMU6-1	3		N	X	X				X		X	X	X	X		X
SWMU 8																
SWMU8-1	0.5		N	X	X				X		X	X				X
SWMU8-1	3		N	X	X				X		X	X	X	X		X
SWMU 9																
SWMU9-1	0.5		N	X	X				X		X	X				X
SWMU9-1	3		N	X	X				X		X	X	X	X		X
SWMU9-1	3		FD	X	X				X		X	X	X	X		X

SWMU 11

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
SWMU11-1	0.5		N	X	X		X									X
SWMU11-1	3		N	X	X		X									X
SWMU11-2	0.5		N	X	X		X									
SWMU11-2	3		N	X	X		X									
SWMU11-3	0.5		N	X	X		X									
SWMU11-3	3		N	X	X		X									
SWMU11-4	0.5		N	X	X		X									
SWMU11-4	3		N	X	X		X									
SWMU11-5	0.5		N	X	X		X									
SWMU11-5	3		N	X	X		X									
SWMU11-6	0.5		N	X	X		X									
SWMU11-6	0.5		FD	X	X		X									
SWMU11-6	3		N	X	X		X									
SWMU11-7	0.5		N	X	X		X									
SWMU11-7	3		N	X	X		X									

Units 4.3

PM Signature: ________________________

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PLANNED SAMPLE TABLE

RFI Work Plan Part B

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8 oz soil jar	3x4oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	4x40ml glass	4x40ml glass	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	none	4ºC	4℃	4ºC	4ºC	4ºC	4ºC	H2O, -7ºC	H2O, -7ºC	none	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	180	7	14	14	14	14	7	14	14	NA	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	Metals (6010B) Calcium,Sodium	PH (9045)	Dioxins/Furans(SW8290)	SVOCs (8270C)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TPH-Purgable (8015B-P)	VOCs (8260B)	Asbestos (EPA600/R-93-116)	TAL/TCL Analytical Suite (1)
Units4.3-1	0.5		N	X	X		X		X		X	X				X
Units4.3-1	3		N	X	X		X		X		X	X	X	X		
Units4.3-2	0.5		N	X	X		X		X		X	X				X
Units4.3-2	3		N	X	X		X		X		X	X	X	X		

NOTES:

NA	not applicable
TBD	to be determined

[1] These surface samples (0 to 0.5 feet) will be analyzed for the full inorganic and organic suites per Contract Laboratory Program Target Analyte List/Target Compound List (TAL/TCL), except VOCs and TPH-purgeables. Volatile organic compound and TPH-purgable analysis will only be performed on the 3 foot sample.

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

Storm Drain Sampling

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	7	14	14	7	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	PH (9045)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TAL/TCL Analytical Suite (1)
SD-1	0.5		N	X	X		X	X	X	
SD-1	3		N	X	X		X	X	X	
SD-1	5		N	X	X		X	X	X	
SD-1	5		FD	X	X		X	X	X	
SD-1	10		N	X	X		X	X	X	
SD-2	0.5		N	X	X		X	X	X	
SD-2	3		N	X	X		X	X	X	
SD-2	5		N	X	X		X	X	X	
SD-2	10		N	X	X		X	X	X	
SD-3	0.5		N	X	X		X	X	X	
SD-3	3		N	X	X		X	X	X	
SD-3	5		N	X	X		X	X	X	X
SD-3	10		N	X	X		X	X	X	
SD-4	0.5		N	X	X	X	X	X	X	
SD-4	3		N	X	X	X	X	X	X	
SD-4	5		N	X	X	X	X	X	X	
SD-4	10		N	X	X	X	X	X	X	
SD-5	0.5		N	X	X		X	X	X	
SD-5	0.5		FD	X	X		X	X	X	
SD-5	3		N	X	X		X	X	X	
SD-5	5		N	X	X		X	X	X	
SD-5	10		N	X	X		X	X	X	X
SD-6	0.5		N	X	X		X	X	X	
SD-6	3		N	X	X		X	X	X	
SD-6	5		N	X	X		X	X	X	
SD-6	10		N	X	X		X	X	X	
SD-7	0.5		N	X	X		X	X	X	
SD-7	3		N	X	X		X	X	X	

PM Signature: ____________________

QC Signature: ____________________

PLANNED SAMPLE TABLE

Storm Drain Sampling

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	7	14	14	7	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	PH (9045)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TAL/TCL Analytical Suite (1)
SD-7	5		N	X	X		X	X	X	
SD-7	10		N	X	X		X	X	X	
SD-8	0.5		N	X	X		X	X	X	
SD-8	3		N	X	X		X	X	X	
SD-8	5		N	X	X		X	X	X	X
SD-8	10		N	X	X		X	X	X	
SD-8	10		FD	X	X		X	X	X	
SD-9	0.5		N	X	X		X	X	X	
SD-9	3		N	X	X		X	X	X	
SD-9	5		N	X	X		X	X	X	
SD-9	10		N	X	X		X	X	X	
SD-10	0.5		N	X	X		X	X	X	
SD-10	3		N	X	X		X	X	X	
SD-10	5		N	X	X		X	X	X	
SD-10	10		N	X	X		X	X	X	
SD-11	0.5		N	X	X		X	X	X	X
SD-11	0.5		FD	X	X		X	X	X	X
SD-11	3		N	X	X		X	X	X	
SD-11	5		N	X	X		X	X	X	
SD-11	10		N	X	X		X	X	X	
SD-12	0.5		N	X	X		X	X	X	
SD-12	3		N	X	X		X	X	X	
SD-12	5		N	X	X		X	X	X	
SD-12	10		N	X	X		X	X	X	
SD-13	0.5		N	X	X		X	X	X	
SD-13	3		N	X	X		X	X	X	X
SD-13	5		N	X	X		X	X	X	
SD-13	10		N	X	X		X	X	X	

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

Storm Drain Sampling

Aqueous Sample Container				8 oz soil jar	8 oz soil jar	8 oz soil jar	8oz soil jar(s)	8oz soil jar(s)	8 oz soil jar	8 oz soil jar
Aqueous Preservatives				4ºC	4ºC	4ºC	4ºC	4ºC	4ºC	4ºC
Filtered				NA	NA	NA	NA	NA	NA	NA
Lab				TBD	TBD	TBD	TBD	TBD	TBD	TBD
Analysis Holding Time				14	180	7	14	14	7	14
Sample Location	Depth	Team	Sample Type	Hexavalent Chromium (7199)	Metals (6010B/7471A) Title 22 Metals	PH (9045)	PCBs (8082)	PAHs (8270Sim)	TPH-Extractable (8015B-E)	TAL/TCL Analytical Suite (1)
SD-14	0.5		N	X	X		X	X	X	
SD-14	3		N	X	X		X	X	X	
SD-14	5		N	X	X		X	X	X	
SD-14	5		FD	X	X		X	X	X	
SD-14	10		N	X	X		X	X	X	
SD-15	0.5		N	X	X		X	X	X	
SD-15	3		N	X	X		X	X	X	
SD-15	5		N	X	X		X	X	X	
SD-15	10		N	X	X		X	X	X	X
SD-16	0.5		N	X	X		X	X	X	
SD-16	3		N	X	X		X	X	X	
SD-16	3		FD	X	X		X	X	X	
SD-16	5		N	X	X		X	X	X	
SD-16	10		N	X	X		X	X	X	
SD-17	0.5		N	X	X		X	X	X	
SD-17	3		N	X	X		X	X	X	
SD-17	5		N	X	X		X	X	X	
SD-17	10		N	X	X		X	X	X	
SD-18	0.5		N	X	X		X	X	X	
SD-18	3		N	X	X		X	X	X	
SD-18	5		N	X	X		X	X	X	
SD-18	10		N	X	X		X	X	X	
SD-19	0.5		N	X	X		X	X	X	
SD-19	0.5		FD	X	X		X	X	X	
SD-19	3		N	X	X		X	X	X	
SD-19	5		N	X	X		X	X	X	
SD-19	10		N	X	X		X	X	X	

PM Signature: ______________________

QC Signature: ______________________

PLANNED SAMPLE TABLE

Storm Drain Sampling

NOTES:

NA	not applicable
TBD	to be determined

[1] These surface samples (0 to 0.5 feet) will be analyzed for the full inorganic and organic suites per Contract Laboratory Program Target Analyte List/Target Compound List (TAL/TCL), except VOCs and TPH-purgeables. Volatile organic compound and TPH-purgable analysis will only be performed on the 3 foot sample.

Appendix G
Standard Operating Procedures

(Provided on CD Only)

SOP-B2

Soil Classification and Logging Procedures
Standard Operating Procedures for PG&E Topock Program

This standard operating procedure (SOP) provides guidance to obtain accurate and consistent descriptions of soil characteristics during soil-sampling operations. The characterization is based on visual examination and manual tests not on laboratory determinations.

REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan, work plan or event-specific field instructions. Planned borehole depth, proposed well construction/specifications, and field sampling summary table, if available.
2) Applicable project work plan or monitoring plan. Refer to Topock Program *Sampling, Analysis, and Field Procedures Manual* and *Quality Assurance Project* Plan (Procedures Manual), as required.
3) Topock Program Health and Safety Plan (HSP).
4) Previous sampling, drilling, or well construction logs from other boreholes or wells in the vicinity, if available.
5) Blank field notebook.
6) Blank CH2M HILL soil boring log Form D1586.

PREPARATION AND SETUP

1) Review event-specific work plan or event-specific field instructions, previous sampling logs, Procedures Manual, and HSP.
2) Initiate field logbook for sampling activity.
3) Review sampling procedures and equipment, and planned sample depths with drilling contractor and field crew.

EQUIPMENT LIST

- Indelible pens
- Tape measure or ruler
- Field logbook
- Spatula
- HCl, 10-percent solution
- Squirt bottle/Spray bottle with water

- Rock- or soil-color chart (e.g., Munsell)
- Grain-size chart
- Hand lens
- Unified Soil Classification System index charts and tables to help with soil classification

PROCEDURES

This section covers several aspects of the soil characterization: instructions for completing the CH2M HILL soil boring log (see Form D1586, Attachment A) and the field logging of soil using the "Unified Soil Classification System and Logging Criteria" (Attachment B).

Instructions for Completing Soil Boring Logs

- Soil boring logs will be completed on field boring log forms. Information collected will be consistent with that required for Form D1586 (attached), a standard CH2M HILL form, or an equivalent form that supplies the same information.
- The information collected in the field to perform the soil characterization is described below.
- Field personnel should review completed logs for accuracy, clarity, and thoroughness of detail. Samples also should be checked to see that information is correctly recorded on both jar lids and labels and on the log sheets.

Heading Information

1) **Boring/Well Number.** Enter the boring/well number. A numbering system should be chosen that does not conflict with information recorded for previous exploratory work done at the site. Number the sheets consecutively for each boring.
2) **Location.** If stationing, coordinates, mileposts, or similar project layout information is available, indicate the position of the boring to that system using modifiers such as "approximate" or "estimated," as appropriate.
3) **Elevation.** Elevation will be determined at the conclusion of field activities.
4) **Drilling Contractor.** Enter the name of the drilling company and the city and state where the company is based.
5) **Drilling Method and Equipment.** Identify the bit size and type, drilling fluid (if used), and method of drilling (e.g., rotary, hollow-stem auger, sonic). Information on the drilling equipment (e.g., CME 55, Mobile B61) should be noted.
6) **Water Level and Date.** Enter the depth below ground surface to the apparent water level in the borehole. The information should be recorded as a comment. If free water is not encountered during drilling or cannot be detected because of the drilling method, this information should be noted. Record date and time of day (for tides, river stage) of each water level measurement.

7) **Date of Start and Finish.** Enter the dates the boring was started and completed. Time of day should be added if several borings are performed on the same day.

8) **Logger.** Enter the first initial and full last name of the logger.

Technical Data

1) **Depth Below Surface.** Use a depth scale that is appropriate for the sample spacing and for the complexity of subsurface conditions.

2) **Sample Interval.** Note the depth at the top and bottom of the sample interval.

3) **Sample Type and Number.** Enter the sample type and number. SS-1 = split spoon, first sample. Number samples consecutively regardless of type. Enter a sample number even if no material was recovered in the sampler.

4) **Sample Recovery.** Enter the length to the nearest 0.1 foot of soil sample recovered from the sampler. Often, there will be some wash or caved material above the sample; do not include the wash material in the measurement. Record recovery in feet.

5) **Soil Description.** The soil classification should follow the format described in the "Field Classification of Soil" subsection below.

6) **Comments.** Include all pertinent observations (changes in drilling fluid color, rod drops, drilling chatter, rod bounce as in driving on a cobble, damaged Shelby tubes, and equipment malfunctions). In addition, note if casing was used, the sizes and depths installed, and if drilling fluid was added or changed. You should instruct the driller to alert you to any significant changes in drilling (changes in material, occurrence of boulders, and loss of drilling fluid). Such information should be attributed to the driller and recorded in this column. Specific information might include:

   - The date and the time drilling began and ended each day.
   - The depth and size of casing and the method of installation.
   - The date, time, and depth of water level measurements.
   - Depth of rod chatter.
   - Depth and percentage of drilling fluid loss.
   - Depth of hole caving or heaving.
   - Depth of change in material.
   - Health and safety monitoring data.
   - Drilling interval through a boulder.

Field Classification of Soil

This section presents the format for the field classification of soil. In general, the approach and format for classifying soils should conform to the "United Soils Classification System and Logging Criteria" (see charts and criteria, Attachment B).

- The Unified Soil Classification System (USCS) is based on numerical values of certain soil properties that are measured by laboratory tests (ASTM D 2487). It is possible, however, to estimate these values in the field with reasonable accuracy using visual-manual procedures (ASTM D 2488). In addition, some elements of a complete soil description, such as the presence of cobbles or boulders, changes in strata, and the relative proportions of soil types in a bedded deposit can be obtained only in the field.
- Soil descriptions should be precise and comprehensive without being verbose. The correct overall impression of the soil should not be distorted by excessive emphasis on insignificant details. In general, similarities rather than differences between consecutive samples should be stressed.

Soil Descriptions

Soil descriptions must be recorded for every soil sample collected. The format and order for soil descriptions should be:

1) Soil name (synonymous with ASTM D 2488 Group Name) with appropriate modifiers. Soil name should be in all capitals in the log, for example "POORLY-GRADED SAND."
2) Group symbol, in parentheses, for example, "(SP)."
3) Color, using Munsell color designation.
4) Particle size distribution (i.e., sand, silt, clay).
5) Moisture content.
6) Relative density or consistency.
7) Soil structure, mineralogy, or other descriptors.

This order follows, in general, the format described in ASTM D 2488.

(1) Soil Name

The basic name of a soil should be the ASTM D 2488 Group Name on the basis of visual estimates of gradation and plasticity. The soil name should be capitalized.

Examples of acceptable soil names are illustrated by the following descriptions:

- A soil sample is visually estimated to contain 15-percent gravel, 55-percent sand, and 30-percent fines (passing No. 200 sieve). The fines are estimated as either low- or highly-plastic silt. This visual classification is SILTY SAND WITH GRAVEL with a Group Symbol of (SM).
- Another soil sample has the following visual estimate: 10-percent gravel, 30-percent sand, and 60-percent fines (passing the No. 200 sieve). The fines are estimated as low-plastic silt. This visual classification is SANDY SILT. The gravel portion is not included in the soil name because the gravel portion was estimated as less than 15 percent. The Group Symbol is (ML).

The gradation of coarse-grained soil (more than 50 percent retained on No. 200 sieve) is included in the specific soil name in accordance with ASTM D 2488.

- There is no need to further document the gradation.
- However, the maximum size and angularity or roundness of gravel and sand-sized particles should be recorded.
- For fine-grained soil (50 percent or more passing the No. 200 sieve), the name is modified by the appropriate plasticity/elasticity term in accordance with ASTM D 2488.

Interlayered soil should each be described starting with the predominant type.

- An introductory name, such as "Interlayered Sand and Silt," should be used.
- In addition, the relative proportion of each soil type should be indicated (see Table 1 for example).

Where helpful, the evaluation of plasticity/elasticity can be justified by describing results from any of the visual-manual procedures for identifying fine-grained soils, such as reaction to shaking, toughness of a soil thread, or dry strength as described in ASTM D 2488.

(2) Group Symbol

The appropriate group symbol from ASTM D 2488 must be given after each soil name.

1) The group symbol should be placed in parentheses to indicate that the classification has been estimated.
2) In accordance with ASTM D 2488, dual symbols (e.g., GP-GM or SW-SC) can be used to indicate that a soil is estimated to have about 10-percent fines.
3) Borderline symbols (e.g., GM/SM or SW/SP) can be used to indicate that a soil sample has been identified as having properties that do not distinctly place the soil into a specific group. Generally, the group name assigned to a soil with a borderline symbol should be the group name for the first symbol. The use of a borderline symbol should not be used indiscriminately. Every effort should be made to first place the soil into a single group.

(3) Color

Soil color is described by comparing the sample with the Munsell Soil Color Charts. The Munsell colors should be used unless directed otherwise by project sampling plans. Instructions for their proper use are in the color charts. The color name shall precede the Munsell color notation (e.g., "yellowish brown, 10 YR 5/4"), with color hue and chroma number parenthetically entered in the borelog description. If no color chip is available, the color should be simply described as primary color (i.e., green, brown, gray, yellow, tan, etc.).

(4) Particle Size Distribution

Within the gravel sizes and the sand sizes, there are further divisions based on particle sizes. Gravel is divided into fine and coarse gravel. Fine-gravel particles (pebbles) are those that would pass through 3/4-inch opening but not a 1/4-inch opening. The fine gravel ranges from pea- to marble-sized. Coarse-gravel particles are those that would pass through a 3-inch opening but not a 3/4-in opening. Common objects of this size are grapes and tennis balls. Cobbles range from 3 inches to 12 inches in size; boulders are larger than 12 inches.

Sand is divided into three sizes: fine, medium, and coarse. Sand passes a No. 4 sieve (approximately 1/4 inch) and is retained in a No. 200 sieve (0.003 inch). Fine-sand particles pass a No. 40 sieve (approximately 1/64 inch) and are retained in the No. 200 (0.003 inch) sieve. These particles are sugar- or table salt-sized. Medium sand passes the No. 10 sieve (approximately 1/2 inch) and retained on the No. 40 sieve. These particles are about the same size as the openings in window screening. Coarse-sand particles would pass a No. 4 sieve (approximately 1/4 inch) and be retained on a No. 10 sieve. Rock salt granules fall in this size range. Sand and gravel particle sizes are illustrated in ASTM D2488 along with percentage estimating charts. The percentages of different grain size fractions are important in the soil type determination.

(5) Moisture Content

Soil moisture content shall be estimated using only the terminology described below:

- Dry - Absence of moisture, dusty, dry to the touch
- Moist - Damp but no visible water
- Wet - Visibly free water, usually sampled from below the water table

(6) Relative Density or Consistency

An estimate of the consistency shall accompany descriptions of all fine-grained soil (silt and clay where more than 50 percent of the material would pass the No. 200 sieve). A pocket penetrometer is the most accurate method for estimating the consistency of fine-grained soils. The table below lists characteristics for soil consistency identification.

Consistency	Unconfined Compressive Strength (tons/ft)[a]	Blows/foot (SPT) [b]	Manual Procedure
Very soft	<0.25	0 – 4	Thumb will penetrate soil more than 1 inch (25 mm).
Soft	0.25 - 0.50	4 – 8	Thumb will penetrate soil about 1 inch (25 mm).
Firm (formerly stiff)	-1.50	8 – 15	Thumb will indent soil about 1/4 inch (6 mm).
Hard	-2.00	15 – 30	Thumb will not indent soil but readily indented with thumbnail.
Very hard	>4.0	> 30	Thumbnail will not indent soil.

Notes:

[a] Pocket penetrometer

[b] Blows/foot is defined as the total number of blows required to drive the second and third 6 inches of penetration (blow counts for the first 6 inches are also noted) while driving an 18-inch SPT sampler with a 140-pound hammer falling a free height of 30 inches. Conversion factors may be applied when the field log information is transferred to the final log when using a sampler other than an SPT (Standard penetrometer) (e.g., S&H or Modified California), or when using different hammer weights and drop. The conversion factor is approximately 0.5 for an S&H sampler with a hammer weight of 140 pounds falling 30 inches.

Descriptions of all coarse-grained soil (sand and gravel where less than 50 percent of the material would pass the No. 200 sieve and 100 percent would pass the 3-inch sieve) shall be accompanied by an estimate of the density based upon standard penetrometer (SPT) blow counts. The following terminology should be used:

Density	Blows/foot (SPT)
Very loose	< 4
Loose	4-10
Medium dense	10-30
Dense	30-50
Very dense	> 50

(7) Soil Structure, Mineralogy, and Other Descriptors

Discontinuities and inclusions are important and should be described. Such features include joints or fissures, slickensides, bedding or laminations, veins, root holes, and wood debris.

Significant mineralogical information such as cementation, abundant mica, or unusual mineralogy should be described.

Other descriptors may include particle angularity or shape, maximum particle size, hardness of large particles, plasticity of fines, dry strength, dilatancy, toughness, reaction to HCl, and staining, as well as other information such as organic debris, odor, or presence of free product. Criteria for the use of these other descriptions include:

- Structure:
  - Stratified - Alternating layers of varying material or color with layers at least 1/4-inch thick; note thickness.
  - Laminated - Alternating layers of varying material or color with the layers less than 1/4-inch thick; note thickness.
  - Fissured - Breaks along definite planes of fracture with little resistance.
  - Slickensides - Fracture planes appear polished or glossy, often striated.
  - Blocky - Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
  - Lensed - Inclusion of small pockets of different soils, such as lenses of sand within clay; note thickness.
  - Homogeneous - Same color and appearance throughout.
  - Grading - Whether the particles increase or decrease in size toward the top of logged interval.
- Particle Shape:
  - Flat - Particles with width/thickness ratio > 3.
  - Elongated - Particles with length/width ratio > 3.

  - Elongated and flat - Particles meet criteria for both flat and elongated.
- Particle Angularity:
  - Angular - Particles have sharp edges and relatively planar sides with unpolished surfaces.
  - Subangular - Particles are similar to angular description but have rounded edges.
  - Subrounded - Particles have nearly planar sides but have well-rounded corners and edges.
  - Rounded - Particles have smoothly-curved sides and no edges.
- Cementation:
  - Weak - rumbles or breaks with handling or little finger pressure.
  - Moderate - Crumbles or breaks with considerable finger pressure.
  - Strong - Will not crumble or break with finger pressure.
- Reaction with HCl:
  - None - No visible reaction.
  - Weak - Some reaction, bubbles forming slowly.
  - Strong - Vigorous reaction, bubbles forming immediately.

Comments

This section should be reserved for information not pertaining to lithologic description. Sample information including sample identifier, analysis, matrix, and depth interval should be included in the boring log comments. Information related to drilling, such as drilling rate, chatter, and equipment malfunctions should also be well documented in the comments section of the boring log. Additionally interpretations of the lithologic data may also be presented in the comments section. Examples of this include “transition between Older Alluvium and Fanglomerate,” “paleosol horizon B,” or “conductive zone.”

Recovery

Recovery data are entered along the left side of the boring log. Enter the length of retrieved core to the nearest 0.1 foot of sample recovered and record the value in feet. Do not count slough or caved material as part of the total recovered length of core. Record total length and percent of sample recovered. If using a 5-foot sample barrel, multiply the total length by 2 and 100 to get a percentage number. Similarly, if using a 2.5-foot sampler, multiply by 4 and 100 to get the percent recovery.

Backfilling

When a boring is completed and the water level measured, the boring shall be backfilled to ground surface according to applicable regulations. The destruction of the hole shall be noted on the log. Borehole destruction should follow SOP 28 *Soil Boring Abandonment*

Attachments

- Soil Boring Log, CH2M HILL Form D1586, and a completed example
- Unified Soil Classification System and Logging Criteria

Key Checks and Preventive Maintenance

Check entries to the soil boring log and field logbook in the field; because the samples will be disposed of, confirmation and corrections cannot be made later. Check that sample numbers and intervals are properly specified. Check that drilling and sampling equipment is decontaminated using the procedures defined in SOP *Decontamination of Drilling Rigs and Equipment*.

ATTACHMENT A

Examples of Soil Bore Logs

CH2MHILL

PROJECT NUMBER	BORING NUMBER SHEET OF

SOIL BORING LOG

PROJECT ______________________________ LOCATION ______________________

ELEVATION ______________ DRILLING CONTRACTOR ______________________

DRILLING METHOD AND EQUIPMENT ______________________________

WATER LEVELS ______________ START ________ FINISH ________ LOGGER ________

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION

SHEET 1 of 9	**PROJECT NUMBER:** 326128.01.16.EN	**BORING NUMBER:** *MW-47*

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program		**HOLE DEPTH (ft):** 288.0	**DRILLING CONTRACTOR:** Prosonic Corp. Phoenix, AZ	
SURFACE ELEVATION: 482.6 ft. MSL	**NORTHING (CCS NAD 27 Z 5):** 2,103,450.05	**EASTING (CCS NAD 27 Z 5):** 7,615,629.49	**DATE STARTED:** 02/27/2006	**DATE COMPLETED:** 03/13/2006
DRILLING METHOD: Rotosonic			**DRILLING EQUIPMENT:** Sonic AT (track mounted)	
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California			**LOGGED BY:** B. Moayyad, K. Ebel	

DEPTH BGS (feet)	SAMPLE INTERVAL	SAMPLE TYPE/ NUMBER	SAMPLE RECOVERY (ft)	USCS CODE	SOIL DESCRIPTION: SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS: DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
5			6	SP	**POORLY GRADED SAND (SP)** - very lt brn (10YR7/3), =2% fines, 98% f to m lithic quartz sand, subang to subrnd, dry - fine roots, iron staining, some iron oxide coating on grains	Hand augured to 5' bgs
10					- slightly moist - dry	
15			10			Rapid drill rate, no chatter
20				SW	**WELL GRADED SAND w/ GRAVEL (SW)** - lt yellowish brn (10YR6/4), 45% gravel up to 7cm, 50% f to m sand, 5% fines, loose, met subang gravel, dry(moist@ 17') - cobble present in slough - one subrnd chert gravel - Possible Fluvially Reworked Alluvium - lt grey (10YR7/2), subang to rnd met gravel up to 9cm, 2% to 5% fines - dk yellowish brn (10YR4/4), mostly c sand subang to ang, met, some Miocene conglomerate gravel	
25					- 65% sand, 30% gravel up to 4cm, 5% fines	
30			16	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - dk yellowish brn (10YR3/6), 35% gravel up to 4cm, 55% m to c sand, 10% silty fines, met clasts are grain supported some mm siltstone - some oxide staining	
35				SW	**WELL GRADED SAND w/ GRAVEL AND CLAY (SW)** - dk yellowish brn (10YR3/6), 30% subang met gravel up to 7 cm, 55% subrnd to subang m to c sand, 15% clayey fines, m density, moist	Drill rate slowed to clean out 8" pipe

CH2MHILL

SHEET 2 of 9	**PROJECT NUMBER:** 326128.01.16.EN	**BORING NUMBER:** *MW-47*

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program		**HOLE DEPTH (ft):** 288.0	**DRILLING CONTRACTOR:** Prosonic Corp. Phoenix, AZ	
SURFACE ELEVATION: 482.6 ft. MSL	**NORTHING (CCS NAD 27 Z 5):** 2,103,450.05	**EASTING (CCS NAD 27 Z 5):** 7,615,629.49	**DATE STARTED:** 02/27/2006	**DATE COMPLETED:** 03/13/2006
DRILLING METHOD: Rotosonic			**DRILLING EQUIPMENT:** Sonic AT (track mounted)	
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California			**LOGGED BY:** B. Moayyad, K. Ebel	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)		SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
			2.5	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - dr yellowish brn (10YR3/6), 30% gravel, 60% sand, 10% silty fines	Drilling smooth but preceeds less rapidly
40 45			10	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - 40% subang met gravel up to 6cm, 55% subrnd to ang sand, 5% fines - more gravel below 38' - gravel is mostly fine	
50			10	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - Pale brn (10YR6/3), 30% subang met gravel up to 5cm, 60% subrnd to subang m to c met sand, 10% silty fines, wet	Soil sample collected
				SP	**POORLY GRADED SAND w/ GRAVEL (SP)** - pale brn (10TR6/3), 30% f subang gravel up to 2 cm, 65% mostly c sand, =2% fines	
55				SW	**WELL GRADED SAND w/ GRAVEL (SW)** - yellowish brn (10YR5/4), 40% subang met gravel up to 9cm, 55% f to c met sand, 5% silty fines, clast supported, m density, wet	
60 65			9.5	GW	**WELL GRADED GRAVEL w/ SILT AND SAND (GW)** - brn (7.5YR5/4), 55% subang to ang met gravel up to 4cm, 25% f to c sand, 20% silty fines, dense, moist to dry - soil dries out - lt grey (10YR7/2) and powder dry - moist sandy zone, 55% gravel, 35% sand, 10% fines - dry silty lt grey GW below 65'	Collected Isoflow sample Drill rate slows to 2' / min
70				SW	**WELL GRADED SAND w/ GRAVEL (SW)** - yellowish brn (10YR5/4), 35% subang met gravel up to 4cm, 60% subrnd sand, 5% silty fines, loose, moist to wet	Moderate Drill Rate

CH2MHILL

SHEET 5 of 9	**PROJECT NUMBER:** 326128.01.16.EN	**BORING NUMBER:** ***MW-47***

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program		**HOLE DEPTH (ft):** 288.0	**DRILLING CONTRACTOR:** Prosonic Corp. Phoenix, AZ	
SURFACE ELEVATION: 482.6 ft. MSL	**NORTHING (CCS NAD 27 Z 5):** 2,103,450.05	**EASTING (CCS NAD 27 Z 5):** 7,615,629.49	**DATE STARTED:** 02/27/2006	**DATE COMPLETED:** 03/13/2006
DRILLING METHOD: Rotosonic			**DRILLING EQUIPMENT:** Sonic AT (track mounted)	
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California			**LOGGED BY:** B. Moayyad, K. Ebel	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)		SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
			6	SP	**POORLY GRADED SAND w/ SILT (SP)** - brn (7.5YR4/4), 5% subrnd to subang met gravel up to 4cm, 85% f to c sand, 10% fines, poorly graded, wet, no odor	
145			3	SM	**SILTY SAND W/ GRAVEL (SM)** - brn (7.5YR4/4), 20% subang to subrnd gravel up to 6cm, 60% f to c sand, 20% silty fines, well graded, m consolidated, met, wet, no odor	
150			5	SM	**SILTY SAND w/ GRAVEL (SM)** - dk yellowish brn (10YR4/4), 25% subang to subrnd up to 4cm met gravel, 60% well graded f to c sand, 15% fines, wet, no odor	
155			4	SW	**WELL GRADED SAND w/ SILT AND SAND (SW)** - dr yellowish brn (10YR4/4), 10% subang to subrnd up to 3cm met gravel, 75%well graded f to c sand, 15% fines, moist to wet	
			2	SW	**SILTY SAND (SM)** - brn (7.5YR4/4), 5% ang to subrnd met gravel up to 1.5cm increasing with depth, 85% poorly graded m to c sand, 10% fines, loose, wet	
			2	SM	**SILTY SAND w/ GRAVEL (SM)** - dk yellowish brn (10YR4/4), 15% subang to subrnd up to 2.5cm met gravel, 75% well graded f to c sand, 10% fines, mostly met, trace chert, loose, wet, no odor	Collected Isoflow sample
160			4	SM	**SILTY SAND W/ GRAVEL (SM)** - brn (7.5YR4/4), 25% subang to subrnd gravel up to 6.5cm, 60% m to c sand, 15% silty fines, well graded, m consolidated, met, wet, no odor	Drill rate = 0.75' to 1.5' / min
165			4	SW	**SILTY SAND (SW)** - mottled dk reddish brn (5YR3/4), 10% subang to subrnd gravel up to 2.5cm, 50% well graded f to m sand, 40% silt, metamorphic, dry to damp, no odor, interbedded sandy silt laminations	
170			5.5	SW	**SAND w/ GRAVEL (SW)** - dk reddish brn (5YR3/4), 20% subang to subrnd gravel up to 5cm, 75% f to c sand, 5% fines, well graded, loose, met, wet	
175			2.5	SM	**SILTY SAND w/ GRAVEL (SM)** - brn (7.5YR4/4), 15% subang to subrnd gravel, 70% f to m sand, 15% fines, poorly graded, met,increasingly consolidated, slightly to moderately calcareous, moist to wet	

SHEET 9 of 9	**PROJECT NUMBER:** 326128.01.16.EN	**BORING NUMBER:** ***MW-47***

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program		**HOLE DEPTH (ft):** 288.0	**DRILLING CONTRACTOR:** Prosonic Corp. Phoenix, AZ	
SURFACE ELEVATION: 482.6 ft. MSL	**NORTHING (CCS NAD 27 Z 5):** 2,103,450.05	**EASTING (CCS NAD 27 Z 5):** 7,615,629.49	**DATE STARTED:** 02/27/2006	**DATE COMPLETED:** 03/13/2006
DRILLING METHOD: Rotosonic			**DRILLING EQUIPMENT:** Sonic AT (track mounted)	
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California			**LOGGED BY:** B. Moayyad, K. Ebel	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)		SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
285			0	BR	**MIOCENE CONGLOMERATE BEDROCK (BR)** - 60% well graded subang to rnd gravel up to 10cm, 30% well graded sand, 10% fines, very calcareous, well consolidated to mostly hard, mod to very altered locally, mostly met, dry to moist	

Boring Terminated at 288 ft

ABBREVIATIONS

cc = continuous core run
brn = brown
lt = light
dk = dark
vf = very fine-grained
f = fine-grained
m = medium-grained
c = coarse-grained
vc = very coarse-grained
ang = angular
subang = subangular
subrnd = subrounded
rnd = rounded
br = bedrock formation
ss = sandstone
conglom = conglomerate
comptd = compacted
qtz = quartz

CH2MHILL

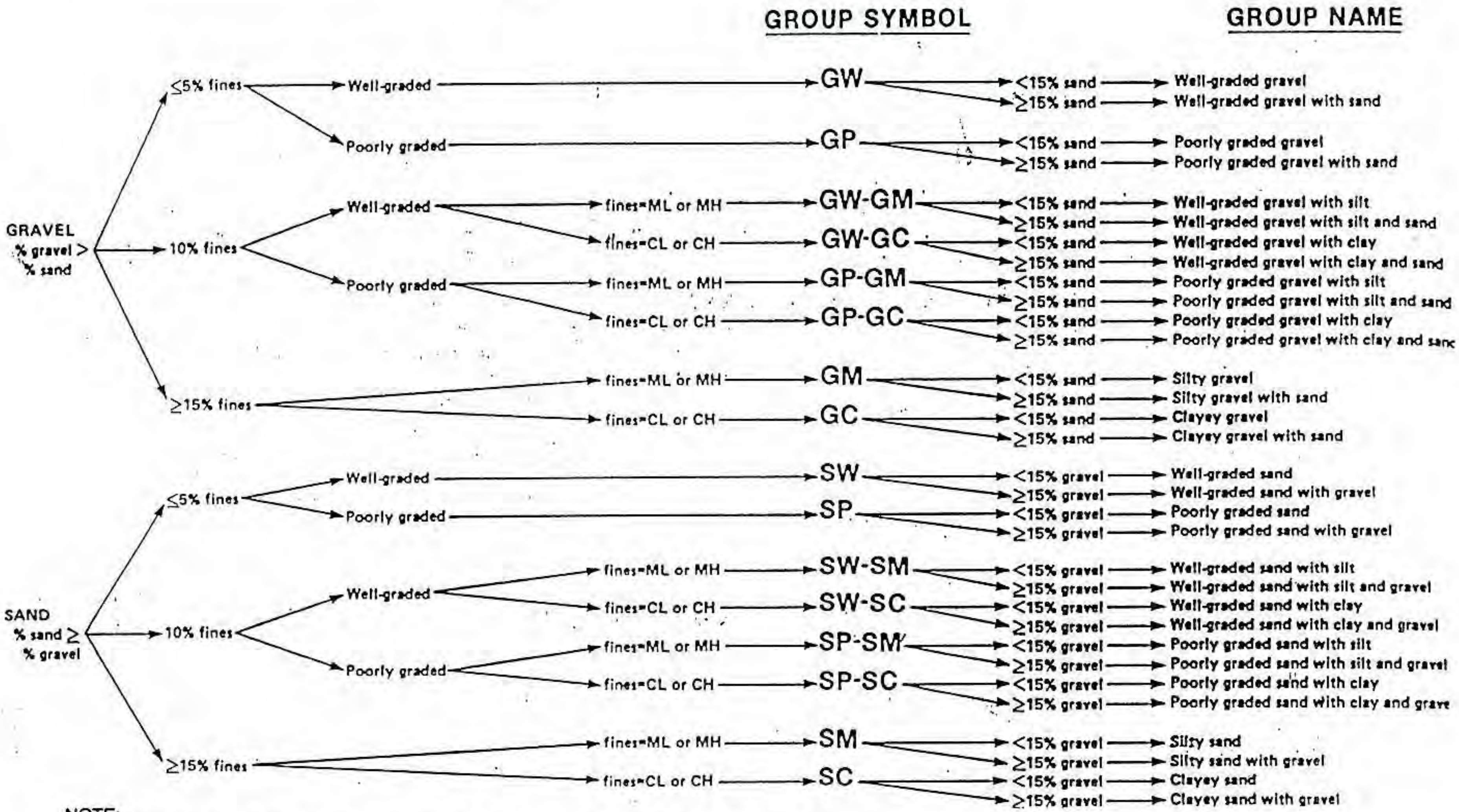
ATTACHMENT B

Unified Soil Classification System and Logging Criteria

GENERAL SOIL CATEGORIES			SYMBOLS	TYPICAL SOIL TYPES
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	**GRAVEL** More than half coarse fraction is larger than No. 4 sieve size	Clean Gravel with little or no fines	GW	Well Graded Gravel, Gravel-Sand Mixtures
			GP	Poorly Graded Gravel, Gravel-Sand Mixtures
		Gravel with more than 12% fines	GM	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures
	SAND More than half coarse fraction is smaller than No. 4 sieve size	Clean sand with little or no fines	SW	Well Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sand with more than 12% fines	SM	Silty Sand, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sand, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 sieve	**SILT AND CLAY** Liquid Limit Less than 50%		ML	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity
			CL	Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay
			OL	Organic Clay and Organic Silty Clay of Low Plasticity
	SILT AND CLAY Liquid Limit Greater than 50%		MH	Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt
			CH	Inorganic Clay of High Plasticity, Fat Clay
			OH	Organic Clay of Medium to High Plasticity, Organic Silt
HIGHLY ORGANIC SOILS			PT	Peat and Other Highly Organic Soils

UNIFIED SOIL CLASSIFICATION SYSTEM

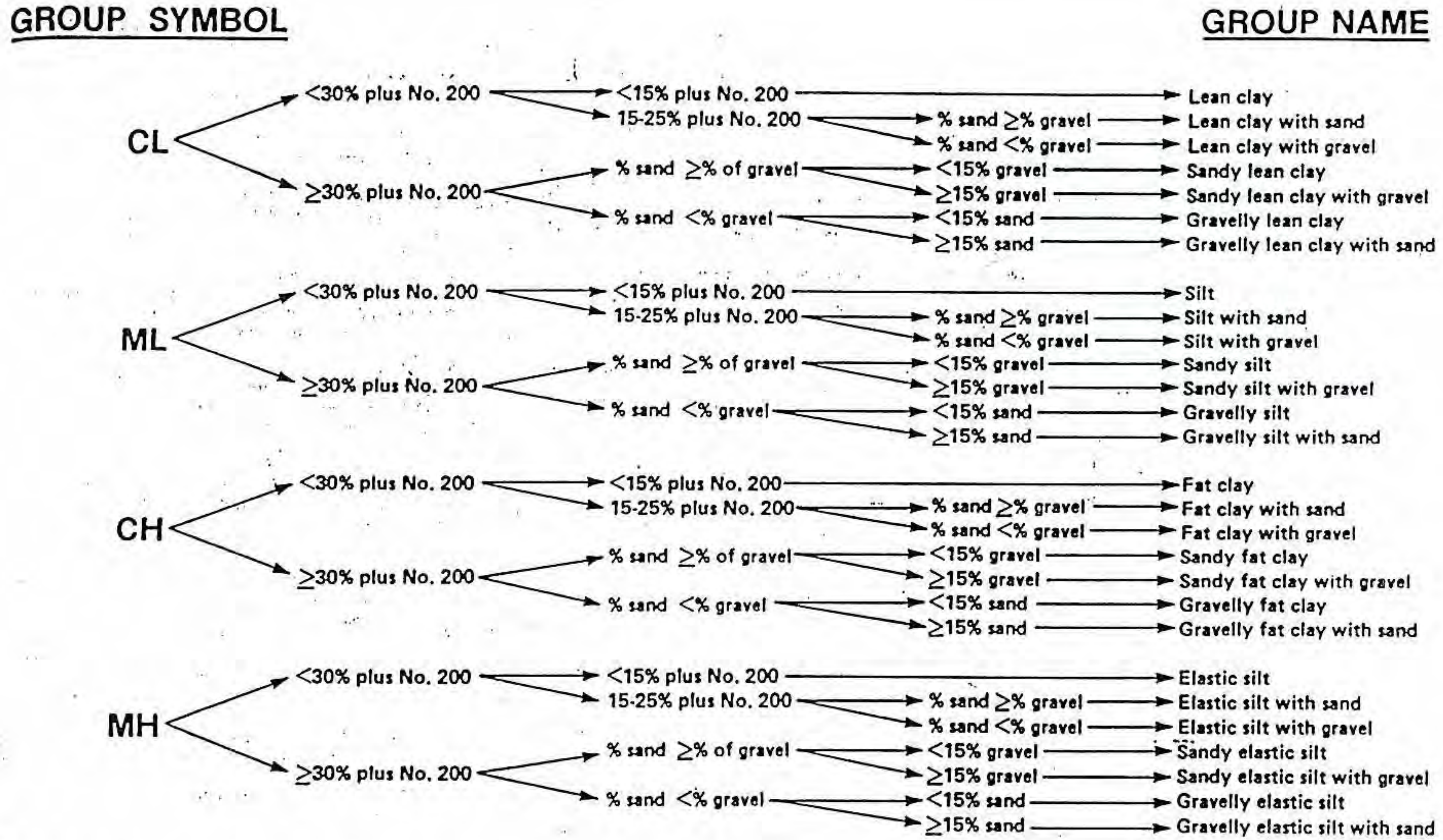
JOB NUMBER	DATE	APPROVED	PLATE



NOTE:
Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5%
(After ASTM Designation D2488 Standard Test Method for Classification of Soils for Engineering Purposes)

Flow Chart for Classifying Coarse-grained Soil
(50% or more retained on No. 200 sieve)

Field Guide for Soil Classification and Logging Procedures



NOTE:
Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5%
(After ASTM Designation D2488 Standard Test Method for Classification of Soils for Engineering Purposes)

Flow Chart for Classifying Fine-grained Soil
(50% or more passing No. 200 sieve)
Field Guide for Soil Classification and Logging Procedures

similar, the material is classified as poorly graded or well sorted. If fines represent less than 5 percent of the total mass, the symbol SP is used for a poorly-graded sand and SW for a well graded sand. If silts and/or clays exceed 12 percent, the symbols GC, SC, GM, and SM are used, respectively.

If the silts and clays are between 5 to 12 percent of the total sample weight, a dual classification with two group symbols is used. The first symbol is GW, GP, SW, or, SP, and the second is GC, GM, SC, or SM. The group name corresponds to the first group symbol plus the modifying words "with clay" or "with silt" to indicate the plasticity characteristics. If the fines plot on the CL-ML range on the plasticity chart (Figure 2-2), possible dual classification group names are:

GW-GM	well graded gravel with silt
GW-GC	well graded gravel with clay
GP-GM	poorly graded gravel with silt
GP-GC	poorly graded gravel with clay
SW-SM	well graded sand with silt
SW-SC	well graded sand with clay
SP-SM	poorly graded sand with silt
SP-SC	poorly graded sand with clay

If silts and clays exceed 12 percent of the total weight of sample, the modifiers "M" and "C" are used, respectively. If a sand or gravel has more than 15 percent of the other coarse-grained constituent, the words "with gravel" or "with sand" are added to the group name. A flow chart for classifying coarse-grained soils is presented in Figure 2-3.

2.2 Fine-grained Soils

Particles passing the No. 200 sieve are silts (M) and clays (C). These soils must undergo testing in order to differentiate between them. Typical tests used are: dry strength, dilatancy, toughness, and plasticity. These terms are further discussed in Tables 2-2 through Table 2-6. Silts have little or no dry strength when dry, while clays have considerable dry strength. Dry strength, dilatancy, and toughness are also used to identify the fine-grained fraction of coarse-grained soils.

TABLE 2-2
Criteria for Describing Dry Strength

Description	Criteria
None	The dry specimen crumbles into powder with the mere pressure of handling.
Low	The dry specimen crumbles into powder with some finger pressure.
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure.
High	The dry specimen cannot be broken with finger pressure. The specimen will break into pieces between the thumb and a hard surface.
Very high	The dry specimen cannot be broken between the thumb and a hard surface.

TABLE 2-3
Criteria for Describing Dilatancy

Description	Criteria
None	There is no visible change in the specimen.
Slow	Water appears slowly on the surface of the specimen during shaking, and does not disappear, or disappears slowly upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking, and disappears quickly upon squeezing.

TABLE 2-4
Criteria for Describing Toughness

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness.
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness.

TABLE 2-5
Identification of Inorganic Fine-grained Soils from Manual Tests

Soil Symbol	Dry Strength	Dilatancy	Toughness
ML	None to low	Slow to rapid	Low or thread cannot form
CL	Medium to high	None to slow	Medium
MH	Low to medium	None to slow	Low to medium
CH	High to very high	None	High

TABLE 2-6
Criteria for Describing Plasticity

Description	Criteria
Nonplastic	A 1/8-inch (3-mm) thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to read the plastic limit. The thread cannot be re-rolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be re-rolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier that the plastic limit.

Fine-grained soils are accurately determined in the laboratory using the Atterberg Limits test. This test include liquid limit, plastic limit, and plasticity index measurements. The liquid limit is the water content of a soil at the point of transition from a plastic to a liquid state. The plastic limit is the water content of a soil at the point of transition from a semisolid to a plastic state. The plasticity index is the difference between the liquid limit and the plastic limit.

As shown in the Figure 2-2, five fields have been identified. These include:

- Silty Clays (CL), Organic Silts (OL) or Organic Silty Clays (OL) of low plasticity
- Fat Clays (CH) and Organic Clays (OH)
- Inorganic Silts (ML) and Organic Silty Clays (OL) of low plasticity
- Silts (MH) and Organic Clays (OH) of a high plasticity
- Silty Clays to Clayey Silt (CL-ML) of low plasticity

Fine-grained soils with a liquid limit > 50 are modified by the symbol H (MH or CH), and those with a liquid limit < 50 are modified by the symbol L (ML or CL). Fine-grained soils containing 30 percent or more coarse-grained fraction should be modified by descriptive terms, such as "gravelly" or "sandy." If the coarse fraction is between 15 and 30 percent, the words" with sand and/or gravel" should be added to the group name. A flow chart for classifying fine-grained soils is presented in Figure 2-4.

2.3 Organic Soils

To classify organic soils, the percentage organic material present in the soil as well as the non-organic fines must be estimated. When the organic content ranges from 18 to 36 percent, the material is an organic clay or an organic silt, depending on the nature of the fine-grained constituents. When the organic content is between 36 and 90 percent, the material is designated a muck or peaty muck (OL or OH). A flow chart for classifying organic soil is presented in Figure 2-4. The term "peaty" is added if the organic remains are

SOP-B3

Borehole Sampling and Logging of Soil Borings Standard Operating Procedures for PG&E Topock Program

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This standard operating procedure (SOP) provides guidance for sample collection from soil borings during the drilling process, and proper documentation necessary. Detailed guidance for sample collection, preservation and handling is provided in Section 4.0 of the site Quality Assurance Project Plan (QAPP) and in the Topock Program *Sampling, Analysis, and Field Procedures Manual* (Procedures Manual). SOP-B2 provides detailed guidance for soil characterization and logging.

REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan (SAP), work plan or event-specific field instructions. Planned borehole depth, proposed well construction/specifications, and field sampling summary table, if available.
2) Applicable project work plan or monitoring plan. Refer to the Procedures Manual and QAPP, as required.
3) Topock Program Health and Safety Plan (HSP).
4) Previous sampling, drilling, or well construction logs from other boreholes or wells in the vicinity, if available.
5) Blank sampling log and field notebook.

PREPARATION AND SETUP

1) Review event-specific work plan or event-specific field instructions, previous sampling logs, Procedures Manual, and HSP.
2) Initiate field logbook for sampling activity.
3) Review sampling procedures and equipment, and planned sample depths with drilling contractor and field crew.

Equipment List

- Field logbook
- Borehole log
- Blue or black waterproof or permanent ink pens
- Trash bags
- Plastic sandwich bags
- Paper towels

- Stainless steel sampling equipment (provided by driller)
- Decontamination equipment (Alconox® solution in spray bottle, brushes, buckets, rinse water spray bottle)
- Soil sample containers appropriate for sample analysis and preservation as called for in SAP and QAPP (glass jars, brass sleeves, Encore® containers, sandwich bags, etc.)
- Soil sampling equipment not provided by driller (spatula or putty knife, stainless steel compositing bowl, hand auger, etc.)
- Groundwater sample containers appropriate for sample analysis and preservation as called for in SAP and QAPP (glass jars, VOA vials, plastic jars, etc.)
- Groundwater sample equipment not provided by driller (pump, filters, tubing, power supply, etc.)
- Water quality meters
- Water level indicator
- Distilled water
- Coolers with ice
- Protective waterproof gloves (nitrile or latex)

GUIDELINES

Soil Boring Logs Documentation

Soil boring logs will be completed on the soil boring log forms during the drilling activities at the time of the logging and soil descriptions. Information collected will be consistent with the standard CH2M HILL form (See SOP-B2 attachment A). Sample data may also be documented in the comments section of the boring log.

Items documented on the borehole log include:

1) **Sample Interval:** The top and bottom depth of each sample run should be recorded on the borelog. Sampling includes samples collected for analysis as well as core retrieved for logging purposes.
2) **Sample Type and Number:** Enter the sample type and number consistent with the sampling and analysis plan at the correct depth intervals. An “x” should be placed across the vertical interval where the environmental soil, grab groundwater, or geotechnical sample was collected.
3) **Sample Recovery:** Enter the length of retrieved core to the nearest 0.1 foot of sample recovered, and record the value in feet. Do not count slough or caved material as part of the total recovered length of core. Record total length and percent of sample recovered. If using a 5-foot sample barrel, multiply the total length by 2 and 100 to get a percentage number. Similarly, if using a 2.5-foot sampler, multiply by 4 and 100 to get the percent recovery.

4) **Sampling:** Sampling difficulties shall be noted. Disturbed samples shall be noted on the log as well as the sample recovery. The top of the sample shall be marked on the container.

5) **Water Levels:** Water-level measurements, where groundwater is encountered, are required for each boring. Changes in soil moisture shall be noted and, if there is no water encountered, a note to that effect shall be included on the borehole log. The date and time of water-level measurements shall be documented.

At a minimum, sample identifiers (IDs) should be noted on boring logs at the depth collected. When time and space allows, a summary of analytical sample information can be included. When inclusion of these data prevents documentation of drilling information, sample data should be omitted in order to document drilling.

Borehole Sampling by Drilling—General Procedure

Split-spoon sampling procedures shall be executed in accordance with American Society for Testing and Materials (ASTM) D1586, "Standard Method for Penetration Test and Split-barrel Sampling of Soils" (ASTM 1984). California (2-inch) or Modified California (2.5-inch) split-barrel samplers may also be used.

1) The split-spoon or split-barrel sampler shall be advanced to the top of the sampling interval using a wire-line or sample rods such as A or AW. The larger-diameter samplers may be fitted with three 6-inch-long stainless-steel sleeves. The sampler shall be driven 18 inches or to refusal, with a 140-pound hammer dropping repeatedly 30 inches. Refusal shall be defined as requiring 50 blows with the hammer to advance the sampler less than 6 inches.

2) The number of blows required to drive the sampler each 6 inches shall be recorded on the borelog.

3) As the sample tubes are disassembled, an organic vapor monitor probe shall be inserted into the gap between two sample liners, and the liner exhibiting the highest reading shall be selected for analysis.

4) In general, the middle liner is collected for laboratory analysis, and 10 percent of the bottom liners are collected for quality assurance testing. A sample of the soil in the top liner typically is placed in a re-sealable plastic bag or 8-ounce clear glass jar and left in the sun for approximately 15 minutes to allow any volatile organic compounds (VOC) to volatilize.

5) After the 15 minute volatilization period, the soil vapor in the plastic bag is then measured for VOCs by taking a reading of the headspace. Background VOCs for the bag are determined by monitoring the air in an empty bag.

6) Results of the organic vapor monitoring are recorded on the boring log.

7) Small portions of soil at the ends of the sleeve are scraped off for classification.

Borehole Sampling by Drilling—Split Spoon Sampling

1) Samples collected for laboratory analysis using split spoon sampling device will be separated and transferred from the split-spoon halves into sample jars by clean stainless-steel utensils.

2) Samples for VOCs will be separated and collected first, followed by semivolatile organic compounds samples.

3) For VOC samples, avoid mixing the soil before sampling and sample directly from the split spoon. See SOPs for guidance on homogenizing soil samples and for VOC sampling using EnCore samplers, respectively.

Borehole Sampling by Drilling—Direct-push Sampling

1) Samples collected for laboratory analysis using a direct-push sampling drill rig will be handled by either opening the tube and placing the soil in sample jars or cutting the acetate tube and submitting it the laboratory directly.

2) For samples that will be removed from the acetate tube, the tube will be cut open longitudinally using a double-bladed razor knife.

    - Soil will be inspected and logged prior to removal of soil samples.
    - A short section of soil will be removed from the acetate sleeve using a stainless-steel utensil, homogenized in a clean stainless-steel bowl, and placed in sample jars.
    - Soil collected for VOC analysis will be sampled directly from the split acetate sleeve using EnCore samplers.

3) Alternatively, a short (6-inch) length of liner will be cut from the acetate sleeve and collected directly for laboratory analysis.

    - The section of acetate liner will be removed, capped with Teflon sheeting and plastic end caps at both ends, and taped with clear label or packing tape.
    - Labels shall be affixed to the liners with job designation, time, boring number, sample depth interval, sample number, date sampled, and the initials of the sampler clearly marked.
    - The samples shall then be enclosed in a plastic bag and stored in a cooler maintained at 4°C.
    - Sample information shall be placed on the chain-of-custody, the borelog, and the field logbook. All samples shall be handled in accordance with *Chain of Custody Procedures*.

Borehole Sampling by Drilling—Split-barrel Sampling

Soil samples can also be collected using a 3-foot-long or 5-foot-long split-barrel sampler. The split-barrel sampler is similar to the split-spoon sampler that is used to hold steel or brass sampling sleeves, but the split-barrel sampler typically is not used to hold sample sleeves.

1) The sampler is lowered to the base of the drill bit and is advanced slightly ahead of the drill bit and augers (or conductor casing). The weight of the drill string and sample barrel along with the drilling and cutting action of the drill bit advances the face of the split-barrel sampler into the formation.
2) Once the desired depth interval is reached, the split-barrel sampler is retrieved using a cable or tool steel sections.
3) The retrieved sampler is unscrewed, and one or both halves are laid on the sample table. The soil typically will form a continuous column of soil in one of the split-barrel halves.
4) The soil column is split longitudinally for soil descriptions using a putty knife or spatula.
5) Samples for VOC analysis are collected immediately directly from the soil column.
6) Other soil samples are collected after the core section has been described and logged. The soil is described following the procedures in the following sections.

Groundwater Sampling

1) Groundwater samples can be collected by hydropunch by bailer or by pumping from an isolated zone. Collection of groundwater by bailing is not an accurate method of collection depth discrete groundwater samples, as the zone sampled is poorly isolated.
2) Hydropunch samples are collected below the bit of the drill stem, in relatively undisturbed soil zone. This method of sample collection may be difficult in fine-textured soils and in very rocky soils. To collect these samples, a point is driven below the depth of the drill bit, then a screen zone is opened within this point and water allowed to flow in. The hydropunch tool must be decontaminated between samples.

Groundwater can also be collected from the open or cased borehole with a bailer. A disposable or decontaminated stainless-steel bailer is lowered into the boring, and water is collected. This method is preferable for collection of groundwater from the water table. Attempts can be made to collect discrete groundwater samples beneath the water table; however, the boring must be cased with watertight, stainless-steel pipe, and the boring must be evacuated prior to collection of samples.

Alternatively, discrete groundwater samples can be collected by isolating a zone with casing and packers. To collect these samples, the borehole is first advanced to the depth at which a sample is required. Then casing is advanced to within 20 feet of the sample zone. Next, a pump and packers are lowered into the hole. The zone from which samples are to be collected is isolated with a packer, and water is pumped directly from the target zone.

Sample Handling

Sample preservation and sampling procedures are detailed in Section 4.0 of the QAPP. Additional information is provided in the Procedures Manual and in the appropriate SAP.

KEY CHECKS AND ITEMS

- Check entries to the soil boring log and field logbook in the field during sampling activities because the samples will be disposed at the end of the fieldwork, confirmation and corrections cannot be made later.

- Check that the sample numbers and intervals are properly specified.
- Ensure that drilling equipment is decontaminated prior to the beginning of work and between each borehole.
- All materials generated during sampling (debris, PPE, decontamination liquids, etc.) will be placed in 55-gallon drums or roll-off bins for storage pending analysis and disposal off site, as outlined in SOP 39, Standard of Practice H-83, and Appendix D of the project *Soil and Groundwater Management Plan*.

ATTACHMENT A

Examples of Soil Bore Logs

CH2MHILL

PROJECT NUMBER	BORING NUMBER SHEET OF

SOIL BORING LOG

PROJECT ______________________ LOCATION ______________________

ELEVATION ______________ DRILLING CONTRACTOR ______________________

DRILLING METHOD AND EQUIPMENT ______________________

WATER LEVELS ______________ START ________ FINISH ________ LOGGER ________

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION

SHEET 1 of 9	PROJECT NUMBER: 326128.01.16.EN	BORING NUMBER: *MW-47*

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program	**HOLE DEPTH (ft):** 288.0	**DRILLING CONTRACTOR:** Prosonic Corp. Phoenix, AZ	
SURFACE ELEVATION: 482.6 ft. MSL	**NORTHING (CCS NAD 27 Z 5):** 2,103,450.05	**EASTING (CCS NAD 27 Z 5):** 7,615,629.49	**DATE STARTED:** 02/27/2006 **DATE COMPLETED:** 03/13/2006
DRILLING METHOD: Rotosonic		**DRILLING EQUIPMENT:** Sonic AT (track mounted)	
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California		**LOGGED BY:** B. Moayyad, K. Ebel	

DEPTH BGS (feet)	SAMPLE INTERVAL	SAMPLE TYPE/ NUMBER	SAMPLE RECOVERY (ft)	USCS CODE	SOIL DESCRIPTION: SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS: DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
			6	SP	**POORLY GRADED SAND (SP)** - very lt brn (10YR7/3), =2% fines, 98% f to m lithic quartz sand, subang to subrnd, dry - fine roots, iron staining, some iron oxide coating on grains	Hand augured to 5' bgs
5					- slightly moist - dry	
10			10			Rapid drill rate, no chatter
15				SW	**WELL GRADED SAND w/ GRAVEL (SW)** - lt yellowish brn (10YR6/4), 45% gravel up to 7cm, 50% f to m sand, 5% fines, loose, met subang gravel, dry(moist@ 17') - cobble present in slough - one subrnd chert gravel - Possible Fluvially Reworked Alluvium	
20					- lt grey (10YR7/2), subang to rnd met gravel up to 9cm, 2% to 5% fines - dk yellowish brn (10YR4/4), mostly c sand subang to ang, met, some Miocene conglomerate gravel - 65% sand, 30% gravel up to 4cm, 5% fines	
25			16	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - dk yellowish brn (10YR3/6), 35% gravel up to 4cm, 55% m to c sand, 10% silty fines, met clasts are grain supported some mm siltstone - some oxide staining	
30				SW	**WELL GRADED SAND w/ GRAVEL AND CLAY (SW)** - dk yellowish brn (10YR3/6), 30% subang met gravel up to 7 cm, 55% subrnd to subang m to c sand, 15% clayey fines, m density, moist	Drill rate slowed to clean out 8" pipe
35						

CH2MHILL

SHEET 2 of 9	**PROJECT NUMBER:** 326128.01.16.EN	**BORING NUMBER:** ***MW-47***

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program
HOLE DEPTH (ft): 288.0
DRILLING CONTRACTOR: Prosonic Corp. Phoenix, AZ
SURFACE ELEVATION: 482.6 ft. MSL
NORTHING (CCS NAD 27 Z 5): 2,103,450.05
EASTING (CCS NAD 27 Z 5): 7,615,629.49
DATE STARTED: 02/27/2006
DATE COMPLETED: 03/13/2006
DRILLING METHOD: Rotosonic
DRILLING EQUIPMENT: Sonic AT (track mounted)
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California
LOGGED BY: B. Moayyad, K. Ebel

DEPTH BGS (feet)	SAMPLE INTERVAL	SAMPLE TYPE/ NUMBER	SAMPLE RECOVERY (ft)	USCS CODE	SOIL DESCRIPTION SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
			2.5	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - dr yellowish brn (10YR3/6), 30% gravel, 60% sand, 10% silty fines	Drilling smooth but preceeds less rapidly
40 45			10	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - 40% subang met gravel up to 6cm, 55% subrnd to ang sand, 5% fines - more gravel below 38' - gravel is mostly fine	
50			10	SW	**WELL GRADED SAND w/ GRAVEL (SW)** - Pale brn (10YR6/3), 30% subang met gravel up to 5cm, 60% subrnd to subang m to c met sand, 10% silty fines, wet	Soil sample collected
				SP	**POORLY GRADED SAND w/ GRAVEL (SP)** - pale brn (10TR6/3), 30% f subang gravel up to 2 cm, 65% mostly c sand, =2% fines	
55				SW	**WELL GRADED SAND w/ GRAVEL (SW)** - yellowish brn (10YR5/4), 40% subang met gravel up to 9cm, 55% f to c met sand, 5% silty fines, clast supported, m density, wet	
60 65			9.5	GW	**WELL GRADED GRAVEL w/ SILT AND SAND (GW)** - brn (7.5YR5/4), 55% subang to ang met gravel up to 4cm, 25% f to c sand, 20% silty fines, dense, moist to dry - soil dries out - lt grey (10YR7/2) and powder dry - moist sandy zone, 55% gravel, 35% sand, 10% fines - dry silty lt grey GW below 65'	Collected Isoflow sample Drill rate slows to 2' / min
70				SW	**WELL GRADED SAND w/ GRAVEL (SW)** - yellowish brn (10YR5/4), 35% subang met gravel up to 4cm, 60% subrnd sand, 5% silty fines, loose, moist to wet	Moderate Drill Rate

CH2MHILL

SHEET 5 of 9	**PROJECT NUMBER:** 326128.01.16.EN	**BORING NUMBER:** *MW-47*

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program		**HOLE DEPTH (ft):** 288.0	**DRILLING CONTRACTOR:** Prosonic Corp. Phoenix, AZ	
SURFACE ELEVATION: 482.6 ft. MSL	**NORTHING (CCS NAD 27 Z 5):** 2,103,450.05	**EASTING (CCS NAD 27 Z 5):** 7,615,629.49	**DATE STARTED:** 02/27/2006	**DATE COMPLETED:** 03/13/2006
DRILLING METHOD: Rotosonic			**DRILLING EQUIPMENT:** Sonic AT (track mounted)	
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California			**LOGGED BY:** B. Moayyad, K. Ebel	

DEPTH BGS (feet)	SAMPLE INTERVAL	SAMPLE TYPE/ NUMBER	SAMPLE RECOVERY (ft)	USCS CODE	SOIL DESCRIPTION SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
			6	SP	**POORLY GRADED SAND w/ SILT (SP)** - brn (7.5YR4/4), 5% subrnd to subang met gravel up to 4cm, 85% f to c sand, 10% fines, poorly graded, wet, no odor	
145			3	SM	**SILTY SAND W/ GRAVEL (SM)** - brn (7.5YR4/4), 20% subang to subrnd gravel up to 6cm, 60% f to c sand, 20% silty fines, well graded, m consolidated, met, wet, no odor	
150			5	SM	**SILTY SAND w/ GRAVEL (SM)** - dk yellowish brn (10YR4/4), 25% subang to subrnd up to 4cm met gravel, 60% well graded f to c sand, 15% fines, wet, no odor	
155			4	SW	**WELL GRADED SAND w/ SILT AND SAND (SW)** - dr yellowish brn (10YR4/4), 10% subang to subrnd up to 3cm met gravel, 75%well graded f to c sand, 15% fines, moist to wet	
			2	SW	**SILTY SAND (SM)** - brn (7.5YR4/4), 5% ang to subrnd met gravel up to 1.5cm increasing with depth, 85% poorly graded m to c sand, 10% fines, loose, wet	
			2	SM	**SILTY SAND w/ GRAVEL (SM)** - dk yellowish brn (10YR4/4), 15% subang to subrnd up to 2.5cm met gravel, 75% well graded f to c sand, 10% fines, mostly met, trace chert, loose, wet, no odor	Collected Isoflow sample
160			4	SM	**SILTY SAND W/ GRAVEL (SM)** - brn (7.5YR4/4), 25% subang to subrnd gravel up to 6.5cm, 60% m to c sand, 15% silty fines, well graded, m consolidated, met, wet, no odor	Drill rate = 0.75' to 1.5' / min
165			4	SW	**SILTY SAND (SW)** - mottled dk reddish brn (5YR3/4), 10% subang to subrnd gravel up to 2.5cm, 50% well graded f to m sand, 40% silt, metamorphic, dry to damp, no odor, interbedded sandy silt laminations	
170			5.5	SW	**SAND w/ GRAVEL (SW)** - dk reddish brn (5YR3/4), 20% subang to subrnd gravel up to 5cm, 75% f to c sand, 5% fines, well graded, loose, met, wet	
175			2.5	SM	**SILTY SAND w/ GRAVEL (SM)** - brn (7.5YR4/4), 15% subang to subrnd gravel, 70% f to m sand, 15% fines, poorly graded, met,increasingly consolidated, slightly to moderately calcareous, moist to wet	

CH2MHILL

SHEET 9 of 9	**PROJECT NUMBER:** 326128.01.16.EN	**BORING NUMBER:** *MW-47*

SOIL BORING LOG - DRAFT FOR DISCUSSION

PROJECT NAME: IMPM Drill Program		**HOLE DEPTH (ft):** 288.0	**DRILLING CONTRACTOR:** Prosonic Corp. Phoenix, AZ	
SURFACE ELEVATION: 482.6 ft. MSL	**NORTHING (CCS NAD 27 Z 5):** 2,103,450.05	**EASTING (CCS NAD 27 Z 5):** 7,615,629.49	**DATE STARTED:** 02/27/2006	**DATE COMPLETED:** 03/13/2006
DRILLING METHOD: Rotosonic			**DRILLING EQUIPMENT:** Sonic AT (track mounted)	
LOCATION: PG&E Compressor Station - Flood Plain, Topock, California			**LOGGED BY:** B. Moayyad, K. Ebel	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)		SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
285			0	BR	**MIOCENE CONGLOMERATE BEDROCK (BR)** - 60% well graded subang to rnd gravel up to 10cm, 30% well graded sand, 10% fines, very calcareous, well consolidated to mostly hard, mod to very altered locally, mostly met, dry to moist	

Boring Terminated at 288 ft

ABBREVIATIONS

cc = continuous core run
brn = brown
lt = light
dk = dark
vf = very fine-grained
f = fine-grained
m = medium-grained
c = coarse-grained
vc = very coarse-grained
ang = angular
subang = subangular
subrnd = subrounded
rnd = rounded
br = bedrock formation
ss = sandstone
conglom = conglomerate
comptd = compacted
qtz = quartz

CH2MHILL

ATTACHMENT B

Unified Soil Classification System and Logging Criteria

GENERAL SOIL CATEGORIES			SYMBOLS	TYPICAL SOIL TYPES
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	**GRAVEL** More than half coarse fraction is larger than No. 4 sieve size	Clean Gravel with little or no fines	GW	Well Graded Gravel, Gravel-Sand Mixtures
			GP	Poorly Graded Gravel, Gravel-Sand Mixtures
		Gravel with more than 12% fines	GM	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures
	SAND More than half coarse fraction is smaller than No. 4 sieve size	Clean sand with little or no fines	SW	Well Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sand with more than 12% fines	SM	Silty Sand, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sand, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 sieve	**SILT AND CLAY** Liquid Limit Less than 50%		ML	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity
			CL	Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay
			OL	Organic Clay and Organic Silty Clay of Low Plasticity
	SILT AND CLAY Liquid Limit Greater than 50%		MH	Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt
			CH	Inorganic Clay of High Plasticity, Fat Clay
			OH	Organic Clay of Medium to High Plasticity, Organic Silt
HIGHLY ORGANIC SOILS			PT	Peat and Other Highly Organic Soils

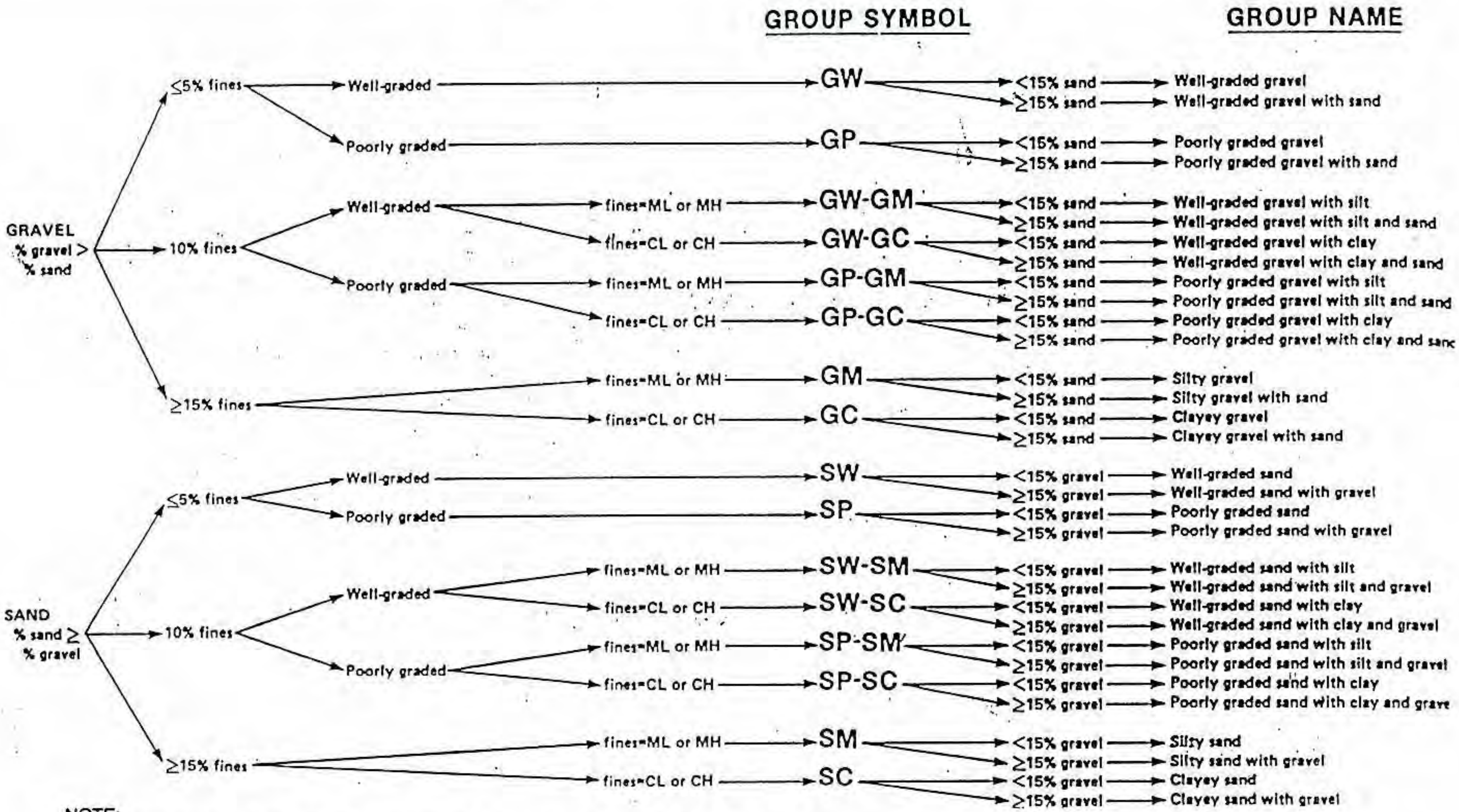
UNIFIED SOIL CLASSIFICATION SYSTEM

JOB NUMBER

DATE

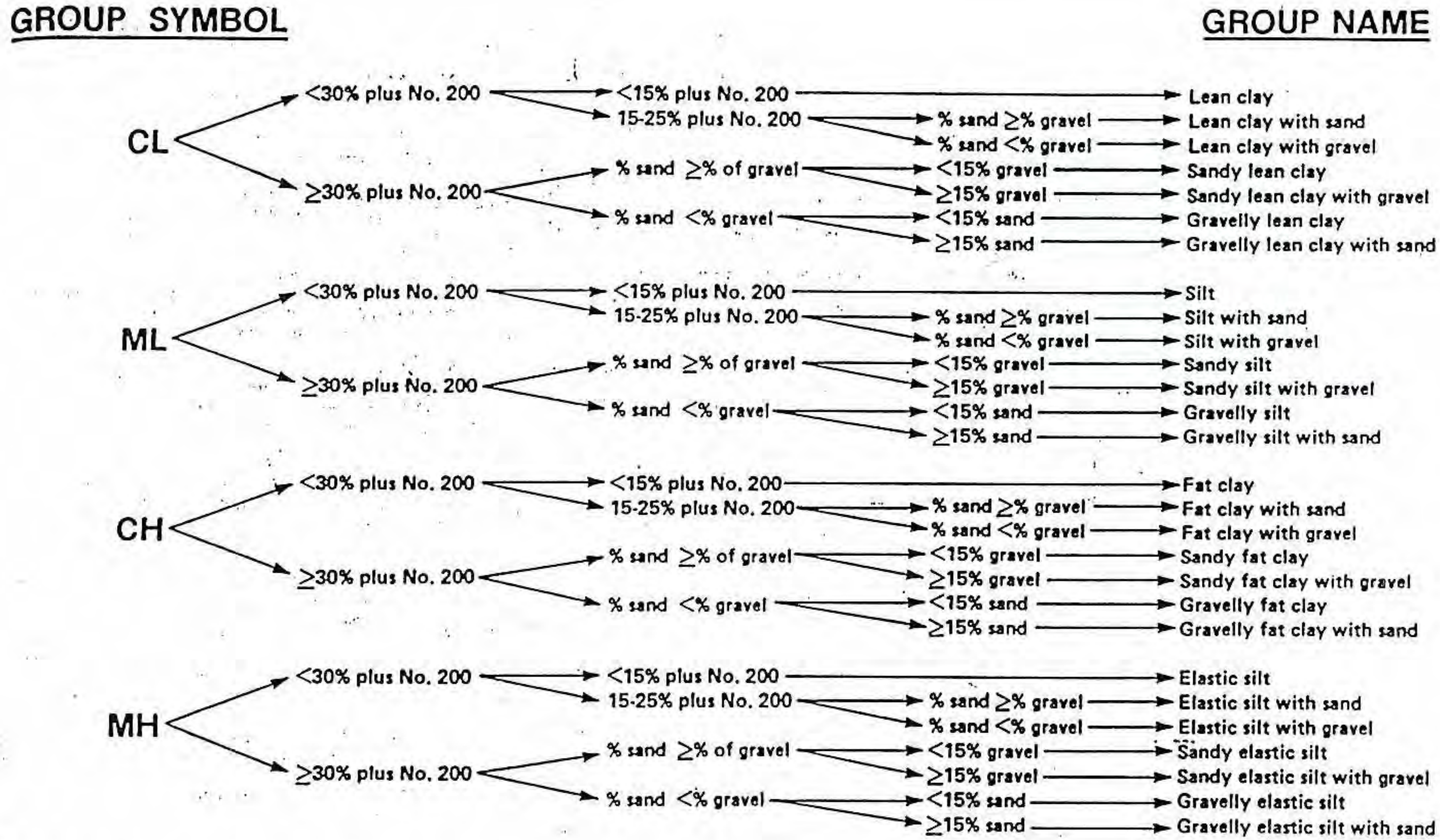
APPROVED

PLATE



NOTE:
Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5%
(After ASTM Designation D2488 Standard Test Method for Classification of Soils for Engineering Purposes)

Flow Chart for Classifying Coarse-grained Soil
(50% or more retained on No. 200 sieve)
Field Guide for Soil Classification and Logging Procedures



NOTE:
Percentages are based on estimating amounts of fines, sand, and gravel to the nearest 5%
(After ASTM Designation D2488 Standard Test Method for Classification of Soils for Engineering Purposes)

Flow Chart for Classifying Fine-grained Soil
(50% or more passing No. 200 sieve)
Field Guide for Soil Classification and Logging Procedures

similar, the material is classified as poorly graded or well sorted. If fines represent less than 5 percent of the total mass, the symbol SP is used for a poorly-graded sand and SW for a well graded sand. If silts and/or clays exceed 12 percent, the symbols GC, SC, GM, and SM are used, respectively.

If the silts and clays are between 5 to 12 percent of the total sample weight, a dual classification with two group symbols is used. The first symbol is GW, GP, SW, or, SP, and the second is GC, GM, SC, or SM. The group name corresponds to the first group symbol plus the modifying words "with clay" or "with silt" to indicate the plasticity characteristics. If the fines plot on the CL-ML range on the plasticity chart (Figure 2-2), possible dual classification group names are:

GW-GM	well graded gravel with silt
GW-GC	well graded gravel with clay
GP-GM	poorly graded gravel with silt
GP-GC	poorly graded gravel with clay
SW-SM	well graded sand with silt
SW-SC	well graded sand with clay
SP-SM	poorly graded sand with silt
SP-SC	poorly graded sand with clay

If silts and clays exceed 12 percent of the total weight of sample, the modifiers "M" and "C" are used, respectively. If a sand or gravel has more than 15 percent of the other coarse-grained constituent, the words "with gravel" or "with sand" are added to the group name. A flow chart for classifying coarse-grained soils is presented in Figure 2-3.

2.2 Fine-grained Soils

Particles passing the No. 200 sieve are silts (M) and clays (C). These soils must undergo testing in order to differentiate between them. Typical tests used are: dry strength, dilatancy, toughness, and plasticity. These terms are further discussed in Tables 2-2 through Table 2-6. Silts have little or no dry strength when dry, while clays have considerable dry strength. Dry strength, dilatancy, and toughness are also used to identify the fine-grained fraction of coarse-grained soils.

TABLE 2-2
Criteria for Describing Dry Strength

Description	Criteria
None	The dry specimen crumbles into powder with the mere pressure of handling.
Low	The dry specimen crumbles into powder with some finger pressure.
Medium	The dry specimen breaks into pieces or crumbles with considerable finger pressure.
High	The dry specimen cannot be broken with finger pressure. The specimen will break into pieces between the thumb and a hard surface.
Very high	The dry specimen cannot be broken between the thumb and a hard surface.

TABLE 2-3
Criteria for Describing Dilatancy

Description	Criteria
None	There is no visible change in the specimen.
Slow	Water appears slowly on the surface of the specimen during shaking, and does not disappear, or disappears slowly upon squeezing.
Rapid	Water appears quickly on the surface of the specimen during shaking, and disappears quickly upon squeezing.

TABLE 2-4
Criteria for Describing Toughness

Description	Criteria
Low	Only slight pressure is required to roll the thread near the plastic limit. The thread and the lump are weak and soft.
Medium	Medium pressure is required to roll the thread to near the plastic limit. The thread and the lump have medium stiffness.
High	Considerable pressure is required to roll the thread to near the plastic limit. The thread and the lump have very high stiffness.

TABLE 2-5
Identification of Inorganic Fine-grained Soils from Manual Tests

Soil Symbol	Dry Strength	Dilatancy	Toughness
ML	None to low	Slow to rapid	Low or thread cannot form
CL	Medium to high	None to slow	Medium
MH	Low to medium	None to slow	Low to medium
CH	High to very high	None	High

TABLE 2-6
Criteria for Describing Plasticity

Description	Criteria
Nonplastic	A 1/8-inch (3-mm) thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to read the plastic limit. The thread cannot be re-rolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be re-rolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier that the plastic limit.

Fine-grained soils are accurately determined in the laboratory using the Atterberg Limits test. This test include liquid limit, plastic limit, and plasticity index measurements. The liquid limit is the water content of a soil at the point of transition from a plastic to a liquid state. The plastic limit is the water content of a soil at the point of transition from a semisolid to a plastic state. The plasticity index is the difference between the liquid limit and the plastic limit.

As shown in the Figure 2-2, five fields have been identified. These include:

- Silty Clays (CL), Organic Silts (OL) or Organic Silty Clays (OL) of low plasticity
- Fat Clays (CH) and Organic Clays (OH)
- Inorganic Silts (ML) and Organic Silty Clays (OL) of low plasticity
- Silts (MH) and Organic Clays (OH) of a high plasticity
- Silty Clays to Clayey Silt (CL-ML) of low plasticity

Fine-grained soils with a liquid limit > 50 are modified by the symbol H (MH or CH), and those with a liquid limit < 50 are modified by the symbol L (ML or CL). Fine-grained soils containing 30 percent or more coarse-grained fraction should be modified by descriptive terms, such as "gravelly" or "sandy." If the coarse fraction is between 15 and 30 percent, the words" with sand and/or gravel" should be added to the group name. A flow chart for classifying fine-grained soils is presented in Figure 2-4.

2.3 Organic Soils

To classify organic soils, the percentage organic material present in the soil as well as the non-organic fines must be estimated. When the organic content ranges from 18 to 36 percent, the material is an organic clay or an organic silt, depending on the nature of the fine-grained constituents. When the organic content is between 36 and 90 percent, the material is designated a muck or peaty muck (OL or OH). A flow chart for classifying organic soil is presented in Figure 2-4. The term "peaty" is added if the organic remains are

SOP-B5

Decontamination of Personnel and Equipment, Well Drilling, and Subsurface Sampling and Investigations
Standard Operating Procedures for PG&E Topock Program

This standard operating procedure provides general guidelines for the decontamination of personnel, sampling equipment, and monitoring equipment used in potentially-contaminated areas.

REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan (SAP).
2) Applicable project work plan or monitoring plan, which includes a health and safety plan. Refer to Topock Program *Sampling, Analysis, and Field Procedures Manual* and *Quality Assurance Project Plan*, as required.

PREPARATION AND SETUP

1) Initiate field log sampling book for activity.
2) Inspect all equipment necessary to carry out activities detailed in event-specific SAP.
3) Review decontamination guidelines for equipment necessary to carry out activities.

Equipment List

- Demonstrated analyte-free, deionized water (specifically, ASTM Type II water)
- Distilled water
- Potable water; must be from a municipal water supplier, otherwise an analysis must be run for appropriate volatile and semivolatile organic compounds and inorganic chemicals (e.g., Target Compound List and Target Analyte List chemicals)
- 2.5% (W/W) Liquinox® and water solution
- Large plastic pails or tubs for Liquinox® and water, scrub brushes, spray or squirt bottles for Liquinox® solution, and distilled or deionized water, plastic bags, and sheets
- Department of Transportation (DOT)-approved 55-gallon drum for disposal of waste
- Nitrile or latex gloves
- Decontamination pad and steam cleaner/high pressure cleaner for large equipment

GUIDELINES

Personnel Decontamination

Decontamination should be performed after completion of tasks whenever personnel come in contact with contaminated (or potentially-contaminated) soils or fluids. Full or emergency decontamination should be performed when contaminant concentrations are not known and when potentially-contaminated fluids come into contact with skin beneath clothing, eyes, nose, or ears.

Procedures for full/emergency decontamination are to:

1) Remove contaminated clothing.
2) Step into containment area (decontamination pad or large pail).
3) Rinse away fluids and soil.
4) Wash skin with Liquinox® solution in such a way as to not abrade skin. (Liquinox® solution should be made with potable water and sufficient detergent to create foamy suds.) Eyes and mucus membranes in contact with contaminants must be washed with eye wash or drinking water continuously for at least 15 minutes.
5) Rinse with potable water.
6) If no other clothes are available, wash affected clothes in Liquinox® solution prior to donning. If other clothes are available, contaminated clothes may be isolated for later wash or disposed of along with personal protective equipment (PPE).
7) Any PPE worn (including disposable latex booties, gloves, and disposable coveralls) should be discarded into DOT-approved 55-gallon drum located at the MW-20 bench.
8) Dispose of wash and rinseate water in an appropriate container with other chromium contaminated fluids. These fluids may be taken to the MW-20 bench for treatment or to a Baker® tank within the PG&E facility for containerization.
9) Replace all appropriate clothing and PPE before resuming work or departing site.

Moist soil or water containing known concentrations of hexavalent chromium less than 50 parts per billion that comes into contact with hands need not require full decontamination. Dry soil containing chromium that comes into contact with clothing can also be decontaminated in an abbreviated manner.

Daily decontamination and minor exposure contact decontamination procedures are to:

1) Wash hands and skin that comes in contact with soils or water that may contain small concentrations of chromium as soon as possible after contact. Wash with Liquinox® solution and rinse with potable water.
2) If contaminated soil or water contacts hands through hole or over lip of gloves, remove gloves and wash hands thoroughly before donning new gloves.
3) Discard gloves into DOT-approved 55-gallon drum located on the MW-20 bench at the end of the day or event.

4) Remove coveralls or dry soils from clothing before leaving site. Clothing contaminated by moist soil or water containing hexavalent chromium should be removed and promptly washed.

5) At the end of the work day, shower entire body, including hair, either at the work site or at hotel.

Sampling Equipment Decontamination—Groundwater Sampling Pumps

Sampling pumps are decontaminated after each use as follows:

1) Don waterproof (nitrile or latex) gloves.

2) Run pump and reusable tubing through with Liquinox® solution (made with potable water) so that the pump and all portions or the tubing have been flushed with the solution for at least 30 to 60 seconds. More time is required if water is present in the tubing. If unsure, run for 2.5 minutes. Outside of the tubing should also be submerged and washed in the solution.

3) Run pump and reusable tubing through first rinse (with potable or distilled water) so that the pump and all portions or the tubing have been flushed with the solution for at least 60 seconds. More time is required if any suds are present in the pump or tubing.

4) Run pump and reusable tubing through second rinse (with distilled water) so that the pump and all portions or the tubing have been flushed with the solution for at least 30 seconds. More time is required if water from first rinse is present in tubing.

5) Equipment blank samples may be taken at this point using ASTM Type II water or distilled water as required by laboratory.

Sampling Equipment Decontamination—Other Equipment

Reusable sampling equipment is decontaminated after each use as follows:

1) Don nitrile or latex gloves.

2) Wash all equipment surfaces that contacted the potentially contaminated soil/water with Liquinox® solution (made from potable water). Water quality meters that are not placed within wells should not be washed with detergent, as this will degrade sensors; these meters should be double-rinsed. Any portion of equipment that is placed inside wells (including cables and pipe) and that comes in contact with moisture should be washed with detergent.

3) Rinse equipment and supplies with potable water, if the equipment is not used to collect groundwater or soil samples. Equipment used to collect samples or take water quality parameters should be rinsed with distilled water.

4) Air dry or towel dry with paper towels.

5) Collect all rinseate and dispose of in Baker® tank within the PG&E facility or Denbeste® tank at the MW-20 bench.

6) Decontamination materials (e.g., plastic sheeting, tubing, etc.) that have come in contact with used decontamination fluids or sampling equipment will be disposed of in DOT-approved 55-gallon drums if highly contaminated. If not contaminated, equipment can be washed and disposed of in trash.

7) Preserved bottles may need to be washed before being packed or handed without gloves. The outsides of filled bottles should be rinsed and toweled dry to prevent contact with strong acids or based.

Heavy Equipment and Tools

Heavy equipment such as drilling rigs, drilling rods/tools, and the backhoe will be decontaminated upon arrival at the site and between locations as follows:

1) Set up a decontamination pad in designated area.

2) Steam clean heavy equipment until no visible signs of dirt are observed. This may require wire or stiff brushes to dislodge dirt from some areas.

KEY CHECKS AND ITEMS

- Clean with solutions of Liquinox® and potable water. Rinse with distilled or deionized water if equipment is used to collect samples or water readings; otherwise, rinse with potable water.
- Equipment placed within wells should be thoroughly decontaminated and before being placed in a well. All potions of this equipment that come into contact with moisture should be decontaminated.
- Decontaminate filled sample bottles before relinquishing them to anyone.

SOP-B4

Boring Abandonment
Standard Operating Procedures for PG&E Topock Program

The purpose of this standard operating procedure (SOP) is to describe methods to abandon drill borings to the surface. The guideline covers all drilling methods and includes borings through surface casings.

REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan, work plan or event-specific field instructions. Planned borehole depth, proposed well construction/specifications, and field sampling summary table, if available.
2) Applicable project work plan or monitoring plan. Refer to Topock Program *Sampling, Analysis, and Field Procedures Manual* and *Quality Assurance Project Plan* (Procedures Manual), as required.
3) San Bernardino County Department of Health well abandonment (destruction) permit.
4) Topock Program Health and Safety Plan (HSP).
5) Blank sampling log and field notebook.

PREPARATION AND SETUP

1) Review event-specific work plan or event-specific field instructions, previous sampling logs, Procedures Manual, and HSP.
2) Initiate field logbook for sampling activity.
3) Review sampling procedures and equipment, and planned sample depths with drilling contractor and field crew.
4) Inspect all required field equipment.

Equipment List

- Truck-mounted drilling rig, skid rig, or barge-mounted tripod rig
- Hollow-stem augers and associated equipment or either rotary-drilling or sonic- drilling equipment
- Steel or Schedule 40 PVC casing, of appropriate diameter for required installations (at least 6.25-inch inside diameter if surface casing is required)
- Approved water source
- Cement
- Bentonite

GUIDELINES

California Department of Water Resources, June 1991, Bulletin 74-90 (Supplement to Bulletin 74-81) *California Well Standards*.

PROCEDURES

Abandonment

1) The borehole will be grouted from total depth to the surface with bentonite-cement grout. The cement-bentonite grout will be installed continuously in one operation from the bottom of the space to be grouted to the ground surface.
2) The grout mixture will consist of 94 pounds of cement (1 bag) per 6 gallons of water and 2 to 3 pounds of powdered bentonite per bag of cement to reduce shrinkage.
3) The source of the water used in the grout mixture must be from a pre-approved source.
4) If there is any risk of borehole collapse upon removal of the drill casing, then the grout will be added prior to the removal of the drill casing. The grouting can be completed in stages, grouting 50 to 100 feet at a time, removing 50 to 100 feet of drill casing, and then repeating until the grout has reached the surface and the final casing removed.
5) When installing grout in soil borings, the grout will be installed through a tremie pipe that is placed inside the drill casing to the bottom of the borehole.
6) The production of grout will be completed to eliminate the preparation of excess/waste grout.

Waste Disposal

1) The soil cuttings are to be drummed and managed as described in SOP *Disposal of Waste Fluids and Soils* and the investigation-derived waste management plan.
2) Minimal quantities of grout may be included in the water or soil waste streams. The quantity of grout will be limited to that produced during cleaning of grouting equipment or decontamination of drill casing.

KEY CHECKS AND PREVENTATIVE MAINTENANCE

- Check that the drilling rig or soil-coring rig is in working order.
- Check that the borehole is grouted to the ground surface at the completion of drilling and sampling.

SOP-B5

Decontamination of Personnel and Equipment, Well Drilling, and Subsurface Sampling and Investigations
Standard Operating Procedures for PG&E Topock Program

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REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan (SAP).
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PREPARATION AND SETUP

1) Initiate field log sampling book for activity.
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3) Review decontamination guidelines for equipment necessary to carry out activities.

Equipment List

- Demonstrated analyte-free, deionized water (specifically, ASTM Type II water)
- Distilled water
- Potable water; must be from a municipal water supplier, otherwise an analysis must be run for appropriate volatile and semivolatile organic compounds and inorganic chemicals (e.g., Target Compound List and Target Analyte List chemicals)
- 2.5% (W/W) Liquinox® and water solution
- Large plastic pails or tubs for Liquinox® and water, scrub brushes, spray or squirt bottles for Liquinox® solution, and distilled or deionized water, plastic bags, and sheets
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1) Remove contaminated clothing.
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3) Rinse away fluids and soil.
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5) Rinse with potable water.
6) If no other clothes are available, wash affected clothes in Liquinox® solution prior to donning. If other clothes are available, contaminated clothes may be isolated for later wash or disposed of along with personal protective equipment (PPE).
7) Any PPE worn (including disposable latex booties, gloves, and disposable coveralls) should be discarded into DOT-approved 55-gallon drum located at the MW-20 bench.
8) Dispose of wash and rinseate water in an appropriate container with other chromium contaminated fluids. These fluids may be taken to the MW-20 bench for treatment or to a Baker® tank within the PG&E facility for containerization.
9) Replace all appropriate clothing and PPE before resuming work or departing site.

Moist soil or water containing known concentrations of hexavalent chromium less than 50 parts per billion that comes into contact with hands need not require full decontamination. Dry soil containing chromium that comes into contact with clothing can also be decontaminated in an abbreviated manner.

Daily decontamination and minor exposure contact decontamination procedures are to:

1) Wash hands and skin that comes in contact with soils or water that may contain small concentrations of chromium as soon as possible after contact. Wash with Liquinox® solution and rinse with potable water.
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3) Discard gloves into DOT-approved 55-gallon drum located on the MW-20 bench at the end of the day or event.

4) Remove coveralls or dry soils from clothing before leaving site. Clothing contaminated by moist soil or water containing hexavalent chromium should be removed and promptly washed.

5) At the end of the work day, shower entire body, including hair, either at the work site or at hotel.

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3) Run pump and reusable tubing through first rinse (with potable or distilled water) so that the pump and all portions or the tubing have been flushed with the solution for at least 60 seconds. More time is required if any suds are present in the pump or tubing.

4) Run pump and reusable tubing through second rinse (with distilled water) so that the pump and all portions or the tubing have been flushed with the solution for at least 30 seconds. More time is required if water from first rinse is present in tubing.

5) Equipment blank samples may be taken at this point using ASTM Type II water or distilled water as required by laboratory.

Sampling Equipment Decontamination—Other Equipment

Reusable sampling equipment is decontaminated after each use as follows:

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2) Wash all equipment surfaces that contacted the potentially contaminated soil/water with Liquinox® solution (made from potable water). Water quality meters that are not placed within wells should not be washed with detergent, as this will degrade sensors; these meters should be double-rinsed. Any portion of equipment that is placed inside wells (including cables and pipe) and that comes in contact with moisture should be washed with detergent.

3) Rinse equipment and supplies with potable water, if the equipment is not used to collect groundwater or soil samples. Equipment used to collect samples or take water quality parameters should be rinsed with distilled water.

4) Air dry or towel dry with paper towels.

5) Collect all rinseate and dispose of in Baker® tank within the PG&E facility or Denbeste® tank at the MW-20 bench.

6) Decontamination materials (e.g., plastic sheeting, tubing, etc.) that have come in contact with used decontamination fluids or sampling equipment will be disposed of in DOT-approved 55-gallon drums if highly contaminated. If not contaminated, equipment can be washed and disposed of in trash.

7) Preserved bottles may need to be washed before being packed or handed without gloves. The outsides of filled bottles should be rinsed and toweled dry to prevent contact with strong acids or based.

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2) Steam clean heavy equipment until no visible signs of dirt are observed. This may require wire or stiff brushes to dislodge dirt from some areas.

KEY CHECKS AND ITEMS

- Clean with solutions of Liquinox® and potable water. Rinse with distilled or deionized water if equipment is used to collect samples or water readings; otherwise, rinse with potable water.
- Equipment placed within wells should be thoroughly decontaminated and before being placed in a well. All potions of this equipment that come into contact with moisture should be decontaminated.
- Decontaminate filled sample bottles before relinquishing them to anyone.

SOP-B6

Disposal of Waste Fluids and Solids (IDW) Standard Operating Procedures for PG&E Topock Program

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This standard operation procedure (SOP) describes the procedures used to dispose of hazardous fluid and solid materials generated as a result of the site operations. This SOP does not provide guidance on the details of Department of Transportation (DOT) regulations pertaining to the transport of hazardous wastes; the appropriate Code of Federal Regulations (49 CFR 171 through 177) should be referenced. Also, the site investigation-derived waste management plan should be consulted for additional information and should take precedence over this SOP.

REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan.

2) Applicable project work plan or monitoring plan. Refer to Topock Program *Sampling, Analysis, and Field Procedures Manual* and *Quality Assurance Project Plan*, as required.

3) Topock Program Health and Safety Plan.

PREPARATION AND SETUP

1) For soil and groundwater collection and storage, a subcontractor (either Denbeste Transportation, Inc. or a drilling or sampling contractor) will bring clean, empty drums, roll-off bins, Denbeste® tanks, or Baker® Tanks to the site.

2) Locate the empty drums at the field staging area and move drums to drilling locations as required.

EQUIPMENT LIST

- DOT-approved 55-gallon steel drums, Denbeste® Tanks, Baker® Tanks or roll-off bins
- Portable polytanks for transferring water from well samples locations to tanks or bins
- Tools for securing drum lids
- Funnel for transferring liquid into drum
- Water pump to transfer liquids
- Labels
- Marking pen for appropriate labels
- Seals for 55-gallon steel drums
- Plastic sheets and buckets to catch leaks and drips

PROCEDURES

General Methodology

1) Prior to filling soil bins, determine if plastic sheeting is required for soil disposal bins. Line bins with plastic sheeting as required by disposal contractor and facility. Seal bins and

check for water tightness on soil bins and water tanks. Inventory all bins and tanks by unique identifier.

2) Fill soil bins with drilling and well installation wastes. When three-fourths full, cap or close, and update inventory. The drilling, sampling, or waste disposal subcontractor will move the drums to the on-site drum storage area. Fill tanks with clear water. Muddy water should be allowed to settle out in soil bins or separator tanks prior to transfer to Denbeste® or Baker® Tanks.

3) Separate full drums by waste and media types.

4) As the drums are filled in the field, affix labels indicating that the contents are potentially hazardous. Update bin log with type of waste and locations from which soil is obtained.

5) Drums may be used for temporary storage of soil or water. The drums should be closed and sealed at the end of each work day or when full. Drums used for soil should not be used for clear water storage without decontamination. Drums should be labeled if the contents are not transferred to a tank or bin by the end of the day.

6) Portable polytanks are used to transfer water from wells being sampled or developed to Denbeste® or Baker® tanks. These tanks should be emptied at the end of each day or when full. Sediment that accumulates that the bottom of these tanks should be removed and disposed of with contaminated soil on a regular basis.

7) Soils and groundwater from the site have been characterized for waste disposal. Wastes, which have not been included in the characterization, should be labeled sampled and separated from other wastes.

8) Typically Denbeste Transportation, Inc. should be contacted for disposal of wastes and movement of soil bins and large water tanks. Other contractors may also be involved in waste disposal.

Labeling

1) Label drums and other containers used for storing wastes from drilling, development, and sampling operations when accumulation in the container begins. Labels will include the following minimum information:

   - Container number
   - Container contents
   - Origin (source area including individuals wells, piezometers, and soil borings)
   - Date that accumulation began
   - Date that accumulation ended

2) When laboratory results are received, complete or revise drum labels to indicate the hazardous waste constituents in compliance with 40 CFR, Part 262, Subpart C.

Groundwater and Drilling Fluids

1) Collect water and drilling fluids generated during well sampling and development and during soil boring in polytank or hopper (water-tight bin used to transport cuttings with forklift).

2) When a polytank is full, or hopper is half full, secure the tank or hopper and transfer fluid to appropriate separator tank or to Denbeste® or Baker® tanks.

3) When fluids are being transferred from polytanks or drums to larger tanks, use an appropriate pump (often referred to as trash pump) used for contaminated fluids. Subcontractors should decontaminate trash pumps before they are brought to the site. When transferring liquids, materials to contain spills and drips should be at hand, and appropriate PPE should be worn. Nitrile or latex gloves should be worn at a minimum. If water is being transferred by bucket, plastic sheeting should be used to contain drips.

4) Water that is allowed to settle in soil bins or separator tanks should be removed prior to movement of bin. Water stored in a soil bin, should not be stored longer than one week after filling to minimized dripping and leaking. Water may be transferred using a vacuum truck or pump and tank.

5) A separate tank will be needed for waste that cannot be treated by on-site water treatment. This waste will be characterized and disposed of off site.

6) Any tanks containing waste fluids for more than one day shall be labeled.

Solids

The soil cuttings from well and boring drilling will constitute a large portion of the solids to be disposed of. The solid waste stream also include plastic sheeting used for decontamination pads, Tyveks, disposable sampling materials, and any other disposable material used during the field operations that appears to be contaminated.

1) Place these materials in the designated bins and indicate what materials, other than soil, are present in logbook.

2) Contact Denbeste Transportation, Inc. or drilling company for removal and disposal of bins.

3) Dispose waste solid materials that contain hazardous constituents at an off-site location in a manner consistent with applicable solid waste, hazardous waste, and water quality regulations.

KEY CHECKS AND ITEMS

- When fluids are being transferred from polytanks or drums to larger tanks, use an appropriately designated pump.
- If wastes are stored in drum, tank, or bin for longer than 1 day, this container should be labeled.
- Waste characterization profiles should be checked prior to waste accumulation to determine if samples should be collected for further characterization and if wastes need to be segregated from others on site.

SOP-B7

Homogenization of Soil and Sediment Samples
Standard Operating Procedures for PG&E Topock Program

The homogenization of soil and sediment samples is performed to minimize any bias of sample representativeness introduced by the natural stratification of constituents within the sample. Standard techniques for soil and sediment homogenization and equipment are provided in this SOP. These procedures do not apply to aliquots collected for volatile organic compounds (VOCs) or field gas chromography screening; samples for these analyses should NOT be homogenized.

REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan (SAP).
2) Applicable project work plan or monitoring plan. Refer to Topock Program *Sampling, Analysis, and Field Procedures Manual* and *Quality Assurance Project Plan,* as required.
3) Topock Program Health and Safety Plan (HSP).
4) Previous sampling logs.
5) Blank sampling logs and field notebook.

PREPARATION AND SETUP

1) Review event-specific SAP or event-specific field instructions, previous sampling logs, Procedures Manual, and HSP.
2) Initiate field logbook for sampling activity.

EQUIPMENT LIST

- Sample containers
- Stainless-steel spoons or spatulas
- Stainless-steel pans
- Phthalate-free gloves

PROCEDURES

Sample Homogenization

1) Soil and sediment samples to be analyzed for semivolatiles, pesticides, polychlorinated biphenyls, metals, cyanide, or field x-ray fluorescence screening should be homogenized in the field.
2) After a sample is taken, a stainless-steel spatula should be used to remove the sample from the split spoon or other sampling device. The sampler should not use fingers to do this, as gloves may introduce organic interferences into the sample.

3) Samples for VOCs should be taken immediately upon opening the spoon and should not be homogenized.
4) Prior to homogenizing the soil or sediment sample, any rocks, twigs, leaves, or other debris should be removed from the sample.
5) The sample should be placed in a decontaminated stainless-steel pan and thoroughly mixed using a stainless-steel spoon. The soil or sediment material in the pan should be scraped from the sides, corners, and bottom, rolled into the middle of the pan, and initially mixed.
6) The sample should then be quartered and moved to the four corners of the pan. Each quarter of the sample should be mixed individually, then rolled to the center of the pan and mixed with the entire sample again.

Equipment Decontamination

1) All stainless-steel spoons, spatulas, and pans must be decontaminated following procedures specified in SOP *Decontamination of Personnel and Equipment* prior to homogenizing the sample.
2) A composite equipment rinse blank of homogenization equipment should be taken each day it is used.

SOP-B9

Drilling--Sonic Method
Standard Operating Procedures for PG&E Topock Program

REQUIRED DOCUMENTS

1) Event-specific sampling and analysis plan (SAP), Work Plan or event-specific field instructions. Planned borehole depth, proposed well construction/specifications, and field sampling summary table, if available.
2) Applicable project work plan or monitoring plan. Refer to Topock Program Sampling, Analysis, and Field Procedures Manual and QAPP (Procedures Manual), as required.
3) Topock Program Health and Safety Plan (HSP)
4) Previous sampling, drilling, or well construction logs from other boreholes or wells in the vicinity, if available
5) Blank sampling log and field notebook

Equipment List:

- Drilling rig (Sonic)
- Drill rods and core barrel

GUIDELINES

PRIOR TO INTRUSIVE ACTIVITIES AT ANY DRILLING LOCATION THE AREA WILL HAVE BEEN CLEARED OF ALL UTILITIES AND THE CLEARANCE RECORDED IN THE FIELD LOGBOOK. It is also the field team leader's responsibility to confirm that all required access permits are in place.

Prior to the start of drilling, the area of site activity will be identified and delineated using stakes and/or flagging. The extent of impact will be mineralized at all times and the delineated area of activity decreased when possible. All sensitive vegetation or habitats will be delineated with stakes and/or flagging and no impact will occur in these areas.

Sampling depths and total depths of holes shall be determined by temporary marking of drill equipment, by reference to standard equipment dimensions (for example, 5-foot hollow-stem auger flights), or by measurement using a fiberglass tape. Final total depth measurements will be confirmed using a weighted fiberglass tape. Observations by the field geologist or engineer shall be recorded directly in the borehole log.

The field borehole log is the standard form used to document subsurface geologic conditions. The borehole log is divided into two areas. One portion contains spaces for noting information on the drilling and sampling methods. The second portion contains space for noting lithologic descriptions. All sheets shall be filled out completely, legibly, and in ink. The borehole log will be filled out in the field at the time of the drilling and sampling. The original logs shall be permanent records, and information on the logs may not be erased. If corrections are needed, information shall be crossed out with a single line and the correction shall be initialed and dated.

The use of water and drilling fluid to assist in sonic drilling for monitoring well installation will be avoided, unless required for such conditions as running sands or drilling bedrock formations.

Temporary outer casing, drill rods, core barrels, and other downhole drilling tools will be properly decontaminated prior to the initiation of drilling activities and between each borehole location. Core barrels and other downhole soil sampling equipment will also be properly decontaminated before and after each use.

Sonic inner casing (sample tube) will have an inside diameter of at least 3.25 inches. Samples may be collected for chemical analysis. For sonic drilling, these samples are collected in a metal trough. A continuous core is collected and the sample interval is selected from the length of core run.

Surface casing may be installed where soil borings will penetrate a confining layer or when there is risk of eroding soil during the drilling process if water is used.

PROCEDURES

Instructions for Completing Soil Boring Logs

Soil boring logs will be completed in the field log books. Information collected will be consistent with that required for Form D1586 (attached), a standard CH2M HILL form or an equivalent form that supplies the same information. Procedures will follow the SOP "*Soil*

Non-Core Collection Drilling

At locations or depths from which core collection is not required, drilling may proceed without the recovery of soil cores. The drilling will include advancing the larger outer casing and the use of water to facilitate cuttings removal from the boring. The inner casing drill rods may or may not be used, depending on the cuttings recovery when drilling with the larger outer casing.

Continuous Core Drilling

At locations or depths when core collection is required, drilling will proceed using an outer casing and an inner core sample tube. The inner core sampling tube will be advanced first without the use of water. Before removal of the sampling tube, the outer casing will be advanced, using water only as needed for cuttings removal, to the same total depth as the inner casing. The outer casing will stabilize the boring when the sampling tube is removed. The process is repeated in 10 to 20 foot intervals, as the lithology of the boring permits.

The length of each drilling interval should be adjusted depending on the lithology and the quality and recovery percentage of the sample cores retrieved. At locations with very hard drilling (i.e. with large cobbles or hard materials) or when percent recovery decreases, the drilling interval should be decreased until such time that the conditions change.

After retrieval of the inner sampling core tube, the minimally disturbed sample cores will be collected into plastic liner sleeves in intervals of 2 to 3 feet. The plastic sleeves will be immediately sealed on both ends. The cores will be used for visual descriptions and may be used for analysis for geochemical and geotechnical parameters.

KEY CHECKS AND ITEMS

- Check entries to the soil boring log and field logbook in the field during sampling activities because the cores will be disposed at the end of the fieldwork, confirmation and corrections cannot be made later.
- Check that the sample numbers and intervals are properly specified.
- Ensure that drilling equipment is decontaminated prior to the beginning of work and between each borehole.
- All materials generated during sampling (debris, PPE, decontamination liquids, etc.) will be placed in approved IDW storage containers pending analysis and disposal off site as outlined in SOP-B6, *Disposal of Waste Fluids and Solids (IDW)*.

SOP-B11

Site Clearance and Permitting
Standard Operating Procedures for PG&E Topock Program

This standard operating procedure (SOP) addresses the procedures for site clearance and permitting at the Topock site. This SOP should be used to obtain proper site clearance and permits before any work is performed at a site.

REQUIRED DOCUMENTS

1) Applicable project work plan, event-specific sampling and analysis plan (SAP), and/or Procedures Manual, if applicable.
2) Topock Program Health and Safety Plan (HSP).
3) Site map with work locations identified.

PREPARATION AND SETUP

1) Review applicable project work plan, event-specific SAP, Procedures Manual, and HSP.
2) Identify locations where work will be performed, determine if any subsurface work will be needed.
3) Before the start of any work obtain approval by the appropriate land agencies (such as BLM, USFWS, County of San Bernardino). Activities located on PG&E property fall under the jurisdiction of the County; however, approval may also be required from BLM and/or USFWS for activities such as access, waste management, etc. Work in Topock, Arizona falls under the jurisdiction of the Arizona Department of Water Resources.
4) Before the start of any work obtain appropriate approval by the regulatory agencies. These include at a minimum the DTSC if in California, and ADEQ is in Arizona. Other regulatory approvals that may be required include, but are not limited to CDFG, USFWS, USACE and RWQCB. Approval from the Arizona Land Department may also be required for wells drilled in Arizona.

If subsurface work will be involved, follow the following steps:

1) Follow the guidelines of the Southern California Underground Service Alert (USA) agency to mark the edges of the work location as outlined on their web page (http://www.digalert.org). If in Arizona, the Arizona Blue Stake should be contacted for location of buried facilities (www.azbluestake.com). Make sure to:
   - Identify delineated areas with white markings with the requesters company name or logo within the pre-marked zones
   - Delineate the exact area of excavation with white paint through the use of dots or dashes, or a continuous solid line. Limit the size of each dash to approximately 6" in length and 1" width with interval spacing not less that approximately 4 feet. Dots of

approximately 1" diameter are typically used to define arcs or radii and may be placed at closer intervals in lieu of dashes. Limit width of lines to 1".

- For point locations (such as a soil boring or well) mark the exact location in the USA or Blue Stake box with a stake. Make sure the delineated area around the stake is of adequate radius (50 to 100 feet is appropriate for drilling).

2) Call USA at 1-800-227-2600 or Arizona Blue Stake at 1-800-782-5348 at least three working days before the start of work at the identified location and provide them with the information requested on the location request form. Be ready to give the location in terms of feet relative to I-40 and to Park Moabi Road when calling. You will be assigned a Dig Alert Number, file this number until work at the delineated area is complete. (The number does expire after two weeks and a new number may need to be obtained if work has been delayed.)

3) Mark the Dig Alert Number in the delineated area using white paint as soon as possible after calling USA or Arizona Blue Stake.

4) If the location is in a developed area, contact a private utility locator and have them perform a sweep of the delineated work area. Util-Locate at (866) 421-5325 is typically used for this service.

5) In some cases the utility companies may need to be contacted directly by CH2M HILL. If the following companies do not respond to the USA or Blue Stake ticket or if we are working in their easements, use the following contact information and procedures:

Southwest Gas: Main contact is Jim Default/702-365-2097 (The required minimum clearance distance from gas pipelines is 18-inches. Potholing may need to be performed in advance of design completion Southwest Gas should be called prior to construction activities). If Southwest Gas does not come to the site after the USA call, contact them at their Bullhead City office at (928) 763-7766

Southern California Gas Co.: Main contact is Frank Castro/818-701-4566; secondary contact is Martin Woodsworth/818-701-4543. If we need to work in their easement, we must provide a letter from BLM giving us permission to be on the property. Southern California Gas Co. also requires advance notification of construction activities. They may also require a copy of the design drawing, potholing activities, and the issuance of a "Non-Interference" letter, if applicable, before work can proceed. One of their representatives may need to be in the field when digging is occurring near their pipeline.

TransWestern Pipeline Co.: Main contacts are Ron Westbrook (ROW Department)/713-345-3067 and Mike Baxter (Operations)/928-757-3620. They may require potholing if proposed construction activities are near their pipelines. Crossing pipeline requires filling out a simple form.

Burlington Northern Santa Fe Railroad: Main contact is Greg Rousseau (BNSF)/909-386-4079. Prior to work in their easements submit the proper application with the $250 fee to the Staubach Company.

City of Needles Utility Dept: Main contact is Ron Myers/760-326-5700 (ext. 7 for the utilities department). Work activities may need to be a minimum of 10 to 15 feet from their utility poles.

6) Do not start subsurface work at the site until the delineated area has been marked or cleared by the appropriate utility agencies.

If the work includes a performing a well installation or abandonment, or drilling a boring in California:

1) Apply for a San Bernardino County well permit two to three weeks before the start of drilling (one permit per well; cost is /$212.00 per well). Obtain a permit application by calling the Environmental Health Services Department at 1-909-387-4666 (open Monday through Friday, 8:00 a.m. to 5:00 p.m. The fee schedule for permits is located at http://www.sbcounty.gov/ dehs/FEESCHEDULE/feeschedule.htm#wateranchor. Fill out the appropriate permit form and provide it to the California-licensed driller contracted to perform the well installation. The driller is expected to review and file the permit with the San Bernardino County Department of Environmental Health Services (Steve Sesler), address below.

Environmental Health Services
385 N. Arrowhead, 2nd Floor
San Bernardino, CA 92415-0160

2) A well permit needs to be obtained from San Bernardino County for well abandonment by the same procedure described in #11. Check the 'destruction' box on the same permit form used for well installation.

3) A permit also needs to be obtained from San Bernardino County for any boring that reaches to or below the water table, even if a well is not actually installed. The permit process is the same as described in #11.

If the work includes a performing a well installation or abandonment, or drilling a boring in Arizona:

1) Apply for an Arizona Department of Water Resources (DWR) well permit two to three weeks before the start of drilling (one permit per well; cost is /$150.00 per well). Obtain a permit application by calling the DWR at 1-(602) 771-8500 (open Monday through Friday, 8:00 a.m. to 5:00 p.m. MST). All ADW permits and instructions can be found at http://www.azwater.gov/dwr/Content/Find_by_Category/Permits_Forms_Applications/default.htm
Fill out the appropriate permit form (55-44A) and provide it to the Arizona-licensed driller contracted to perform the well installation. The driller is expected to review and file the permit with the Arizona Department of Water Resources address below.

Arizona Department of Water Resources
3550 N. Central Avenue
Phoenix, AZ 85012

Upon completion of the well, the driller must submit a Driller Report and Well Log (Form 55-55) to the DWR within 30 days. The form and instructions can be found on the DWR webpage.

2) A well abandonment permit needs to be obtained from the Arizona Department of Water Resources prior to well abandonment (form 55-38). Exploratory wells that are abandoned before the drill rig leaves the site are exempt from the well abandonment permit requirements. The well abandonment form and instructions are included as Attachment 4 and can be found at the ADW webpage . No fee is required for filing this form.

   Within 30 days of well abandonment a Well Abandonment Completion Report (Form 55-58) must be filed with the DWR.

SOP-B15

Volatile Organic Compound (VOC) Soil Sampling Standard Operating Procedures for PG&E Topock Program

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This standard operating procedure (SOP) provides guidance for Volatile Organic Compound (VOC) sample collection from soil. Additional guidance for sample collection, preservation and handling is provided in Section 4.0 of the PG&E Quality Assurance Project Plan (QAPP). SOP-B2 and SOP-B3 *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program* (CH2M HILL, 2005) provides additional guidance for soil characterization and logging.

Required Documents

1) Event-specific planned sample table (PST).
2) Applicable project work plan or monitoring plan. Refer to the Procedures Manual and QAPP as required.
3) Topock Program Health and Safety Plan (HSP).
4) Previous sampling, drilling, or well construction logs from other boreholes or wells in the vicinity, if available.
5) Field notebook.
6) Database generated sampling logs.

Preparation and Setup

1) Review event-specific PST or event-specific field instructions, previous sampling logs, Procedures Manual, and HSP.
2) Coordinate with the Project Chemist for coolers, sample containers, and courier pickup of the samples.
3) Initiate field logbook for sampling activity.
4) Review sampling procedures and planned sample depths with field crew.
5) Field-check and set up equipment for sampling, decontamination, spill prevention, and health and safety.

Equipment List

- Pre-labeled soil sample containers appropriate for sample analysis and preservation as called for in PST and QAPP (Pre-weighed Vials, glass jars, auger sleeves, etc.)
- Soil sampling equipment (stainless steel trowel, spatula, EnCore™ Sampler, EasyDraw Syringe®, or a disposable plastic syringe with a barrel smaller than the neck of the soil vial with the cap removed from the plunger, etc.)
- Field notebook
- Sediment sampling logs generated from database

- Blue or black waterproof or permanent ink pens
- Trash bags
- Paper towels
- Decontamination equipment (Alconox® solution in spray bottle, brushes, buckets, rinse water spray bottle)
- Water level indicator
- Distilled water
- Coolers with ice
- Protective waterproof gloves (nitrile or latex)

SOIL SAMPLING LOGS DOCUMENTATION

Soil sampling logs or boring logs (SOP-B2 and SOP-B3 *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program* [CH2M HILL, 2005]) will be completed at the time of sample collection. Items to be documented on the sampling log include:

6) **Sample Interval:** The top and bottom depth of each sample run should be recorded on the log. Sampling includes samples collected for analysis as well as retrieved for logging purposes.
7) **Sample Type and Number:** Enter the sample type and number consistent with the sampling and analysis plan at the correct depth intervals. An “x” should be placed across the vertical interval where the environmental soil, grab groundwater, or geotechnical sample was collected.
8) **Sample Recovery:** Enter the length of retrieved sample to the nearest inch of sample recovered. Record total length and percent of sample recovered.
9) **Sampling:** Sampling difficulties shall be noted. The top of the sample shall be marked on the container.
10) **Water Levels:** Water-level measurements, where groundwater is encountered, are required for each boring. Changes in soil moisture shall be noted and, if there is no water encountered, a note to that effect shall be included on the sediment sampling log. The date and time of water-level measurements shall be documented.

At a minimum, sample identifiers (IDs) should be noted on sampling logs at the depth collected. When time and space allows, a summary of analytical sample information can be included.

VOLATILE ORGANIC COMPOUNDS (VOC) SOIL SAMPLING - COLLECTION OF SAMPLES FOR ANALYSIS

It is recommended (EPA Method 5035A) that VOC soil samples be collected in a coring device to minimize volatilization and soil disturbance to prevent constituent losses. After collection, the sample shall be immediately transferred to the sample vial (to be used for analysis) and stored for no longer than 48 hours at 4 C ± 2^{o} C prior to analysis. Freezing the samples between -7 and -20° C within 48 hours and maintaining them frozen until analysis allows a 14 day holding time. Chemical preservation techniques are also available as options.

Use either a commercially available sampler (such as the EnCore™ Sampler or EasyDraw Syringe®) or a disposable plastic syringe to collect VOC soil samples. To use a syringe, cut the syringe end of the barrel off and removed the rubber 'cap' from the plunger, prior to sampling (barrel of the syringe needs to be smaller than the neck of the soil vial). One sampler is needed for each sample aliquot to be collected (typically the laboratory will supply the sampler along with the sample vials, but arrangements must be made prior to sampling).

11) Weigh 3 empty samplers and note the weight. Using the same 3 samplers collect several trial samples (try to collect 5.0 ± 0.2g). Weigh each trial sample (total weight – syringe weight = sample weight) and note the length of the soil column in the syringe. Use the data to determine the length of soil in the syringe that corresponds to 5.0 grams. The length of the soil column equal to 5 grams becomes the volume for the project location. Discard each trial sample.

12) The VOC sample collection process should be completed in the least amount of time as possible in order to minimize the loss of VOCs. Sample collection should be done with the least amount of disturbance/disruption as possible. Additional, exposure of the sampling location's surface layers should be considered if the material may have already lost VOCs or if it may have been contaminated by other means. Removal of surface layers can be accomplished by scraping the surface using a clean spatula, scoop, knife, or shovel.

13) Insert a clean coring tool into a freshly exposed surface; do not trap air between the sample and the plunger. For greater ease in pushing into the solid matrix, the front edge of these tools can be sharpened. The optimum diameter of the coring tool depends on the size of the opening of the collection vial (tool should fit inside mouth), the sample characteristics (e.g., particles size, cohesion), and volume of sample required for analysis. After an undisturbed sample has been obtained by pushing the barrel of the coring tool into a freshly exposed surface, quickly wipe the exterior of the barrel with a clean disposable towel. Transfer the sample into a pre-weighted vial by gently pushing the plunger, (use extreme care to ensure none of the preservative is lost if the sample is collected into a pre-preserved vial – water, methanol or NaHSO4), verify the sealing surfaces are clean, and secure the cap (the transfer should take less than 10 seconds). **Note: Samples are collected in pre-weighed and pre-labeled vials provided by the laboratory; no additional labels are to be added to the vials!** Complete the label attached by the laboratory (fill in sample ID-only). All vials from one sample location will be placed into a zip-lock bag and the sample information shall be recorded on a label attached to the bag.

14) As a last resort non-cohesive granular samples (sand, gravel, or a mixture of gravel and fines) that can not be easily obtained or transferred using coring tools, can be quickly sampled using a decontaminated stainless steel spatula or scoop. Decontamination is covered in section 3.3 of the PG&E Program QAPP and in SOP-B5 *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program* (CH2M HILL, 2005).

15) As with the collection of aqueous samples for volatiles, collect at least 3 replicate samples. This will allow the laboratory an additional sample for reanalysis, if needed. The replicate samples should be taken from the same soil stratum or the same section of the solid waste

being sampled, and within close proximity to the location from which the original sample was collected.

16) In addition, if a VOC sample is the only sample to be collected at a given location, collect at least one additional aliquot for the determination of percent moisture. Trip blanks and equipment blanks should be collected per the PG&E Program QAPP. However, trip blanks do not apply to samples that have been frozen upon collection.

17) Transport the sample at 4^{o} C, to the lab in less than 48 hours or freeze (reagent water preserved samples to between -7 and -20^{o} C) within 48 hours and transport frozen.

18) Complete Soil Sampling Logs and Chain of Custody Logs.

SOP-B16

Field-portable X-Ray Fluorescence Soil Sampling Standard Operating Procedures for PG&E Topock Program

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This SOP describes the analysis of *in-situ* and *ex-situ* soil samples using a field portable X-Ray Fluorescence instrument (XRF). SOP-B2 and SOP-B3- in the *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program* (CH2M HILL, 2005) provides additional guidance for soil characterization and logging.

Required Documents

1) Event-specific planned sample table (PST).
2) Applicable project work plan or monitoring plan. Refer to the Procedures Manual and QAPP as required.
3) Topock Program Health and Safety Plan (HSP).
4) Field notebook.
5) Database generated chain-of-custody.
6) XRF Functional Check Log

Preparation and Setup

1) Review event-specific PST or event-specific field instructions, previous sampling logs, Procedures Manual, and HSP.
2) Coordinate with the Project Chemist for coolers, sample containers, and courier pickup of the samples.
3) Initiate field logbook for sampling activity.
4) Initiate electronic file for X-Ray Fluorescence (XRF) instrument download.
5) Review sampling procedures and planned sample depths with field crew.
6) Field-check and set up equipment for functional checks, sampling, decontamination, spill prevention, and health and safety.

Equipment List

- Niton XRF Meter and stand
- Spare battery chargers
- Field notebook
- Trowel for smoothing soil surfaces
- Reusable plastic bags or stainless steel tray
- Disposable Sample cups with X-ray film and lids

- X-Ray window film (Mylar, Kapton, Spectrolene, polypropylene, or equivalent; 2.5 – 6.0 micrometers (um) thick)
- Disposable scoops, stainless steel spoons or other appropriate mixing tools
- Appropriate quality control (QC)/quality assurance (QA) standards, and blank sand
- Chemwipes
- Decontamination equipment (Alconox® solution (or equivalent) in spray bottle, brushes, buckets, rinse water spray bottle) for mixing tools and trowels
- Protective waterproof gloves (nitrile or latex)

XRF SOIL ANALYSIS DOCUMENTATION

The XRF sample results will be recorded by the associated software in an excel format. The files will be downloaded at the end of each day and emailed to the project chemist for review. Any additional sample logging and sample collection should follow the protocol and procedures found in the *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program* (CH2M HILL,2005). Detailed notes should be recorded in the sampler's field notebook or in a log generated from the field database. Items to be documented on the sampling log include (note: include as much of the following information in the XRF software as possible):

1) Record type of boring or excavation equipment and the total boring or excavation depth.
2) If multiple samples are being collected at one location at a variety of depths, record all sample depths.
3) Record date and time of sample collection in addition to the full sample ID that is listed in the PST.
4) Sampling difficulties shall be noted (i.e. difficult slope or abnormal debris in sample location).
5) Analysis start time and the source count time (i.e. 60 sec, 90 sec, or 120 sec etc.) will be documented on sample collection sheet. Note: analysis and count time are automatically recorded in the XRF software.

Field-portable X-Ray Fluorescence Soil Sampling- COLLECTION OF SAMPLES FOR ANALYSIS

In-Situ Sample Preparation

When the soil moisture is less than 20 percent, the error associated with moisture may be minimal. If areas are encountered where the moisture content is greater than 20 percent (moisture is visible), consult with the project chemist for options available for proceeding with field analysis.

For *in-situ* analysis,

1) Large or non-representative debris must be removed from the selected location. This debris includes rocks, gravel, vegetation and concrete.

2) The location chosen for analysis should be homogenized by mixing in place an area approximately 4″ by 4″ by 3″ deep, using a clean (or decontaminated) stainless steel or disposable spoon. The location should then be smoothed and firmly tamped to provide as flat and smooth an area as possible.

1) A section of x-ray window film should be stretched over the area to be tested to maintain a dust free environment for the nose of the instrument. (Note: use in-situ analysis for metals only samples).

2) To initiate a reading, the nose of the XRF will be positioned against the x-ray film, squeezing the shutter release, and firmly pressing the instrument flat against the surface. Source count times for *in-situ* analysis usually range from one to two minutes, varying among instruments and depending on requirement detection limits.

3) After the *in-situ* field screening is performed, inspect the nose of the instrument for contamination, which may affect future analysis. If necessary, clean it with a soft cloth or tissue.

For confirmation samples, or where samples for organic analysis are to be collected the soil samples should be treated as *ex-situ* samples, below.

***Ex-Situ* Sample Preparation**
For *ex-situ* analysis,

There are several possible correct methods for the ex-situ analysis of samples. The area that previously would have been homogenized for the in-situ analysis should be scooped out and placed into a clean (or decontaminated) stainless steel or disposable pan (do not use plastic if organic analysis will be performed on any of this homogenized sample), using a stainless steel or disposable spoon or spatula (do not use plastic if organic analysis are associated with the homogenized sample). The sample should then be thoroughly mixed (homogenized) using the same spoon or spatula.

1) The preferred method is to setup the portable field stand in an area where the XRF can be stationed and left in place for the day. Use the Niton software and a laptop computer to setup the method criteria and control the XRF instrument during the soil analysis.
    a) Starting with the previously homogenized sample, use the supplied soil sieves, bowl, and mortar to generate a finely ground well homogenized sample. (Note: This step is not required if the soil sample was passed through a sieve during the homogenization step.)
    b) Transfer the prepared sample into a new sample cup (order replacement supplies from Niton), place the X-ray film over the cup and snap the lid in place. Place the sample cup in the portable field test stand (The XRF points upward, the sample rests on top of the XRF with the X-ray film directly in contact with the nose of the XRF - cup lid facing down).
    c) Using the computer, start the analysis. The source count time should be at least two minutes for chromium. Consult previous analysis to determine if multiple scan frequencies are required (or contact the project chemist).
    d) Prepare the next sample while the XRF is analyzing the current sample.

2) An alternative method to using the portable field stand is to identify the sample for XRF analysis and homogenize the sample (as described above).
   a) Transfer the sample to a re-sealable plastic bag and firmly molded into a flat smooth surface.
   b) Use the Niton software and a laptop computer or the included PDA to setup the method criteria.
   c) To start the analysis, position the nose of the XRF against the flat smooth surface of the sample and squeeze the shutter release (or press the start button on the laptop or PDA). Be sure to maintain constant pressure against the sample. If contact is broken, the analysis will need to be restarted. The source count time for *ex-situ* analysis usually range from one to two minutes, depending on the required detection limits (see *c* above for count times).
   d) After the ex-situ field screening is performed, inspect the nose of the instrument for contamination, which may affect future analysis. If necessary, clean it with a soft cloth or tissue.

3) Transfer the sample to a labeled glass jar for shipment to the confirmation laboratory (if applicable).

Sample Analysis
In today's modern XRF models:

1) An X-ray source is used for detection. Expose the sample to the X-ray source for a minimum of one minute. Longer exposure times may be needed depending on the media that is being analyzed and the required detection levels. The time needed for analysis will be determined in the field by analyzing standards that have concentrations of the metals of concern near the required detection levels. Better detection limits can usually be obtained by homogenizing the sample, increasing the exposure time, and using two or more scan frequencies (Use a minimum of a two minute exposure for Chromium analysis).

2) When the XRF instrument displays the results they include the analyte, the result, and a percent confidence (displayed as a ± value). The result is displayed as non-detect for analytes that do not meet the percent confidence established in the instrument. The lower the required detection levels, the longer the analysis time required to meet the percent confidence.

3) Download saved data from XRF instrument daily (if data is collected in PDA). Foreword the data files to the project chemist daily.

4) All samples collected for off-site confirmation will also be analyzed using the XRF and treated as *ex-situ* samples.

Using older models:

1) Expose the sample to the energy source for a minimum of one minute. Longer exposure times may be needed depending on the media that is being analyzed as well as the age of the detector (non X-ray detectors). The time needed for analysis will be determined in the field by analyzing standards that have concentrations of the metals of concern near the required detection levels. Better detection limits can usually be obtained by homogenizing the sample, increasing the exposure time. (Use a minimum of a two minute exposure for Chromium)

2) When the XRF instrument indicates the results for the suite of analyzed elements and their concentrations, it includes a standard deviation for the reported concentrations. An analyte concentration is considered **not detected** if the result value is **less than two times the standard deviation**. The lower the required detection levels, the longer the analysis time required to reduce the result's standard deviation.

3) Record the readings (electronically or documented on the sampling log). Review the standard deviations for the elements of interest and determine if a longer analysis time is needed to reduce the standard deviations, thereby allowing the desired accuracy and precision for the concentrations. The standards will be analyzed using increasingly longer times until the required detection level is achieved.

4) Record values in field notebooks.

5) Download saved data from XRF instrument daily.

6) Samples collected for off-site confirmation will also be analyzed using the XRF and will be treated as *ex-situ* samples.

Calibration

Two forms of calibration are important with XRF testing: an energy calibration and a sample matrix calibration.

Energy Calibration

The Niton XLi 702 automatically re-calibrates the energy scale when powered on. The energy scale can also be re-calibrated by pressing "Reset" on the instrument. The energy calibration should be performed every two hours.

Sample Matrix Calibration

Modern XRF instruments, such as the Niton Xli 702, do not require site specific calibrations to account for sample matrix effects. EPA Method 6200 allows both fundamental parameters and Compton normalization as two techniques to eliminate site specific calibrations. Niton uses the Compton normalization method to automatically correct for sample specific matrix effects. The XRF is calibrated internally at the factory on NIST standard reference soil samples. Ensure the annual factory calibration certification is on file. This internal calibration is used for subsequent field work, without need for adjustment or recalibration at other sites.

Quality Assurance and Quality Control (Functional Checks)

Even though no onsite calibration will be performed, the method does require QA/QC Functional check testing protocols. The QA/QC that will be used to document that the XRF is operating properly will have the following steps:

- A startup operations check
- Analysis of a blank sample (clean sand)
- Analysis of standard sample(s)
- Analysis of duplicate samples
- QA/QC procedures will be compliant with manufacture's instructions.

1) At the beginning of each day perform QA/QC functional check procedure or when the instrument is turned on after more than 2 hours of down time or if the operating environment changes, such as a temperature change of more than 20 degrees Fahrenheit.
2) Two types of blanks should be analyzed, an instrument blank and a method blank. An instrument blank sample (silicon dioxide, provided by Niton) will be analyzed at the start and end of each day and once every 20 samples, to confirm proper zero calibration of the XRF. The blank will be analyzed following the procedure for the *ex-situ* sample analysis. A method blank is used to monitor for any field induced contamination. The method blank should follow any preparation procedures performed on the samples, such as mixing or *exsitu* analysis. **A method blank will be analyzed each day**.
3) A set of three to ten QC samples will be collected from the site during the initial field activities. These samples will be well homogenized, and a portion sent to the off-site laboratory for characterization. The remaining sample will be collected in re-sealable bags, labeled and stored with the XRF for use as standards. Three to five of the on-site standards will be analyzed at the start of each day. The results of the standards will be plotted against the original XRF results and a correlation value calculated. A correlation coefficient of 0.90 or greater must be achieved to meet the project objectives. A running log of all on-site standards analyzed will be maintained. One of the standards will be analyzed after every 20 samples. The readout from the XRF **must be within 20 percent RPD of the known QC sample concentration**.
4) The last QA/QC step will be to analyze duplicate samples (two separate aliquots) at a rate of 1 in 10. These duplicate measurements must be within 35 percent of each other for the analysis to continue. If the sample results are not in agreement, then the reason for this discrepancy must be determined.
5) The Niton XL3t 600 displays both concentration and precision for each sample analyte measurement. The precision displayed by the Niton's 95% (2-sigma) confidence intervals; where as the precision calculated in EPA method 6200 is at a 68% (1-sigma) level. The Niton also calculates and displays detection limits for analytes if the concentration is below three standard deviations. This bypasses the need for replicate measurements on low level standards.

Note: VOC, SVOC, and other organic samples can not be collected from the homogenized soil if plastic is used for homogenizing or after XRF analysis, if contacted by plastic.

Appendix H
PG&E Program QAPP and QAPP Addendum

(Provided on CD Only)

Draft

PG&E Program Quality Assurance Project Plan

Prepared for

Pacific Gas and Electric Company

Revision 0 (November 2004); Revision 1 (December 2008)

CH2MHILL
155 Grand Ave. Suite 800
Oakland, CA 94612

Document Title: PG&E Program Quality Assurance Project Plan

Site Name: Program wide

Site Location: Multiple

Anticipated Sampling Dates: Various

Prepared By: CH2M HILL Date: December 2008

Address: 155 Grand Avenue, Suite 800

City/State/Zip: Oakland, California 94612

Telephone: 510/251-2426

Program Manager: Gerald Vogt Phone: 530/229-3328

****

Approved ______________________________ Date ____________
CH2M HILL Program Manager

Approved ______________________________ Date ____________
CH2M HILL PG&E Program Chemist

Approved ______________________________ Date ____________
CH2M HILL PG&E Program Quality Officer

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Acronyms and Abbreviations

%D	percent difference or drift
%R	percent recovery
°C	degrees Celsius
µg/L	microgram(s) per liter
µmhos/cm	micromhos per centimeter
AB	ambient blank
AFCEE	Air Force Center for Engineering and the Environment (formerly the Air Force Center for Environmental Excellence)
ASTM	American Society for Testing and Materials
AutoDV	automated data validation
BTEX	benzene, toluene, ethylbenzene, and xylene
CAS	Chemical Abstract Service
CF-IRMS	continuous-flow isotope ratio mass spectrometry
CHHSL	California Human Health Screening Levels
CoC	chain-of-custody
COPC	contaminate of potential concern
DOC	dissolved organic carbon
DQO	data quality objective
DTSC	California Department of Toxic Substance Control
EB	equipment rinsate blank
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
FB	field blank
FD	field duplicate
ICAL	initial calibration
ICP	inductively coupled plasma
ICP-MS	inductively coupled plasma/mass spectrometry
ID	identifier
IDW	investigation-derived waste
IPC	instrument performance check

LCS	laboratory control sample
MCT	matrix concentration threshold
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
ml	milliliter
MS	matrix spike
MSA	method of standard addition
MSD	matrix spike duplicate
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyls
pCi/L	picocuries per liter
PDF	portable document format
PG&E	Pacific Gas and Electric Company
PNA	polynuclear aromatic hydrocarbon
PPE	personal protective equipment
PST	planned sample table
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RT	retention time
SAP	sampling and analysis plan
SIM	selected ion monitoring
SOP	standard operating procedure
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
TB	trip blank
TCLP	Toxicity Characteristic Leaching Procedure

TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TOC	total organic carbon
TPH	total petroleum hydrocarbon
TSS	total suspended solids
TTLC	total threshold limit concentration
VOA	volatile organic analysis
VOC	volatile organic compound

SECTION 1
Introduction

This *Pacific Gas and Electric Company Program Quality Assurance Project Plan* (QAPP), Revision 1 was prepared to ensure that data of appropriate quality are collected and used for multiple sites for Pacific Gas and Electric Company (PG&E) projects that CH2M HILL supports. Each project will have a sampling and analysis plan (SAP), this QAPP, and QAPP addenda required to meet the project-specific requirements.

1.1 Background

CH2M HILL has been providing services to PG&E since the 1970s. Currently, CH2M HILL and affiliate companies are working at approximately 35 sites for PG&E. CH2M HILL provides services for the following:

- **Site management.** Projects include soil and groundwater monitoring, site characterization, and remediation design systems.
- **Remediation construction.** Projects include soil excavation, disposal, and treatment system construction.
- **Ecosystems and permitting.** Projects include proponent's environmental assessments, California Environmental Quality Act documentation, and other permitting and planning projects.
- **Engineering design.** Projects include computer-aided design and support and structural analysis.

1.2 Program Objectives

1.2.1 Program Objectives and Scope

This QAPP presents the quality assurance (QA) and quality control (QC) requirements designed to ensure that environmental data collected for the PG&E Program will be of the appropriate quality to achieve the objectives defined in the project-specific SAPs or QAPP addenda, unless otherwise defined. Specific protocols for sampling, sample handling and storage, chain-of-custody (CoC), laboratory analyses, data handling, and data evaluation and assessment are discussed. Requirements for performance evaluations, corrective actions, and preventive maintenance of equipment are specified. The elements included in this QAPP are consistent with those specified in the U.S. Environmental Protection Agency (EPA) *Requirements for Quality Assurance Project Plans, EPA QA/R-5,* March 2001. The objectives of this QAPP are as follows:

- Ensure that data collection and measurement procedures are standardized among all participants.

- Monitor the performance of the various measurement systems within the program to maintain statistical control and provide rapid feedback so that corrective measures, if needed, can be implemented before data quality is compromised.
- Periodically assess the performance of these measurement systems and their components.
- Verify that reported data are sufficiently complete, comparable, representative, unbiased, and precise so that they are suitable for their intended use.

This QAPP is intended for use by CH2M HILL and its subcontractors that provide services associated with the environmental data collection effort. The QAPP supplements all SAPs and any other project-specific documents. The program quality officer and the program chemist are primarily responsible for implementation of this QAPP.

1.2.2 Program QAPP versus SAPs and QAPP Addenda

Elements such as the general description, sources of contamination, information from previous investigations, and proposed investigations are addressed in project or site-specific SAPs or QAPP addenda. The guidance set forth in this QAPP will be followed in the absence of site specific SAPs or QAPP addenda.

1.2.3 Analytical Project Planning

The PG&E Program has a laboratory procurement process, modeled after the Air Force Center for Engineering and the Environment (AFCEE) (formerly the Air Force Center for Environmental Excellence), EPA, the U.S. Navy, and other federal programs. The process balances the program quality, defensible data, and costs. The model has identified three steps in planning the analytical needs of a project:

1. **Determine the requirements.** To determine project-specific requirements, the program chemist should attend kick-off meetings (or equivalent) to understand the project goals and help develop the analytical scope of work.
2. **Determine the laboratory needs and select the laboratory.** Factors influencing the selection of analytical, geotechnical, radiochemistry laboratories include the matrices sampled; laboratory capabilities, recent performance, and location; and price. The program chemist ensures that the laboratory selected is appropriate to meet project objectives. The more information regarding the project objectives given to the chemists, the better chance they have to control liabilities related to analytical work.
3. **Decide what level of data validation is required to provide defensible data at the appropriate level of QC.** See Section 6.3 for descriptions of the data validation process. When a request for proposal is received from PG&E, there is a kickoff meeting of key people, including the project manager, the responsible contract administrator, the program chemist (or sometimes a project-specific chemist), a representative from project delivery, and others, depending on the type of project. Laboratory scope is discussed and a plan is determined that will provide the appropriate analytical services.

1.2.4 Data Quality Objectives

The specific needs for the data collected during each activity will be examined to evaluate whether project objectives for each investigation will be optimally achieved. Specific data quality objectives (DQO) are considered independently through EPA's seven-step DQO process (EPA, 2000). The DQO process includes the following steps:

1. **State the problem.** Concisely describe the problem to be investigated. This determines the need for data collection. Review existing information to define the problem.
2. **Identify the decision**. Identify the decision that will solve the problem by using the data to be collected.
3. **Identify the inputs to the decision**. Identify the information and environmental measurements that are needed to support the decision.
4. **Define the study boundaries**. Specify the times, spatial areas, and other conditions (e.g., target analytes) that determine when and where data should be collected.
5. **Develop a decision rule**. For each decision, define the conditions that would cause the decision maker to choose between alternate actions (the decision rule is usually in the form of an "if…then" statement).
6. **Specify tolerable limits for decision errors**. Define how much uncertainty can be tolerated by the decision maker. Determine the acceptable error rates based on the consequences of making an incorrect decision.
7. **Optimize the design**. Evaluate information from the previous steps and choose the most resource-efficient design for data collection that will support a reliable decision.

SECTION 2

Program Organization and Responsibility

2.1 Program Organization

The PG&E Program management team has been structured with a client service manager, program manager, program quality control manager, program health and safety manger and a program chemist to ensure that the goals of the program are met.

2.2 Project/Task Organization

The organization chart and descriptive text identifying task managers and individuals charged with specific responsibilities for each project can be found in project-specific SAPs. Lines of authority and the scope of authority given to each key member of the project team, including the authority to initiate and approve corrective actions, are discussed in the SAPs. All subcontractors and scopes of work are also identified in the project- or site-specific SAPs.

2.3 Training and Certification Requirements

All personnel engaged in field activities will have completed the Occupational Safety Health Administration, 40-hour health and safety training that meets the requirements of Title 29 Code of Federal Regulations Section 1910.120 and Title 8 Code of California Regulations Section 5192. All CH2M HILL personnel working on the PG&E Program will read applicable project-specific health and safety plans. Documentation will be maintained to demonstrate that all requirements of the plan are followed.

All laboratories contracted for analytical services will be certified under the California Department of Health Environmental Laboratory Accreditation Program, when appropriate and where accreditation is afforded under the California program. No analyses may be performed or reported if accreditation is revoked. Any loss or suspension of accreditation must be communicated to CH2M HILL within 24 hours of notification. Laboratory managers will ensure that all laboratory personnel have been properly trained and are qualified to perform the assigned tasks.

SECTION 3

Sampling Procedures

3.1 Sampling Design

The number and location of samples are specific to each site and are discussed in the project-specific SAPs. The rationale for the sampling design is also described in the SAPs. The sampling design is a function of the medium sampled, information about the sampling site, the type of data to be collected, and how the data are to be used.

Projects with multiple large sampling events should use the field database and provide a planned sample table (PST), CoC forms, and other database-generated paperwork.

The procedures described in the following sections may be superseded or supplemented by the project-specific SAPs or QAPP addenda.

3.2 Sampling Method Requirements

This section addresses the requirements for soil and groundwater sampling. It is meant to provide guidance for projects that do not otherwise require additional documentation to implement field activities. Many projects will require site-specific SOPs because of unique conditions that should be addressed in the project-specific work plan, SAP, QAPP addenda or other project-specific documents. The *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program (CH2M HILL, 2005)* or its update is an excellent source for field SOPs.

3.2.1 Soil Sampling

Sampling locations will be specified in the project-specific SAPs, but the exact locations will be determined in the field based on such factors as accessibility and topography. The exact locations will be recorded in the field logbook or on the field sampling form when sampling is completed. A sketch of the sampling location will be entered into the logbook, if necessary, with reference points labeled including distances to the sampling location.

Soil sampling using decontaminated equipment will be performed as described in the following sections. Each sample container will be closed as soon as it is filled; it will be chilled and processed for shipment to an offsite laboratory to allow laboratory analysis within the applicable holding time.

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

3.2.1.1 Surface Soil Sampling

Surface soil samples will be collected as grab samples at the depth interval specified in the project-specific SAP for each location. Samples will be collected using a decontaminated stainless steel or nonmetallic hand trowel or equivalent equipment (sampling equipment should be chosen based on the analyte of concern for the specific sample). An EnCore™ sampler, EasyDraw Syringe®, cutoff disposable syringe or equivalent equipment will be used for volatile organic compounds (VOC), as described in Section 3.2.1.4. Samples to be analyzed for VOCs will be collected first. Samples to be analyzed for all other analytes should be placed in a sample-dedicated, 1-gallon, disposable pail or a decontaminated stainless steel bowl. The samples will be homogenized (using the trowel), and transferred to the appropriate containers. To prevent potential contaminant migration from the sample, sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being sealed.

3.2.1.2 Subsurface Soil Sampling

Subsurface soil samples will be collected by boring to the depth specified in the project-specific SAP using an appropriately sized hand auger or equivalent equipment. Once the specified depth is reached, the hand auger will be removed, and accumulated soil will be set aside in a sample-dedicated disposable pail or tarp. A different, clean hand auger will be inserted into the hole to collect the sample (decontamination of the boring implement is sufficient if multiple boring implements are not available). Other sampling devices, such as push tubes or split-spoon samplers, may be used. An EnCore™ sampler, EasyDraw Syringe®, cutoff disposable syringe, or equivalent equipment will be used for VOCs, as described below. Samples to be analyzed for VOCs will be collected first. Samples to be analyzed for all other analytes should be placed in a sample-dedicated, 1-gallon, disposable pail or a decontaminated stainless steel bowl. The samples will be homogenized (using the trowel) and transferred to the appropriate containers. To prevent potential contaminant migration from the sample, sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being sealed.

3.2.1.3 Confirmation Sampling for Soil Excavation

Confirmation sampling will be performed prior to closure of any excavation. Confirmation samples are usually collected from the bottom and sides of the excavation. The number and type of samples collected should be of sufficient quantity to be representative of the excavated site. The project- or site-specific SAP should address the number, type, and quantity of samples to be collected. All confirmation samples should be analyzed by the analytical methodology specified herein or in the project-specific QAPP addendum (collection of soil samples for determination of VOCs shall be in accordance with Section 3.2.1.4.). Field or laboratory screening data should not be used to verify that contamination has been removed below project action levels unless specifically approved by the overseeing regulatory agency.

3.2.1.4 Soil Sampling for Volatile Organic Compounds

Guidelines for collecting soil samples for VOC analysis are provided in Method SW5035A. These sampling techniques are applicable to analysis by methods SW8260B, SW8021, and SW8015B (volatile parameters). Sampling for VOCs may be accomplished by using an EasyDraw Syringe®, an EnCore™ sampler, a cutoff plastic syringe, or any equivalent sampling device.

VOC samples will be frozen or chilled in the field. If, chilled to 4 degrees Celsius (°C) (±2°C) the samples should be shipped by overnight express delivery the same day they are collected. If frozen, appropriate measures should be taken to ensure that frozen samples remain frozen until receipt by the laboratory. If samples remain frozen, the laboratory has 14 days from date of collection to analyze the samples. If samples thaw to temperatures higher than 4°C (±2°C), they must be analyzed within 48 hours of collection. If the temperature does not exceed 4°C (±2°C), the laboratory may (1) freeze the samples between -7 and -20ºC within 48 hours of collection and keep them frozen or (2) preserve them in sodium bisulfate or methanol within 48 hours of collection. Either of these procedures will extend the holding time to 14 days.

Sampling Using Cutoff Syringe. A disposable syringe capable of measuring 1 to 5 milliliters (ml) (±0.5 ml) is required. Calibration in the field will be needed for the specific soil type and the type of syringe to determine the proper setting on the syringe to collect the samples. For example, the plunger is set to 5 ml, and the sample is collected and weighed; if 5 grams (±0.5 gram) are not obtained, the process is repeated until the correct plunger setting is identified. The same procedure is repeated for the 1-gram sample. Once the volume setting is identified, all soils of similar type will be collected at this volume. Samples can be collected with or without field preservation. When field preservation is chosen, the samples are collected into vials pre-preserved with methanol or sodium bisulfate. Otherwise, samples can be collected into vials without preservative, and preservation can be performed by the laboratory upon receipt of the samples.

Sampling with EnCore™ Sampler or EasyDraw Syringe®. The sample is collected into the EnCore™ or equivalent sampler following the manufacturer's instructions. A minimum of three samples will be collected. Two aliquots are needed for low-level analysis and reanalysis if necessary. The third aliquot is needed for extraction in methanol by the laboratory in case high-concentration analysis is indicated. Exposure to air must be minimized.

Sampling with Field Preservation. Before using this option, determine if the soil is amenable to the sodium bisulfate preservative. Soil samples that contain carbonate minerals may effervesce upon contact with the preservative. If the amount of gas generated is small (little if any effervescence with the preservative), field preservation may be used. If rapid or vigorous gas generation is observed, the sample should be collected without field preservation. If the sample is amenable to field preservation, it is collected using one of the methods listed above and quickly transferred into a VOC vial with preservative. The vial should be quickly sealed to avoid significant loss of volatiles components. The laboratory will supply a minimum of three preweighed VOC vials with 5 ml of aqueous sodium bisulfate preservative as described in Method SW5035, as well as a single preweighed VOC vial without the preservative for each sample to be analyzed for VOCs. Two 5-gram aliquots in bisulfate are required for low-concentration analysis and reanalysis, when necessary. One 5-gram aliquot without sodium bisulfate is required for extraction in methanol by the laboratory in case high-concentration analysis is indicated by a low-concentration or screening analysis of the sample. One 1-gram sample in bisulfate is needed because the possibility exists that neither the 5-gram sample intended for low-concentration analysis, nor the 5-gram sample intended for high-concentration analysis, will have all target analyte concentrations within the calibration range. Exposure of the sample to air must be minimized.

If VOC analyses are the only analyses being performed for samples collected from any location; an additional 2- or 4-ounce soil sample must also be collected to analyze for percent moisture.

Sampling without Field Preservation. The samples will be collected using one of the methods listed above and quickly transferred into a minimum of three preweighed, vials without preservative supplied by the laboratory. These preweighed vials may be empty, they may contain reagent water, or they may be preserved with methanol, depending on whether the contaminant concentration is at low- or high-level concentration. Two 5-gram aliquots are needed for low-concentration analysis and reanalysis, when necessary. In addition, one 5-gram aliquot is required for extraction in methanol by the laboratory in case high-concentration analysis is indicated by a low-concentration or screening analysis of the sample. One 1-gram sample is also recommended because the possibility exists that neither the 5-gram sample intended for low-concentration analysis, nor the 5-gram sample intended for high-concentration analysis, will have all target analyte concentrations within the calibration range. Exposure of the sample to air must be minimized. Freezing the samples between -7 and -20° C within 48 hours and keeping them frozen until analysis allows a 14-day holding time.

If VOC analyses are the only analyses being performed for samples collected from any location; an additional 2- or 4-ounce soil sample must also be collected to analyze for percent moisture.

3.2.2 Groundwater Sampling

3.2.2.1 Water Level Measurement

Field meter probes and water level sounding equipment will be decontaminated before and after each use at each well. Water levels in wells that are known or suspected to be least contaminated will be measured first. Water levels in wells that are known or suspected to have the highest contamination will be measured last.

If well heads are accessible, all wells will be sounded from the top of the casing to determine the depth to water and total well depth prior to purging. An electronic sounder, accurate to ±0.01 foot, will be used to measure depth to water in each well. Annual calibration documentation shall be maintained on file. The serial number of the meters shall be recorded in the sampling logbook. When using an electronic sounder, the probe will be lowered down the casing to the top of the water column, and the graduated markings on the probe wire or tape will be used to measure the depth to water from the surveyed point on the rim of the well casing. (Typically, the measuring device emits a constant tone when the probe is submerged in standing water. Most electronic level sounders have a visual indicator consisting of a small light bulb or diode that turns on when the probe encounters water.) The total well depth will be sounded from the surveyed top of the casing by lowering the weighted probe to the bottom of the well. The weighted probe will sink into silt, if present, at the bottom of the well screen. The total well depth will be measured by recording the depth to the nearest 0.1 foot.

3.2.2.2 Field Calibration

Field equipment will be calibrated before the start of work and recorded in the field notebook or daily calibration log. Any instrument drift from prior calibration should be noted. Calibration will be in accordance with procedures and schedules in the particular instrument's operations manual.

Calibrated equipment will be uniquely identified by using the manufacturer's serial number or other means. A label with the identification number and the date when the next calibration is due (scheduled calibrations) will be physically attached to the equipment. If this is not possible, records traceable to the equipment (e.g., showing the equipment identification) will be readily available for reference. In addition, instrument identifications and the results of calibrations and records of repairs will be recorded in the logbook or daily calibration log.

Scheduled periodic calibration of testing equipment does not relieve field personnel of the responsibility of using properly functioning equipment. If equipment malfunction is suspected, the device shall be removed from service, tagged so that it is not inadvertently used, and the appropriate personnel notified so that a recalibration can be performed or substitute equipment can be obtained.

Equipment that fails calibration or becomes inoperable during use will be removed from service and either segregated to prevent inadvertent use or tagged to indicate it is out of calibration. Such equipment will be repaired and satisfactorily recalibrated. Equipment that cannot be repaired will be replaced.

3.2.2.3 Well Purging

All wells will be purged prior to sampling. All equipment that will contact the sample during purging and sampling will be decontaminated prior to each use.

Low-flow Purge. One option for well sampling is low-stress (low-flow) purging using a pump capable of a purge rate of 1 liter per minute or less. Typically, a pneumatic or small electric submersible pump is used. The water level should be monitored approximately every 5 minutes. The flow rate should be started at the minimum flow capacity of the pump, then gradually increased until initial drawdown is observed. The flow rate should then be reduced slightly to achieve a stabilized pumping level. This reduced rate should become the maximum purge rate for the well. Each adjustment to the flow rate and the water level measured after each adjustment should be recorded. The flow rate should not exceed 1 liter per minute. Care should be taken to maintain pump suction and avoid entrapment of air in the tubing.

Casing Volume Purge. Another option for well sampling is three casing volume (macro-purging) using a pump capable of purging 1 to 5 gallons per minute, usually an electrical submersible pump. Purging will be conducted at a flow rate sufficient to remove water from the entire screened interval of the well. However, the purge rate should not result in substantial drawdown, which is defined as 5 percent of the water column or the top of the screened interval. Purging will consist of the removal of a minimum of three casing volumes of water.

For low-yield wells (wells that exhibit less than 80 percent recovery [%R], within 2 hours), one casing volume of water shall be removed. If pump capability allows, the well will be purged at a rate of less than 1 gallon per minute. The well will then be allowed to recover to 80 percent and sampled within 24 hours of purging.

Water Quality Parameter Stabilization. To ensure representative sampling, water quality parameters (dissolved oxygen, pH, redox potential, specific conductance, and turbidity) must be stable before samples are collected, regardless of purge technique. Parameters will be measured approximately every 3 to 5 minutes, depending on the rate and duration of the purge. Purging is considered complete when the following water quality parameters are stable (i.e., for three consecutive readings):

- The pH varies by no more than 0.1 pH unit.
- Specific conductance readings are within 10 percent of the average.
- The redox potential varies by no more than 10 millivolts.
- The dissolved oxygen readings are within 10 percent of the average.

The water used to make measurements will not be used to fill sample bottles.

If the macro-purge technique is used, three casing volume well purges must be complete **and** the water quality parameters must be stable before the sample is collected. The total amount of water purged will be recorded in the field logbook or well-specific purge and sample collection form.

Grab-sample Collection. In some instances, it is appropriate to collect a grab sample from a monitoring well. For example, when a low-yield well has been purged and allowed to recharge. A bailer can be used to collect the sample without additional purge, eliminating the need to deploy a well pump for sample collection.

If a bailer is used to collect samples, a sufficient volume of water must be collected to fill the sample bottles and perform one measurement of water quality parameters. The water quality parameters will be recorded in the field logbook or well-specific purge and sample collection form.

3.2.2.4 Well Sampling

Prior to sampling each well, the water level will be measured and the well purged, as previously described. All wells will be sampled within 24 hours of purging. Wells without a dedicated pump will be sampled using a bailer of appropriate material, such as Teflon or stainless steel. Wells with a dedicated pump will be sampled directly from the tap closest to the well head. All aerators, strainers, and hoses will be removed from the tap prior to sample collection. The flow will be adjusted so that a gentle stream is obtained. To minimize volatilization, a flow rate of less than 100 milliliters per minute is recommended for samples to be analyzed for VOCs.

At each sampling location, sample bottles designated for a particular analysis will be filled sequentially before bottles designated for other analyses are filled. Vials for VOCs will be filled first to minimize aeration of water in the well. All vials for VOCs will be provided, pre-preserved by the subcontract laboratory. The vials will be filled directly from the tap. Each vial will be inverted and checked for air bubbles and checked for headspace. If a pea-size or larger air bubble appears, the cap can be removed and additional sample added to eliminate the air space. If there is any likelihood of contamination being introduced into the sample, the vial contents will be emptied into the container used to measure purge volumes, the vial discarded, and a new sample collected in a new vial.

If a duplicate sample is to be collected, all sample bottles designated for a particular analysis for both duplicates will be filled sequentially before bottles for another analysis are filled. For example, duplicate samples will be collected sequentially for semivolatile organic compounds (SVOC), followed by duplicate samples collected sequentially for metals. EPA recommends the following collection order:

1. Volatile organic compounds and total organic compounds
2. Dissolved gasses and total organic carbon
3. Semivolatile compounds – Acid/Base extractables, pesticides, and PCBs
4. Metals and general chemistry
5. Radionuclides

It is considered good management practice to plan sample collection from the least to the most contaminated area of the site to decrease the risk of cross contamination (assuming no other factors that drive the priority of sampling location order).

Groundwater samples will be transferred from the bailer, tap, or pump tubing directly into the appropriate pre-preserved sample containers, if required. When transferring samples, care must be taken not to touch any nondedicated equipment to the sample container. The containers will be chilled and processed for shipment to the laboratory.

3.3 Equipment Decontamination

Sampling equipment must be consistently decontaminated to ensure the quality of the samples collected. All equipment that comes into contact with potentially contaminated soil or water samples will be decontaminated. Disposable equipment intended for one use will not be decontaminated but will be packaged for appropriate disposal. In addition, equipment that is dedicated for repeated use at only one location does not need to be decontaminated. Equipment decontamination will occur prior to each use.

The following decontamination sequence is recommended:

1. Nonphosphate detergent and tap water wash, using a brush if necessary

2. Tap water rinse

3. Two rinses with deionized/distilled water

4. Organic-free water rinse (high-performance liquid chromatography grade) for organic samples

Large and bulky sampling equipment might need to be steam cleaned. Equipment will be decontaminated in a predesignated area on pallets or plastic sheeting. The cleaned equipment will be wrapped or covered to prevent contamination and stored in an uncontaminated area.

3.4 Disposal of Investigation-derived Wastes

The disposal of investigation-derived waste (IDW) should be addressed in the project-specific SAP. Each project or task can have different IDW disposal requirements, depending on site-specific conditions and the work performed. The following potentially contaminated IDW might be generated during field activities:

- **Used personal protective equipment (PPE) and disposable equipment.** Used PPE will be double-bagged and placed in a municipal refuse dumpster onsite. PPE and disposable equipment that is still serviceable will be rendered unusable before disposal into the dumpster.
- **Decontamination fluids.** Decontamination fluids include dilute nitric acid, deionized water, residual contaminants, and water with nonphosphate detergent. These fluids will be collected and disposed of in accordance with site requirements and applicable regulatory requirements
- **Soil cuttings.** Soil cuttings generated during subsurface sampling will be collected and disposed of in accordance with site requirements and applicable regulatory requirements.
- **Purged groundwater and excess groundwater collected for sample container filling.** These wastes will be collected and disposed of in accordance with site requirements and applicable regulatory requirements.

Each project SAP should address IDW. Any samples collected for waste characterization should include IDW in the sample identifier (ID).

3.5 Field Quality Control Samples

QC samples will be collected to monitor accuracy, precision, and the potential presence of field contamination for analytical methods to be performed in the offsite laboratory. All field QC samples, except matrix spike/matrix spike duplicates (MS/MSD), will be sent double-blind to the laboratory along with regular field samples. These double-blind samples will be labeled similar to regular field samples to disguise them. Sampling frequencies may vary according to the project needs, as defined in the project-specific SAP or QAPP addendum. The recommended frequency of collection for QC samples is discussed in the following sections and should be reviewed and updated to achieve project-specific DQOs.

3.5.1 Field Duplicate Samples

A field duplicate (FD) is an independent sample collected as close as possible to the original sample, from the same source, and under identical conditions. FDs are used to document sampling and analytical precision. FDs will be collected at a minimum frequency of 10 percent or one per sampling event, whichever is more frequent, for each matrix and type of analysis. The sampling procedures described in Section 3.2 will be followed. The sampling locations for FD samples will be recorded in the field logbook or field sampling form, or both.

3.5.2 Equipment Blanks

Equipment blanks (EB) will be collected to evaluate field sampling and decontamination procedures by pouring deionized water over the decontaminated equipment. EBs will be collected at a frequency of one EB per day for each nondedicated equipment type per sampling team. EBs will be analyzed in the offsite laboratory for the same parameters specified for the corresponding matrix or for the main contaminate of potential concern (COPC).

3.5.3 Field Blanks

Field blanks (FB) (also known as ambient blanks [AB]) are collected to evaluate (or to monitor) whether contaminants have been introduced during sampling. FBs will be collected by pouring deionized water (or organic free water for organic samples) into a sample container at the sampling location and leaving the sample exposed to the atmosphere for a minimum of 30 minutes. FBs will be collected at a frequency of one per location that warrants concern because of environmental conditions or project-specific QC concerns, as determined by the project chemist or project manager. Generally, FBs need to be collected if the analyte concentrations are high enough to allow mobile contaminants to affect the sample results. FB will be analyzed for the same parameters specified for the associated samples.

3.5.4 Trip Blanks

Trip blanks (TB) are used to monitor contamination during sample shipping and handling and for cross contamination through VOC migration among the collected samples. They are prepared in the laboratory by pouring American Society for Testing and Materials (ASTM) Type II or organic-free water into a VOC sample container. They are then sealed, transported to the field, stay sealed while VOC samples are taken, and transported back to the laboratory in the same cooler as the VOC samples. One TB should accompany each VOC sample cooler.

3.5.5 Matrix Spike/Matrix Spike Duplicate

A MS/MSD consists of duplicate field sample aliquots spiked by the laboratory with analytes of concern to evaluate the effects of the matrix on the recoveries of these analytes. For every 20 field samples of each matrix collected at each site, additional duplicate aliquots of one of the samples should be collected for each analysis and designated on the CoC form for use as an MS/MSD by the laboratory. Separate line entries are not required for matrix spikes. The increased number of sample containers should be noted. The duplicate aliquots for MS/MSD analyses should be collected simultaneously or in immediate succession with the parent sample. They will be treated in exactly the same manner as the parent sample during storage and shipment. The sampling locations for the MS/MSD will be documented in the field logbook or the field sampling form, or both if the MS/MSD are specifically requested by the project; if not, document the extra volume on the CoC and in the field logbook or on the field sampling form.

3.5.6 Split Samples

Split samples may be collected periodically for comparison of data between analytical laboratories. A split sample is collected from a thoroughly homogenized original sample and is used to document analytical precision. Split samples will be collected for each matrix and for each analytical method, except those for volatiles when project objectives dictate the need. The sampling procedures described in Section 3.2 or those described in the project- or site-specific SAPs or QAPP addenda will be followed. The sampling locations will be recorded in the field logbook or field sampling form, or both. Split samples will be sent to a second certified laboratory, and results will be compared with those from the primary laboratory.

3.6 Sample Documentation and Tracking

Projects with large sampling events should take advantage of the field database to provide a PST, CoCs, and sample container labels. The use of Mobil Integrated Sample Tracking (MIST) and the field database are recommended.

Prelabeled, pre-preserved sample containers should be received from the laboratory. The laboratory labeling must indicate the type of preservative in the container. The sample ID, date, and time of sampling are recorded on the label immediately prior to collection. The labels must be secured using clear tape to protect the label. Double bagging the ice used in shipping containers and using laser printed labels and indelible ink pens to complete sample labels will ensure that the samples arrival at the laboratory dry and appropriately marked. Vital information regarding the collection of each sample will be recorded in a field logbook, field sampling form, and CoC form.

A separate logbook will be used for each project. It will be bound with consecutively numbered pages. All entries will be legibly written in black ink and signed and dated by the individual making the entries. Factual and objective language will be used. All entries will be complete and accurate to allow reconstruction of each field activity. A line will be placed through any portion of a field notebook that is unused. One line strike-through will be used to show corrections to entries. The strike-through will be initialed and dated. No correction fluid will be used. The following information for each sample will be recorded in the field logbook, field sampling form, or CoC form, whichever is appropriate:

- Sampling location and description (sketch and measured distances from reference points will be recorded if there is no established identification for the sample location)
- Sample ID
- Sampler's name
- Date and time of sampling
- Sample designation as composite or grab
- Sample matrix
- Type and ID of sampling equipment

- Field measurement data (e.g., pH, temperature, conductivity)
- Field observations that may be relevant to the analysis or sample integrity (e.g., odor, color, and weather conditions)
- Associated QC blanks
- Preservative used
- CoC form number, custody seal number, and lot numbers of sample containers (when appropriate)
- Shipping details (if the laboratory is providing courier service, the courier must sign and date the CoC forms; copies of the signed CoC forms should be transmitted to the office as soon as practical; if FedEx, UPS, or other courier is used, include shipping information for each shipment)
- Destination laboratory

SECTION 4

Sample Handling and Custody

4.1 Containers and Preservatives

The contracted analytical laboratory will provide the required sample containers for all samples including QC samples. All containers will have been cleaned and certified free of the analytes of concern for this project. No sample containers will be reused. The contracted laboratory will add preservatives, if required, prior to shipping the sample containers to the field or supply the preservative as appropriate. The laboratory, upon receipt of the samples, will verify and record the adequacy of preservation and will add additional preservative, if necessary. For VOCs, the sample label or CoC will indicate the presence of preservative and the laboratory will verify and record the pH after the analysis. The containers, minimum sample quantities, required preservatives, and maximum holding times for many parameters are shown in Table 4-1 (tables appear at the end of the section in which they are first referenced). The project- or site-specific SAP or QAPP addendum will contain the specific containers required for each project.

4.2 Chain-of-Custody

Collecting data of known quality begins at the point of sample collection. Legally defensible data are generated by using proven evidentiary procedures. These procedures are described in the following sections and must be followed to preserve and ensure the integrity of all samples from the time of collection through analysis. Sample custody records must be maintained in the field office (if there is a field office) and subcontractor laboratory. A sample is considered to be in custody if it is either in physical possession or view, locked up, or kept in a secured and restricted area. Until the samples are shipped, custody will be the responsibility of the sampling team leader.

CoC forms document sample collection and shipment to the laboratory. A CoC form will be completed for each sampling event. The original copy will be provided to the laboratory with the sample shipping cooler, and a copy will be retained in the field documentation files. The CoC form will identify the contents of each shipment and maintain the custodial integrity of the samples. All CoC forms will be signed and dated by the responsible sampling team personnel, as applicable. The "Relinquished By" field will be signed by the responsible sampling team personnel, with the date, time, and air bill number noted on the CoC form. The laboratory will provide a PDF copy of the CoC forms, with the sample login information included, within 48 hours of sample receipt. The laboratory will also include the original or a copy with the final hardcopy report (the final "hardcopy" can be in a paper or PDF format or both, depending on project-specific requirements).

A self-adhesive custody seal will be placed across the lid of each sample to maintain its integrity until the laboratory opens it. The shipping coolers containing the samples will be sealed with a custody seal any time they are not in an individual's possession or view before shipping. All custody seals will be signed and dated by the responsible sampling team personnel.

At a minimum, the CoC form must include the following information:

- Project information such as project number or identification of investigation monitoring program, Project Manager, etc.
- Unique sample ID
- Date and time of sample collection
- Source of sample (including name, location, sample type, and matrix)
- Number of containers
- Designation of MS/MSD (if applicable)
- Preservative used
- Analyses required
- Name of sampler
- Custody transfer signatures, dates, and times of sample transfers from the field to transporters and to the laboratories
- Bill of lading or transporter tracking number (if applicable)

4.3 Laboratory Responsibilities

After the samples reach the laboratory, they shall be checked against information on the CoC form for anomalies. The condition, temperature, and appropriate preservation of samples shall be checked and documented on the CoC form or a sample receipt checklist. Checking an aliquot of each sample container, at the time of receipt, using litmus paper is an acceptable procedure to determine the pH of all sample containers received, except VOCs. The pH check should be conducted in the sample receiving area or in the appropriate laboratory department. Samples for VOC analysis require that the pH check be performed after the vial has been opened for analysis; the pH shall be recorded at the time of analysis in the department log books. Anomalies in the received samples and their resolution shall be documented in laboratory records and summarized in the final analytical report case narrative. All sample information shall then be entered into a tracking system, and unique analytical sample IDs shall be assigned. A copy of this information shall be reviewed by the laboratory for accuracy. Sample holding time tracking begins with the collection of samples and continues until the analysis is complete.

Samples not preserved or analyzed in accordance with the requirements in this QAPP or the project-specific SAP or QAPP addendum shall be resampled and analyzed at no additional cost to CH2M HILL. Any subcontracted analyses shall be documented on a CoC form by the laboratory and noted in the case narrative. Internal laboratory CoC procedures shall also be documented and implemented by the laboratory. Sample custody within the laboratory will, at a minimum, include storage of samples in a secure, restricted access area when not in use; samples must be checked out and checked back in by the analysts who use them. Internal custody records must be maintained by the laboratory as part of the documentation file for each sample. Specific instructions concerning the analysis specified for each sample shall be communicated to the analysts. Analytical batches shall be created, and laboratory QC samples shall be introduced into each batch.

While in the laboratory; samples shall be stored in limited-access, temperature-controlled areas. Refrigerators, coolers, and freezers shall be monitored for temperature 7 days a week. Acceptance criterion for the temperatures of the refrigerators and coolers is 4°C ±2°C. Acceptance criterion for the temperatures of the freezers shall be between -7°C and -20°C. All of the cold-storage areas shall be monitored by using thermometers that have been calibrated with a National Institute of Standards and Technology approved traceable thermometer. As indicated by the calibration results, correction factors shall be applied to each thermometer.

Records that include acceptance criteria shall be maintained. Samples for volatile organics analysis shall be stored separately from other samples, standards, and sample extracts. Samples shall be stored after analysis until disposed of in accordance with applicable local, state, and federal regulations. Disposal records shall be maintained by the laboratory.

The following information shall be documented on the CoC form, the sample receipt form, or the sample login form (or on more than one of these forms, as applicable):

- Date samples received
- CH2M HILL sample ID
- Laboratory sample ID
- Analytical tests requested for the sample batch
- Sample matrix
- Number of samples in the batch
- Container description and location in the laboratory
- Verification of sample preservation

All of the information must be retained and traceable in the laboratory sample tracking system, with summary information provided in the analytical reports.

Standard operating procedures (SOP) describing sample control and custody shall be maintained by the laboratory.

4.4 Sample Packaging and Transport

The following sections provide guidelines for sample packaging and transport that may be superceded, amended, or replaced in the project- or site-specific SAPs or QAPP addenda.

4.4.1 Sample Container Preparation

The following procedures shall be implemented:

- Labels will be secured to each container with clear tape, if not previously done.

- Container lids will be checked for tightness; if the container is not full, the outside of the container will be marked with indelible ink to indicate the sample volume level.
- Sample bottles will be double-bagged in heavy-duty plastic. Glass sample containers will be covered with bubble wrap to prevent breakage.

4.4.2 Shipping Cooler Preparation

The following procedures shall be implemented:

- All previous labels and broken custody seals used on the sample shipping cooler will be removed.
- Drain plugs will be sealed with fiberglass or similar tape (outside and inside) to prevent melting ice from leaking.
- A cushioning layer of packing material, such as bubble wrap (approximately 1 inch thick), will be placed at the bottom of the cooler to prevent breakage during shipment.
- The cooler will be lined with a large plastic bag (same type used to contain samples).
- All ice will be double-bagged in zip-lock plastic bags.

4.4.3 Placing Samples in the Cooler

The following procedures shall be implemented:

- The CoC form will be placed in a zip-lock bag and taped inside the top of the cooler if shipment is to be made through commercial carrier.
- Samples will be placed in an upright position in the cooler.
- Ice will be placed on top of samples and between samples. Ideally, ice will be placed in resealable plastic bags in duplicate to minimize leakage of ice melt into the cooler.
- Void space between samples should be filled with packing material or ice packs (vermiculite is not acceptable packing material unless required by DOT).

4.4.4 Closing the Cooler

The following procedures shall be implemented:

- The cooler lid will be taped with strapping tape, encircling the cooler several times.
- Custody seals may also be affixed to the cooler lid to further ensure the integrity of the samples. Custody seals should be initialed and dated.

4.4.5 Transport

Sample coolers will be transported to the laboratory immediately after sample collection. An overnight courier may be used to transport the samples. Intermediate stops should be avoided, except for emergencies, in which case, the situation should be noted in the field notebooks. The laboratory should be notified that samples are being shipped.

TABLE 4-1
Sample Containers, Preservation, and Holding Times
PG&E Program Quality Assurance Project Plan

		Container and Minimum Quantity			
Analyte	**Method**	**Water**	**Soil/Sediment**	**Preservation**	**Holding Time**
Metals (except hexavalent chromium)	SW6010B, SW6020A, EPA200.7, EPA200.8, SM3120B, EPA245.1, SW7000 series methods	1-liter P or G	8-oz/P, G, or T	Water: Add HNO_3 to pH<2; soil/sediment: None	28 days for mercury; 180 days for all others
Hexavalent Chromium	SW7196A	250-ml P or G	4-oz/P, G, or T	Water/Soil: Chill to 4°C (±2°C)	Water: 24 hours
Hexavalent Chromium	SW7199	250-ml P or G	4-oz/P, G, or T	Water: Chill to 4°C (±2°C). Laboratory or field filtration. After filtration adjust the pH to 9–9.5 by adding $(NH_4)_2SO_4$/ NH_4OH buffer solution Soil/sediment: Chill to 4°C (±2°C)	Water: 24 hours Soil: 30 days to extraction, 7 days to analysis
Hexavalent Chromium	EPA218.6	250-ml P	Not applicable	chill to ≤6°C Laboratory or field filtration within 24 hours. After filtration adjust the pH to 9–9.5 by adding $(NH_4)_2SO_4$/ NH_4OH buffer solution	28 days
Hexavalent Chromium	SM3500-Cr B	250-ml P	Not applicable	chill to ≤6°C Laboratory or field filtration within 24 hours. After filtration adjust the pH to 9–9.5 by adding $(NH_4)_2SO_4$/ NH_4OH buffer solution	28 days
Purgeable TPH	SW8015B Preparation methods: SW5035B (soil) SW5030B (water)	Three 40-ml G-TLC	4 EnCore™ samplers or equivalent (see Section 3.2.1.4)	Water: Add HCl to pH<2; chill to 4°C (±2°C) Soil/sediment: Chill to 4°C (±2°C)	Water: 14 days (preserved); 7 days (unpreserved) Soil: 48 hours if only cooled to 4ºC; 48 hours by Encore™ or equivalent sampler unless extruded and preserved within 48 hours
BTEX	SW8021	Three 40-ml G-TLC	4 EnCore™ samplers or equivalent (see Section 3.2.1.4)		14 days if solid samples preserved by: • 4ºC/frozen in 48 hours • Frozen onsite • Sodium bisulfate • Methanol

TABLE 4-1
Sample Containers, Preservation, and Holding Times
PG&E Program Quality Assurance Project Plan

Analyte	Method	Container and Minimum Quantity		Preservation	Holding Time
		Water	Soil/Sediment		
Extractable TPH	SW8015B	Two 1-liter G	8-oz/G or T	Chill to 4°C (±2°C)	Water: 7 days to extraction; 40 days to analysis Soil: 14 days to extraction; 40 days to analysis
Pesticides	SW8081A	Two 1-liter G	8-oz/ G or T	Chill to 4°C (±2°C)	Water: 7 days to extraction; 40 days to analysis Soil: 14 days to extraction; 40 days to analysis
PCB	SW8082	Two 1-liter G	8-oz/ G or T	Chill to 4°C (±2°C)	Water: 7 days to extraction; 40 days to analysis Soil: 14 days to extraction; 40 days to analysis
VOCs	SW8260B Preparation methods: SW5035B (Soil) SW5030B (Water)	Three 40-ml G-TLC	4 EnCore™ samplers or equivalent; see Section 3.2.1.4	Water: Add HCl to pH<2; chill to 4°C (±2°C) Soil/sediment: Chill to 4°C (±2°C)	Water: 14 days (preserved); 7 days (unpreserved) Soil: 48 hours if only cooled to 4ºC 48 hours by Encore™ or equivalent sampler unless extruded and preserved with 48 hours 14 days if solid samples preserved by the following methods: • 4ºC/frozen in 48 hours • Frozen onsite • Sodium bisulfate • Methanol
SVOC	SW8270C	Two 1-liter G	8-oz G or T	Chill to 4°C (±2°C)	Water: 7 days to extraction; 40 days to analysis Soil: 14 days to extraction; 40 days to analysis
Herbicides	SW8151A	Two 1-liter G	8-oz G or T	Chill to 4°C (± 2°C)	Water: 7 days to extraction; 40 days to analysis Soil: 14 days to extraction; 40 days to analysis

TABLE 4-1
Sample Containers, Preservation, and Holding Times
PG&E Program Quality Assurance Project Plan

		Container and Minimum Quantity			
Analyte	**Method**	**Water**	**Soil/Sediment**	**Preservation**	**Holding Time**
PNA	SW8270SIM	Two 1-liter G	8-oz G or T	Chill to 4°C (±2°C)	Water: 7 days to extraction; 40 days to analysis Soil: 14 days to extraction; 40 days to analysis
Carbon Dioxide, Methane, Ethane, and Ethane	RSK-175	Three 40-ml G-TLC	Not applicable	Add HCl to pH<2; chill to 4°C (±2°C)	Water: 14 days
Carbon Dioxide	SM5400-CO2	1-liter P or G		≤6°C	14 days
Ammonia	EPA350.1 Revision 2 or SM4500-NH3	1-liter P or G	4-oz P, G, or T	Water: Add H_2SO_4 to pH<2; chill to ≤6°C Soil/sediment: 4°C (±2°C)	Water: 28 days Soil: Not available
Anions	EPA300.0 or SM4500	500-ml P or G	4-oz P, G, or T	Chill to ≤6°C (none required for chloride and fluoride) ortho-Phosphate requires filtering within 15 minutes after sample collection	Bromide, chloride, fluoride, sulfate, and iodide in 28 days Nitrate and ortho-Phosphate in water 48 hours
Metabolic Acids	EPA300.M	500-ml P or G		Chill to ≤6°C	Water: 28 days
Alkalinity (total, bicarbonate, carbonate, hydroxide)	EPA310.2 or SM2320 B	500-ml P or G		Chill to ≤6°C	14 days
TDS	SM2540 C	500-ml P or G		Chill to ≤6°C	7 days
TSS	SM2540 D	500-ml P or G		Chill to ≤6°C	7 days
Turbidity	EPA180.1 Revision 2 or SM2130	500-ml P or G		Chill to ≤6°C	48 hrs
Color	SM2120 E	125-ml P or G		Chill to ≤6°C	48 hours
Specific Conductance	EPA120.1 Revision 1, or SM2510 SW9050	500-ml P or G	4-oz P, G, or T	Chill to ≤6°C Soil/sediment: Chill to 4°C (±2°C)	28 days
Hardness	SM2340 B or C	500-ml P or G		Chill to ≤6°C	6 months
pH	SM4500H+B or SW9040	500-ml P or G	4-oz P, G, or T	Chill to ≤6°C	15 minutes
BOD	SM5210 B	500-ml P or G		Chill to ≤6°C	48 hours

TABLE 4-1
Sample Containers, Preservation, and Holding Times
PG&E Program Quality Assurance Project Plan

		Container and Minimum Quantity			
Analyte	**Method**	**Water**	**Soil/Sediment**	**Preservation**	**Holding Time**
TOC/DOC	SM 5310 C	500-ml G or 40-ml VOA	4-oz P, G, or T	Water: For 500-ml: Add H_2SO_4 to pH<2; chill to ≤6°C For 40-ml VOA: Add H_2PO_4 to pH<2; chill to ≤6°C	28 days
TOC	Walkley Black	Not applicable	4-oz P, G, or T	Chill to ≤6°C	28 days
Perchlorate	EPA314.0	500-ml P or G	4-oz P, G, or T	Chill to ≤6°C	28 days
Sulfide	SM4500-S^2	500-ml P or G		Add zinc acetate and NaOH to pH>9, chill to ≤6°C	7 days
Acid Volatile Sulfide	E821/R-91-100	Check with Laboratory prior to sample collection			
TKN	EPA351.1/2 or SM4500	500-ml P or G	4-oz P, G, or T	Add H_2SO_4 to pH<2; chill to Chill to ≤6°C	28 days
Ferrous Iron (Fe +2)	SM3500D	500-ml P or G		Chill to ≤6°C	24 hours
Dissolved Silica	EPA200.7 or SM4500-Si or SM3120 B	500-ml P only		Chill to ≤6°C	28 days
18O and deuterium	Laboratory SOP (continuous flow mass spectrometer – CF-IRMS)	100-ml P or 40-ml VOA		Chill to ≤6°C	6 months
Cyanide	EPA335.4 (R1) or SM4500-CN C/D/E (water) SW9010B, SW9012, or SW9014 (soil)	500-ml P or G	4-oz P, G, or T	Water: Add NaOH to pH>12; chill to ≤6°C Soil/sediment: Chill to 4°C (±2°C)	Water and soil: 14 days
Gross Alpha	SM7110C	500 ml P or G		Add HNO_3 to pH<2	6 months
Gross Beta	E900.0	500-ml P or G		Add HNO_3 to pH<2	6 months
Radium-226	E903.1	500-ml P or G	4-oz P, G, or T	Add HNO_3 to pH<2; soil/sediment: None	6 months
Radium-228	E904.0	500-ml P or G	4-oz P, G, or T	Add HNO_3 to pH<2; soil/sediment: None	6 months
Strontium	E905.0	500-ml P or G	4-oz P, G, or T	Add HNO_3 to pH<2; soil/sediment: None	6 months
Tritium	E906.0	500-ml P or G	4-oz P, G, or T	Add HNO_3 to pH<2; soil/sediment: None	6 months
Uranium	R908.0	500-ml P or G	4-oz P, G, or T	Add HNO_3 to pH<2; soil/sediment: None	6 months

TABLE 4-1
Sample Containers, Preservation, and Holding Times
PG&E Program Quality Assurance Project Plan

		Container and Minimum Quantity			
Analyte	**Method**	**Water**	**Soil/Sediment**	**Preservation**	**Holding Time**

Notes:

> = greater than

< = less than

≤ = less than or equal to

BTEX = benzene, toluene, ethylbenzene, and xylene

CF-IRMS = continuous-flow isotope ratio mass spectrometry

DOC = dissolved organic compounds

G = glass

G-TLC = glass with teflon-lined cap

H_2PO_4 = phosphoric acid

H_2SO_4 = sulfuric acid

HCl = hydrochloric acid

HNO_3 = nitric acid

NaOH = sodium hydroxide

NH_4 = ammonium

NH_4OH = ammonium hydroxide

$(NH_4)_2SO_4$ = ammonium sulfate

oz = ounce

P = polyethylene

PCB = polychlorinated biphenyls

PNA = polynuclear aromatic hydrocarbons

SIM = selected ion monitoring

SO_4 = sulfate

T = brass sleeves in the sample barrel (sometimes called California brass)

TDS = total dissolved solids

TKN = total kjeldahl nitrogen

TLC = teflon lined closure

TOC = total organic compounds

TPH = total petroleum hydrocarbons

TSS = total suspended solids

SECTION 5

Data Quality Objectives and Quality Assurance Program

The DQOs for each individual project are specified in the project-specific work plan or SAP. DQOs are the basis for the design of the data collection plan; they specify the type, quality, and quantity of data to be collected and how the data are to be used to make the appropriate decisions for the project. The final output of the process is a data collection design that meets the qualitative and quantitative needs of the project.

5.1 Data Categories

Both screening and definitive data may be generated. Screening data are generated by rapid analytical methods, and calibration and QC requirements are less rigid than those required for definitive data. Quantitation from a screening method is usually imprecise. Definitive data are generated by rigorous analytical methods using standardized calibration and QC and are reported on specified deliverables. The data are analyte-specific, and both identification and quantitation are confirmed.

In general, screening data will be confirmed by definitive data for use in decision making for this program. However, screening data may be used for decision making purposes on a project-specific basis, depending upon the DQOs. The project-specific documents will describe the advantages of collecting screening data that might be less precise but will more adequately define the characteristics of the site by increasing the number of samples collected. This approach can reduce overall error in the data collection process.

5.2 Precision, Accuracy, Representativeness, Completeness, and Comparability

Data quality will be evaluated for precision, accuracy, representativeness, completeness, and comparability (PARCC). Both definitive and screening data will be subject to PARCC requirements. PARCC objectives for screening methods may be identical to those for definitive data, or they may be less stringent depending on the project-specific objectives. Sampling frequencies may vary according to the project needs, as defined in the project-specific SAPs or QAPP addenda.

5.2.1 Precision

Precision is a measure of reproducibility of analytical results. It can be defined as the degree of mutual agreement among individual measurements obtained under similar conditions. Total precision is a function of the variability associated with both sampling and analysis. Precision will be evaluated as the relative percent difference (RPD) between field duplicate sample results or between the MS and MSD results. Field duplicates will comprise

10 percent of the sampling effort. MS/MSD samples will be analyzed at a 5-percent frequency. The MS/MSD samples will be field designated, if so required by project specific requirements. Laboratory-generated precision control limits can be used for data evaluation; however, all precision control limits listed in Tables 5-2A through 5-27 must be met.

5.2.2 Accuracy

Accuracy is the degree of agreement between a measured value and the “true” or expected value. It represents an estimate of total error from a single measurement, including both systematic error, or bias, and random error that may reflect variability due to imprecision. Accuracy is evaluated in terms of percent recovery (%R) determined from results of MS/MSD and laboratory control sample (LCS) analyses. Surrogate recoveries from samples analyzed for organic parameters are also used to assess accuracy. Laboratory-generated accuracy control limits can be used for data evaluation; however, the accuracy control limits listed in Tables 5-2A through 5-27 must be met.

5.2.3 Representativeness

Representativeness is the degree to which sample data accurately reflect the characteristics of a population of samples. It is achieved through a well-designed sampling program and by using standardized sampling strategies and techniques and analytical procedures. Factors that can affect representativeness include site homogeneity, sample homogeneity at a single point, and available information around which the sampling program is designed. Using multiple methods to measure an analyte can also result in nonrepresentative sample data.

5.2.4 Completeness

Completeness is the number of valid measurements compared with the total number of measurements generated. Completeness will be determined for each method, matrix, and analyte combination. The completeness goals of each project are optimized to meet the DQOs. The goals for this program are 95 percent for aqueous samples and 90 percent for soil samples.

5.2.5 Comparability

Comparability is the confidence with which one data set can be compared to another. It is achieved by maintaining standard techniques and procedures for collecting and analyzing samples and reporting the analytical results in standard units. Results of performance evaluation samples and systems audits will provide additional information for assessing comparability of data among subcontracting laboratories.

5.3 Method Detection Limits, Reporting Limits, and Instrument Calibration Requirements

5.3.1 Method Detection Limits

The method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Each participating laboratory will determine the MDL for each method, matrix, and analyte for each instrument that will be used to analyze samples. The MDLs will be initially determined prior to analyzing samples and again at least once every 12 months; a quarterly MDL verification can be substituted for the annual MDL study. The following steps should be followed:

1. Estimate the MDL using one of the following:
    - The concentration value that corresponds to an instrument signal/noise ratio in the range of 2.5 to 5
    - The concentration equivalent of three times the standard deviation of replicate measurement of the analyte in reagent water
    - The region of the standard curve where there is a significant change in sensitivity (i.e., a break in the slope of the standard curve)
2. Prepare (e.g., extract and digest) and analyze seven samples of an MS (ASTM Type II water for aqueous methods; Ottawa sand for soil methods; 1-mm glass beads, or smaller, for metals) containing the analyte of interest at a concentration three to five times the estimated MDL.
3. Determine the variance for each analyte by using Equations 1 and 2:

$$S^2 = \frac{1}{n-1}\left[\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2\right] \tag{1}$$

where:

S^2 = variance
^{x}I = the nth measurement of the variable x and
$\bar{x}$ = the average value of x

$$\bar{X} = \frac{1}{n}\sum_{i=1}^{n} x_i \tag{2}$$

4. Determine the standard deviation(s) for each analyte by using Equation 3:

$$s = (S^2)^{1/2} \tag{3}$$

5. Determine the MDL for each analyte by using Equation 4:

$$\text{MDL} = 3.14(s) \tag{4}$$

Note: 3.14 is the one-sided t-statistic at the 99-percent confidence level appropriate for determining the MDL using seven samples.

6. If the spike level used in Step 2 is more than 10 times the calculated MDL, repeat the process using a smaller spiking level.

CH2M HILL requires a verification check be performed on the calculated MDLs for each target compound (AFCEE, 2006). The MDL check standard shall be spiked at approximately two times the current reported MDL. The MDL is verified if the check standard produces a response at least 3 times above the instrument's noise level and greater than the blank associated with the MDL verification study. If the verification response is too low, spike at a successively higher concentration until verification criteria are met, and use the first successful concentration as the reported MDL. The MDL verification check will be sent to CH2M HILL for review and approval.

5.3.2 Reporting Limits

In general, reporting limits (RL) should be greater than two times the calculated MDL. RLs used by the laboratory should not be greater than the reporting limit objectives listed in Tables 5-2 through 5-13

When calibrating instruments, a standard at a concentration equal to or less than the RL must be included. In the project-specific SAP or QAPP addendum, reporting of analytical data will be addressed. One of the following options will be selected when establishing reporting requirements for each project:

- Analytes at concentrations greater than the laboratory MDL but less than the RL will be flagged "J" and reported as an estimate. Analytes that are not detected at or above the laboratory MDL will be flagged "U" and reported as not detected at the RL.
- Only analytes at a concentration greater than the project-specific RL will be reported. Analytes detected at less than the RL will be flagged "U" and reported as not detected at the RL.

For consistency, RLs and sample results shall be reported to two significant figures if less than 10 μg/L (parts per billion) and to three significant figures otherwise.

RLs shall be reported on a dry-weight basis for soil samples.

5.3.3 Instrument Calibration

Laboratory instruments shall be calibrated by qualified personnel prior to sample analysis according to the procedures specified for each method. Calibration shall be verified at method-specified intervals throughout the analysis sequence. The frequency and acceptance criteria for calibration are specified for each analytical method in Tables 5-16 through 5-27, with supplemental requirements defined in the following sections for organic methodologies. When multipoint calibration is specified, the concentrations of the calibration standards should bracket those expected in the samples. Samples should be diluted, if necessary, to bring analyte responses within the calibration range. Data that exceed the calibration range cannot be reported by the laboratory. The initial calibration (ICAL) curve shall be verified as accurate with a standard purchased or prepared from an independent second source. ICAL verification involves the analysis of a standard containing all the target analytes, typically in the middle of the calibration range, each time the ICAL is performed. Quantitation based on extrapolation is not desirable.

5.3.3.1 Initial Calibration Models for the Determination of Organic Compounds

Organic methodologies often provide multiple options for ICAL curve fits and associated acceptance criteria for use. The following sections describe the required laboratory practices that will be employed by the laboratory. The hierarchy that the laboratory will use when selecting the calibration curve fit for use in quantitation of sample results is described in the following section.

Calibration Techniques. The following procedures will be implemented:

- The analyst will verify that correct instrument operating conditions and routine maintenance as specified in the method and laboratory SOP are employed. All maintenance activities will be documented in a laboratory notebook for troubleshooting and scheduling of future routine, periodic maintenance.
- Ensure that the instrument is free of contamination prior to calibration. **Do not** perform any blank subtraction.
- The entire ICAL must be performed and meet method performance criteria prior to sample analyses. The calibration standards must be analyzed in sequential order from the lowest to highest concentration. If **one** calibration standard fails to meet criteria, it may be reanalyzed at the end of the calibration sequence. Justification for removing a calibration point from the selected curve fit includes circumstances such as, improper purge, injection failure, nonspiked level, or other obvious failures. The failure of multiple standards suggests an instrument problem or operator error and corrective action is required.
- Only the lowest or the highest calibration points can be removed from the calibration curve without justification. If the lowest calibration point is removed, the RL for that compound increases to the level of the next lowest calibration point. Approval to elevate RLs greater than the project-specific objectives **must** be approved by the program or project chemist. If the highest calibration point is removed, the linear range is shortened for that compound.
- The lowest calibration point in the calibration curve must be at or below the required RL.
- The other standard concentrations must define the working range of the instrument or the expected range of concentrations found in the samples.
- Either external or internal calibration can be employed for methods not involving mass spectrometry detectors. Internal calibration must be used when a mass spectrometry detector is employed.
- A minimum of five calibration points must be used for the calibration curve for gas chromatography/mass spectrometry and gas chromatography methods.
- Most compounds tend to be linear, and a linear approach should be favored when linearity is suggested by the calibration data. Nonlinear calibration should be considered only when a linear approach cannot be applied. It is not acceptable to use an alternate calibration procedure when a compound fails to perform in the usual manner. When this occurs it is indicative of instrument issues or operator error.
- If a nonlinear calibration curve fit is employed, a minimum of six calibration levels must be used for second-order (quadratic) curves, and a third order polynomial requires a minimum of seven calibration levels.

- When more than five levels of standards are analyzed in anticipation of using second- or third-order calibration curves, all calibration points **must** be used regardless of the calibration option employed. The highest or lowest calibration point may be excluded to narrow the calibration range and meet the requirements for a specific calibration option. Otherwise, unjustified exclusion of calibration data is expressly forbidden.
- Using the average (mean) relative standard deviation (RSD) of all analytes to meet ICAL criteria is **not** acceptable.

Calibration Options. This section describes the acceptable calibration options and the hierarchy that the laboratory should use when selecting a specific option. The choice of calibration option may also be based on previous experience or prior knowledge of detector response.

The following are calibration options:

- **Linear calibration using average calibration or response factors.** Calibration factors for external calibrations or response factors for internal calibrations must have RSDs not exceeding 20 percent or 15 percent, respectively, for quantitation. A minimum response factor of 0.05 for most target analytes or 0.01 for the least responsive target analytes must be achieved to ensure detectability.
- **Linear calibration using a linear regression equation (y=mx+b).** The correlation coefficient must equal 0.995 or better. The line should **not** be forced through the origin. The equation and a plot of the linear regression must be included in the raw data generated by the laboratory and made available in the data package upon request.
- **Nonlinear calibration.** This model may be a second-order or third-order polynomial. The model must be continuous without a break in the function and should **not** be forced through the origin. The coefficient of determination of the nonlinear regression must be 0.99 or better. The equation and a plot of the nonlinear regression must be included in the raw data generated by the laboratory and made available in the data package upon request. This method of calibration **must** be approved by the program or project chemist prior to analysis and is intended for nonlinear responding compounds only.

5.3.3.2 Continuing Calibration

Periodic verification of the ICAL is essential in generating analytical data of known quality. The continuing calibration verification analyses ensure that the instrument has not been adversely affected by the sample matrix or other instrument failures that would increase or decrease the sensitivity or accuracy of the method. The laboratory will perform continuing calibration for all methods in accordance with the specific requirements in the method and laboratory SOP.

Method SW8000B allows the use of the average of all analytes percent difference or drift (%D) to meet the continuing calibration requirements for the method. Using the average (mean) %D to meet continuing calibration criteria is **not** acceptable. All analytes must meet the continuing calibration criteria for %D.

5.4 Elements of Analytical Quality Control

Laboratory QC checks indicate the state of control that prevailed at the time of sample analysis. QC checks that involve field samples, such as matrix and surrogate spikes and field duplicates, also provide an indication of the presence of matrix effects. Field-originated blanks provide a way to monitor potential contamination that field samples are subjected to. The QAPP specifies requirements for method blanks, LCSs, surrogate spikes, and MS/MSD that must be followed by subcontracting laboratories.

A laboratory QC batch is defined as a method blank, LCS, MS/MSD, or a sample duplicate (depending upon the method) and 20 or fewer environmental samples of similar matrix that are extracted or analyzed together. For gas chromatography/mass spectrometry volatile analyses, a method blank, LCS, and MS/MSD must be analyzed in each 12-hour calibration period. The number of environmental samples allowed in the laboratory QC batch is defined by the remaining time in the method-prescribed 12-hour calibration period divided by the analytical run time. Each preparation or analytical batch should be identified in a way that will associate environmental samples with the appropriate laboratory QC samples.

5.4.1 Method Blanks

Method blanks are used to monitor each preparation or analytical batch for interference or contamination from glassware, reagents, and other potential contaminant sources in the laboratory. A method blank is an analyte-free matrix (laboratory reagent water for aqueous samples or Ottawa sand for soil samples) to which all reagents are added in the same amount or proportions as are added to samples. It is processed through the entire sample preparation and analytical procedures along with the samples in the batch. There should be at least one method blank per preparation or analytical batch. If a target analyte is found at a concentration that exceeds the RL, corrective action must be performed to identify and eliminate the contamination source. **All** associated samples must be re-prepared or reanalyzed, or both, after the contamination source has been eliminated if the compounds detected in the associated blank are also present in the field samples. No analytical data may be corrected for the concentration found in the blank (no blank correction).

5.4.2 Laboratory Control Sample

An LCS consists of an analyte-free matrix (laboratory reagent water for aqueous samples and Ottawa sand or glass beads for soil samples) spiked with known amounts of analytes that come from a source different than that used for calibration standards. A **complete target analyte list** for each method specified in the QAPP will be spiked into the LCS. The spike levels should be less than or equal to the midpoint of the calibration range. If LCS results are outside the specified control limits, corrective action must be taken, including sample re-preparation or reanalysis, or both, if appropriate. Documentation of the re-preparation or reanalysis, or both, must be provided in the analytical report. If more than one LCS is analyzed in a preparation or analytical batch, the results for each of the LCSs analyzed must be reported. Any LCS recoveries that are above or below the QC limits affect the accuracy for the entire batch and requires corrective action.

5.4.3 Surrogates

Surrogates are organic analytes that behave similarly as the analytes of interest but are not expected to occur naturally in the samples. They are spiked into the standards, the samples, and QC samples prior to sample preparation. Surrogate recoveries are used as an indicator of accuracy, method performance, and extraction efficiency. If surrogate recoveries are outside the specified control limits, corrective action must be taken, including sample re-preparation or reanalysis, or both, if appropriate. Documentation of the re-preparation or reanalysis, or both, must be provided in the analytical report.

5.4.4 Matrix Spike/Matrix Spike Duplicate

An MS is a sample matrix fortified with known quantities of specific compounds; it is subjected to the same preparation and analytical procedures as the native sample. Target analytes are spiked into the sample. MS recoveries are used to evaluate the effect of the sample matrix on the recovery of the analytes of interest. An MSD is a second fortified sample matrix. The RPD between the results of duplicate MSs measures the precision of sample results. One MS/MSD (MSD where appropriate) per 20 project-specific samples will be analyzed. A complete target analyte list for each method specified in the QAPP will be spiked into the MS/MSD (with the exception of PCBs; see Table 5-7). Project-specific samples designated on the CoC form will be spiked. The spike levels will be less than or equal to the midpoint of the calibration range. Exceedances of control limits should be flagged in the analytical report.

5.4.4.1 Matrix Spike for Hexavalent Chromium Analyses

Interference from groundwater is known to reduce the sensitivity of Methods SW7199 and EPA218.6. This can result in an incorrect assessment of the analyte identification or the specific RL if the “Matrix Spike and Dilution Protocol” is not followed. Samples being analyzed by Methods SW7199 and EPA218.6 will follow the protocol in the following section.

Matrix Spike and Dilution Protocol. Matrix interference has been encountered that affects the sensitivity for hexavalent chromium by ion chromatography methods. CH2M HILL shall direct the laboratories to perform an additional QA/QC analyses to aid in assessing any effect on method sensitivity for each project due to the sample matrix.

For nondetect sample results, the laboratory will analyze an MS by spiking the samples with 1 µg/L of hexavalent chromium to ensure that identification is accurate and verify that false negatives are detected. For samples with detected results, the laboratory will analyze an MS by spiking the sample with hexavalent chromium at a level not less than 25 percent of the sample concentration. Laboratories will follow the standard protocol of 1 MS and 1 laboratory sample duplicate per 20 samples, unless directed by the project chemist to analyze the MS more frequently.

If the MS is not recovered or the peak is outside of the established retention time window for either detected or nondetect results, the laboratory will make a fivefold dilution of two aliquots of the sample. The first aliquot will be analyzed without the spike; the second aliquot will be spiked with hexavalent chromium at a concentration consistent with the concentrations previously listed and the recovery and peak retention times evaluated. If this

MS recovery is not within laboratory QC limits or the peak is not within the laboratory retention time window, the laboratory will dilute two additional aliquots of the sample tenfold, spike one of the aliquots, analyze the sample/MS. This procedure will be performed at successively greater dilutions of 25:1, 50:1, or 100:1 until the peak identified in the post spike analysis is within the established retention time window for hexavalent chromium and the recovery of the spike is within the laboratory QC limits listed in Tables 5-2 or 5-3.

The detected result that is reported by the laboratory on the final data package will be chosen from the dilution where both the peak detected in the unspiked and the spiked sample are within the appropriate retention time and the MS is recovered within the QC control limits. The RLs will be raised to the level of the appropriate dilution.

For nondetect results, the dilution selected by the laboratory for reporting will be taken from the smallest dilution that yields an MS recovery within QC control limits and within the appropriate retention time window.

5.4.5 Internal Standards

Internal standards are compounds that have similar properties as the analytes of interest but are not expected to occur naturally in the samples. Some methods require the use of internal standards to compensate for losses during injection or purging or losses due to viscosity. A measured amount of the internal standard is added to the standards, the samples, and QC samples following preparation. When the internal standard results exceed the control limits, corrective action must be taken, including sample reanalysis, if appropriate. Corrective action must be documented in the analytical report.

5.4.6 Laboratory Sample Duplicate

For some methods, a laboratory duplicate is performed instead of a matrix spike duplicate. A laboratory sample duplicate is a sample duplicate selected by the laboratory. It is subjected to the same preparation and analytical procedures as the native sample. The RPD between the results of the native sample and laboratory sample duplicate measures the precision of sample results. The data collected may also yield information regarding whether the sample matrix is homogenous or heterogeneous.

5.4.7 Interference Check Samples

Interference check samples are used in inductively coupled plasma (ICP) analyses to verify background and interelement correction factors. They consist of two solutions, A and AB. Solution A contains the interfering analytes, and Solution AB contains the analytes of interest and the interfering analytes. Both solutions are analyzed at the beginning and at the end of each analytical sequence. When the interference check sample results exceed the control limits, corrective action must be taken, including sample reanalysis, if appropriate.

5.4.8 Retention Time Windows

Retention time windows for gas and liquid chromatographic analyses must be established by replicate injections of the calibration standard over multiple days as described in SW846 8000B, analytical method, or appropriate laboratory SOP. The absolute retention time of the calibration verification standard at the start of each analytical sequence will be the centerline of the window. For an analyte to be reported as positive, its elution time must be within the retention time window.

5.4.9 Equipment Blank

EBs are used to assess the effectiveness of the sampling equipment decontamination procedure. They are obtained immediately after sampling equipment decontamination by rinsing the decontaminated sampling equipment with deionized or ASTM Type II water. The rinse water is collected in sample bottles, preserved, handled, and analyzed in the same manner as the samples. EBs will be collected at a frequency of one per day for each nondedicated equipment type per sampling team.

5.4.10 Ambient Blank

ABs are collected to monitor contamination from ambient sources (e.g., active runways, engine test cells, operating motor vehicles) during collection of VOC samples. An AB is prepared by pouring ASTM Type II water into a VOC sample container at the sampling site where VOC samples are collected. The blank is preserved, handled, and analyzed in the same manner as the VOC samples.

5.4.11 Trip Blank

TBs are used to monitor contamination during sample shipping and handling and for cross contamination by VOC migration among the samples. TBs are prepared in the laboratory by pouring ASTM Type II water into a VOC sample container. The sample containers are then sealed, transported to the field, and remain sealed while VOC samples are collected; they returned to the laboratory in the same cooler as the VOC samples. One TB should accompany each VOC sample cooler.

5.4.12 Field Duplicates

A FD is an independent sample collected as close as possible to the original sampling location, from the same source, and under identical conditions. FDs are used to evaluate sampling precision. The FDs are collected simultaneously or in immediate succession and are treated in exactly the same manner during storage, shipment, and analysis. FDs will be collected at a minimum frequency of 10 percent or one per sampling event, whichever is more frequent, for each matrix and each type of analysis. The sampling locations for field samples will be recorded in the field logbook or on the field sampling form.

The FDs will be identified in a manner that will not allow the laboratory to recognize them.

5.5 Additional Quality Control Requirements

5.5.1 Holding Time

The holding time requirements specified in this QAPP (Table 4.1) must be met. For methods requiring both sample preparation and analysis, the preparation holding time will be calculated from the time of sampling to the completion of preparation. The analysis holding time will be calculated from the time of completion of preparation to the time of completion of the analysis, including required dilutions, confirmation analysis, and reanalysis. For methods requiring analysis only, the holding time is calculated from the time of sampling to completion of the analysis, including required dilutions, confirmation analysis, and reanalysis.

5.5.2 Confirmation

Confirmation analysis must be performed as specified for specific organic methods when the result is at or above the RL. Both the primary and confirmation results will be reported. Unless one of the analysis is specifically designated as the confirmation by the method, the more concentrated result will be reported as the sample result and the lesser concentration result as the confirmation. All calibration and QC requirements must be met when confirmation analysis is performed.

5.5.3 Cleanup Procedures to Minimize Matrix Effects

To maintain the lowest possible RLs, appropriate cleanup procedures should be employed when it is indicated by the method to remove or minimize matrix interference. Methods for sample cleanup include, but are not limited to, gel permeation chromatography, silica gel, alumna, florisil, mercury (sulfur removal), sulfuric acid, and acid/base partitioning. Method blanks, MS/MSDs, and LCSs must be subjected to the same cleanup procedures performed on the samples to monitor the efficiencies of these procedures.

5.5.4 Sample Dilution

Dilution of a sample results in elevated RLs and ultimately affects the usability of the data related to potential actions at the sampling site. It is important to minimize dilutions and maintain the lowest possible RLs. When dilutions are necessary because of high concentrations of target analytes, lesser dilutions should also be reported to fully characterize the sample for each analyte. The level of the lesser dilution should be such that it will provide the lowest possible RLs without having a lasting deleterious effect on the analytical instrumentation.

When a sample exhibits characteristics of matrix interference that are identified through analytical measurement or visual observation, appropriate cleanup procedures specified in Section 5.5.3 must be proven ineffective or inappropriate prior to proceeding with dilution and analysis. Any analyses conducted at a dilution where all analytes will be reported as non-detect above the QAPP RL, must be discussed with the project chemist prior to finalizing the report.

5.5.5 Standard Materials and Other Supplies and Consumables

Standard materials must be of known high purity and traceable to an approved source. Pure standards must not exceed the manufacturer's expiration date or 1 year after receipt if no expiration date is provided. Solutions prepared by the laboratory from the pure standards must be used within the expiration date specified in the laboratory's SOP.

All other supplies and consumables must be inspected prior to use to ensure that the supplies meet the requirements specified in the appropriate SOP. The laboratory's inventory and storage system should ensure their use within the manufacturer's expiration date and storage under proper conditions.

5.5.6 Manual Integration

The laboratory is required to provide all analysts performing methods that rely on interpretation of chromatographic data with training on appropriate software or manual integration practices. The laboratory also will make every effort to minimize the use of manual integration of data. If the need arises to use manual integration to correct a software autointegration error, the manual integration will be clearly identified in the instrument data. Before and after enlargements of the region of the chromatogram where the manual integration was performed will be provided on an appropriate scale that allows an independent reviewer to evaluate the need and quality of the manual integration. The analyst will also document the reason for the manual integration on the chromatogram along with their date and initials. The laboratory manager or designee will approve the manual integration by dating and initialing the chromatogram.

5.5.7 Laboratory Quality Assurance Program

The laboratory will maintain a quality assurance manual or equivalent document. The manual must include all of the requirements provided in the California Environmental Laboratory Accreditation Program (ELAP), and, if applicable, the National Environmental Laboratory Accreditation Program (NELAP). The manual will define the laboratory's internal procedures for QA/QC as follows:

- QA policies, objectives, and requirements
- Organization and personnel
- Document control
- SOPs (analytical methodology and administrative)
- Data generation
- Software verification
- Quality assurance
- Quality control
- Nonconformance/corrective action procedures
- Data review

5.5.7.1 Laboratory Standard Operating Procedures

The laboratory will maintain SOPs for all analytical methods and laboratory operations. The format for SOPs will conform with the following:

- *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, SW-846, Third Edition, Update III, Section 1* (EPA, 1996)

- "Good Laboratory Practices" in *Principles and Guidance to Regulations for Ensuring Data Integrity in Automated Laboratory Operations* (EPA, 1995)

All SOPs must have a unique identification number that is traceable to previous revisions of the same document.

5.5.7.2 Demonstration of Capability

Laboratory QA department personnel will maintain records documenting the ability of each analyst to perform applicable method protocols. Documentation will include annual checks for each method and analyst. In addition, internal, blind performance evaluation samples for each method and matrix demonstrating overall laboratory performance must be submitted annually. The laboratory may receive additional blind performance evaluation samples in conjunction with this program.

5.6 Analytical Procedures

The allowed sample preparation methods are presented in Table 5-1. Any changes or alternatives to this list will be included in site-specific SAPs or QAPP addenda. Analytical and preparation methods for SW7000 series are provided in Table 5-1 as alternate methods to SW6020. These methods will be allowed, provided the RL objectives are met. After a method is chosen, it must be used throughout the duration of a specific project to maintain data comparability.

This QAPP includes common analytical procedures that may be required for the PG&E Program. Tables 5-2 through 5-14 contain representative lists of the analytes of concern, the methods to be used, and the RL objectives. Some of the listed analytes may not necessarily be of concern for a particular project; project-specific SAPs or QAPP addenda will list the analytes of concern. The RLs included herein reflect quantifiable levels that are attainable with a specified degree of confidence using the specified methods. The RLs should meet most preliminary cleanup goals or action levels. If changes to the methods or RLs are necessary to meet cleanup goals, the QAPP will be updated or amended by addendum.

General QC requirements are discussed in Section 5.3.3. The calibration and QC requirements specified for each method will be followed and are included in Tables 5-2 through 5-27. Appropriate corrective action will be taken when acceptance criteria are not met. If corrective action is not effective, and data quality is potentially degraded, the occurrence must be documented in a corrective action report and in the data package case narrative. The laboratory manager or a designated person must notify the project chemist.

Analytical services will be provided by laboratories contracted by CH2M HILL or its subcontractors. Analytical laboratories will be accredited, in accordance with the California ELAP, for all parameters where accreditation is available. Subcontract laboratories will be required to follow the SAP and QAPP addenda that are applicable to specific projects or activities.

Field measurements will be performed or supervised directly or indirectly by CH2M HILL field personnel.

5.7 Analytical Requirements

The project-specific SAPs or QAPP addenda shall specify project-specific analytes and analytical methods. The project manager or designee for the project-specific SAPs will determined the RL requirements, evaluate the QAPP specification to assure they meet those requirements, and address any differences in a QAPP addendum. The QAPP addendum will be included as part of the project-specific documents.

Project-specific preliminary cleanup goals or action levels will be included in the SAPs or QAPP addenda, if available. The sources for the preliminary cleanup goals or action levels will be indicated in the project-specific documents. In cases where available technology does not offer analytical methods that are sufficiently sensitive to detect concentrations at or below the reference levels cited by the source, the method RLs are used as the preliminary cleanup goals or action levels. All goals are subject to revision and will be documented.

The analytical requirements are presented in the following tables.

TABLE 5-1
Extraction and Digestion Methods
PG&E Program Quality Assurance Project Plan

Analytical Method	Parameter	Preparatory Methods
SW6010B	Trace metals by ICP	SW3005A, SW3010A, SW3015, SW3050B, SW3051
SW6020	Trace metals by ICP-MS	SW3005A, SW3010A, SW3015, SW3050B, SW3051
SW7000 Series	Various elements (unless specified separately)	SW3015, SW3020A, SW3050B, SW3051
EPA200.7 and EPA200.8	Trace metals by ICP/ICP-MS	See analytical method
SW7470A, SW7471A, and EPA245.1	Mercury by cold vapor atomic adsorption	See analytical method
SW7196A, SW7199, and EPA218.6	Hexavalent chromium	See analytical method for water, Use SW3060A for soil preparation prior to SW7199
SW7041	Antimony (water and soil)	See analytical Method SW3005A
SW7060A	Arsenic (water and soil)	See analytical Method SW3050B
SW7740	Selenium (water and soil)	See analytical Method 3050B
SW8015M	TPH volatile and extractable (water and soil)	Volatiles: SW5030BB, SW5031, SW5035 Extractables: SW3510C, SW3520C, SW3545C, SW3541, SW3545, SW3550B
SW8081A	Organochlorine pesticides (water and soil)	SW3510C, SW3520C, SW3540C, SW3541, SW3545, SW3550B
SW8082	PCBs (water and soil)	SW3510C, SW3520C, SW3540C, SW3541
SW8151A	Chlorinated herbicides (water and soil)	SW3510C, SW3520C, SW3540C, SW3541, SW3550B
SW8021B	BTEX (water and soil)	SW3585, SW5021, SW5030B, SW5031, SW5032, SW5035
SW8260B	Volatile organics (water and soil)	SW3585, SW5021, SW5030B, SW5031, SW5032, SW5035
SW8270C and SW8270C SIM	Semivolatile organics (water and soil)	SW3510C, SW3520C, SW3535, SW3540C, SW3541, SW3545, SW3550B
Laboratory SOP (CF-IRMS)	Stable isotopes	See laboratory SOP
Various[a]	General chemistry	See analytical method

[a] EPA120.1/SW9050, EPA150.1/SW9040, EPA160.1, EPA160.2, EPA180.1, EPA300.0/SW9056, EPA310.1, EPA350.3, EPA354.1, EPA365.1, EPA370.1, EPA376.1/2, SM3500D, EPA335.2, SW9010B, SW9014, and EPA415.2.

Note:

ICP-MS = inductively coupled plasma/mass spectrometry

TABLE 5-2A
Reporting Limits, Accuracy, and Precession Limits for General Chemistry
PG&E Program Quality Assurance Project Plan

Method	Constituent	CAS	Unit	QAPP RL	EPA Regional Screening Levels 2008	Federal Drinking Water Standards MCLs	LCS Accuracy Control Limits (%R) Upper Limit		MS/MSD Accuracy Control Limits (%R) Upper Limit		Precision Water % RPD
E300.0M	Acetate	64-19-7	mg/L	0.1			75	125	75	125	20
SM2320 B	Alkalinity	Alkalinity	mg/L	5			85	115	75	125	20
SM4500-NH3 B, C, D, E, or G	Ammonia (as N)	7664-41-7	mg/L	0.5			85	115	75	125	20
SM2320 B	Bicarbonate	Bicarbonate	mg/L	5			85	115	75	125	20
SM5210 B	BOD	BOD	mg/L								10
E300.0	Bromide	Bromide	mg/L	0.5			90	110	80	120	20
E300.0M	Butyrate	107-92-6	mg/L	0.1			75	125	75	125	20
SM4500 CO_2	Carbon dioxide	124-38-9	mg/L	5							20
SM2320 B	Carbonate	Carbonate	mg/L	5			85	115	85	115	20
E300.0/SM4500-Cl B, C, E, or D	Chloride	Chloride	mg/L	0.5			90	110	80	120	20
SM2120 E	Color	Color	Color unit	1			90	110	90	110	20
E300.0/SM4500-F B, C, D, or E	Fluoride	Fluoride	mg/L	0.5	2.2	4.0	90	110	80	120	20
SM2340 B or C	Hardness	Hardness	mg/L	10			75	125	75	125	20
SM2320 B	Hydroxide alkalinity	Hydroxide	mg/L	5			85	115	75	125	20
E300.0M	Lactate	50-21-5	mg/L	0.1			75	125	75	125	20
E300.0	Nitrate (as N)	14797-55-8	mg/L	0.5	58	10	90	110	80	120	20
E353.2/SM4500-NO_3 E, F or H	Nitrate/nitrite (as N)	NO3NO2N	mg/L	0.5		10	85	115	75	125	20
E300.0/SM4500-NO_2 B, F of E	Nitrite (as N)	14797-65-8	mg/L	0.5	3.7	1.0	90	110	80	120	20
SM5310 B, C, or D	Organic carbon	DOC/TOC	mg/L	0.3			85	115	75	125	20
E300.0/SM4500-P E or F	Ortho phosphate	Ortho Phosphate	mg/L	0.02			90	110	80	120	20
E314.0	Perchlorate	Perchlorate	µg/L	4	0.026		85	115	85	115	20

TABLE 5-2A
Reporting Limits, Accuracy, and Precession Limits for General Chemistry
PG&E Program Quality Assurance Project Plan

Method	Constituent	CAS	Unit	QAPP RL	EPA Regional Screening Levels 2008	Federal Drinking Water Standards MCLs	LCS Accuracy Control Limits (%R) Upper Limit		MS/MSD Accuracy Control Limits (%R) Upper Limit		Precision Water % RPD
SM4500-H+ B SW9040	pH	pH	pH units	0.1							20
E300.0M	Propionate	79-09-4	mg/L	0.1			75	125	75	125	20
E300.0M	Pyruvate	127-17-3	mg/L	0.1			75	125	75	125	20
SM4500-SiO_2 E	Reactive silica	7631-86-9	mg/L	1			75	125	75	125	20
SM4500-SiO_2 C	Silica	7631-86-9	mg/L	0.04			75	125	75	125	20
SILICA_CALC	Soluble silica	7631-86-9	mg/L	0.04			75	125	75	125	20
E120.1/SW9050	Specific conductance	Conductance	µmhos/cm	2			85	115	75	125	20
E300.0/SM4110 B	Sulfate	Sulfate	mg/L	0.5			90	110	80	120	20
SM4500-S^{-2} F, E, D, or G	Sulfide	Sulfide	mg/L	2			75	125	75	125	20
SM2540 C	Total dissolved solids	TDS	mg/L	10			75	125			10
SM4500-N_{org} B or C	Total kjeldahl nitrogen	7727-37-9	mg/L				75	125	75	125	20
E365.1/E365.3 SM4500-P E or F	Total phosphorous	Total Phosphorous	mg/L	0.02			75	125	75	125	20
SM2540 D	Total suspended solids	TSS	mg/L	10			75	125	75	125	10
E180.1/SM2130 B	Turbidity	TURB	NTU	0.1							20
E218.6/SM3500-Cr C/SW7199	Chromium, hexavalent	18540-29-9	µg/L	0.2			90	110	90	110	20
SM3500-Cr B/SW7196A (Colorimetric)	Chromium, hexavalent	18540-29-9	µg/L	10			85	115	80	120	20

Notes:

µmhos/cm = micromhos per centimeter

Secondary Federal Drinking Water Standards include the following:

Chlorine	250 mg/L
Fl	2.0 mg/L
SO_4	250 mg/L
TDS	500 mg/L
Color	15 Color Units
pH	Outside the range of 6.5 to 8.5

TABLE 5-2B

Reporting Limits, Accuracy, and Precession Limits for General Chemistry

PG&E Program Quality Assurance Project Plan

Method	Constituent	CAS	Units	QAPP RL	EPA Regional Screening Levels 2008		Most Stringent Screening Level	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
					Residential	Commercial			Lower Limit	Upper Limit	
SW9012 or SW9014	Cyanide	57-12-5	mg/kg	0.25	1,600	20,000	1,600	No	*	*	30
WBLACK	Total organic carbon	TOC	mg/kg	50					75	125	35
SW9050	Specific conductance	Conductance	µmhos/cm	5					75	125	20
SW9045	pH	pH	pH units	0.1							20
SM2540B/E160.3	percent moisture	Moist	Percent								20
E300.0	Fluoride	Fluoride	mg/kg	2	4,700	61,000	4,700	No	70	130	35
E300.0	Chloride	Chloride	mg/kg	2					70	130	35
E300.0	Sulfate	Sulfate	mg/kg	2					70	130	35
E821/R-91-100	Sulfide, acid volatile	18496-25-8	mg/kg	80					70	130	30
SW7199[a]	Chromium, hexavalent	18540-29-9	mg/kg	0.4	230	1400	17	No	85	115	20

[a] Method SW3060A followed by SW7199

Notes:

DTSC CHHSL: residential hexavalent chromium 17 (mg/kg)

DTSC CHHSL: commercial hexavalent chromium 17 (mg/kg)

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-3A
Reporting Limits, Accuracy, and Precession Limits for Metals – E200 Series, SW6000 Series, SW7000 Series, SM3120B, and SM3500 Cr
PG&E Program Quality Assurance Project Plan

Constituent	**CAS**	**QAPP RL (µg/L)**	**EPA Regional Screening Levels 2008 (µg/L)**	**Federal Drinking Water Standards MCLs (µg/L)**	**Most Stringent Screening Level (µg/L)**	**Does RL Exceed Screening Level?**	**LCS Accuracy Control Limits (%R)**		**MS/MSD Accuracy Control Limits (%R)**		**Precision Water % RPD**
							Lower Limit	**Upper Limit**	**Lower Limit**	**Upper Limit**	
Aluminum	7429-90-5	50	330		50	No	85	115	75	125	20
Antimony	7440-36-0	10	15	6	6	yes	85	115	75	125	20
Arsenic	7440-38-2	0.1	0.045	10	0.045	yes	85	115	75	125	20
Barium	7440-39-3	10	7,300	2,000	2,000	No	85	115	75	125	20
Beryllium	7440-41-7	1	73	4	4	No	85	115	75	125	20
Cadmium	7440-43-9	3	18	5	5	No	85	115	75	125	20
Calcium	7440-70-2	100					85	115	75	125	20
Chromium	7440-47-3	1		100*	50	No	85	115	75	125	20
Chromium, Hexavalent[a]	18540-29-9	0.2	110	100*	100	No	90	110	90	110	20
Chromium, Hexavalent[b]	18540-29-9	10	110	100*	100	No	85	115	80	120	20
Cobalt	7440-48-4	5	11		11	No	85	115	75	125	20
Copper	7440-50-8	5	1,500	1,300	1,000	No	85	115	75	125	20
Iron	7439-89-6	20	26,000		300	No	85	115	75	125	20
Lead	7439-92-1	10		15	15	No	85	115	75	125	20
Magnesium	7439-95-4	100				No	85	115	75	125	20
Manganese	7439-96-5	10	880		50	No	85	115	75	125	20
Mercury	7439-97-6	0.2	0.63	2	0.63	No	75	125	75	125	20
Molybdenum	7439-98-7	10	180		180	No	85	115	75	125	20
Nickel	7440-02-0	10	730		100	No	85	115	75	125	20
Potassium	7440-09-7	500				No	85	115	75	125	20
Selenium	7782-49-2	10	180	50	50	No	85	115	75	125	20
Silver	7440-22-4	5	180		180	No	85	115	75	125	20
Sodium	7440-23-5	500				No	85	115	75	125	20
Thallium	7440-28-0	1	2.4	2	2	No	85	115	75	125	20

TABLE 5-3A

Reporting Limits, Accuracy, and Precession Limits for Metals – E200 Series, SW6000 Series, SW7000 Series, SM3120B, and SM3500 Cr

PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS Accuracy Control Limits (%R) Lower Limit	LCS Accuracy Control Limits (%R) Upper Limit	MS/MSD Accuracy Control Limits (%R) Lower Limit	MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Water % RPD
Vanadium	7440-62-2	5	260		260	No	85	115	75	125	20
Zinc	7440-66-6	10	11,000		5,000	No	85	115	75	125	20

[a] Method SW7199 or E218.6

[b] Method SW7196 or SM3500 Cr

*Federal Drinking Water Standard MCLs include all forms of chromium.

Notes:

CAS = Chemical Abstract Service

California Drinking Water Standards MCLs include the following:

Aluminum	1,000 µg/L
Barium	1,000 µg/L
Chromium	50 µg/L
Nickel	100 µg/L

Secondary federal drinking water standards include the following:

Aluminum	50 µg/L
Copper	1,000 µg/L
Gold	100 µg/L
Iron	300 µg/L
Manganese	50 µg/L
Zinc	5,000 µg/L

TABLE 5-3B
Reporting Limits, Accuracy, and Precession Limits for Metals – E200 Series, SW6000 Series, and SW7000 Series
PG&E Program Quality Assurance Project Plan

			DTSC CHHSL		EPA Regional Screening Levels 2008				LCS Accuracy Control Limits (%R)		MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (mg/kg)**	**Residential (mg/kg)**	**Commercial (mg/kg)**	**Residential (mg/kg)**	**Commercial (mg/kg)**	**Most Stringent Screening Level (mg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
Aluminum	7429-90-5	10			77,000	990,000	77,000	No	85	115	75	125	20
Antimony	7440-36-0	2	30	380	31	410	30	No	85	115	75	125	20
Arsenic	7440-38-2	0.5	0.07	0.42	.39	1.6	0.07	Yes	85	115	75	125	20
Barium	7440-39-3	1	5,200	63,000	15,000	190,000	5,200	No	85	115	75	125	20
Beryllium	7440-41-7	0.5	150	1,700	160	2,000	150	No	85	115	75	125	20
Cadmium	7440-43-9	0.5	1.7	7.5	70	810	1.7	No	85	115	75	125	20
Calcium	7440-70-2	100							85	115	75	125	20
Chromium	7440-47-3	1	*	*	280	1,400	280	No	85	115	75	125	20
Cobalt	7440-48-4	1	660	3,200	23	300	23	No	85	115	75	125	20
Copper	7440-50-8	1	3,000	38,000	3,100	41,000	3,000	No	85	115	75	125	20
Iron	7439-89-6	10			55,000	720,000	55,000	No	85	115	75	125	20
Lead	7439-92-1	1	150	3,500	400	800	150	No	85	115	75	125	20
Magnesium	7439-95-4	100							85	115	75	125	20
Manganese	7439-96-5	1			1,800	23,000	1,800	No	85	115	75	125	20
Mercury	7439-97-6	0.1	18	180	6.7	28	6.7	No	75	125	75	125	20
Molybdenum	7439-98-7	1	380	4,800	390	5,100	380	No	85	115	75	125	20
Nickel	7440-02-0	1	1,600	16,000	1,600	20,000	1,600	No	85	115	75	125	20
Potassium	7440-09-7	100							85	115	75	125	20
Selenium	7782-49-2	1	380	4,800	390	5,100	380	No	85	115	75	125	20
Silver	7440-22-4	1	380	4,800	390	5,100	380	No	85	115	75	125	20
Sodium	7440-23-5	100							85	115	75	125	20
Thallium	7440-28-0	2	5	63	5.1	66	5	No	85	115	75	125	20
Vanadium	7440-62-2	1	530	6,700	550	7,200	78	No	85	115	75	125	20

TABLE 5-3B
Reporting Limits, Accuracy, and Precession Limits for Metals – E200 Series, SW6000 Series, and SW7000 Series
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (mg/kg)	DTSC CHHSL Residential (mg/kg)	DTSC CHHSL Commercial (mg/kg)	EPA Regional Screening Levels 2008 Residential (mg/kg)	EPA Regional Screening Levels 2008 Commercial (mg/kg)	Most Stringent Screening Level (mg/kg)	Does RL Exceed Screening Level?	LCS Accuracy Control Limits (%R) Lower Limit	LCS Accuracy Control Limits (%R) Upper Limit	MS/MSD Accuracy Control Limits (%R) Lower Limit	MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Zinc	7440-66-6	2	23,000	100,000	23,000	310,000	23,000	No	85	115	75	125	20
Chromium, Hexavalent[a]	18540-29-9	0.4	17	37	39	200	17	No	80	120	75	125	20

[a] Method SW3060A followed by SW7199

*CHHSL for Chromium (III), CAS 16065-83-1, 100,000 gm/kg for both Residential and commercial.

Notes:

CHHSL = California Human Health Screening Levels
DTSC = California Department of Toxic Substance Control
mg/kg = milligrams per kilogram

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

Title 22 Metals

California waste characterization protocol specifies following a stepped procedure for the determination of hazardous waste disposal.

1. If the sample is suspected of containing high levels of metals; analyzed for the Title 22 metals – TTLC Table 5-3C
2. Compare the TTLC sample results with Column 5 of Table 5-3C.
3. If the TTLC sample results are greater than the concentrations listed in Column 5 of Table 5-3C, extract and analyze the samples using the Waste Extraction Test (WET) for any analytes that exceeded the concentrations listed in Column 5 of Table 5-3C.
4. If the soluble threshold limit concentration (STLC) sample result, from WET, is greater than the concentration listed in Column 4 of Table 5-3D for any of the Resource Conservation and Recovery Act (RCRA) metals listed in Table 5-3E, extract the sample by TCLP Method 1311 and analyze for the specific metals that exceeded the STLC threshold.

TABLE 5-3C
Reporting Limits, Accuracy, and Precession Limits for Title 22 TTLC Metals – E200 Series, SW6000 Series, SW7000 Series
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (mg/kg)	Title 22 TTLC Concentration Maximum (mg/kg)	If TTLC Concentration is ≥ this value STLC Analysis Must be performed (mg/kg)	LCS Accuracy Control Limits (%R)		MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
					Lower Limit	**Upper Limit**	**Lower Limit**	**Upper Limit**	
Antimony, TTLC	7440-36-0_TTLC	5	500	150	85	115	75	125	20
Arsenic, TTLC	7440-38-2_TTLC	5	500	50	85	115	75	125	20
Barium, TTLC	7440-39-3_TTLC	10	10,000	1,000	85	115	75	125	20
Beryllium, TTLC	7440-41-7_TTLC	1	75	7.5	85	115	75	125	20
Cadmium, TTLC	7440-43-9_TTLC	1	100	10	85	115	75	125	20
Chromium, TTLC	7440-47-3_TTLC	5	2,500	50	85	115	75	125	20
Chromium, Hexavalent–TTLC[a]	18540-29-9_TTLC	0.4	500	50	80	120	75	125	20
Cobalt, TTLC	7440-48-4_TTLC	10	8,000	800	85	115	75	125	20
Copper, TTLC	7440-50-8_TTLC	5	2,500	250	85	115	75	125	20
Lead, TTLC	7439-92-1_TTLC	5	1,000	50	85	115	75	125	20
Mercury, TTLC	7439-97-6_TTLC	0.1	20	2	75	125	75	125	20
Molybdenum, TTLC	7439-98-7_TTLC	10	3,500	3,500	85	115	75	125	20
Nickel, TTLC	7440-02-0_TTLC	5	2,000	200	85	115	75	125	20
Selenium, TTLC	7782-49-2_TTLC	5	100	10	85	115	75	125	20
Silver, TTLC	7440-22-4_TTLC	5	500	50	85	115	75	125	20
Thallium, TTLC	7440-28-0_TTLC	5	700	70	85	115	75	125	20
Vanadium, TTLC	7440-62-2_TTLC	5	2,400	240	85	115	75	125	20
Zinc, TTLC	7440-66-6_TTLC	10	5,000	2,500	85	115	75	125	20

[a] Method SW3060A followed by SW7199

Notes:

STLC = soluble threshold limit concentration

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-3D
Reporting Limits, Accuracy, and Precession Limits for Title 22 STLC Metals – E200 Series, SW6000 Series, and SW7000 Series
PG&E Program Quality Assurance Project Plan

				LCS Accuracy Control Limits (%R)		**MS/MSD Accuracy Control Limits (%R)**		
Constituent	**CAS**	**QAPP RL (mg/L)**	**Title 22 STLC Concentrations (mg/L)[a]**	**Lower Limit**	**Upper Limit**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
Antimony, STLC	7440-36-0_STLC	0.1	15	80	120	75	125	20
Arsenic, STLC	7440-38-2_STLC	1	5	80	120	75	125	20
Barium, STLC	7440-39-3_STLC	1	100	80	120	75	125	20
Beryllium, STLC	7440-41-7_STLC	0.01	0.75	80	120	75	125	20
Cadmium, STLC	7440-43-9_STLC	0.1	1	80	120	75	125	20
Chromium, Hexavalent–STLC[a]	18540-29-9_STLC	0.001	5	80	120	75	125	20
Chromium, STLC	7440-47-3_STLC	0.1	5	80	120	75	125	20
Cobalt, STLC	7440-48-4_STLC	0.1	80	80	120	75	125	20
Copper, STLC	7440-50-8_STLC	0.01	25	80	120	75	125	20
Lead, STLC	7439-92-1_STLC	0.1	5	80	120	75	125	20
Mercury, STLC	7439-97-6_STLC	0.0002	0.2	75	125	75	125	20
Molybdenum, STLC	7439-98-7_STLC	0.1	350	80	120	75	125	20
Nickel, STLC	7440-02-0_STLC	0.1	20	80	120	75	125	20
Selenium, STLC	7782-49-2_STLC	0.1	1	80	120	75	125	20
Silver, STLC	7440-22-4_STLC	0.1	5	80	120	75	125	20
Thallium, STLC	7440-28-0_STLC	0.1	7	80	120	75	125	20
Vanadium, STLC	7440-62-2_STLC	0.1	24	80	120	75	125	20
Zinc, STLC	7440-66-6_STLC	0.1	250	80	120	75	125	20

[a] Non-RCRA and RCRA hazardous wastes are greater than or equal to this value and require TCLP extraction for metals on the TCLP list.

[b] Method SW7199

Note:
RCRA = Resource Conservation and Recovery Act

TABLE 5-3E
Reporting Limits, Accuracy, and Precession Limits for Title 22 TCLP (RCRA) Metals – E200 Series, SW6000 Series, and SW7000 Series
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (mg/L)	Title 22 TCLP Concentration (mg/L)[a]	LCS Accuracy Control Limits (%R)		MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
				Lower Limit	Upper Limit	Lower Limit	Upper Limit	
Arsenic, TCLP	7440-38-2_TCLP	1	5	80	120	75	125	20
Barium, TCLP	7440-39-3_TCLP	1	100	80	120	75	125	20
Cadmium, TCLP	7440-43-9_TCLP	0.1	1	80	120	75	125	20
Chromium, TCLP	7440-47-3_TCLP	0.1	5	80	120	75	125	20
Lead, TCLP	7439-92-1_TCLP	0.1	5	80	120	75	125	20
Mercury, TCLP	7439-97-6_TCLP	0.0002	0.2	80	120	75	125	20
Selenium, TCLP	7782-49-2_TCLP	0.1	1	80	120	75	125	20
Silver, TCLP	7440-22-4_TCLP	0.1	5	80	120	75	125	20

[a] RCRA hazardous wastes are greater than or equal to this value.

Note:
TTLC = total threshold limit concentration

TABLE 5-4A
Reporting Limits, Accuracy, and Precession Limits for Total Petroleum Hydrocarbons – SW8015B
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (mg/L)	EPA Regional Screening Levels 2008 (mg/L)	Federal Drinking Water Standards MCLs (mg/L)	Most Stringent Screening Level (mg/L)	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Water % RPD
Motor Oil	TPH-motor oil	1				50	150	30
TPH-Diesel	TPH-diesel	0.5				61	143	30
TPH-Gasoline	TPH-gasoline	0.1				67	136	30

TABLE 5-4B
Reporting Limits, Accuracy, and Precession Limits for Total Petroleum Hydrocarbons – SW8015B
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (mg/kg)	EPA Regional Screening Levels 2008 Residential (mg/kg)	EPA Regional Screening Levels 2008 Commercial (mg/kg)	Most Stringent Screening Level (mg/kg)	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Motor Oil	TPH-motor oil	10				60	120	50
TPH-Diesel	TPH-diesel	10				51	153	50
TPH-Gasoline	TPH-gasoline	1				57	146	50

Note:
All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-5A
Reporting Limits, Accuracy, and Precession Limits for BTEX – SW8021B
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Water % RPD
Benzene	71-43-2	0.5	0.41	5	0.41	75	125	30
Ethylbenzene	100-41-4	1	1.5	700	1.5	75	125	30
Toluene	108-88-3	1	2,300	1,000	1000	75	125	30
Xylenes, Total	1330-20-7	2	200	10,000	200	75	125	30
m -Xylene	108-38-3	2	1,400			75	125	30
o-Xylene	95-47-6	1	1,400		1,400	75	125	30
p-Xylene	106-42-3	1	1,500		1,500	75	125	30

TABLE 5-5B
Reporting Limits, Accuracy, and Precession Limits for BTEX – SW8021B
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008 Residential (µg/kg)	EPA Regional Screening Levels 2008 Commercial (µg/kg)	Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Benzene	71-43-2	5	1,100	5,600	1,100	No	65	135	30
Ethylbenzene	100-41-4	5	5,700	29,000	5,700	No	65	135	30
Toluene	108-88-3	5	5,000,000	46,000,000	5,000,000	No	65	135	30
Xylenes, Total	1330-20-7	5	600,000	2,600,000	600,000	No	65	135	30
m -Xylene	108-38-3	5	4,500,000	19,000,000	4,500,000	No	65	135	30
o-Xylene	95-47-6	5	5,300,000	23,000,000	5,300,000	No	65	135	30
p-Xylene	106-42-3	5	4,700,000	20,000,000	4,700,000	No	65	135	30

Note:
All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-6A

Reporting Limits, Accuracy, and Precession Limits for Pesticides – SW8081A

PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Water % RPD
							Lower Limit	**Upper Limit**	
4,4'-DDD	72-54-8	0.1	0.28		0.28	No	50	139	30
4,4'-DDE	72-55-9	0.1	0.2		0.2	No	48	137	30
4,4'-DDT	50-29-3	0.1	0.2		0.2	No	47	138	30
Aldrin	309-00-2	0.1	0.004		0.004	Yes	42	138	30
alpha-BHC	319-84-6	0.1	0.011		0.011	Yes	60	128	30
alpha-Chlordane	5103-71-9	0.1		2	2	No	63	123	30
beta-BHC	319-85-7	0.1	0.037		0.037	Yes	66	126	30
delta-BHC	319-86-8	0.1					46	136	30
Dieldrin	60-57-1	0.1	0.0042		0.0042	Yes	62	129	30
Endosulfan I	959-98-8	0.1					49	120	30
Endosulfan II	33213-65-9	0.1					42	130	30
Endosulfan sulfate	1031-07-8	0.1					54	137	30
Endrin	72-20-8	0.1	11	2	2	No	56	134	30
Endrin aldehyde	7421-93-4	0.1					56	137	30
gamma-BHC (lindane)	58-89-9	0.1	0.061	0.2	0.061	Yes	30	146	30
gamma-Chlordane	5103-74-2	0.1		2	2	No	67	120	30
Heptachlor	76-44-8	0.1	0.015	0.4	0.015	Yes	51	128	30
Heptachlor Epoxide	1024-57-3	0.1	0.0074	0.2	0.0074	Yes	62	131	30
Methoxychlor	72-43-5	0.5	180	40	180	No	56	150	30
Toxaphene	8001-35-2	1	0.061	3	0.061	Yes	41	126	30

Notes:

California Drinking Water Standards MCLs include the following:

Chlordane	0.1 µg/L
Endrin	2 µg/L
Heptachlor and its epoxide	0.01 µg/L
Lindane	0.2 µg/L
Methoxychlor	30 µg/L
Toxaphene	3 µg/L

TABLE 5-6B
Reporting Limits, Accuracy, and Precession Limits for Pesticides – SW8081A
PG&E Program Quality Assurance Project Plan

			DTSC CHHSL		EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
4,4'-DDD	72-54-8	4	2,300	9,000	2,000	7,200	2,000	No	50	139	50
4,4'-DDE	72-55-9	4	1,600	6,300	1,400	5,100	1,400	No	68	126	50
4,4'-DDT	50-29-3	4	1,600	6,300	1,700	7,000	1,600	No	46	135	50
Aldrin	309-00-2	4	33	130	29	100	29	No	47	120	50
alpha-BHC	319-84-6	4			77	270	77	No	62	125	50
alpha-Chlordane	5103-71-9	4	430	1,700					63	121	50
beta-BHC	319-85-7	4			320	1,300	320	No	62	127	50
delta-BHC	319-86-8	4							57	130	50
Dieldrin	60-57-1	4	35	130	30	110	30	No	67	125	50
Endosulfan I	959-98-8	4							41	147	50
Endosulfan II	33213-65-9	4							37	141	50
Endosulfan sulfate	1031-07-8	4							62	135	50
Endrin	72-20-8	4	21,000	230,000	18,000	180,000	18,000	No	61	133	50
Endrin aldehyde	7421-93-4	4							37	147	50
gamma-BHC (Lindane)	58-89-9	4	500	2,000	520	21,000	500	No	59	123	50
gamma-Chlordane	5103-74-2	4	430	1,700					48	124	50
Heptachlor	76-44-8	4	130	520	110	380	110	No	51	140	50
Heptachlor epoxide	1024-57-3	4			53	190	53	No	66	130	50
Methoxychlor	72-43-5	20	340,000	3,800,000	310,000	3,100,000	310,000	No	57	143	50
Toxaphene	8001-35-2	100	460	1,800	440	1,600	440	No	31	136	50

Notes:
DTSC CHHSL: residential or commercial
All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-7A
Reporting Limits, Accuracy, and Precession Limits for PCBs – SW8082
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Water % RPD
Aroclor-1016	12674-11-2	0.5	0.96	0.5	0.5	No	40	144	30
Aroclor-1221	11104-28-2	0.5	0.0068	0.5	0.0068	Yes	41	136	30
Aroclor-1232	11141-16-5	0.5	0.0068	0.5	0.0068	Yes	41	136	30
Aroclor-1242	53469-21-9	0.5	0.034	0.5	0.034	Yes	39	150	30
Aroclor-1248	12672-29-6	0.5	0.034	0.5	0.034	Yes	41	136	30
Aroclor-1254	11097-69-1	0.5	0.034	0.5	0.034	Yes	29	141	30
Aroclor-1260	11096-82-5	0.5	0.034	0.5	0.034	Yes	45	145	30

Note:
LCS, MS, and MSD only require Aroclor-1016 and Aroclor-1260 spikes

TABLE 5-7B

Reporting Limits, Accuracy, and Precession Limits for PCBs – SW8082

PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008 Residential (µg/kg)	EPA Regional Screening Levels 2008 Commercial (µg/kg)	Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Aroclor-1016	12674-11-2	50	3,900	21,200	3,900	No	41	138	50
Aroclor-1221	11104-28-2	50	170	620	170	No	45	136	50
Aroclor-1232	11141-16-5	50	170	620	170	No	45	136	50
Aroclor-1242	53469-21-9	50	220	740	220	No	43	150	50
Aroclor-1248	12672-29-6	50	220	740	220	No	44	136	50
Aroclor-1254	11097-69-1	50	220	740	220	No	41	141	50
Aroclor-1260	11096-82-5	50	220	740	220	No	61	131	50

Notes:

DTSC CHHSL: Residential – total PCB 89 (µg/kg)

DTSC CHHSL: Commercial – total PCB 300 (µg/kg)

LCS, MS, and MSD only require Aroclor-1016 and Aroclor-1260 spikes

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-8A
Reporting Limits, Accuracy, and Precession Limits for Herbicides – SW8151
PG&E Program Quality Assurance Project Plan

Common Name	Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µ/L)	Most Stringent Screening Level (µ/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Water % RPD
								Lower Limit	Upper Limit	
2,4-D	2,4-dichlorophenoxyacetic acid	94-75-7	10	370	70	70	No	39	120	30
2,4-DB	4-(2,4-dichlorophenoxy) butyric acid	94-82-6	20	290		290	No	44	120	30
2,4,5-T	2,4,5-Trichlorophenoxyacetic acid	93-76-5	20	370		370	No	44	122	30
2,4,5-TP	2-(2,4,5-Trichlorophenoxy) propionic acid	93-72-1	10	290		290	No	49	126	30
Dalapon	2,2-dichloro-propionic acid	75-99-0	30	1,100	200	200	No	40	120	30
Dicamba	3,6-dichloro-2methoxbenzoic acid	1918-00-9	30	1,100		1,100	No	60	120	30
Dichloroprop	2-(2,4-Dichlorophenoxy) propionic acid	120-36-5	20					68	122	30
Dinoseb	Dinitrobutylphenol (multiple forms)	88-85-7	3	37	7	7	No	28	115	30
MCPA	2-methyl-4-chlorophenoxyacetic acid	94-74-6	100	18		18	Yes	62	144	30
MCPP	2-(2-methyl-4-chlorophenoxy) propionic acid	7085-19-0	100	37		37	Yes	60	133	30

Notes:

California Drinking Water Standards MCLs include the following:

2,4-D	70 µg/L
2,4,5-TP (Silvex)	50 µg/L
Dalapon	200 µg/L
Dinoseb	7 µg/L

TABLE 5-8B
Reporting Limits, Accuracy, and Precession Limits for Herbicides – SW8151
PG&E Program Quality Assurance Project Plan

Common Name	Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008		Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
				Residential (µg/kg)	Commercial (µg/kg)			Lower Limit	Upper Limit	
2,4-D	2,4-dichlorophenoxyacetic acid	94-75-7	200	690	7,700	690	No	32	121	50
2,4-DB	4-(2,4-dichlorophenoxy) butyric acid	94-82-6	500	490	4,900	490	Yes	42	145	50
2,4,5-T	2,4,5-Trichlorophenoxyacetic acid	93-76-5	500	610	6,200	610	No	43	139	50
2,4,5-TP	2-(2,4,5-Trichlorophenoxy) propionic acid	93-72-1	200	490	4,900	490	No	46	128	50
Dalapon	2,2-dichloro-propionic acid	75-99-0	100	1,800	18,000	1,800	No	22	125	50
Dicamba	3,6-dichloro-2methoxbenzoic acid	1918-00-9	500	1,800	18,000	1,800	No	56	120	50
Dichloroprop	2-(2,4-Dichlorophenoxy) propionic acid	120-36-5	500					72	142	50
Dinoseb	Dinitrobutylphenol (multiple forms)	88-85-7	100	61	620	61	Yes	20	131	50
MCPA	2-methyl-4-chlorophenoxyacetic acid	94-74-6	1,000	31	310	31	Yes	65	120	50
MCPP	2-(2-methyl-4-chlorophenoxy) propionic acid	7085-19-0	1,500	61	620	61	No	60	118	50

Notes:
DTSC CHHSL: residential 2,4-D 690 µg/kg; 2,4,5-T – 7,700 µg/kg
DTSC CHHSL: commercial 2,4-D 550 µg/kg; 2,4,5-T – 6,100 µg/kg)

TABLE 5-9A
Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B
PG&E Program Quality Assurance Project Plan

Constituent	**CAS**	**QAPP RL (µg/L)**	**EPA Regional Screening Levels 2008 (µg/L)**	**Federal Drinking Water Standards MCLs (µg/L)**	**California Drinking Water Standards MCLs (µg/L)**	**Most Stringent Screening Level (µg/L)**	**Does RL Exceed Screening Level?**	**LCS/MS/MSD Accuracy Control Limits (%R)**		**Precision Water % RPD**
								Lower Limit	**Upper Limit**	
1,1,1,2-Tetrachloroethane	630-20-6	0.5	0.52			0.52	No	81	129	20
1,1,1-Trichloroethane (TCA)	71-55-6	1	9,100	200	200	200	No	67	132	20
1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.067		1	0.067	Yes	63	128	20
1,1,2-Trichloroethane	79-00-5	1	0.24	5	5	0.24	Yes	75	125	20
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	1	59,000		1200	1200	No	75	125	20
1,1-Dichloroethane	75-34-3	1	2.4		5	2.4	No	69	133	20
1,1-Dichloroethene or 1,1-Dichloroethylene (1,1-DCE)	75-35-4	1	340	7	6	6	No	68	130	20
1,1-Dichloropropene	563-58-6	1						73	132	20
1,2,3-Trichlorobenzene	87-61-6	1						67	137	20
1,2,3-Trichloropropane	96-18-4	1	0.0096			0.0096	Yes	73	124	20
1,2,4-Trichlorobenzene	120-82-1	1	8.2	70	5	5	No	66	134	20
1,2,4-Trimethylbenzene	95-63-6	1	15			15	No	74	132	20
1,2-Dibromo-3-Chloropropane	96-12-8	2	0.00032	0.2		0.00032	Yes	50	132	20
1,2-Dibromoethane (EDB)	106-93-4	1	0.0065	0.05		0.0065	Yes	80	121	20
1,2-Dichlorobenzene	95-50-1	1	370	600	600	370	No	71	122	20
1,2-Dichloroethane (EDC)	107-06-2	0.5	0.15	5	.5	0.15	Yes	69	132	20
1,2-Dichloropropane	78-87-5	1	0.39	5	5	0.39	Yes	75	125	20
1,3,5-Trimethylbenzene	108-67-8	1	12			12	No	74	131	20
1,3-Dichlorobenzene	541-73-1	1						75	124	20
1,3-Dichloropropane	142-28-9	1	730			730	No	73	126	20
1,4-Dichlorobenzene	106-46-7	0.5	0.43	75	5	0.43	Yes	74	123	20
2,2-Dichloropropane	594-20-7	1						69	137	20
2-Butanone (MEK)	78-93-3	10	7,100			7,100	No	49	136	20

TABLE 5-9A
Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	California Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Water % RPD
								Lower Limit	Upper Limit	
2-Chlorotoluene	95-49-8	1	730			730	No	73	126	20
4-Chlorotoluene	106-43-4	1	2,600			2,600	No	74	128	20
4-Isopropyltoluene	99-87-6	1						73	130	20
4-Methyl-2-Pentanone	108-10-1	10	2,000			2,000	No	58	134	20
Acetone	67-64-1	10	22,000			22,000	No	40	135	20
Acrolein	107-02-8	20	0.042			0.042	Yes	75	125	20
Acrylonitrile	107-13-1	20	0.045			0.045	Yes	75	125	20
Benzene	71-43-2	0.4	0.41	5	1	0.41	No	81	122	20
Bromobenzene	108-86-1	1	20			20	No	76	124	20
Bromochloromethane	74-97-5	1						65	129	20
Bromodichloromethane	75-27-4	0.5	1.1	100		1.1	No	76	121	20
Bromoform	75-25-2	1	8.5	100		8.5	No	69	128	20
Bromomethane	74-83-9	3	8.7			8.7	No	53	141	20
Carbon Disulfide	75-15-0	1	1,000			1,000	No	75	125	20
Carbon Tetrachloride	56-23-5	1	0.2	5	.5	0.2	Yes	66	138	20
Chlorobenzene	108-90-7	0.5	91	100		91	No	81	122	20
Chloroethane	75-00-3	1	21,000			21,000	No	58	133	20
Chloroform	67-66-3	1	0.19	100		0.19	Yes	69	128	20
Chloromethane	74-87-3	1	1.8			1.8	No	56	131	20
cis-1,2-Dichloroethene or cis-1,2-Dichloroethylene	156-59-2	1	370	70	6	6	No	72	126	20
cis-1,3-Dichloropropene	10061-01-5	0.5						69	131	20
Dibromochloromethane	124-48-1	0.5	0.8	100		0.8	No	66	133	20
Dibromomethane	74-95-3	1	370			370	No	76	125	20
Dichlorodifluoromethane (Freon 12)	75-71-8	1	390			390	No	53	153	20

TABLE 5-9A
Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	California Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Water % RPD
								Lower Limit	Upper Limit	
Ethylbenzene	100-41-4	1	1.5	700		1.5	No	73	127	20
Hexachlorobutadiene	87-68-3	0.6	0.86			0.86	No	67	131	20
Isopropylbenzene (Cumene)	98-82-8	1	680			680	No	75	127	20
Methylene chloride	75-09-2	1	4.8	5	5	4.8	No	63	137	20
Naphthalene	91-20-3	1	0.14			0.14	Yes	54	138	20
n-Butylbenzene	104-51-8	1						69	137	20
n-Propylbenzene	103-65-1	1						72	129	20
sec-Butylbenzene	135-98-8	1						72	127	20
Styrene	100-42-5	1	1,600	100	100	100	No	65	134	20
tert-Butyl Methyl Ether (MTBE)	1634-04-4	5	12		13	12	No	65	123	20
tert-Butylbenzene	98-06-6	1						70	129	20
Tetrachloroethene or Tetrachloroethylene (PCE)	127-18-4	1	0.11	5	5	0.11	Yes	66	128	20
Toluene	108-88-3	1	2,300	1,000	150	150	No	77	122	20
trans-1,2-Dichloroethene or trans-1,2-Dichloroethylene	156-60-5	1	110	100	10	10	No	63	137	20
trans-1,3-Dichloropropene	10061-02-6	1						59	135	20
Trichloroethene or Trichloroethylene (TCE)	79-01-6	1	1.7	5	5	1.7	No	70	127	20
Trichlorofluoromethane (Freon 11)	75-69-4	1	1,300		150	150	No	57	129	20
Vinyl Chloride	75-01-4	1	0.016	2	.5	0.016	Yes	50	134	20
Xylenes, Total	1330-20-7	2	200	10,000	1750	200	No	75	125	20
m -Xylene	108-38-3	2	1,400			15	No	76	128	20
o-Xylene	95-47-6	1	1,400			1,400	No	80	121	20
p-Xylene	106-42-3	1	1,500			1500	No	76	128	20

TABLE 5-9B
Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B
PG&E Program Quality Assurance Project Plan

			EPA Regional Screening Levels 2008				**LCS/MS/MSD Accuracy Control Limits (%R)**		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
1,1,1,2-Tetrachloroethane	630-20-6	5	2000	9,800	2000	No	74	125	30
1,1,1-Trichloroethane (TCA)	71-55-6	5	9,000,000	39,000,000	9,000,000	No	68	130	30
1,1,2,2-Tetrachloroethane	79-34-5	5	590	2900	590	No	59	140	30
1,1,2-Trichloroethane	79-00-5	5	1,100	5,500	1,100	No	62	127	30
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	5	43,000,000	180,000,000	43,000,000	No	65	135	30
1,1-Dichloroethane	75-34-3	5	3,400	17,000	3,400	No	73	125	30
1,1-Dichloroethylene or 1,1-Dichloroethene (1,1-DCE)	75-35-4	5	250,000	1,100,000	250,000	No	65	136	30
1,1-Dichloropropene	563-58-6	5					70	135	30
1,2,3-Trichlorobenzene	87-61-6	5					62	133	30
1,2,3-Trichloropropane	96-18-4	5	91	410	91	No	63	130	30
1,2,4-Trichlorobenzene	120-82-1	5	87,000	400,000	87,000	No	65	131	30
1,2,4-Trimethylbenzene	95-63-6	5	67,000	280,000	67,000	No	65	135	30
1,2-Dibromo-3-chloropropane	96-12-8	5	5.6	73	5.6	No	49	135	30
1,2-Dibromoethane (EDB)	106-93-4	5	34	170	34	No	70	124	30
1,2-Dichlorobenzene	95-50-1	5	2,000,000	10,000,000	2,000,000	No	74	120	30
1,2-Dichloroethane (EDC)	107-06-2	5	450	2,200	450	No	72	137	30
1,2-Dichloropropane	78-87-5	5	930	4,700	930	No	71	120	30
1,3,5-Trimethylbenzene	108-67-8	5	47,000	200,000	47,000	No	65	133	30
1,3-Dichlorobenzene	541-73-1	5					72	124	30
1,3-Dichloropropane	142-28-9	5	1,600,000	20,000,000	1,600,000	No	76	123	30
1,4-Dichlorobenzene	106-46-7	5	2,600	13,000	2,600	No	72	125	30
2,2-Dichloropropane	594-20-7	5					67	134	30
2-Butanone (MEK)	78-93-3	50	28,000,000	190,000,000	28,000,000	No	40	135	30

TABLE 5-9B
Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B
PG&E Program Quality Assurance Project Plan

			EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
2-Chlorotoluene	95-49-8	5	1,600,000	20,000,000	1,600,000	No	69	128	30
4-Chlorotoluene	106-43-4	5	5,500,000	72,000,000	5,500,000	No	73	126	30
4-Isopropyltoluene	99-87-6	6					75	133	30
4-Methyl-2-pentanone	108-10-1	50	5,300,000	52,000,000	5,300,000	No	65	135	30
Acetone	67-64-1	50	61,000,000	610,000,000	61,000,000	No	40	141	30
Acrolein	107-02-8	100	160	680	160	No	65	135	30
Acrylonitrile	107-13-1	50	240	1200	240	No	65	135	30
Benzene	71-43-2	5	1,100	5,600	1,100	No	73	126	30
Bromobenzene	108-86-1	5	94,000	410,000	94,000	No	66	121	30
Bromochloromethane	74-97-5	5					71	127	30
Bromodichloromethane	75-27-4	5	10,000	46,000	10,000	No	72	128	30
Bromoform	75-25-2	6	61,000	220,000	61,000	No	66	137	30
Bromomethane	74-83-9	5	7,900	35,000	7,900	No	45	141	30
Carbon disulfide	75-15-0	5	670,000	3,000,000	670,000	No	65	135	30
Carbon tetrachloride	56-23-5	5	250	1,300	250	No	67	133	30
Chlorobenzene	108-90-7	5	310,000	1,500,000	310,000	No	75	123	30
Chloroethane	75-00-3	5	15,000,000	62,000,000	15,000,000	No	41	141	30
Chloroform	67-66-3	2	300	1,500	300	No	72	124	30
Chloromethane	74-87-3	5	1,700	8,400	1,700	No	51	129	30
cis-1,2-Dichloroethene or cis-1,2-Dichloroethylene	156-59-2	5	780,000	10,000,000	780,000	No	67	125	30
cis-1,3-Dichloropropene	10061-01-5	5					72	126	30
Dibromochloromethane	124-48-1	5	5,800	21,000	5,800	No	66	130	30
Dibromomethane	74-95-3	5	780,000	10,000,000	780,000	No	73	128	30
Dichlorodifluoromethane	75-71-8	5	190,000	780,000	190,000	No	34	136	30

TABLE 5-9B
Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B
PG&E Program Quality Assurance Project Plan

			EPA Regional Screening Levels 2008				**LCS/MS/MSD Accuracy Control Limits (%R)**		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
Ethylbenzene	100-41-4	5	5,700	29,000	5,700	No	74	127	30
Hexachlorobutadiene	87-68-3	5	6,200	22,000	6,200	No	53	142	30
Isopropylbenzene (Cumene)	98-82-8	5	2,200,000	11,000,000	2,200,000	No	77	129	30
Methylene Chloride	75-09-2	5	1,100	5,400	1,100	No	63	137	30
Naphthalene	91-20-3	5	3,900	20,000	3,900	No	51	135	30
n-Butylbenzene	104-51-8	5					65	138	30
n-Propylbenzene	103-65-1	5					63	135	30
sec-Butylbenzene	135-98-8	5					63	132	30
Styrene	100-42-5	5	6,500,000	38,000,000	6,500,000	No	74	128	30
tert-Butyl Methyl Ether (MTBE)	1634-04-4	20	39,000	190,000	39,000	No	50	135	30
tert-Butylbenzene	98-06-6	5					65	132	30
Tetrachloroethene or Tetrachloroethylene (PCE)	127-18-4	5	570	2,700	570	No	67	139	30
Toluene	108-88-3	5	5,000,000	46,000,000	5,000,000	No	71	127	30
trans-1,2-Dichloroethene or trans-1,2-Dichloroethylene	156-60-5	5	110,000	500,000	110,000	No	66	134	30
trans-1,3-Dichloropropene	10061-02-6	5					65	127	30
Trichloroethene or Trichloroethylene (TCE)	79-01-6	5	2,800	14,000	2,800	No	77	124	30
Trichlorofluoromethane (Freon 11)	75-69-4	5	800,000	3,400,000	800,000	No	49	139	30
Vinyl Chloride	75-01-4	5	60	1,700	60	No	58	126	30
Xylenes, Total	1330-20-7	15	600,000	2,600,000	600,000	No	65	125	50
m-Xylene	108-38-3	10	4,500,000	19,000,000	4,500,000	No	79	126	30
p-Xylene	106-42-3	10	4,700,000	20,000,000	4,700,000	No	79	126	30
o-Xylene	95-47-6	5	5,300,000	23,000,000	5,300,000	No	77	125	30

Note: All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-10A

Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C

PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	Upper Limit	Precision Water % RPD
1,2,4-Trichlorobenzene	120-82-1	10	8.2	70	8.2	Yes	37	120	20
1,2-Dichlorobenzene	95-50-1	10	370	600	370	No	33	120	20
1,3-Dichlorobenzene	541-73-1	10					32	120	20
1,4-Dichlorobenzene	106-46-7	10	0.43	75	0.43	Yes	32	120	20
2,4,5-Trichlorophenol	95-95-4	50	3,700		3,700	No	49	120	20
2,4,6-Trichlorophenol	88-06-2	10	6.1		6.1	Yes	49	126	20
2,4-Dichlorophenol	120-83-2	10	110		110	No	48	120	20
2,4-Dimethylphenol	105-67-9	10	730		730	No	28	120	20
2,4-Dinitrophenol	51-28-5	10	73		73	No	25	130	20
2,4-Dinitrotoluene	121-14-2	10	73		73	No	51	120	20
2,6-Dinitrotoluene	606-20-2	10	37		37	No	49	120	20
2-Chloronaphthalene	91-58-7	10	2,900		2,900	No	49	120	20
2-Chlorophenol	95-57-8	10	180		180	No	37	120	20
2-Methylnaphthalene	91-57-6	10	150		150	No	46	120	20
2-Methylphenol (o-Cresol)	95-48-7	10	1,800		1,800	No	38	120	20
2-Nitroaniline	88-74-4	50					48	120	20
2-Nitrophenol	88-75-5	10					39	123	20
3,3'-Dichlorobenzidine	91-94-1	20	0.15		0.15	Yes	20	120	20
3-Nitroaniline	99-09-2	50	3.2		3.2	Yes	20	126	20
4,6-Dinitro-2-methylphenol	534-52-1	50	3.7		3.7	Yes	40	130	20
4-Bromophenyl Phenyl Ether	101-55-3	10					52	120	20
4-Chloro-3-methylphenol	59-50-7	20					47	120	20

TABLE 5-10A
Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Water % RPD
							Lower Limit	Upper Limit	
4-Chloroaniline	106-47-8	20	1.2		1.2	Yes	20	120	20
4-Chlorophenyl phenyl ether	7005-72-3	10					50	120	20
4-Methylphenol (p-Cresol)	106-44-5	50	180		180	No	32	120	20
4-Nitroaniline	100-01-6	50	3.2		3.2	Yes	36	120	20
4-Nitrophenol	100-02-7	50					20	120	20
Acenaphthene	83-32-9	10	2,200		2,200	No	47	120	20
Acenaphthylene	208-96-8	10					50	120	20
Anthracene	120-12-7	10	11,000		11,000	No	54	120	20
Benzo (a) anthracene	56-55-3	10	0.029		0.029	Yes	56	100	20
Benzo (a) pyrene	50-32-8	10	0.0029	0.2	0.0029	Yes	53	120	20
Benzo (b) fluoranthene	205-99-2	10	0.029		0.029	Yes	45	124	20
Benzo (g,h,i) perylene	191-24-2	10					38	123	20
Benzo (k) fluoranthene	207-08-9	10	0.29		0.29	Yes	45	124	20
Benzoic acid	65-85-0	100	150,000		150,000	No	20	120	20
Benzyl alcohol	100-51-6	20	18,000		18,000	No	30	120	20
bis (2-chloroethoxy) methane	111-91-1	10	110		110	No	46	120	20
bis (2-chloroethyl) ether	111-44-4	10	0.012		0.012	Yes	37	120	20
bis (2-chloroisopropyl) ether	108-60-1	10	0.32		0.32	Yes	26	131	20
bis (2-ethylhexyl) phthalate	117-81-7	10	4.8	6	4.8	Yes	42	126	20
Butyl benzylphthalate	85-68-7	10	35		35	No	46	120	20
Chrysene	218-01-9	10	2.9		2.9	Yes	55	120	20
Dibenzo (a,h) anthracene	53-70-3	10	0.0029		0.0029	Yes	42	127	20
Dibenzofuran	132-64-9	10					54	120	20
Diethyl phthalate	84-66-2	10	29,000		29,000	No	41	120	20
Dimethyl phthalate	131-11-3	10					25	127	20

TABLE 5-10A
Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Water % RPD
Di-n-butylphthalate	84-74-2	10	3,700		3,700	No	54	120	20
Di-n-octylphthalate	117-84-0	10					37	137	20
Fluoranthene	206-44-0	10	1,500		1,500	No	54	120	20
Fluorene	86-73-7	10	1,500		1,500	No	50	120	20
Hexachlorobenzene	118-74-1	10	0.042	1	0.042	Yes	52	120	20
Hexachlorobutadiene	87-68-3	10	0.86		0.86	Yes	27	120	20
Hexachloroethane	67-72-1	10	4.8		4.8	Yes	28	120	20
Indeno (1,2,3-c,d) pyrene	193-39-5	10	0.029		0.029	Yes	43	125	20
Isophorone	78-59-1	10	71		71	No	50	120	20
Naphthalene	91-20-3	10	0.14		0.14	Yes	39	120	20
Nitrobenzene	98-95-3	10	3.4		3.4	Yes	44	120	20
n-Nitrosodi-n-propylamine	621-64-7	10	0.0096		0.0096	Yes	34	128	20
n-Nitrosodiphenylamine	86-30-6	10	14		14	No	48	120	20
Pentachlorophenol	87-86-5	50	0.56	1	0.56	Yes	38	120	20
Phenanthrene	85-01-8	10				No	51	120	20
Phenol	108-95-2	10	11,000		11,000	No	20	120	20
Pyrene	129-00-0	10	1,100		1,100	No	49	128	20

Notes:

California Drinking Water Standards MCLs include the following:

Benzo(a)pyrene	0.2 µg/L
Hexachlorobenzene	1 µg/L
Pentachlorophenol	1 µg/L

TABLE 5-10B
Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C
PG&E Program Quality Assurance Project Plan

			EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
1,2,4-Trichlorobenzene	120-82-1	330	87,000	400,000	87,000	No	44	125	30
1,2-Dichlorobenzene	95-50-1	330	2,000,000	10,000,000	2,000,000	No	45	125	30
1,3-Dichlorobenzene	541-73-1	330					39	125	30
1,4-Dichlorobenzene	106-46-7	330	2,600	13,000	2,600	No	35	125	30
2,4,5-Trichlorophenol	95-95-4	700	6,100,000	62,000,000	6,100,000	No	49	125	30
2,4,6-Trichlorophenol	88-06-2	330	44,000	160,000	44,000	No	43	125	30
2,4-Dichlorophenol	120-83-2	330	180,000	1,800,000	180,000	No	45	125	30
2,4-Dimethylphenol	105-67-9	330	1,200,000	12,000,000	1,200,000	No	32	125	30
2,4-Dinitrophenol	51-28-5	700	120,000	1,200,000	120,000	No	25	132	30
2,4-Dinitrotoluene	121-14-2	330	120,000	1,200,000	120,000	No	48	125	30
2,6-Dinitrotoluene	606-20-2	330	61,000	620,000	61,000	No	48	125	30
2-Chloronaphthalene	91-58-7	330	6,300,000	82,000,000	6,300,000	No	45	125	30
2-Chlorophenol	95-57-8	330	390,000	5,100,000	390,000	No	44	125	30
2-Methylnaphthalene	91-57-6	330	310,000	4,100,000	310.000	No	47	125	30
2-Methylphenol (o-Cresol)	95-48-7	330	3,100,000	31,000,000	3,100,000	No	40	125	30
2-Nitroaniline	88-74-4	700					44	125	30
2-Nitrophenol	88-75-5	700					42	125	30
3,3'-Dichlorobenzidine	91-94-1	1,300	1,100	3,800	1,100	Yes	25	128	30
3-Nitroaniline	99-09-2	700	18,000	82,000	18,000	No	27	125	30
4,6-Dinitro-2-methylphenol	534-52-1	1600	6,100	62,000	6,100	No	29	137	30
4-Bromophenyl phenyl ether	101-55-3	330					46	125	30
4-Chloro-3-methylphenol	59-50-7	600					46	125	30
4-Chloroaniline	106-47-8	700	9,000	32,000	9,000	No	10	125	30
4-Chlorophenyl phenyl ether	7005-72-3	330					47	125	30

TABLE 5-10B
Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C
PG&E Program Quality Assurance Project Plan

			EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
4-Methylphenol (p-Cresol)	106-44-5	330	310,000	3,100,000	310,000	No	41	125	30
4-Nitroaniline	100-01-6	700	23,000	82,000	23,000	No	34	125	30
4-Nitrophenol	100-02-7	700					25	138	30
Acenaphthene	83-32-9	330	3,400,000	33,000,000	3,400,000	No	46	125	30
Acenaphthylene	208-96-8	330					44	125	30
Anthracene	120-12-7	330	17,000,000	170,000,000	17,000,000	No	53	125	30
Benzo (a) anthracene	56-55-3	330	150	2,100	150	Yes	52	125	30
Benzo (a) pyrene	50-32-8	330	15	210	15	Yes	50	125	30
Benzo (b) fluoranthene	205-99-2	330	150	2,100	150	Yes	45	125	30
Benzo (g,h,i) perylene	191-24-2	330					38	126	30
Benzo (k) fluoranthene	207-08-9	330	1,500	21,000	1,500	No	45	125	30
Benzoic acid	65-85-0	5,000	240,000,000	2,500,000,000	240,000,000	No	25	125	30
Benzyl alcohol	100-51-6	330	31,000,000	310,000,000	31,000,000	No	25	125	30
bis (2-chloroethoxy) methane	111-91-1	330	180,000	1,800,000	180,000	No	43	125	30
bis (2-chloroethyl) ether	111-44-4	330	190	900	190	Yes	38	125	30
bis (2-chloroisopropyl) ether	108-60-1	330	3,500	17,000	3,500	No	25	125	30
bis (2-ethylhexyl) phthalate	117-81-7	330	35,000	120,000	35,000	No	47	127	30
Butyl benzylphthalate	85-68-7	1000	260,000	910,000	260,000	No	49	125	30
Chrysene	218-01-9	330	15,000	210,000	15,000	No	53	125	30
Dibenzo (a,h) anthracene	53-70-3	330	15	210	15	Yes	41	125	30
Dibenzofuran	132-64-9	330					51	125	30
Diethyl phthalate	84-66-2	330	49,000,000	490,000,000	49,000,000	No	50	125	30
Dimethyl phthalate	131-11-3	330					49	125	30
Di-n-butylphthalate	84-74-2	330	6,100,000	62,000,000	6,100,000	No	56	125	30
Di-n-octylphthalate	117-84-0	1000					41	132	30

TABLE 5-10B
Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008 Residential (µg/kg)	EPA Regional Screening Levels 2008 Commercial (µg/kg)	Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Fluoranthene	206-44-0	330	2,300,000	22,000,000	2,300,000	No	54	125	30
Fluorene	86-73-7	330	2,300,000	22,000,000	2,300,000	No	49	125	30
Hexachlorobenzene	118-74-1	330	300	1,100	300	Yes	47	125	30
Hexachlorobutadiene	87-68-3	330	6,200	22,000	6,200	No	40	125	30
Hexachloroethane	67-72-1	330	35,000	120,000	35,000	No	34	125	30
Indeno (1,2,3-c,d) pyrene	193-39-5	330	150	2,100	150	Yes	38	125	30
Isophorone	78-59-1	330	510,000	1,800,000	510,000	No	43	125	30
Naphthalene	91-20-3	330	3,900	20,000	3,900	No	40	125	30
Nitrobenzene	98-95-3	330	31,000	280,000	31,000	No	41	125	30
n-Nitrosodi-n-propylamine	621-64-7	330	69	250	69	Yes	40	125	30
n-Nitrosodiphenylamine	86-30-6	330	99,000	350,000	99,000	No	49	125	30
Pentachlorophenol	87-86-5	700	3,000	9,000	3,000	Yes	25	125	30
Phenanthrene	85-01-8	330					50	125	30
Phenol	108-95-2	330	18,000,000	180,000,000	18,000,000	No	39	125	30
Pyrene	129-00-0	330	1,700,000	17,000,000	1,700,000	No	46	125	30

Notes:
DTSC CHHSL: Residential benzo (a) pyrene 38 (µg/kg), pentachlorophenol – 4,400 (µg/kg)
DTSC CHHSL: Commercial benzo (a) pyrene 130 (µg/kg), pentachlorophenol – 130,00 (µg/kg)
All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-11A

Reporting Limits, Accuracy, and Precession Limits for Polynuclear Aromatic Hydrocarbon – SW8270SIM

PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Water % RPD
							Lower Limit	Upper Limit	
1-methylnaphthalene	90-12-0	0.2	2.3		2.3	No	35	131	30
2-methylnaphthalene	91-57-6	0.2	150		150	No	36	121	30
Acenaphthene	83-32-9	0.2	2,200		2,200	No	39	125	30
Acenaphthylene	208-96-8	0.2					43	140	30
Anthracene	120-12-7	0.2	11,000		11,000	No	41	132	30
Benzo (a) anthracene	56-55-3	0.2	0.029		0.029	Yes	58	141	30
Benzo (a) pyrene	50-32-8	0.2	0.0029	0.2	0.0029	Yes	31	142	30
Benzo (b) fluoranthene	205-99-2	0.2	0.029		0.029	Yes	42	156	30
Benzo (g,h,i) perylene	191-24-2	0.2					12	171	30
Benzo (k) fluoranthene	207-08-9	0.2	0.29		0.29	No	49	165	30
Chrysene	218-01-9	0.2	2.9		2.9	No	51	155	30
Dibenzo (a,h) anthracene	53-70-3	0.2	0.0029		0.0029	Yes	28	153	30
Fluoranthene	206-44-0	0.2	1,500		1,500	No	47	158	30
Fluorene	86-73-7	0.2	1,500		1,500	No	40	140	30
Indeno (1,2,3-c,d) pyrene	193-39-5	0.2	0.029		0.029	Yes	20	167	30
Naphthalene	91-20-3	0.2	0.14		0.14	Yes	39	125	30
Phenanthrene	85-01-8	0.2				No	46	144	30
Pyrene	129-00-0	0.2	1,100		1,100	No	39	158	30

TABLE 5-11B
Reporting Limits, Accuracy, and Precession Limits for Polynuclear Aromatic Hydrocarbon – SW8270SIM
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008 Residential (µg/kg)	EPA Regional Screening Levels 2008 Commercial (µg/kg)	Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
1-methylnaphthalene	90-12-0	5	22,000	99,000	22,000	No	30	111	30
2-methylnaphthalene	91-57-6	5	310,000	4,100,000	310,000	No	30	111	30
Acenaphthene	83-32-9	5	3,400,000	33,000,000	3,400,000	No	28	110	30
Acenaphthylene	208-96-8	5					23	126	30
Anthracene	120-12-7	5	17,000,000	170,000,000	17,000,000	No	28	136	30
Benzo (a) anthracene	56-55-3	5	150	2,100	150	No	31	146	30
Benzo (a) pyrene	50-32-8	5	15	210	15	No	28	128	30
Benzo (b) fluoranthene	205-99-2	5	150	2,100	150	No	30	139	30
Benzo (g,h,i) perylene	191-24-2	5					21	149	30
Benzo (k) fluoranthene	207-08-9	5	1,500	21,000	1,500	No	42	129	30
Chrysene	218-01-9	5	15,000	210,000	15,000	No	39	134	30
Dibenzo (a,h) anthracene	53-70-3	5	15	210	15	No	30	138	30
Fluoranthene	206-44-0	5	2,300,000	22,000,000	2,300,000	No	30	142	30
Fluorene	86-73-7	5	2,300,000	22,000,000	2,300,000	No	27	116	30
Indeno (1,2,3-c,d) pyrene	193-39-5	5	150	2,100	150	No	17	164	30
Naphthalene	91-20-3	5	3,900	20,000	3,900	No	29	106	30
Phenanthrene	85-01-8	5					32	127	30
Pyrene	129-00-0	5	1,700,000	17,000,000	1,700,000	No	28	130	30

Notes:
DTSC CHHSL: Residential benzo (a) pyrene 38 (µg/kg)
DTSC CHHSL: Commercial benzo (a) pyrene 130 (µg/kg)
All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 5-12
Reporting Limits, Accuracy, and Precession Limits for Radiochemistry
PG&E Program Quality Assurance Project Plan

Method	Constituent	CAS	Units	QAPP RL	California Drinking Water Standards MCLs	Federal Drinking Water Standards MCLs	LCS Accuracy Control Limits (%R) Upper Limit	MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Water % RPD
CF-IRMS	D18O	D18O	0/00						20
CF-IRMS	DD	DD	0/00						20
SM7110C	Gross alpha	Gross alpha	pCi/L	3	15	15			20
E900.0	Gross beta	Gross beta	pCi/L	4	4				20
E903.1	Radium-226	013982-63-3	pCi/L	1		5			20
E904.0	Radium-228	015262-20-1	pCi/L	1		5			20
E905.0	Strontium	7440-26-4	pCi/L	2	8				20
E906.0	Tritium	10028-17-8	pCi/L	1000	20,000				20
E908.0	Uranium	7440-61-1	pCi/L	1	20				20

Notes:

pCi/L = picocuries per liter

California Drinking Water Standards MCL is as follows: radium-226 + radium-228 <5 pCi/L

TABLE 5-13
Reporting Limits, Accuracy, and Precession Limits for RSK175
PG&E Program Quality Assurance Project Plan

Constituent	CAS	QAPP RL (µg/L)	EPA Regional Screening Levels 2008 (µg/L)	Federal Drinking Water Standards MCLs (µg/L)	Most Stringent Screening Level (µg/L)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Water % RPD
Carbon Dioxide	124-38-9	5					80	120	20
Ethane	74-84-0	5					80	120	20
Ethene	74-85-1	5					80	120	20
Methane	74-82-8	5					80	120	20

TABLE 5-14A
Maximum Concentrations for Title 22 – Organic Compounds – SW8000 Series
PG&E Program Quality Assurance Project Plan

Constituent	CAS	TTLC Concentration Maximum (mg/kg)	STLC Concentration Maximum (mg/L)	TCLP Concentration Maximum (mg/L)
SW8260B				
Benzene	71-43-2			0.5
Carbon tetrachloride	56-23-5			0.5
Chlorobenzene	108-90-7			100
Chloroform	67-66-3			6
o-Cresol (2-Methylphenol)	95-48-7			200[a]
m-Cresol	108-39-4			200[a]
p-Cresol (4-Methylphenol)	106-44-5			200[a]
Total Cresols				200[a]
1,4-Dichlorobenzene	106-46-7			7.5
1,2-Dichloroethane (EDC)	107-06-2			0.5
1,1-Dichloroethylene	75-35-4			0.7
Hexachlorobutadiene	87-68-3			0.5
Tetrachloroethylene (PCE)	127-18-4	2,040	204	0.7
Vinyl chloride	75-01-4			0.2
Trichloroethylene (TCE)	79-01-6			0.5
2-Butanone (MEK)	78-93-3			200
SW8270C				
2,4-Dinitrotoluene	121-14-2			0.13
Hexachlorobenzene	118-74-1			0.13
Hexachloroethane	67-72-1			3
Hexachlorobutadiene	87-68-3			0.5
Nitrobenzene	98-95-3			2
Pentachlorophenol	87-86-5	17	1.7	100
2,4,5-Trichlorophenol	95-95-4			400
2,4,6-Trichlorophenol	88-06-2			2
Pyridine	110-86-1			5
3,3-Dichlorobenzidine				0.01
SW8081A				
Endrin	72-20-8	0.2	0.02	0.02
Heptachlor (and its epoxide)	76-44-8	4.7	0.47	0.008
Methoxychlor	72-43-5	100	10	10
Toxaphene	8001-35-2	5	0.5	0.5
Chlordane	57-74-9	2.5	0.25	0.03
Lindane	58-89-9	4	0.4	0.4
Aldrin	309-00-2	1.4	0.14	
Kepone	143-50-0	21	2.1	
4,4'-DDD	72-54-8	1	0.1	

TABLE 5-14A
Maximum Concentrations for Title 22 – Organic Compounds – SW8000 Series
PG&E Program Quality Assurance Project Plan

Constituent	CAS	TTLC Concentration Maximum (mg/kg)	STLC Concentration Maximum (mg/L)	TCLP Concentration Maximum (mg/L)
4,4'-DDE	72-55-9	1	0.1	
4,4'-DDT	50-29-3	1	0.1	
Dieldrin	60-57-1	8	0.8	
Heptachlor	76-44-8	4.7	0.47	
SW8151A				
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	100	10	10
2,4,5-Trichlorophenoxypropionic acid (2,4,5-TP) (Silvex)	93-72-1	10	1	1
SW8082				
Polychlorinated biphenyls (PCB)		50	5	
Dioxins				
Dioxin (2,3,7,8-TCDD)	1746-01-6	0.01	0.001	

[a]Combine concentration of cresol in any form.

TABLE 5-14B

Maximum Concentrations for Title 22 – Organic Compounds – SW8000 Series

PG&E Program Quality Assurance Project Plan

Constituent	CAS	Method
Mirex	2385-85-5	SW8081
Methyl chloromethyl ether (Chloromethyl methyl ether)	107-30-2	SW8021B
2-Acetylaminofluorene (2-AAF)	53-96-3	SW8270C
Acrylonitrile	107-13-1	SW8260B
4-Aminodiphenyl (4-Aminobiphenyl)	92-67-1	SW8270C
Benzidine and its salts	92-87-5	SW8270C
bischloromethyl ether (BCME)	542-88-1	SW8270C
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	SW8270C
4-Dimethylaminoazobenzene (DAB)	60-11-7	SW8270C
Ethyleneimine (EL)	151-56-4	
ALPHA-NAPHTHYLAMINE (1-NA)	134-32-7	SW8270C
BETA-NAPHTHYLAMINE (2-NA)	91-59-8	SW8270C
4-Nitrobiphenyl (4-NBP)	92-93-3	SW8270C
N-Nitrosodimethylamine (DMN)	62-75-9	SW8270C
beta-Propiolactone (BPL)	57-57-8	SW8260B

Note:

If the sample contains any of the compounds listed in this table at a single or combined concentration equal to or exceeding 0.001 percent by weight, the sample is considered to be toxic under CA Title 22 Section 66261.24 (Characteristic of Toxicity)

TABLE 5-15
Surrogate Recovery for Organic Compounds – SW8000 Series
PG&E Program Quality Assurance Project Plan

	Liquid Matrix % Recovery		Solids Matrix % Recovery	
Compound	**Lower Limit**	**Upper Limit**	**Lower Limit**	**Upper Limit**
SW8015-E[a]				
Benzo (a) pyrene	70	125	60	125
Bromobenzene	50	140	50	150
Hexacosane	60	140	60	140
Octacosane	26	152	25	162
Triacontane	40	140	30	150
Ortho-Terphenyl	57	132	47	142
Fluorobenzene	75	125	65	135
SW8015-P				
Bromofluorobenzene	70	130	64	148
Chlorobenzene[b]	74	138	64	148
Trifluorotoluene	70	130	70	130
SW8021				
Trifluorotoluene	65	125	65	125
SW8082[c]				
Decachlorobiphenyl	29	133	26	125
Tetrachloro-m-xylene	50	120	48	121
SW8260B[d]				
1,2-Dichloroethane-d4	72	119	52	149
4-Bromofluorobenzene	76	119	65	135
Dibromofluoromethane	85	115	65	135
Toluene-d8	81	120	75	125
SW8270C				
1,2-Dichlorobenzene-d4[e, f]	27	100	25	110
2,4,6-Tribromophenol[g]	42	124	36	126
2-Chlorophenol-d4[e, g]	34	98	30	100
2-Fluorobiphenyl[f]	48	120	43	125
2-Fluorophenol[g]	20	120	37	125
Nitrobenzene-d5[f]	41	120	37	125
Phenol-d5[g]	20	120	40	125
Terphenyl-d14[f]	51	135	32	125
SW8270SIM				
1,2-Dichlorobenzene-d4	27	100	25	110
2-Fluorobiphenyl	34	135	34	135
Nitrobenzene-d5	25	135	25	135
Terphenyl-d14	34	167	14	129

TABLE 5-15
Surrogate Recovery for Organic Compounds – SW8000 Series
PG&E Program Quality Assurance Project Plan

	Liquid Matrix % Recovery		Solids Matrix % Recovery	
Compound	**Lower Limit**	**Upper Limit**	**Lower Limit**	**Upper Limit**
SW8081A				
Decachlorobiphenyl	29	135	26	125
Tetrachloro-m-xylene	33	138	36	124
SW8151A				
2,4-dichlorophenylacetic acid	50	130	51	146

[a] Choose two from the list
[b] Required by method
[c] Use tetrachloro-m-xylene as a surrogate if DCBP is used as an IS.
[d] Choose three from the list
[e] Approved alternatives
[f] Base fraction
[g] Acid fraction

TABLE 5-16
Calibration and QC Requirements for Metals – SW6010B and EPA200.7
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
ICAL (a blank and at least one standard)	Before sample analysis, every 24 hours, when modifications are made to the system, or when continuing calibration verification fails.	If more than one standard is used, correlation coefficient must be >0.995.	Not applicable.
Second-Source Calibration Verification	Immediately following each ICAL.	All analytes within ±10% of expected value for SW6010B and within ±5% of expected value for EPA200.7.	Correct problem and repeat ICAL.
Calibration Blank	After every second-source or continuing calibration verification analysis.	No analytes detected at or above the RL.	Correct the problem and reanalyze previous 10 samples.
Continuing Calibration Verification	After every 10 samples and at the end of the analysis sequence.	All analytes within ±10% of expected value for SW6010B and within ±10% of expected value for EPA200.7.	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
Interference Check Standard	At the start and end of each analytical sequence or twice during an 8-hour period, whichever is more frequent.	All analytes within ±20% of expected value.	Correct the problem, recalibrate, and reanalyze ICS and all affected samples.

TABLE 5-16
Calibration and QC Requirements for Metals – SW6010B and EPA200.7
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed.	All analytes within limits specified in Tables 5-3A through 5-3E.	None.
Laboratory Sample Duplicate	Once per analytical batch if MSD not performed.	Concentration of reported analytes are >5 times the RL in either sample and RPD >20%. One sample result <RL and a difference of ±2 times the RL.	None.
LCS	At least one per analytical batch.	All analytes within limits specified in Tables 5-3A through 5-3E.	Correct the problem, re-prepare and reanalyze the LCS and all samples in the analytical batch.
Dilution Test	Each new sample matrix.	Result from 1:5 dilution must be within ±10% of the undiluted sample result (applies only if undiluted sample result is at least 25 times the RL).	Perform postdigestion spike addition.
Linear Range Calibration Check Standard	Once per quarter.	All analytes within +10% of expected value.	Correct problem and reanalyze or reset linear range.
Postdigestion Spike Addition	When dilution test fails.	Recovery within 75 to 125% of expected value.	None.

TABLE 5-17
Calibration and QC Requirements for Metals – SW6020 and EPA200.8
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
ICAL (a blank and at least one standard)	Before initial sample analysis, every 24 hours, when modifications are made to the analytical system, or when continuing calibration verification fails.	Not applicable	Not applicable
Second-source Calibration Verification	Immediately following each ICAL.	All analytes within ±10% of expected value.	Correct problem and repeat ICAL.
Calibration Blank	After every Second-source or Continuing calibration verification analysis.	No analytes detected at or above the RL.	Correct the problem and reanalyze previous 10 samples.
Continuing Calibration Verification	After every 10 samples and at the end of the analysis sequence.	All analytes within ±10% of expected value.	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
Interference Check Standard	At the start and end of each analytical sequence or twice during an 8-hour period, whichever is more frequent.	All analytes within ±20% of expected value.	Correct the problem, recalibrate and reanalyze ICS and all affected samples.
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed.	All analytes within limits specified in Tables 5-3A through 5-3E.	None.
Laboratory Sample Duplicate	Once per analytical batch if MSD not performed.	Concentration of reported analytes are >5 times the RL in either sample and RPD >20%. One sample result <RL and a difference of ±2 times the RL.	None.
LCS	At least one per analytical batch.	All analytes within limits specified in Tables 5-3A through 5-3E.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.
Dilution Test	Each new sample matrix.	Result from 1:5 dilution must be within ±10% of the undiluted sample result (applies only if undiluted sample result is at least 25 times the RL).	Perform postdigestion spike addition.
Postdigestion Spike Addition	When dilution test fails.	Recovery within 75 to 125% of expected value.	None.

TABLE 5-18
Calibration and QC Requirements for Metals – SW7000 Series and EPA245.1
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Multipoint ICAL (a blank and at least five standards)	Before initial sample analysis, every 24 hours, when modifications are made to the analytical system, or when continuing calibration verification fails.	Correlation coefficient of linear regression is ≥0.995.	Correct the problem and repeat the ICAL.
Second-source Calibration Verification	Immediately following each ICAL.	All analytes within ±20% of expected value.	Correct the problem and repeat ICAL.
Calibration Blank	After every second-source or continuing calibration verification analysis.	No analytes detected at or above the RL.	Correct the problem, then reanalyze previous 10 samples.
Continuing Calibration Verification	After every 10 samples and at the end of the analysis sequence.	All analytes within ±20% of expected value.	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed.	All analytes within limits specified in accuracy and precision table.	None.
Laboratory Sample Duplicate	Once per analytical batch if MSD not performed.	Concentration of reported analytes are >5 times the RL in either sample and RPD >20%. One sample result <RL and a difference of ±2 times the RL.	None.
LCS	At least one per analytical batch.	All analytes within limits specified Tables 5-3A through 5-3E.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.
Dilution Test	Each new sample matrix.	Result from 1:5 dilution must be within ±10% of the undiluted sample result (applies only if undiluted sample result is at least 25 times the RL).	Perform recovery test.
Recovery Test	When dilution test fails.	Recovery within 85 to 115% of expected value.	Analyze all samples by MSA.

Note:
MSA = method of standard addition

TABLE 5-19
Calibration and QC Requirements for General Chemistry and Other Parameters[a]
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Multipoint ICAL (a blank and at least five standards); Does Not Apply to Titrimetric Method	Before initial sample analysis, every 24 hours, when modifications are made to the analytical system, or when continuing calibration verification fails.	Correlation coefficient of linear regression is ≥0.995.	Correct the problem and repeat the ICAL.
Second-source calibration verification	Immediately following each ICAL.	Analytes within ±15% of expected value (±10% for SW9056/EPA300.0).	Correct the problem and repeat ICAL.
Calibration blank; does not apply to titrimetric method	After every second-source or continuing calibration verification analysis.	No analytes detected at or above the RL.	Correct the problem, then reanalyze previous 10 samples.
Continuing calibration verification	After every 10 samples and at the end of the analysis sequence.	Within ±15% of expected value (±10% for SW9056/EP300.0).	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification.
Method blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
MS/MSD	One set per 20 project-specific samples. MSD is optional if a laboratory sample duplicate is performed.	All analytes within limits specified in Tables 5-2A, 5-2B, 5-12, and 5 13.	None.
Laboratory Sample Duplicate	Once per analytical batch if MSD not performed.	Concentration of reported analytes are >5 times the RL in either sample and RPD >20%. One sample result <RL and a difference of ±2 times the RL.	None.
LCS	At least one per analytical batch.	All analytes within limits specified in Tables 5-2A, 5-2B, 5-12, and 5 13.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.
IPC (EPA314.0 only)	Daily, before sample analysis.	Conductance within 10% of original value (original value within ±10% of MCT).	Prepare fresh IPC solution.
		$PD_{A/H}$ <25%, instrument response within ±20% of expected response.	Redetermined MCT or correct problem and reanalyze IPC.
		Retention time shifts <5%, or overall retention time <80% of original recorded value.	Correct problem, clean or replace column.

TABLE 5-19
Calibration and QC Requirements for General Chemistry and Other Parameters[a]
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
ICAL Verification (ICCS) (EPA314.0 only)	Daily, before sample analysis or when eluent is changed.	Instrument response within ±25% of expected value using a standard at or below the RL.	Correct problem then repeat ICAL.
Pretreated Laboratory Reagent Blank (EPA314.0 only)	Required in any analytical batch which includes samples that have been pretreated to reduce the common anion levels.	Perchlorate must be ≤½ RL.	Correct problem, re-prepare, and analyze method blank and all samples processed with the contaminated blank.
Low-level MDL Check Standard (EPA314.0 only)	Weekly and with ICAL.	Must meet QC acceptance criteria, 50 to 150% of its true concentration.	Reanalyze low-level MDL check standard, if still out of criteria, repeat ICAL.

[a] Unless calibration and QC requirements are specified for an individual method.

Notes:

ICCS = initial calibration check standard
IPC = instrument performance check
MCT = matrix conductivity threshold

TABLE 5-20
Calibration and QC Requirements for Hexavalent Chromium – SW7199 and EPA218.6
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Multipoint ICAL (a blank and at least five standards)	Before initial sample analysis, every 24 hours, when modifications are made to the analytical system, or when continuing calibration verification fails.	Correlation coefficient of linear regression is ≥0.999.	Correct the problem and repeat the ICAL.
Second-source Calibration Verification	Immediately following each ICAL.	All analytes within ±10% of expected value.	Correct the problem and repeat ICAL.
Calibration Blank	After every second-source or continuing calibration verification analysis.	No analytes detected at or above the RL.	Correct the problem, then reanalyze previous 10 samples.
Continuing Calibration Verification	After every 10 samples and at the end of the analysis sequence.	All analytes within ±10% of expected value for SW7199 and within ±5% of expected value for EPA218.6.	Recalibrate and reanalyze all samples since the last acceptable continuing calibration verification.
Duplicate Sample Injections (SW7199 only)	Every sample.	RPD between injections must be <20%.	Correct the problem, re-prepare, and reanalyze all associated samples.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.

TABLE 5-20
Calibration and QC Requirements for Hexavalent Chromium – SW7199 and EPA218.6
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
MS	One per 20 project-specific samples.	All analytes within limits specified in Tables 5-2A, 5-2B, 5-3A, and 5-3B.	None.
Laboratory Sample Duplicate	Once per analytical batch if MSD not performed.	Concentration of reported analytes are >5 times the RL in either sample and RPD >20%. One sample result <RL and a difference of ±2 times the RL.	None.
LCS	At least one per analytical batch.	All analytes within limits specified in Tables 5-2A, 5-2B, 5-3A, and 5-3B.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.
pH Buffer Solution Modification	As needed because of sample matrices that cause the analytical column to overload. All QC samples and analyses will use the modified buffered solution when needed.	A modified pH-adjustment buffer that contains 10 times less ammonium sulfate (33 g/L) but the same concentration of ammonium hydroxide as the buffer prescribed in SW7199/ EPA218.6.	None.
MS Dilute and Spike (see Section 5.3.3.1)	As directed in Section 5.3.3.1.	Spike recovery 85 to 115% and peak within RT window.	Dilute two aliquots 1:5, spike one with 1 μg/L of hexavalent chromium and analyze the other unspiked. Continue the procedure using successively greater dilutions of two aliquots until RT and recovery criteria are met.

Notes:

RT = retention time

μg/L = micrograms per liter

TABLE 5-21
Soil Preparation Method SW3060A for Method SW7199
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
2.5 grams sample to a final volume of 100 ml must be used for each sample	Each sample in the preparation batch.	Follow method preparation for all samples, method blank, and QC samples.	
Method Blank	One per preparation batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
LCS	One per preparation batch.	Spike at concentration specified in method. Recovery range 80 to 120%.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.
Soluble Matrix Spike	One per preparation batch.	Spike at concentration specified in method. Recovery range 75 to 125%.	None.
Insoluble Matrix Spike	One per preparation batch.	Spike at concentration specified in method. Recovery range 75 to 125%.	None.
Post Digestion Spike	One per preparation batch.	Spike at concentration specified in method. Recovery range 85 to 115%.	None.

TABLE 5-22
Calibration and QC Requirements for Stable Isotopes[a]
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Instrument Standardization	Daily, prior to sample analysis.	Laboratory SOP.	Perform instrument maintenance.
Laboratory Sample Duplicate	Every sample analyzed five times.	Laboratory SOP.	Perform instrument maintenance and reanalyze samples.

[a] ^{18}O and deuterium

TABLE 5-23
Calibration and QC Requirements for TPH, BTEX, Herbicides, and Dissolved Gases – SW8015B, SW8021B, SW8151A, and RSK-175S
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Multipoint ICAL (minimum 5 points)	Prior to sample analysis, or when calibration verification fails.	If the %RSD is ≤20%, the average RRF may be used for quantitation; otherwise use calibration curve with coefficient of correlation or determination ≥0.99.	Correct the problem and repeat the ICAL.
Continuing Calibration Verification	At the start of each analytical sequence and after every 10 samples, and at the end of the sequence.	Analytes within ±15% of expected value.	Correct the problem, recalibrate, and reanalyze all samples since the last acceptable continuing calibration verification.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
Surrogate Spike	Every standard, sample, method blank, MS/MSD, and LCS.	All surrogates in samples, method blank, MS/MSD, and LCS within limits specified in Tables 5-4A, 5-4B, 5-5A, 5-5b, 5-8A, 5-8B, and 5-13.	Correct the problem and reanalyze (re-prepare if necessary).
MS/MSD	One set per 20 samples.	Full target list spike required within limits specified in Tables 5-4A, 5-4B, 5-5A, 5-5b, 5-8A, and 5-8B. Not applicable for RSK-175.	None.
LCS	At least one per analytical batch.	Full target list spike required within limits specified in Tables 5-4A, 5-4B, 5-5A, 5-5b, 5-8A, 5-8B, and 5-13.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.
Second Detector or Second Column Confirmation (does not apply to SW8015B or RSK-175)	All samples with results above the RL objectives must be confirmed within the holding time.	Confirmation to be done using a second detector, or second column of dissimilar phase and retention characteristics (or gas chromatography/mass spectrometry if sample concentration is sufficiently high). All calibration and QC acceptance criteria specified for primary analysis must be met in the confirmation analysis.	Failure to perform confirmation will result in potential resampling and analysis at no cost to the project.

Note:
RRF = relative response factor

TABLE 5-24
Calibration and QC Requirements for Pesticides and PCBs – SW8081A and SW8082
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Multipoint ICAL (minimum 5 points) for single-response pesticides; single-point calibration for toxaphene and chlordane; multipoint calibration for Aroclors 1016 and 1260 only, but include midpoint standard for all other Aroclors for pattern recognition; if a specific Aroclor is found in any sample, quantitation for that Aroclor must be done using 5-point calibration	Prior to sample analysis or when calibration verification fails.	To use average RRF for quantitation of any analyte, % RSD must be ≤20%; otherwise use calibration curve with coefficient of correlation or determination ≥0.99.	Correct the problem and repeat the ICAL.
Second-source calibration verification – pesticides and Aroclors 1016 and 1260 (or Aroclors identified in samples)	Once for each multipoint ICAL.	All analytes within ±15% of expected value.	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable continuing calibration verification.
Continuing calibration verification – pesticides and Aroclors 1016 and 1260 (or Aroclors identified in samples)	At the start of each analytical sequence; after every 12 hours or 10 samples, whichever is more frequent; and at the end of the sequence.	All analytes within ±15% of expected value.	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable continuing calibration verification.
Endrin/DDT breakdown check (not applicable when analyzing for Aroclors/PCBs only)	At start of each 12-hour period.	Breakdown of either endrin or DDT ≤15%.	Evaluate injector port and take corrective action; recalibrate and reanalyze affected samples if necessary.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
Surrogate Spike	Every standard, sample, method blank, MS/MSD, and LCS.	At least one of the surrogates in samples, method blank, MS/MSD, and LCS within limits specified in Tables 5-6A, 5-6B, 5-7A, and 5-7B.	Correct the problem and reanalyze (re-prepare if necessary).
MS/MSD	One set per 20 project-specific samples.	Full target list spike required within limits specified in corresponding Tables 5-6A, 5-6B, 5-7A, and 5-7B.	None.
LCS	At least one per analytical batch.	Full target list spike required within limits specified in corresponding Tables 5-6A, 5-6B, 5-7A, and 5-7B.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.

TABLE 5-24
Calibration and QC Requirements for Pesticides and PCBs – SW8081A and SW8082
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Second Column Confirmation	All samples with results above the RL objectives must be confirmed within the holding time.	Confirmation to be done using second column of dissimilar phase and retention characteristics (or gas chromatography/mass spectrometry if sample concentration is sufficiently high). All calibration and QC acceptance criteria specified for primary analysis must be met in the confirmation analysis.	Failure to perform confirmation will result in potential resampling and analysis at no cost to the project.

Note:

DDT = dichloro-diphenyl-trichloroethane

TABLE 5-25
Calibration and QC Requirements for VOCs – SW8260B
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
BFB Tuning	Prior to ICAL and calibration verification (every 12 hours).	Refer to criteria listed in the method.	Retune instrument and verify.
Multipoint ICAL (minimum 5 points)	Prior to sample analysis, or when calibration verification fails.	SPCCs average RRF ≥0.30a and %RSD for RRFs for CCCs ≤30% and one of the following options: Option 1 Linear – RSD for each analyte <15%. Use of the mean %RSD for all analytes ≤15% may **not** be used. Option 2 Linear – least squares regression r ≥0.995. Option 3 Nonlinear – coefficient of determination ≥0.99 (6 standards to used for a second order; 7 standards to be used for a third order).	Correct the problem and repeat the ICAL.
Second-source Calibration Verification	Once for each multipoint ICAL.	All analytes within ±25% of expected value.	Correct the problem and repeat ICAL.

TABLE 5-25
Calibration and QC Requirements for VOCs – SW8260B
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Continuing Calibration Verification	At the start of each analytical sequence and every 12 hours thereafter.	SPCCs average RF ≥0.30c and %D for RFs for CCCs ≤20%. All other analytes within ±20% of expected value.	Correct the problem, recalibrate, and reanalyze all samples since the last acceptable continuing calibration verification.
Retention Time Window Calculated for Each Analyte	Each analyte.	Relative retention time of each analyte within ±0.06 relative retention time units of the ICAL.	Not applicable (used for identification of analyte).
Internal Standards	Each sample and QC sample, method blank, MS/MSD and LCS.	Continuing calibration verification retention time within ±30 seconds from retention time of the ICAL midpoint standard. Sample retention time within ±30 seconds from retention time of the daily continuing calibration verification. Continuing calibration verification EICP area within –50% to +100% of the internal standard responses in the ICAL midpoint standard. Sample EICP area within –50% to +100% of the daily continuing calibration verification.	Inspect mass spectrometer and gas chromatography for malfunctions; reanalyze all affected samples.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
Surrogate Spike	Every standard, sample, method blank, MS/MSD and LCS.	All surrogates in samples, method blank and LCS within limits Tables 5-9A and 5-9B.	Correct the problem and reanalyze (re-prepare if necessary).
MS/MSD	One set per 20 project-specific samples.	Full target list spike required within limits specified in Tables 5-9A and 5-9B.	None.
LCS	At least one per analytical batch.	Full target list spike required within limits specified in Tables 5-9A and 5-9B.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.

[a] SPCC average RRF ≥0.10 for bromoform, chloromethane, and 1,1-dichloroethane.

Notes:

BFB = bromofluorobenzene
CCC = calibration check compounds
EICP = extracted ion current profile SPCC

TABLE 5-26
Calibration and QC Requirements for Semivolatile Organic Compounds – SW8270C
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
DFTPP Tuning	Prior to ICAL and calibration verification (every 12 hours).	Refer to criteria listed in the method.	Retune instrument and verify.
Multipoint ICAL (minimum 5 points)	Prior to sample analysis, or when calibration verification fails.	SPCCs average RF ≥0.050 and %RSD for RFs for CCCs ≤30% and one of the following options: Option 1 Linear – RSD for each analyte <15%. Use of the mean %RSD for all analytes ≤15% may **not** be used. Option 2 Linear – least squares regression r ≥0.995. Option 3 Nonlinear – coefficient of Determination ≥0.99 (6 standards to used for a second order; 7 standards to be used for a third order).	Correct the problem and repeat the ICAL.
Second-source Calibration Verification	Once for each multipoint ICAL.	All analytes within ±25% of expected value.	Correct the problem and repeat ICAL.
Continuing Calibration Verification	At the start of each analytical sequence and every 12 hours thereafter.	SPCCs average RF ≥0.050 and %D for RFs for CCCs ≤20%. All other analytes within ±20% of expected value.	Correct the problem, recalibrate, and reanalyze all samples since the last acceptable continuing calibration verification.
Retention Time Window Calculated for Each Analyte	Each analyte.	Relative retention time of each analyte within ±0.06 relative retention time units of the ICAL.	Not applicable (used for identification of analyte).
Internal Standards	Each sample and QC sample, method blank, MS/MSD and LCS.	Continuing calibration verification retention time within ±30 seconds from retention time of the ICAL midpoint standard. Sample retention time within ±30 seconds from retention time of the daily continuing calibration verification. Continuing calibration verification EICP area within -50% to +100% of the internal standard responses in the ICAL midpoint standard. Sample EICP area within -50% to +100% of the daily continuing calibration verification.	Inspect mass spectrometer and gas chromatography for malfunctions; reanalyze all affected samples.

TABLE 5-26
Calibration and QC Requirements for Semivolatile Organic Compounds – SW8270C
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
Surrogate Spike	Every standard, sample, method blank, MS/MSD and LCS.	At least two surrogates per fraction in samples, method blank and LCS within limits specified in Tables 5-10A and 5-10B.	Correct the problem and reanalyze (re-prepare if necessary).
MS/MSD	One set per 20 project-specific samples.	Full target list spike required within limits specified in Tables 5-10A and 5-10B.	None.
LCS	At least one per analytical batch.	Full target list spike required within limits specified in Tables 5-10A and 5-10B.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.

Note:

DFTPP = decafluorotriphenylphosphene

TABLE 5-27
Calibration and QC Requirements for Polynuclear Aromatic Hydrocarbons – SW8270C SIM
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
DFTPP Tuning	Prior to ICAL and calibration verification (every 12 hours).	Refer to criteria listed in the method.	Retune instrument and verify.
Multipoint ICAL (minimum 5 points)	Prior to sample analysis, or when calibration verification fails.	SPCCs average RF ≥0.050 and %RSD for RFs for CCCs ≤30% and one of the following options: Option 1 RSD for each analyte <15%. Option 2 Least squares regression r ≥0.990. Option 3 Nonlinear – Coefficient of Determination ≥0.99 (6 standards to used for a second order; 7 standards to be used for a third order).	Correct the problem and repeat the ICAL.
Second-source Calibration Verification	Once for each multipoint ICAL.	All analytes within ±30% of expected value.	Correct the problem and repeat ICAL.
Continuing Calibration Verification	At the start of each analytical sequence and every 12 hours thereafter.	All analytes within ±20% of expected.	Correct the problem, recalibrate, and reanalyze all samples since the last acceptable continuing calibration verification.

TABLE 5-27
Calibration and QC Requirements for Polynuclear Aromatic Hydrocarbons – SW8270C SIM
PG&E Program Quality Assurance Project Plan

QC Check	Frequency	Criteria	Corrective Action
Retention Time Window Calculated for Each Analyte	Each analyte.	Relative retention time of each analyte within ±0.06 relative retention time units of the ICAL.	Not applicable (used for identification of analyte).
Internal Standards	Each sample and QC sample, method blank, MS/MSD, and LCS.	Continuing calibration verification retention time within ±30 seconds from retention time of the ICAL midpoint standard. Sample retention time within ±30 seconds from retention time of the daily continuing calibration verification. Continuing calibration verification EICP area within -50% to +100% of the internal standard responses in the ICAL midpoint standard. Sample EICP area within -50% to +100% of the daily continuing calibration verification.	Inspect mass spectrometer and gas chromatography for malfunctions; reanalyze all affected samples.
Method Blank	At least one per analytical batch.	No analytes detected at or above the RL.	Correct the problem, re-prepare, and reanalyze all associated samples.
Surrogate Spike	Every standard, sample, method blank, MS/MSD and LCS.	At least two surrogates in samples, method blank and LCS within limits specified in Tables 5-11A and 5-11B.	Correct the problem and reanalyze (re-prepare if necessary).
MS/MSD	One set per 20 project-specific samples.	Full target list spike required within limits specified in Tables 5-11A and 5-11B.	None.
LCS	At least one per analytical batch.	Full target list spike required within limits specified in Tables 5-11A and 5-11B.	Correct the problem, re-prepare, and reanalyze the LCS and all samples in the analytical batch.

SECTION 6

Data Reduction, Validation, and Reporting

6.1 Laboratory Data Management

Data reduction will be performed manually or by using appropriate computer software. Quantitation procedures specified for each method must be followed. If data reduction is performed manually, the documentation must include the formulas used. Computer software used for data reduction must have been previously verified by the laboratory for accuracy. Documentation of the software verification must be maintained in the laboratory. All data reduction documentation must allow re-creation of the calculations.

All data will undergo a minimum of three levels of review at the laboratory prior to release. The analyst performing the tests shall initially review 100 percent of the data. After the analyst's review has been completed, 100 percent of the data shall be reviewed independently by a senior analyst or by the section supervisor for accuracy, completeness and compliance with calibration, QC requirements, and holding times. Analyte identification and quantitation must be verified. Calibration and QC results will be compared with the applicable control limits. RLs should be reviewed to make sure they meet the project objectives. Results of multiple dilutions should be reviewed for consistency. Any discrepancies must be resolved and corrected. Laboratory qualifiers will be applied when there are nonconformances that could potentially affect data usability. These qualifiers must be properly defined as part of the deliverables. All issues that are relevant to the quality of the data must be addressed in a case narrative. The laboratory QC manager will review a minimum of 10 percent of data or deliverables generated for this program against the project-specific requirements. A final data review will be conducted by the laboratory manager or client services representative to ensure that all required analyses were performed and that all documentation is complete.

The hardcopy and electronic data deliverable (EDD) laboratory reports for all samples and analyses will contain the information necessary to perform data evaluation.

The PG&E Program will request four types of deliverables from the laboratory, depending upon the DQOs of the individual project. The following is a synopsis of when it is appropriate to use each type deliverable:

- **Level 1.** Appropriate for screening-level sampling results. Noncritical project decisions are made using this data.
- **Level 2.** Appropriate for investigative sampling results that will be replaced with confirmatory data or results used for disposal purposes. Less critical project decisions are made using this data.

- **Level 3.** Appropriate for investigative, confirmatory, or closure results. Critical project decisions may be made using this data.
- **Level 4.** Appropriate for investigative, confirmatory, or closure results. Critical decisions may be made using this data and should be used for projects that require a high degree of confidence in the accuracy of the data.

Hardcopy deliverables (and a electronic copy in portable document format [PDF]), in summary format, equivalent to those specified in the latest versions of EPA *Contract Laboratory Program Statements of Work for Organics and Inorganics Analyses* are preferred. The laboratory data report should be organized in a format that facilitates identification and retrieval of data. Alternate reporting formats require approval from the program chemist or project chemist.

A Level 1 report will include, at a minimum, the following information (when applicable):

- Cover letter with the following information:
  - Title of report and laboratory unique report identification (e.g., sample delivery group number)
  - Project name and site location
  - Name and location of laboratory and second-site or subcontracted laboratory
  - Client name and address
  - Statement of authenticity and official signature and title of person authorizing release of the report
- Table of contents
- Summary of samples received that correlates field sample IDs with the laboratory IDs
- Laboratory qualifier flags and definitions
- Field identification number
- Date received
- Date prepared
- Date analyzed (and time of analysis if the holding time is less than or equal to 48 hours)
- Preparation and analytical methods
- Result for each analyte (dry-weight basis for soils)
- Percent solids results for soil samples
- Dilution factor (provide both diluted and undiluted results when available)
- Sample-specific RL adjusted for sample size, dilution/concentration

- Sample-specific MDL adjusted for sample size, dilution/concentration (when project objectives require reporting less than the RL)
- Units of measure
- Applicable flags for data associated with QC that are outside of control limits
- CoC forms

A Level 2 report will consist of all the elements included in a Level 1 deliverable plus the following:

- Case narrative that addresses the following:
  - Sample receipt discrepancies (e.g., bubbles in VOA samples or temperature exceedances)
  - Descriptions of all nonconformances in the sample receipt, handling, preparation, analytical and reporting processes, and the corrective action taken for each occurrence
  - Identification and justification for sample dilution
  - Serial dilution recoveries, if applicable (required in hardcopy format only)
  - Postdigestion spike recoveries, if applicable (required in hardcopy format only)
- Surrogate %Rs
- MS/MSD and LCS spike concentrations, native sample results, spiked sample results, %R, and RPDs between the MS and MSD results; associated QC limits must also be provided
- Method blank results
- Analytical batch reference number that cross references samples to QC sample analyses
- Completed sample receipt checklist

A Level 3 report will consist of all the elements included in Level 1 and 2 reports plus the following:

- Analytical sequence or laboratory run log that contains sufficient information to correlate samples reported in the summary results to the associated method QC information, such as initial and continuing calibration analyses
- Confirmation results
- Calibration blank results for inorganic analyses (required in hardcopy format only)
- ICP and ICP/MS interference check sample results that include true concentrations, measured concentrations, and the calculated %R of the elements included (required in hardcopy format only)
- Method of standard addition results, if applicable (required in hardcopy format only)

- Internal standard recovery and retention time information, as applicable
- ICAL summary, including standard concentrations, response factors, average response factors, RSDs or correlation coefficients, and calibration plots or equations, if applicable (required in hardcopy format only)
- Continuing calibration verification summary, including expected and recovered concentrations and percent differences (required in hardcopy format only)
- Instrument tuning and mass calibration information for gas chromatography/mass spectrometry and ICP/MS analyses
- Any other method-specific QC sample results

A Level 4 report will include all elements for Levels 1 through 3 and all of the associated raw data. It is imperative that the relative scale used for all chromatographic and other instrument data be supplied in a scale that facilitates review from hardcopy. Enlargements of sufficient size and clarity for complex areas of sample chromatograms will be provided. Additional information to be supplied includes the following:

- Sample preparation logs that include the following:
  - Preparation start and end times
  - Beginning and ending temperatures (e.g., water baths and digestion blocks)
- Each algorithm and an example calculation for at least one sample for each matrix analyzed
- Reconstructed total ion chromatograms or selected ion current profiles for each sample (or blank) analyzed and mass spectra(s) for each compound identified including the following:
  - Raw compound spectra
  - Enhanced or background spectra
  - Laboratory generated library spectra (for tentatively identified compounds, provide the reference mass spectra from software spectra library)
- Ion ratio information for dioxin/furan methods

6.2 Hardcopy and Electronic Deliverables

Within the timeframe specified in the laboratory statement of work, contract, or purchase order from sample receipt, the laboratory shall deliver two hardcopies and one PDF of documentation, as specified in this QAPP. In addition, the laboratory shall deliver one electronic copy of the data (i.e., EDD), as specified in the format described in Table 6-1 (or as directed in the project-specific addendum), on CD-ROM or by e-mail (in ASCII format) within the same timeframe (LabSpec-7 format [see Table 6-1]).

All electronic data files shall match the final hardcopy results. CH2M HILL requires receipt of final hardcopy results with electronic files.

All raw data will be maintained in the laboratory and will be available upon request. Complete documentation of sample preparation and analysis and associated QC information will be maintained in a manner that allows easy retrieval if additional validation or information is required. Appropriate back-up procedures must be implemented by the laboratory for data that are stored electronically. All data generated using gas chromatography/mass spectrometry must be maintained on COD-ROM or equivalent format and provided to CH2M HILL upon request. All documentation must be retained for a minimum of 5 years after data acquisition.

The primary responsibility for implementing these procedures in the laboratory will reside with the laboratory manager or equivalent. The laboratory manager will approve laboratory reports before submittal.

6.3 Data Validation and Verification

Depending on the project-specific objectives, the analytical results of the data collection effort will be validated by CH2M HILL. In general, there will be different levels of validation employed for the program that correspond to the reports described in Section 6.1. In some instances a Level 3 or Level 4 data package may be obtained from the laboratory, but only a Level 1 or Level 2 validation may be conducted. Specific validation levels will be identified in the site-specific SAP or QAPP addendum. Validation of Levels 1 through 4 will always be performed by the project chemist or designee. The levels are summarized as follows:

Level 1	Import the laboratory results into the project database; use automated data validation (AutoDV), as applicable, to the project database. Verify that samples were analyzed by the methods requested, and review the data for outliers and anomalies. Prepare a brief summary validation report.
Level 2	Import the laboratory results into the project database; use AutoDV as applicable, to the project database. Verify that samples were analyzed by the methods requested, review the laboratory case narrative for events in the laboratory that affect the accuracy or precision of the data, review QC indicator data, and perform a cursory review of the data. Prepare a summary validation report.
Level 2B	Import the Laboratory results into the project database; use AutoDV, as applicable, to the project database. Verify that samples were analyzed by the methods requested, review the laboratory case narrative for events in the laboratory that affect the accuracy or precision of the data, review QC indicator data, and perform a cursory review of the data. Review specific raw data, as specified in the QAPP addendum, and compare the current data with historical data. Prepare a summary validation report.
Level 3	Import the laboratory results into the project database; use AutoDV, as applicable, to the project database. Validate the analytical data, as described in the following sections, without reviewing any raw data or analyte verification. Prepare a summary validation report.

Level 3B	Import the laboratory results into the project database; use AutoDV, as applicable, to the project database. Validate the analytical data as described in the following sections with review of specific raw data, as specified in the QAPP addendum, and compare the current data with historical data. Prepare a summary validation report.
Level 4	Import the laboratory results into the project database; use AutoDV, as applicable, to the project database. Validate analytical data as described in the following sections, including a review of the analytical raw data, and compare the current data with historical data. Prepare a summary validation report.

6.4 Level 3 and 4 Validation Procedures

Personnel involved in the data validation function will be independent of any data generation effort. The project chemist will have responsibility for oversight of the data validation effort. Data validation will be performed when the final data packages are received from the laboratory. Data validation will be performed on an analytical batch basis within each analytical report using the summary results of calibration and laboratory QC and the results from associated field samples. Data packages will be reviewed for all constituents of concern. Raw data will be reviewed when deemed necessary by the project chemist or as specified in QAPP addenda. Data validation procedures will include the following:

- Review of the data package for completeness
- Review of CoC records for discrepancies that might degrade data quality
- Review for compliance with holding time and QC frequency requirements
- Evaluation of all calibration and QC summary results against the project requirements
- Verification of analyte identification and calculations for at least 10 percent of the data
- Qualification of the data using appropriate qualifier flags, as necessary, to reflect data usability limitations
- Initiation of corrective actions, as necessary, based on the data review findings

Data validation will be patterned after the *Contract Laboratory National Functional Guidelines for Inorganic Data Review* (EPA, 2002) and *Contract Laboratory National Functional Guidelines for Organic Data Review* (EPA, 1999), substituting the calibration and QC requirements specified in this QAPP for those specified in the guidelines. The national functional guidelines will primarily be used as a guidance document for the application of data qualification criteria. The level of validation will be defined in the SAP or QAPP addendum.

The flagging criteria presented in Tables 6-2 and 6-3 will be used; the qualifier flags are defined in Table 6-4. Qualifier flags, if required, will be applied to the electronic sample results. A summary table of the data qualifications will be provided in the validation report. If multiple flags are required for a result, the most severe flag will be applied to the electronic result. The hierarchy of flags, from the most severe to the least severe, will be as follows: R, UJ, U, J.

A validation report will be generated for each method and sample delivery group. A copy of the validation report will be retained with the data package in the project chemistry file. The project chemist will be notified of any significant data quality problems.

TABLE 6-1A
Data Guidelines for Electronic Data Deliverables
PG&E Program Quality Assurance Project Plan

Field Number	Field Name	Data Type	Data Length	Requirement	Valid Values[a]	Description and Comments
1	VersionCode	Text	15	R	Yes	Code identifying the version of the EDD deliverable.
2	LabName	Text	10	R	Yes	Identification code for the laboratory performing the work. This value is used to distinguish between different facilities.
3	SDG	Text	15	R	No	Sample delivery group designation; always populated for all samples, including QC.
4	FieldID	Text	30	R	No	Client sample ID as appears on CoC forms with optional laboratory-assigned suffixes or prefixes to make it unique. If the sample ID on the CoC form and the prefix or suffix is more than 20 characters, abbreviate the value but make it unique. For laboratory QC samples (e.g., method blanks and laboratory control samples), use a unique laboratory sample ID.
5	NativeID	Text	30	R	No	Client sample ID, **exactly** as on CoC forms. **No prefix or suffix allowed** in client sample IDs. Used to identify the native sample from which other samples are derived (e.g., QAQCType = LR, MS, or SD). For laboratory QC samples (i.e., method blanks and laboratory control samples), use the FieldID value that was assigned. However, for laboratory blank spike duplicate samples, use the FieldID value that was assigned to the associated laboratory blank spike sample.
6	QAQCType	Text	2	R	Yes	The code for the sample type. Any field sample that is not used as laboratory QC and is not otherwise marked on the CoC forms should have the designation of “N” (normal field sample). No suffix allowed (i.e., do not add numbers as suffixes to the QAQCType values as called for in the ERPIMS guidelines). If all analyses for a given sample are diluted, the first dilution should be designated as the normal sample. If more dilutions are required, the next dilution should be designated as the first true dilution with a QAQCType value of “LR” and a LRType value of “DL” (see LRType,).

TABLE 6-1A
Data Guidelines for Electronic Data Deliverables
PG&E Program Quality Assurance Project Plan

Field Number	Field Name	Data Type	Data Length	Requirement	Valid Values[a]	Description and Comments
7	LRType	Text	3	C	Yes	This is the code for laboratory replicate sample type. Values are as follows: • Blank (if QAQCType value is not LR) • DL (dilution) • RE (re-analysis) • D (inorganic duplicate) • CF (confirmation) For multiple dilutions or reanalyses of the same sample, append the replicate number after the LRType value (e.g., RE, RE2, and RE3).
8	Matrix	Text	5	R	Yes	Sample matrix code. Valid values are as follows: “AIR”, “WATER”, or “SOIL” unless otherwise provided by the project data manager and marked on CoC forms. The use of other terms (e.g., “liquid” or “solid”) for laboratory QC is not allowed.
9	LabSampleID	Text	12	R	No	Laboratory sample ID assigned by the laboratory. Prefix or suffix is allowed. Dilutions or re-extractions are noted here. For example, “D97-11111RE” is acceptable.
10	AnalysisMethod	Text	20	R	Yes	Analysis method code. This is the ID of the analytical method performed on the sample. For example, “SW8260A.” Generic names such as “EPA” should not be used.
11	ExtractionMethod	Text	20	R	Yes	Preparation method code. A value in this field is required. If the preparation is described in the method, use “METHOD”. If there is no separate preparation required, use “NONE”. Total and dissolved metal analyses are differentiated by the value in this column. Total, TCLP, and SPLP analyses are differentiated by the value in the LeachMethod column (see below).
12	SampleDate	Date		C	No	Date of sample collection. A value is required for all samples sent to the laboratory and samples derived from those samples. Format = mm/dd/yyyy.
13	SampleTime	Time		C	No	Time of sample collection. A value is required for all samples sent to the laboratory and samples derived from those samples. Twenty-four-hour format (hh:mm).
14	ReceiveDate	Date		C	No	Date of sample receipt in the laboratory. A value is required for all samples sent to the laboratory and samples derived from those samples. Format = mm/dd/yyyy.

TABLE 6-1A
Data Guidelines for Electronic Data Deliverables
PG&E Program Quality Assurance Project Plan

Field Number	Field Name	Data Type	Data Length	Requirement	Valid Values[a]	Description and Comments
15	ExtractDate	Date		C	No	Date of sample preparation (extraction or digestion). A value is required if the ExtractionMethod field value is other than “NONE”. Format = mm/dd/yyyy
16	ExtractTime	Time		C	No	Time of sample preparation. A value is required if the ExtractionMethod field value is other than “NONE”. Twenty-four-hour format (hh:mm).
17	AnalysisDate	Date		R	No	Date of sample analysis. A value is required for all records. Format = mm/dd/yyyy
18	AnalysisTime	Time		R	No	Time of sample analysis. A value is required for all records. Twenty-four-hour format (hh:mm).
19	PercentSolids	Number		R	No	Percent solids within the sample; should be zero for water samples.
20	LabLotCtlNum	Text	10	C	No	ID for an autonomous group of environmental samples and associated QC samples prepared together. For example, the value can be a digestion or extraction batch ID. If there is no separate extraction or preparation performed, the field is left blank.
21	CAS	Text	20	R	No	CAS registry number of analyte, if available.
22	ParamID	Text	12	R	Yes	Parameter ID code for the parameter listed in the Analyte field.
23	Analyte	Text	60	R	No	Name of analyte, chemical name.
24	Result	Text	10	R	No	Result of the analysis. Surrogate analytes are reported in units of percent. All others are reported in sample concentration units. If undetected, report the adjusted MDL or adjusted RL, depending on the project. (Reported as a text field to preserve significant figures.)
25	ExpectedValue	Number		C	No	Report “100” for surrogates; report “0” for blanks; spike level plus parent result for LCS, and MS/MSD; parent value for laboratory duplicate.
26	Units	Text	10	R	Yes	Units of measure used in the analysis. Report “PERCENT” for surrogate analytes; report concentration units for all others.
27	Dilution	Number		R	No	Total dilution reported in the analysis. Default value is “1”. This value reflects changes to sample preparation amounts as defined by the method (e.g., less sample used for standard VOC analysis).

TABLE 6-1A
Data Guidelines for Electronic Data Deliverables
PG&E Program Quality Assurance Project Plan

Field Number	Field Name	Data Type	Data Length	Requirement	Valid Values[a]	Description and Comments
28	MDL	Number		C	No	Minimum detection limit adjusted for preparation and dilution. This value may be the method detection limit or the instrument detection limit, depending on the method and the project requirements. This value is **not** adjusted for percent moisture.
29	RL	Number		C	No	Reporting limit adjusted for preparation and dilution. Value is **not** adjusted for percent moisture. Equivalent to PQL.
30	LabQualifier	Text	6	R	No	Laboratory qualifier for the results, as reported on the hardcopy. Use "=" as first (or only) qualifier value for detected results if there are no other qualifiers for the result.
31	Surrogate	Text	1	R	Yes	If the chemical is a surrogate = Y; if not = N.
32	Comments	Text	240	O	No	Comment field.
33	ParValUncert	Text	16	C	No	Radiological parameter value uncertainty.
34	Recovery	Number		C	No	Percent recovery for MS, SD, LCS, LCSD, and surrogate compounds.
35	LowerControlLimit	Number		C	No	Lower control limit value for spiked compounds, expressed in units of percent. A value in this field is required if there is a value in the Recovery field (Field 34).
36	UpperControlLimit	Number		C	No	Upper control limit value for spiked compounds, expressed in units of percent. A value in this field is required if there is a value in the Recovery field (Field 34).
37	Basis	Text	1	R	Yes	Weight basis for soil (or solid) sample analysis; D = dry-weight basis, W = wet-weight basis, and X = not applicable.
38	ConcQual	Text	1	R	Yes	Concentration qualifier. Use "=" for detects, "J" for estimated value (value between detection limit and reporting limit), "U" for undetected result, and "E" for exceeded result.
39	MDLAdjusted	Number		C	No	Minimum detection limit adjusted for preparation, dilution **and percent moisture**. See the description of the MDL field (Field 28) for an explanation of the contents of this field.
40	RLAdjusted	Number		C	No	Reporting limit adjusted for preparation, dilution **and percent moisture**. Equivalent to PQL

TABLE 6-1A
Data Guidelines for Electronic Data Deliverables
PG&E Program Quality Assurance Project Plan

Field Number	Field Name	Data Type	Data Length	Requirement	Valid Values[a]	Description and Comments
41	SampleDescription	Text	30	C	No	Full sample ID as it appears on CoC forms. In some cases, this may be the name of the sampling location instead of the sample. Required for all samples that are either collected in the field and specified on CoC forms, or derived from samples that are collected in the field and specified on COC forms.
42	LeachMethod	Text	20	R	Yes	Analytical method used for leaching the sample; applies to TCLP, SPLP, or other leaching or pre-extraction leaching procedures. Use “NONE” if the sample was not leached.
43	LeachDate	Date		C	No	Date that the leaching method was performed (use the start date for multidate leaching procedures). Value is required if the LeachMethod field value is other then “NONE”. Format = mm/dd/yyyy.
44	LeachTime	Time		C	No	Time that the leaching procedure started. Value is required if the LeachMethod field value is other then “NONE”. Twenty-four-hour format (hh:mm).
45	LeachLot	Text	10	C	No	ID of an autonomous group of environmental samples and associated QC samples **leached** at the same time. Value is required if the LeachMethod field value is other then “NONE”. If the sample was not leached, the field is left blank.
46	AnalysisLot	Text	10	R	No	ID of an autonomous group of environmental samples and associated QC samples **analyzed** together. A value in this field is required (i.e., it should not be blank).
47	CalRefID	Text	10	C	No	ID of a group of environmental and QC samples linked by a common set of calibration records. All results with the same CalRefID value will have had the same initial calibration run.

[a] For a list of valid values see Table 6-1B.

Notes:

The EDD file from the laboratory will be a comma-delimited ASCII file in the format listed above. There will be one EDD file per hardcopy report and the filename of the EDD file will be in the format REPORTID.csv, where REPORTID is the hardcopy report ID of sample delivery group.

C = Conditionally Required
EPRIMS = Environmental Restoration Program Information Management System
R = Required
STLC = soluble threshold limit concentration
TCLP = toxicity characteristic leaching procedure

TABLE 6-1B
Data Guidelines for Electronic Data Deliverables
PG&E Program Quality Assurance Project Plan

Field Name	Valid Values	Meaning
VersionCode	4.20AFCEE3	Format 4.20, AFCEE data values. LabQualifier field contains the laboratory qualifier values defined in the AFCEE QAPP, Version 3.0.
VersionCode	4.20EPACLP	Format 4.20, EPA data values. LabQualifier field contains the standard EPA CLP laboratory qualifiers.
QAQCType	N	Normal, environmental sample
QAQCType	LB	Laboratory method blank
QAQCType	MS	Laboratory matrix spike sample
QAQCType	SD	Laboratory matrix spike duplicate
QAQCType	LR	Laboratory replicate (dilution, re-analysis, duplicate)
QAQCType	BS	Laboratory method blank spike
QAQCType	BD	Laboratory method blank spike duplicate
LRType	DL	First dilution sample
LRType	DL2	Second dilution sample
LRType	DL3	Third dilution sample
LRType	RE	First re-analysis/re-extraction sample
LRType	RE2	Second re-analysis/re-extraction sample
LRType	RE3	Third re-analysis/re-extraction sample
LRType	D	Inorganic duplicate sample
LRType	CF	First confirmation analysis sample
LRType	CF2	Second confirmation analysis sample
LRType	CF3	Third confirmation analysis sample
AnalysisMethod	SW8260A	Volatiles by method 8260A in EPA SW846.
AnalysisMethod	SW8270	Semivolatiles by method 8270 in EPA SW846.
AnalysisMethod	SW6010	ICP metals by method 6010 in EPA SW846.
AnalysisMethod	SW7060	GFAA arsenic by method 7060 in EPA SW846.
ExtractionMethod	FLDFLT	Field filtration for dissolved metals analysis
ExtractionMethod	C3050	CLP-modified SW3050 acid digestion for metals analysis in soil samples.
ExtractionMethod	SW1311	TCLP extraction
ExtractionMethod	DISWAT	Distilled water extraction for analytes in soil samples.
ExtractionMethod	SW3510	Separatory funnel extraction
ExtractionMethod	SW3540	Soxhlet extraction
ExtractionMethod	TOTAL	Digestion of unfiltered waters for total metals analysis

TABLE 6-1B
Data Guidelines for Electronic Data Deliverables
PG&E Program Quality Assurance Project Plan

Field Name	Valid Values	Meaning
ParamID	ACE	Acetone
ParamID	AS	Arsenic
ParamID	BHCGAMMA	gamma-BHC (Lindane)
ParamID	BZ	Benzene
ParamID	CDS	Carbon disulfide
ParamID	PB	Lead
ParamID	PHENOL	Phenol
ParamID	SE	Selenium
ParamID	TCE	Trichloroethene

TABLE 6-2
Flagging Conventions for Organic Methods
PG&E Program Quality Assurance Project Plan

Quality Control Check	Evaluation	Flag	Samples Affected
Holding Time	Holding time exceeded for extraction or analysis	J = positive results; UJ = nondetects	Sample
	Holding time exceeded by a factor of two	J = positive results; R = nondetects	
Sample Preservation SW8260B	Sample not preserved	J = positive results; UJ = nondetects	Sample
Sample Integrity SW8260B	Bubbles in VOA vial used for analysis	J = positive hits; UJ = nondetects	Sample
Temperature	>6°C	J = positive results; UJ = nondetects	All samples in same cooler
ICAL	RRF <0.050, <0.010 for poor responders (SW8260B and SW8270C)	J = positive results, R = nondetects	All associated samples in analysis batch
	%RSD >20.0% (SW8260B and SW8270C), or >20% (SW8015B, SW8081A, SW8082, and SW8151A), **AND** calibration curve not used; **OR** calibration curve used, but with coefficient of correlation or determination <0.99	J = positive results, UJ = nondetects	
Calibration Verification (second-source and continuing calibration verification)	RRF <0.050, <0.010 for poor responders (SW8260B and SW8270C)	J = positive results, R = nondetects	All associated samples in analysis batch
	%D >25.0% (SW8260B and SW8270C) or >15% (SW8015B, SW8081A, SW8082, SW8151A	J = positive results, UJ = nondetects	
Laboratory Control Sample	%R >UT	J = positive results	All samples in preparation batch
	%R LT	J = positive results, UJ = nondetects	
	%R <10%	J = positive results; R = nondetects	
Calibration Blank Method Blank	Convert blank concentration to soil units, if applicable; multiply the highest blank concentration by five	U = positive sample results <5x highest blank concentration	All samples in preparation batch or analytical batch, whichever one applies, associated with method blank or calibration blank
Equipment Blank Field Blank Ambient Blank			All samples, same site, matrix and date (water) or all samples, same site, matrix (soil) associated with equipment blank
Trip Blank			All samples shipped in the same cooler as the trip blank

TABLE 6-2
Flagging Conventions for Organic Methods
PG&E Program Quality Assurance Project Plan

Quality Control Check	Evaluation	Flag	Samples Affected
MS/MSD			
%R	%R >UT	J = positive results	MS analytes in parent sample and field duplicate, if any.
	%R <LT	J = positive results; UJ = nondetects	
	%R <10%	J = positive results; R = nondetects	
RPDs	RPD >UT	J = positive results	MS analytes in parent sample and field duplicate, if any.
Surrogates			
SW8260B; SW8015B; SW8015B SW8081 SW8082; SW8151A; SW8310, SW8270CSIM	%R >UT	J = positive results	All analytes in sample
	%R <LT and none <10%	J = positive results; UJ = nondetects	
	%R <10%	J = positive results; R = nondetects	
SW8270C	2 or more surrogates in same fraction with %R >UT	J = positive results	All analytes in same fraction in sample
	2 or more surrogates in same fraction with %R <LT but not <10%	J = positive results; UJ = nondetects	
	2 or more surrogates in same fraction with %R <LT and <10%	J = positive results; R = nondetects	
Internal Standards (SW8260B; SW8270C, SW8270CSIM)	Area >UT	J = positive results	Associated analytes in sample
	Area <LT but not <10%	J = positive results; UJ = nondetects	
	Area <10%	J = positive results; R = nondetects	
Field Duplicates	Concentration of reported analytes are >5 times the RL in either sample and RPD >UT (30% for water samples; 50% for soil samples)	J = positive results	Field duplicate pair
	One or both sample results <5 times the RL and a difference of ±2 times the RL for water (±4 times for soil).	J = positive; UJ = nondetect	

TABLE 6-2
Flagging Conventions for Organic Methods
PG&E Program Quality Assurance Project Plan

Quality Control Check	Evaluation	Flag	Samples Affected
Confirmation (SW8015B; SW8021B,SW8081A; SW8151A;)	RPD between primary and confirmation results > 25%	J = positive results	Sample

Notes:

All QA/QC criteria are included in Tables 5-16 through 5-27 and will be used for validation criteria.

Organic methods include SW8015B, SW8081A, SW8082, SW8151A, SW8260B, SW8270C, and SW8270C SIM.

Spike recovery limits do not apply when sample concentration exceeds the spike concentration by a factor of four or more.

For methods requiring confirmation, the qualifications apply to primary analysis results (either of the two columns/detectors may be designated as the primary column/detector).

Where one MS recovery meets acceptance criteria and the other MS of the pair does not, professional judgment may be used to determine if the parent sample should be qualified for matrix effects by comparing the MS recoveries to other QC results within the batch or sample site.

Qualifier may not apply in cases where a surrogate coelutes with a nontarget analyte.

Qualifier may not apply in cases where low surrogate recoveries are due to sample dilution.

< = less than
> = greater than
%R = percent recovery
LT = lower tolerance
UT = upper tolerance

TABLE 6-3
Flagging Conventions – Minimum Data Evaluation Criteria for Inorganic Methods
PG&E Program Quality Assurance Project Plan

Quality Control Check	Evaluation	Flag	Samples Affected
Holding Time	Holding time exceeded for extraction, digestion, or analysis	J = positive results; R = nondetects for mercury; UJ = nondetects for all other analytes	Sample
	Holding time for digestion or analysis exceeded by a factor of two	J = positive results; R = nondetects	
Sample Preservation	Sample preservation requirements not met (If sample preservation was not done in the field, but was performed at the laboratory upon sample receipt, no flagging is required)	J = positive results; R = nondetects	Sample
Temperature	>6°C (not applicable to metals except mercury)	J = positive results; UJ = nondetects	Samples in same cooler
ICAL (Multipoint only)	Correlation coefficient ≤0.995	J = positive; UJ = nondetects	All associated samples in analytical batch
Calibration verification (ICAL verification, continuing calibration verification)	%R >UT	J = positive results	All associated samples in analytical batch
	%R <LT	J = positive results, UJ = nondetects	
Interference check sample (SW6010B/SW6020 only)	%R >UT	J = positive results	All associated samples in analytical batch
	%R <LT	J = positive results; UJ = nondetects	
Laboratory Control Sample	%R >UT	J = positive results	All samples in preparation batch
	%R <LT	J = positive results; UJ = nondetects	
	%R <10%	J = positive results; R = nondetects	
Calibration Blank (ICB,CCB) Method Blank	Multiply the highest blank concentration by five	U = positive sample results <5x highest blank concentration	All samples in preparation batch or analytical batch, whichever one applies, associated with method blank or calibration blank
Equipment Blank			All samples, same site, matrix and date
MS/MSD	%R >UT	J = positive results	MS analytes in parent sample and field duplicate
	%R <LT	J = positive results; UJ = nondetects	
	%R <10%	J = positive results; R = nondetects	
	RPD >UT	J = positive results	

TABLE 6-3
Flagging Conventions – Minimum Data Evaluation Criteria for Inorganic Methods
PG&E Program Quality Assurance Project Plan

Quality Control Check	Evaluation	Flag	Samples Affected
MS Dilute and Spike for hexavalent chromium by Methods SW7199 or EPA218.6 (see Section 5.3.3.1)	Spike recovery 85-115% and peak within recovery time window. If criteria are not met, the laboratory is required to dilute two aliquots 1:5, spike one with 1 μg/L of hexavalent chromium and analyze the other unspiked. Continue the aforementioned procedure using successively greater dilutions of two aliquots until recovery time and recovery criteria are met.	Choose the dilution where the RT/recovery criteria are met. If RT/recovery criteria are met at a 1:1 dilution, data qualification is not required for detected or nondetected results. If RT/recovery criteria met at dilution greater than a 1:1, elevate the RL for nondetected results and qualify the data U at a level equal to the RL multiplied by the dilution factor of the acceptable analysis (apply ValAdj validation reason). If RT/recovery criteria are not met: a) Analysis performed only at a 1:1 dilution: J positive results (apply LabA&P validation reason) UJ or R nondetects determined in conjunction with Project Chemist (apply LabA&P validation reason) b) Analysis performed at subsequent dilutions and criteria are still not met: J flag positive apply LabA&P validation reason) Elevate RL - UJ or R nondetects, determined in conjunction with project chemist (apply LabA&P validation reason)	Sample
Dilution Test	If concentration is >25 times the RL and percent difference >UT	J = positive results UJ = nondetects	Analytes in parent sample if analytical spike not performed
Postdigestion Spikes/Recovery Test (Metals only)	Spike results indicate performance of MSA required, but MSA not done.		All samples in digestion batch if MSA not performed
	%R >UT	J = positive	
	%R <LT	J = positive results, UJ = nondetects	

TABLE 6-3
Flagging Conventions – Minimum Data Evaluation Criteria for Inorganic Methods
PG&E Program Quality Assurance Project Plan

Quality Control Check	Evaluation	Flag	Samples Affected
MSA (GFAA only) for samples where postdigestion spike (performed as a result of unacceptable serial dilution) fails	r <0.995	J = positive results	Sample
Field Duplicates Laboratory Sample Duplicates	Concentration of reported analytes are >5 times the RL in either sample and RPD >20%	J = positive results	Field duplicate pair
	One or both sample results <5 times the RL and a difference of ±2 times the RL	J = positive results; UJ = nondetects	

Notes:

< = less than
> = greater than

All QA/QC criteria are included in Tables 5-16 through 5-27 and will be used for validation criteria.

Spike recovery limits do not apply when sample concentration exceeds the spike concentration by a factor of four or more.

CCB = continuing calibration blank
ICB = Initial calibration blank
LabA&P = laboratory accuracy and precision criteria not met
LT = lower tolerance
MSA = method of standard addition
UT = upper tolerance
ValAdj = Value reported by laboratory adjusted because of matrix issues.

TABLE 6-4
Qualifier Flag Definitions
PG&E Program Quality Assurance Project Plan

Flag	Definition
J	Analyte was present but reported value may not be accurate or precise.
R	The result has been rejected.
U	Analyte was analyzed for but not detected at the specified detection limit.
UJ	Analyte was not detected above the detection limit objective; however, the reported detection limit is approximate and might not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

SECTION 7

Performance Evaluations

To assess sample and data collection procedures, performance evaluations will be conducted that include of technical systems audits and performance audits.

7.1 Technical Systems Audits

7.1.1 Laboratory Audits

The laboratories participating in the data collection effort will be prequalified by the project management teams. A surveillance audit program that requires routine technical system audits will be instituted. Laboratory prequalification and the surveillance audits may also be undertaken by regulatory agencies. Laboratory prequalification audits may be performed as onsite audits, desk audits, or a combination of both, depending on the scale and sensitivity of the project.

7.1.1.1 Onsite Laboratory Prequalification Audit

An onsite laboratory prequalification audit in conjunction with a desk audit (see Section 7.1.1.2) is the preferred audit when using a new laboratory. The onsite laboratory audit will start with a pre-audit meeting during which the auditor will discuss with the laboratory staff the purpose of the audit, the schedule and areas to be audited, and the procedures that will be followed. The meeting may include a brief tour of the laboratory. The audit will then be conducted. The auditor will assemble the findings at the conclusion of the audit and discuss the findings with laboratory staff.

Critical items that will be addressed in a technical system audit include the following:

- Calibration procedures and documentation
- Treatment and handling of standards
- Completeness of data forms, notebooks, and other reporting requirements
- Data review and verification procedures
- Data storage, filing, and recordkeeping procedures
- Sample custody procedures
- QC procedures, tolerances, and documentation
- Operating conditions of facilities and equipment
- Documentation of staff training and instrument maintenance activities
- Systems and operations overview

A written audit report will be sent to the laboratory within a specified time. A copy of the audit report will be sent to the project manager, and a copy will be retained in the project files.

The need for follow-up action will be determined based on the laboratory's responses. If an audit identifies an unacceptable condition or unacceptable data, the laboratory will be responsible for developing and initiating corrective action to resolve the situation. The project manager will be notified if the nonconformance impacts the project and requires resources not normally available to the project team. In such cases, the project manager will decide whether resources to pursue corrective action will be made available. Disposition may include the following:

- Reanalysis of samples if holding time has not expired
- Resampling and analysis
- Amending analytical procedures
- Acceptance of suspect data, acknowledging the limits on usability

7.1.1.2 Desk Prequalification Audit

In part, a prequalification audit is performed to provide a perspective of the laboratory operations and the internal auditing and data review processes. Noncritical samples, split samples, or performance evaluation samples will be sent to the laboratory as part of the prequalification audit to ascertain the laboratory's ability to produce quality data. Generally, this process starts by sending guidance documents (e.g., QAPP, SAP, and SOW) to the laboratory for review. After a review and confirmation, the laboratory will follow the guidance documents to the best of their ability and to the project chemist's satisfaction. The auditor will request copies of accreditation audits (e.g., ELAP, NELAP, or AFCEE), SOPs, an example data package, and the laboratory's quality assurance manual. After a review of the laboratory's documentation (including instrument output, analytical reports, and other documentation specific to a batch of samples), samples can be sent to the laboratory. The data will be validated by using the Level 4 protocol described in Section 6.3 and reviewing the laboratories QC documentation. The corrective actions described in Section 7.1.1.1 may also apply.

7.1.2 Field Audits

Field audits will be performed annually to verify the performance of field procedures. The audit will evaluate the following:

- Sample containers and preservatives
- Sample collection and identification procedures
- Sample custody, handling, and shipping procedures
- Equipment decontamination procedures
- Calibration of field instruments and performance of field tests
- Documentation of field activities, maintenance of field records, and document control

7.2 Performance Audits

7.2.1 Performance Evaluations

Laboratories are required to participate in a performance testing program, in accordance with the California ELAP. Any method or analyte failure in a performance evaluation that affects the certification status of the laboratory with the National Environmental Laboratory Accreditation Program or the state of California must be immediately communicated to the program chemist.

7.2.2 External Audits

Announced and unannounced audits of the field operations and laboratories may be conducted during any stage of the project.

7.2.3 Internal Audits

Annual audits of the laboratory shall be conducted by the laboratory's quality assurance officer. The audits shall verify, at a minimum, that written SOPs are being followed; standards are traceable to certified sources; documentation is complete; data review is being done effectively and is properly documented; and data reporting, including electronic and manual data transfer, is accurate and complete. All audit findings shall be documented in QA reports to management. Necessary corrective actions shall be taken within a reasonable timeframe. The quality assurance office shall verify that such actions are effective and complete and document their implementation in an audit closeout report to management.

SECTION 8

Preventive Maintenance

The primary objective of preventive maintenance is to promote the timely and effective completion of a data collection effort. The maintenance program should be designed to minimize the downtime of crucial sampling and analytical equipment caused by component failures. The maintenance program should establish the following:

- Maintenance responsibilities
- Maintenance schedules
- An adequate inventory of critical spare parts and equipment

8.1 Maintenance Responsibilities

Laboratory instrument maintenance is the responsibility of the participating laboratory. Generally, the laboratory manager or supervisor is responsible for the instruments in their work areas; they will establish maintenance procedures and schedules for each instrument. Laboratories should maintain service agreements with instrument manufacturers or a reputable service company to minimize downtime if there is an instrument malfunction.

Maintenance responsibilities for field equipment are assigned to the field team leader for specific sampling tasks. However, the field team using the equipment is responsible for checking the status of the equipment prior to use and reporting any problems encountered. The field team is also responsible for ensuring that critical spare parts are included as part of the field equipment checklist. Nonoperational field equipment should be removed from service and a replacement obtained. All field instruments will be properly protected against inclement weather conditions during the field investigation.

8.2 Maintenance Schedules

The effectiveness of any maintenance program depends, to a large extent, on adherence to specific maintenance schedules for each piece of equipment. Nonroutine maintenance activities are conducted as needed. Manufacturers' recommendations should provide the primary basis for establishing maintenance schedules. Service contracts may be used to implement maintenance schedules.

Each analytical instrument should be assigned an instrument logbook; all maintenance activities for will be the documented instrument in the logbook. Logbooks should contain the following information:

- Date of service
- Person performing the service
- Type of service performed and the reason for service
- Replacement parts installed, if appropriate
- Date of next scheduled service
- Any other useful information

8.3 Spare Parts

An adequate inventory of spare parts is required to minimize equipment down time. The inventory will include the following:

- Parts and supplies that are subject to frequent failure
- Parts and supplies that have limited useful lifetimes
- Parts and supplies that cannot be obtained in a timely manner should failure occur

Field managers and laboratory managers are responsible for maintaining an adequate inventory of spare parts. In addition to spare parts and supply inventories, an in-house source of backup equipment and instrumentation should be available.

SECTION 9

Data Assessment

9.1 Data Quality Assessment

All data will be evaluated according to the QA acceptance criteria specified in Tables 5-16 through 5-27. Limitations regarding data usability will be assigned, if appropriate, in accordance with the validation process described in Section 7.

9.2 Reconciliation with Project Objectives

The program includes projects and sites with varying tasks and objectives. The procedure for data reconciliation will be a function of the project-specific objectives and will be addressed in the project-specific documents.

SECTION 10

Corrective Action

Corrective action may be required as a result of deviations from field or analytical procedures. Deficiencies identified in audits and data quality evaluations may also call for corrective action. All project personnel have the responsibility to identify, report, and solicit approval for corrective actions to resolve conditions that are adverse to data quality.

Tables 5-16 through 5-27 specify the corrective actions to be taken when deviations from calibration and QC acceptance criteria occur. Field and laboratory staff may encounter conditions requiring immediate corrective action that are not addressed in this QAPP, the SAPs, or QAPP addenda. These staff will document conditions and the results of corrective actions in a field logbook or laboratory nonconformance report and communicate their actions as soon as feasible to the appropriate people (field team leader, laboratory supervisor, project chemist, project manager, and if necessary, the program quality manager) for immediate input. A mechanism must be in place to allow for supervisory review or client input, or both, for all deviations or deficiencies. A corrective action reporting system that requires immediate documentation of deviations or deficiencies and for supervisory review of the actions taken to correct them will be established. At a minimum, the corrective action report should include the following information:

- The type of deviation or deficiency
- The date of occurrence
- The impact of the deviation or deficiency, such as samples affected
- The corrective action taken
- Documentation that the process has been returned to control

The only time that a corrective action report may be waived is when a deviation or deficiency is immediately corrected and its impact is precluded. An example would be an unacceptable ICAL that is repeated before samples are analyzed.

Each corrective action report must be reviewed and approved by a person of authority, such as the field team leader or laboratory supervisor. The ultimate responsibility for the laboratory corrective action process is the QC manager, who must ensure that proper documentation, approval, and close out of all out-of-control or nonconformance events is performed. A nonconformance report will summarize each nonconformance condition. Corrective action reports that could potentially affect data quality must be brought to the attention of the project chemist. Report disposition will be the responsibility of the project chemist. The project manager may be notified about a particular report at the project chemist's discretion. Copies of corrective action reports must be maintained in the laboratory or field project files.

SECTION 11

Quality Assurance Reports

Where specified in the SAP, work plan, or QAPP addendum, a QA report or data quality evaluation will be submitted by the project chemist to the project manager on a predetermined interval established in the SAP or QAPP addendum. The report will summarize the results of the data validation and the data assessment. The results should be presented in a manner that facilitates decision making. For example, temporal data may be more effectively presented if supplemented by a time plot. Any significant quality problems and recommended solutions should be included in the report. Limitations on data usability identified during data validation should be highlighted. Results of the data assessment should be reconciled with the project objectives.

SECTION 12

Data Management

Electronic data associated with CH2M Hill projects will be used to generate validation reports, risk assessment calculations, modeling results, data summary tables, maps, and other figures. The data management program will follow CH2M HILL standard procedures for environmental data collection. All environmental data collected for the PG&E Program will follow the policies, procedures, and protocols as required in the *PG&E Program Data Management Plan* (CH2M HILL, 2004a). Other consultants or contractors may use other electronic data management programs, which will be described in the SAP or QAPP addendum. However, any system used must be capable of storing and managing the information listed in the *PG&E Program Data Management Plan* (CH2M HILL, 2004a) or its revision. The CH2M Hill plan provides data users with the following:

- Simple procedures to get rapid access to stored data
- Data entry methods of known accuracy and efficiency
- Well-documented validation procedures for electronic databases
- Sampling data management using unique sample IDs
- A sampling inventory of newly collected data and methods of sample inventory reconciliation
- Sample-specific attributes, including location IDs, sample type and media, and sample date
- Reporting and delivery formats to support data analysis and reduction

12.1 Archiving

Hardcopy and electronic versions will be archived in project files and on electronic archive tapes for the duration of the project, as specified in contractual agreements, or for a minimum of 5 years. All electronic data will be subject to routine back-up until it is archived for long-term retention.

12.2 Data Flow and Transfer

The data flow from the laboratory and field to the project staff and data users will be sufficiently documented to ensure that data are properly tracked, reviewed, and validated.

12.3 Record Keeping

In addition to the data management procedures for analytical data provided in Section 6.1, the laboratory will maintain electronic and hardcopy records sufficient to re-create each analytical event. At a minimum, laboratory will maintain the following records:

- Raw data, including instrument printouts, bench work sheets, and chromatograms, with compound identification and quantitation reports
- Laboratory-specific, written SOPs for each analytical method and QA/QC function implemental during the analysis of project samples

Record keeping requirements for non-analytical data are included in the *PG&E Program Data Management Plan* (CH2M HILL, 2004a).

SECTION 13

References

Air Force Center for Environmental Excellence (AFCEE) (now the Air Force Center for Engineering and the Environment). 2006. *AFCEE Model Quality Assurance Project Plan.* Version 4.0.02 May.

CH2M HILL. 2004a. *PG&E Program Data Management Plan*. November.

CH2M HILL. 2004b. *PG&E Quality Assurance Project Plan*. June.

CH2M HILL. 2005. *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program*. March.

U.S. Environmental Protection Agency (EPA). 2002. *Contract Laboratory National Functional Guidelines for Inorganic Data Review*.

U.S. Environmental Protection Agency (EPA). 2000. *EPA Guidance for the Data Quality Objective Process*. EPA QA/G-4. EPA/600/R-96/055. August.

U.S. Environmental Protection Agency (EPA). 1999. *Contract Laboratory Program National Functional Guidelines for Organic Data Review*. October.

U.S. Environmental Protection Agency (EPA). 1996. *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, SW-846, 3rd Edition, Update III, Section 1.*

U.S. Environmental Protection Agency (EPA). 1995. “Good Laboratory Practices” in *Principles and Guidance to Regulations for Ensuring Data Integrity in Automated Laboratory Operations*.

Addenda

Addendum to the PG&E Program Quality Assurance Project Plan for Dioxins and Furans

Prepared for

Pacific Gas and Electric Company

January 2010

CH2MHILL
155 Grand Ave. Suite 1000
Oakland, CA 94612

1.0 Introduction

This Addendum to the *PG&E Program Quality Assurance Project Plan* (QAPP) (CH2M HILL, 2008) has been prepared to address relevant variations that may be encountered with the dioxin and furans data for the Topock compressor station that are not specifically addressed in the QAPP or SW-846 Method 8290. Laboratories will be required to adhere to the QAPP and then use the specific information outlined within this QAPP Addendum to supersede the QAPP and method information.

2.0 Project Organization and Responsibility

2.1 Project/Task Organization

TABLE 2-1
Project Staff
Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Title	Name/Address	Phone	Fax	Email
Topock Site Project Manager	Christina Hong 1000 Wilshire 21st Floor Los Angeles, CA 90017	213/228-8248		chong@ch2m.com
Project Chemist	Shawn Duffy 2525 Airpark Dr. Redding, CA 96001	530/229-3303	530/339-3303	sduffy@ch2m.com
Data Manager	Tuesdai Powers 155 Grand Ave, Suite 1000 Oakland, CA 94612	510/587-7595	510/622-9595	tpowers@ch2m.com
Health and Safety Manager	Rick Cavil 1737 North First Street Suite 300 San Jose, CA 95112	408/436-4909 ext. 429	408/436-482	rcavil@ch2m.com

3.0 Sampling Procedures

3.1 Sampling Design

The number and location of samples collected should be addressed in a work plan (WP) or sampling analysis plan (SAP). The WP or SAP should address or include a planned sample table, chain of custody forms, and other database-generated paperwork.

3.2 Field Sampling Procedures

Sample collection will follow the standard operating procedures (SOP) provided in the *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program* (CH2M HILL, 2005). Updated SOPs may be available, check with the project manager and the project chemist for the latest approved SOPs.

4.0 Data Quality Objectives and Quality Assurance Program

The data quality objectives for all projects are specified in the WPs. They are the basis for the design of the data collection plan, and as such, they specify the type, quality, and quantity of data to be collected, and how the data are to be used to make the appropriate decisions for the project. The final output of the process is a data collection design that meets the qualitative and quantitative needs of the project.

4.1 Analytical Requirements

This QAPP Addendum addresses analytical methods that were not addressed in the QAPP. Method, analyte, or quality control parameters specified in this QAPP Addendum that differ from the QAPP supersede the criteria in the QAPP as the QAPP supersedes the methods.

The following discussion is presented as a process to be used for the purposes of confirming low level detected results (as defined by the method).

Congeners with results that are less than 5 times the signal to noise, but are considered detects for the purpose of reporting (under the method protocols both as an estimated detection level [EDL] or an estimated maximum potential concentration [EMPC]) will be re-analyze for confirmation. To confirm the results, the existing extract will be re-analyzed and compared to the original result. (Re-analyze the associated blank if it contains a similar low-level detect.)

If the confirmation results are considered detects for the purpose of reporting (under the method protocols) the more conservative result (higher concentration) will be reported and the result will be qualified as estimated and flagged “J”.

If the confirmation results are not considered detects for the purpose of reporting (under the method protocols, EDL or EMPC) the results will be reported at the previously detected concentration and flagged “U”.

The laboratory will be required to record and summarize the results of the above deviation (from the SW8290 method) in the report case narrative.

Other calibration and QC criteria will follow the SW8290 method.

4.2 Data Validation

The validation for this QAPP addendum will follow the Level 3B designation from the QAPP and in accordance with National Functional Guidelines, *USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review, EPA-540-R-05-001*, September 2005 and will be performed by the project chemist and designees.

5.0 References

CH2M HILL. 2008. *PG&E Program Quality Assurance Project Plan, Rev 1*. December.

CH2M HILL. 2007. *Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part A and Part B*.

CH2M HILL. 2005. *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program*. March.

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Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Prepared for

Pacific Gas and Electric Company

Revision 0 (December 2008); Revision 1 (January 2010)

CH2MHILL
155 Grand Ave. Suite 1000
Oakland, CA 94612

1.0 Introduction

This addendum to the *PG&E Program Quality Assurance Project Plan* (QAPP) (CH2M HILL, 2008) has been prepared to address any variations (from the QAPP) associated with the RCRA facility investigation/remedial investigation (RFI/RI) of the Topock compressor station that are not included in the QAPP. Laboratories will be required to adhere to the QAPP and then use the specific information outlined within this addendum to supersede the QAPP information.

2.0 Project Organization and Responsibility

2.1 Project/Task Organization

TABLE 2-1
Project Staff
Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Title	Name/Address	Phone	Fax	Email
Topock Site Project Manager	Christina Hong 1000 Wilshire 21st Floor Los Angeles, CA 90017	213/228-8248		chong@ch2m.com
Task Manager/ Project Manager	Mike Cavaliere 155 Grand Ave, Suite 1000 Oakland, CA 94612	510/587-7753	510/622-9229	mcavalie@ch2m.com
Project Chemist	Shawn Duffy 2525 Airpark Dr. Redding, CA 96001	530/229-3303	530/339-3303	sduffy@ch2m.com
Data Manager	Tuesdai Powers 155 Grand Ave, Suite 1000 Oakland, CA 94612	510/587-7595	510/622-9595	tpowers@ch2m.com
Health and Safety Manager	Rick Cavil 1737 North First Street Suite 300 San Jose, CA 95112	408/436-4909 ext. 429	408/436-482	rcavil@ch2m.com

2.2 Certification Requirements

All laboratories participating in analytical services will be certified under the state of California, Department of Health Environmental Laboratory Accreditation Program where applicable. The laboratory managers will be responsible for ensuring that all personnel have been properly trained and are qualified to perform their assigned tasks.

3.0 Sampling Procedures

3.1 Sampling Design

The number and location of samples collected for the soil RFI are discussed in the Draft *RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part A and Part B* (CH2M HILL, 2007). The work plan also addresses the medium sampled, information about the sampling site, the type of data to be collected, and how the data are to be used. The soil RFI/FI projects have multiple large sampling events and will use the field database, a planned sample table, chain of custody forms, and other database-generated paperwork.

3.2 Field Sampling Procedures

Sample collection will follow the standard operating procedures (SOP) provided in the *Sampling, Analysis, and Field Procedures Manual, PG&E Topock Program* (CH2M HILL, 2005). Updated SOPs may be available, check with the assistant project manager and the project chemist for the latest approved SOPs.

4.0 Data Quality Objectives and Quality Assurance Program

The data quality objectives for the soil RFI/FI are specified in the WPs. They are the basis for the design of the data collection plan, and as such, they specify the type, quality, and quantity of data to be collected, and how the data are to be used to make the appropriate decisions for the project. The final output of the process is a data collection design that meets the qualitative and quantitative needs of the project. See Appendix A (Soil RFI Analyte Comparison Table) for additional screening level information used for decisions making.

4.1 Analytical Requirements

This QAPP addendum specifies project-specific analytes and analytical methods that differ from the QAPP. All method, analyte, or quality control parameters specified in this addendum that differ from the QAPP supersede the criteria in the QAPP as the QAPP supersedes the methods.

For purpose of reporting all analytes, with the exception of dioxins and furans (SW8290), that are not detected at or above the laboratory RL will be flagged “U” and reported as not detected at the RL.

For dioxins and furans (SW8290) congeners with results that are less than 5 times the signal to noise, but are considered detects for the purpose of reporting (under the method protocols) will be re-analyze for confirmation. To confirm the results the extract will be re-analyzed and compared to the original result. (Re-analyze the associated blank if it contains a similar low-level detect.)

If the confirmation results fall within an acceptance criteria of ± 50% RPD the more conservative result (higher concentration) will be reported.

If the confirmation results do not fall within the ± 50% RPD acceptance criteria and the result is less than the original result the congener will be flagged “U” and reported as non-detect at 5 times the signal to noise.

If the confirmation results do not fall within an acceptance criteria of ± 50% RPD and the result is higher than the original result – the project chemists will work with the laboratory to determine and correct the issue with the data.

The soil RFI/FI projects will use the Contract Laboratory Program (CLP) full list of metals (ILM05.3/ILM05.4 Target Compound List, 2007), pesticides, polychlorinated biphenyls (PCB), volatile organic compounds and semivolatile organic compounds (SOM01.2 Target Compound Lists, 2006) on 10 percent of the initial sampling for Part A and Part B. The remaining 90 percent of the initial sampling will use the method criteria as specified in the QAPP (Project Standard List, Table 4-1 through Table 4-7).

The analytes and analytical requirements are presented in the following tables.

4.2 Data Validation

The validation for this QAPP addendum will follow the Level 3B designation from the QAPP and will be performed by the project chemist and designees.

TABLE 4-1
Reporting Limits, Accuracy, and Precession Limits for General Chemistry
Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

					EPA Regional Screening Levels 2008				**LCS/MS/MSD Accuracy Control Limits (%R)**		
Method	**Constituent**	**CAS**	**Units**	**QAPP RL**	**Residential**	**Commercial**	**Most Stringent Screening Level**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
SW9012 or SW9014	Cyanide	57-12-5	mg/kg	0.25	1,600	20,000	1,600	No	*	*	30
WBLACK	Total organic carbon	TOC	mg/kg	50					75	125	35
SW9050	Specific conductance	Conductance	µmhos/cm	5					75	125	20
SW9045	pH	pH	pH units	0.1							20
SW1312	SPLP										
ASTM D 422[a]	Particle size										
ASTM D 4318	Atterberg Limits										
SM2540B/E160.3	Percent moisture	Moist	percent								20

*Use laboratory established QC limits – Approved by the Project Chemist

[a] Use ASTM D 421 preparation method

Notes:

SPLS extractions will use deionized water instead of the acidic extraction solution specified in the method, to better duplicate onsite conditions.

All soils sample results will be reported in dry weight unless otherwise specified in the sampling and analysis plan (SAP).

µmhos/cm = micromhos per centimeter
CAS = Chemical Abstract Service
LCS = laboratory control sample
mg/kg = milligrams per kilogram
MS = matrix spike
MSD = matrix spike duplicate
RL = reporting limit
RPD = relative percent difference

TABLE 4-2A
Reporting Limits, Accuracy, and Precession Limits for Metals – E200 Series, SW6000 Series, and SW7000 Series – Standard List (Title 22 List of Metals)
Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			DTSC CHHSL		**EPA Regional Screening Levels 2008**				**LCS Accuracy Control Limits (%R)**		**MS/MSD Accuracy Control Limits (%R)**		
Constituent	**CAS**	**QAPP RL (mg/kg)**	**Residential (mg/kg)**	**Commercial (mg/kg)**	**Residential (mg/kg)**	**Commercial (mg/kg)**	**Most Stringent Screening Level (mg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
Antimony	7440-36-0	2	30	380	31	410	30	No	85	115	75	125	20
Arsenic	7440-38-2	0.5	0.07	0.24	.39	1.6	0.07	Yes	85	115	75	125	20
Barium	7440-39-3	1	5,200	63,000	15,000	190,000	5,200	No	85	115	75	125	20
Beryllium	7440-41-7	0.5	150	1,700	160	2,000	150	No	85	115	75	125	20
Cadmium	7440-43-9	0.5	1.7	7.5	70	810	1.7	No	85	115	75	125	20
Chromium	7440-47-3	1	*	*	280	1400	280	No	85	115	75	125	20
Chromium, Hexavalent[a]	18540-29-9	0.4	17	37	39	200	17	No	80	120	75	125	20
Cobalt	7440-48-4	1	660	3,200	23	300	23	No	85	115	75	125	20
Copper	7440-50-8	1	3,000	38,000	3.100	41,000	3,000	No	85	115	75	125	20
Lead	7439-92-1	1	150	3,500	400	800	150	No	85	115	75	125	20
Mercury	7439-97-6	0.1	18	180	6.7	28	6.7	No	75	125	75	125	20
Molybdenum	7439-98-7	1	380	4,800	390	5,100	380	No	85	115	75	125	20
Nickel	7440-02-0	1	1,600	16,000	1,600	20,000	1,600	No	85	115	75	125	20
Selenium	7782-49-2	1	380	4,800	390	5,100	380	No	85	115	75	125	20
Silver	7440-22-4	1	380	4,800	390	5,100	380	No	85	115	75	125	20
Thallium	7440-28-0	2	5	63	5.1	66	5	No	85	115	75	125	20
Vanadium	7440-62-2	1	530	6,700	550	7,200	530	No	85	115	75	125	20
Zinc	7440-66-6	2	23,000	100,000	23,000	310,000	23,000	No	85	115	75	125	20

*CHHSL for Chromium (III), CAS 16065-83-1, 100,000 gm/kg for both Residential and commercial.

[a]Method SW3060A followed by SW7199

Notes:

CHHSL = California Human Health Screening Levels
DTSC = California Department of Toxic Substance Control

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-2B

Reporting Limits, Accuracy, and Precession Limits for Metals – E200 Series, SW6000 Series, and SW7000 Series – Additional CLP Parameters

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			DTSC CHHSL		EPA Regional Screening Levels 2008				LCS Accuracy Control Limits (%R)		MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (mg/kg)**	**Residential (mg/kg)**	**Commercial (mg/kg)**	**Residential (mg/kg)**	**Commercial (mg/kg)**	**Most Stringent Screening Level (mg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
Aluminum	7429-90-5	10			77,000	990.000	77,000	No	85	115	75	125	20
Calcium	7440-70-2	100							85	115	75	125	20
Iron	7439-89-6	10			55,000	720,000	55,000	No	85	115	75	125	20
Magnesium	7439-95-4	100							85	115	75	125	20
Manganese	7439-96-5	1			1,800	23,000	1,800	No	85	115	75	125	20
Potassium	7440-09-7	100							85	115	75	125	20
Sodium	7440-23-5	100							85	115	75	125	20
Cyanide	57-12-5	0.25			1,600	20,000	1,600	No	75	125	75	125	20

Notes:

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-3

Reporting Limits, Accuracy, and Precession Limits for Total Petroleum Hydrocarbons – SW8015B – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008			LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (mg/kg)**	**Residential (mg/kg)**	**Commercial (mg/kg)**	**Most Stringent Screening Level (mg/kg)**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
Motor Oil	TPH-motor oil	10				60	120	50
TPH-Diesel	TPH-diesel	10				51	153	50
TPH-Gasoline	TPH-gasoline	1				57	146	50

Note:

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-4A

Reporting Limits, Accuracy, and Precession Limits for Pesticides – SW8081A – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			DTSC CHHSL		EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
4,4'-DDD	72-54-8	4	2,300	9,000	2,000	7,200	2,300	No	50	139	50
4,4'-DDE	72-55-9	4	1,600	6,300	1,400	5,100	1,400	No	68	126	50
4,4'-DDT	50-29-3	4	1,600	6,300	1,700	7,000	1,600	No	46	135	50
Aldrin	309-00-2	4	33	130	29	100	29	No	47	120	50
Alpha-BHC	319-84-6	4			77	270	77	No	62	125	50
Alpha-Chlordane	5103-71-9	4	430	1,700	1,600	6,500	43	No	63	121	50
beta-BHC	319-85-7	4			320	1,300	320	No	62	127	50
Delta-BHC	319-86-8	4			77	270	77	No	57	130	50
Dieldrin	60-57-1	4	35	130	30	110	30	No	67	125	50
Endosulfan I	959-98-8	4			370,000	3,700,000	370,000	No	41	147	50
Endosulfan II	33213-65-9	4			370,000	3,700,000	370,000	No	37	141	50
Endosulfan sulfate	1031-07-8	4			370,000	3,700,000	370,000	No	62	135	50
Endrin	72-20-8	4	21,000	230,000	18,000	180,000	18,000	No	61	133	50
Endrin aldehyde	7421-93-4	4	21,000	230,000	18,000	180,000	18,000	No	37	147	50
gamma-BHC (lindane)	58-89-9	4	500	2,000	520	2,100	500	No	59	123	50
gamma-Chlordane	5103-74-2	4	430	1,700	1,600	6,500	43	No	48	124	50
Heptachlor	76-44-8	4	130	520	110	380	110	No	51	140	50
Heptachlor epoxide	1024-57-3	4			53	190	53	No	66	130	50
Methoxychlor	72-43-5	20	340,000	3,800,000	310,000	3,100,000	310,000	No	57	143	50
Toxaphene	8001-35-2	100	460	1,800	440	1,600	440	No	31	136	50

Notes:

DTSC CHHSL: residential or commercial

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

µg/kg = micrograms per kilogram

TABLE 4-4B

Reporting Limits, Accuracy, and Precession Limits for Pesticides – SW8081A – Additional CLP Parameters

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Constituent	CAS	QAPP RL (µg/kg)	DTSC CHHSL Residential (µg/kg)	DTSC CHHSL Commercial (µg/kg)	EPA Regional Screening Levels 2008 Residential (µg/kg)	EPA Regional Screening Levels 2008 Commercial (µg/kg)	Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Endrin ketone	53494-70-5	4	21,000	230,000	18,000	180,000	18,000	No	*	*	50

*Use laboratory established QC limits – Approved by the Project Chemist

Notes:

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE4-5A

Reporting Limits, Accuracy, and Precession Limits for PCBs – SW8082 – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008 Residential (µg/kg)	EPA Regional Screening Levels 2008 Commercial (µg/kg)	Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Aroclor-1016	12674-11-2	50	3,900	21,000	3,900	No	41	138	50
Aroclor-1221	11104-28-2	50	170	620	170	No	45	136	50
Aroclor-1232	11141-16-5	50	170	620	170	No	45	136	50
Aroclor-1242	53469-21-9	50	220	740	220	No	43	150	50
Aroclor-1248	12672-29-6	50	220	740	220	No	44	136	50
Aroclor-1254	11097-69-1	50	220	740	220	No	41	141	50
Aroclor-1260	11096-82-5	50	220	740	220	No	61	131	50

Notes:

DTSC CHHSL: Residential – Total PCB 89 (µg/kg)

DTSC CHHSL: Commercial – Total PCB 300 (µg/kg)

LCS, MS, and MSD only require Aroclor-1016 and Aroclor-1260 spikes

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE4-5B

Reporting Limits, Accuracy, and Precession Limits for PCBs – SW8082 – Additional CLP Parameters

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008		Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
			Residential (µg/kg)	**Commercial (µg/kg)**			**Lower Limit**	**Upper Limit**	
Aroclor-1262	37324-23-5	50	220	740	220	No	41	150	50
Aroclor-1268	11100-14-4	50	220	740	220	No	41	150	50

Notes:

LCS, MS, and MSD only require Aroclor-1016 and Aroclor-1260 spikes

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-6A

Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008		Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
			Residential (µg/kg)	**Commercial (µg/kg)**			**Lower Limit**	**Upper Limit**	
1,1,1,2-Tetrachloroethane	630-20-6	5	2,000	9,800	2,000	No	74	125	30
1,1,1-Trichloroethane (TCA)	71-55-6	5	9,000,000	39,000,000	9,000,000	No	68	130	30
1,1,2,2-Tetrachloroethane	79-34-5	5	590	2,900	590	No	59	140	30
1,1,2-Trichloroethane	79-00-5	5	1,100	5,500	1,100	No	62	127	30
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	5	43,000,000	180,000,000	43,000,000	No	65	135	30
1,1-Dichloroethane	75-34-3	5	3,400	17,000	3,400	No	73	125	30
1,1-Dichloroethene or 1,1-Dichloroethylene	75-35-4	5	250,000	1,100,000	250,000	No	65	136	30
1,1-Dichloropropene	563-58-6	5					70	135	30
1,2,3-Trichlorobenzene	87-61-6	5					62	133	30

TABLE 4-6A

Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
1,2,3-Trichloropropane	96-18-4	5	91	410	91	No	63	130	30
1,2,4-Trichlorobenzene	120-82-1	5	87,000	400,000	87,000	No	65	131	30
1,2,4-Trimethylbenzene	95-63-6	6	67,000	280,000	67,000	No	65	135	30
1,2-Dibromo-3-chloropropane	96-12-8	5	5.6	73	5.6	No	49	135	30
1,2-Dibromoethane (EDB)	106-93-4	5	34	170	34	No	70	124	30
1,2-Dichlorobenzene	95-50-1	5	2,000,000	10,000,000	2,000,000	No	74	120	30
1,2-Dichloroethane (EDC)	107-06-2	5	450	2,200	450	No	72	137	30
1,2-Dichloropropane	78-87-5	5	930	4,700	930	No	71	120	30
1,3,5-Trimethylbenzene	108-67-8	5	47,000	200,000	47,000	No	65	133	30
1,3-Dichlorobenzene	541-73-1	5					72	124	30
1,3-Dichloropropane	142-28-9	5	1,600,000	20,000,000	1,600,000	No	76	123	30
1,4-Dichlorobenzene	106-46-7	5	2,600	13,000	2,600	No	72	125	30
2,2-Dichloropropane	594-20-7	5					67	134	30
2-Butanone (MEK)	78-93-3	5	28,000,000	190,000,000	28,000,000	No	40	135	30
2-Chlorotoluene	95-49-8	5	1,600,000	20,000,000	158,000	No	69	128	30
4-Chlorotoluene	106-43-4	5	5,500,000	72,000,000	5,500,000	No	73	126	30
4-Isopropyltoluene	99-87-6	6					75	133	30
4-Methyl-2-pentanone	108-10-1	50	5,300,000	52,000,000	5,300,000	No	65	135	30
Acetone	67-64-1	50	61,000,000	610,000,000	61,000,000	No	40	141	30
Acrolein	107-02-8	100	160	680	160	No	65	135	30
Acrylonitrile	107-13-1	50	240	1200	240	No	65	135	30
Benzene	71-43-2	5	1,100	5,600	1,100	No	73	126	30
Bromobenzene	108-86-1	5	94,000	410,000	94,000	No	66	121	30
Bromochloromethane	74-97-5	5					71	127	30
Bromodichloromethane	75-27-4	5	10,000	46,000	10,000	No	72	128	30
Bromoform	75-25-2	5	61,000	220,000	61,000	No	66	137	30

TABLE 4-6A

Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008				**LCS/MS/MSD Accuracy Control Limits (%R)**		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
Bromomethane	74-83-9	5	7,900	35,000	7,900	No	45	141	30
Carbon disulfide	75-15-0	5	670,000	3,000,000	670,000	No	65	135	30
Carbon tetrachloride	56-23-5	5	250	1,300	250	No	67	133	30
Chlorobenzene	108-90-7	5	310,000	1,500,000	310,000	No	75	123	30
Chloroethane	75-00-3	5	15,000,000	62,000,000	15,000,000	No	41	141	30
Chloroform	67-66-3	5	300	1,500	300	No	72	124	30
Chloromethane	74-87-3	5	1,700	8,400	1,700	No	51	129	30
cis-1,2-Dichloroethene or cis-1,2-Dichloroethylene	156-59-2	5	780,000	10,000,000	780,000	No	67	125	30
cis-1,3-Dichloropropene	10061-01-5	5					72	126	30
Dibromochloromethane	124-48-1	5	5,800	21,000	5,800	No	66	130	30
Dibromomethane	74-95-3	5	780,000	10,000,000	780,000	No	73	128	30
Dichlorodifluoromethane	75-71-8	5	190,000	780,000	190,000	No	34	136	30
Ethylbenzene	100-41-4	5	5,700	29,000	5,700	No	74	127	30
Hexachlorobutadiene	87-68-3	5	6,200	22,000	6,200	No	53	142	30
Isopropylbenzene (Cumene)	98-82-8	5	2,200,000	11,000,000	2,200,000	No	77	129	30
Methylene Chloride	75-09-2	5	1,100	5,400	1,100	No	63	137	30
Naphthalene	91-20-3	5	3,900	20,000	3,900	No	51	135	30
n-Butylbenzene	104-51-8	5					65	138	30
n-Propylbenzene	103-65-1	5					63	135	30
sec-Butylbenzene	135-98-8	5					63	132	30
Styrene	100-42-5	5	6,500,000	38,000,000	6,500,000	No	74	128	30
tert-Butyl Methyl Ether (MTBE)	1634-04-4	20	39,000	190,000	39,000	No	50	135	30
tert-Butylbenzene	98-06-6	5				No	65	132	30
Tetrachloroethene or Tetrachloroethylene (PCE)	127-18-4	5	570	2,700	570	No	67	139	30
Toluene	108-88-3	5	5,000,000	46,000,000	5,000,000	No	71	127	30

TABLE 4-6A

Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
trans-1,2-Dichloroethene or trans-1,2-Dichloroethylene	156-60-5	5	110,000	500,000	110,000	No	66	134	30
trans-1,3-Dichloropropene	10061-02-6	5					65	127	30
Trichloroethene or Trichloroethylene (TCE)	79-01-6	5	2,800	14,000	2,800	No	77	124	30
Trichlorofluoromethane (Freon 11)	75-69-4	5	800,000	3,400,000	800,000	No	49	139	30
Vinyl Chloride	75-01-4	5	60	1,700	60	No	58	126	30
Xylenes, Total	1330-20-7	15	600,000	2,600,000	600,000	No	65	125	50
m-Xylene	108-38-3	10	4,500,000	19,000,000	4,500,000	No	79	126	30
p-Xylene	106-42-3	10	4,700,000	20,000,000	4,700,000	No	79	126	30
o-Xylene	95-47-6	5	5,300,000	23,000,000	5,300,000	No	77	125	30

Note:

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-6B

Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B – Additional CLP Parameters

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**cas**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screeni ng Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
2-Hexanone	591-78-6	10					*	*	30
Cyclohexane	110-82-7	5	7,200,000	30,000,000	7,200,000	No	*	*	30
Methyl acetate	79-20-9	5	78,000,000	1,000,000,000	78,000,000	No	*	*	30
Methylcyclohexane	108-87-2	5					*	*	30

*Use laboratory established QC limits – Approved by the Project Chemist

TABLE 4-6B
Reporting Limits, Accuracy, and Precession Limits for Volatile Organic Compounds – SW8260B – Additional CLP Parameters
Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Constituent	cas	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008		Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
			Residential (µg/kg)	Commercial (µg/kg)			Lower Limit	Upper Limit	

Note:

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-7A
Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C – Standard List
Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008		Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R)		Precision Soil % RPD
			Residential (µg/kg)	Commercial (µg/kg)			Lower Limit	Upper Limit	
1,2,4-Trichlorobenzene	120-82-1	330	87,000	400,000	87,000	No	44	125	30
1,2-Dichlorobenzene	95-50-1	330	2,000,000	10,000,000	2,000,000	No	45	125	30
1,3-Dichlorobenzene	541-73-1	330					39	125	30
1,4-Dichlorobenzene	106-46-7	330	2,600	13,000	2,600	No	35	125	30
2,4,5-Trichlorophenol	95-95-4	700	6,100,000	62,000,000	6,100,000	No	49	125	30
2,4,6-Trichlorophenol	88-06-2	330	44,000	160,000	44,000	No	43	125	30
2,4-Dichlorophenol	120-83-2	330	180,000	1,800,000	180,000	No	45	125	30
2,4-Dimethylphenol	105-67-9	330	1,200,000	12,000,000	1,200,000	No	32	125	30
2,4-Dinitrophenol	51-28-5	700	120,000	1,200,000	120,000	No	25	132	30
2,4-Dinitrotoluene	121-14-2	330	120,000	1,200,000	120,000	No	48	125	30
2,6-Dinitrotoluene	606-20-2	330	61,000	620,000	61,000	No	48	125	30
2-Chloronaphthalene	91-58-7	330	6,300,000	82,000,000	6,300,000	No	45	125	30
2-Chlorophenol	95-57-8	330	390,000	5,100,000	390,000	No	44	125	30
2-Methylnaphthalene	91-57-6	330	310,000	4,100,000	310,000	No	47	125	30
2-Methylphenol (o-Cresol)	95-48-7	330	3,100,000	31,000,000	3,100,000	No	40	125	30

TABLE 4-7A

Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008				**LCS/MS/MSD Accuracy Control Limits (%R)**		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
2-Nitroaniline	88-74-4	700					44	125	30
2-Nitrophenol	88-75-5	700					42	125	30
3,3'-Dichlorobenzidine	91-94-1	1,300	1,100	3,800	1,100	Yes	25	128	30
3-Nitroaniline	99-09-2	700	18,000	82,000	18,000	No	27	125	30
4,6-Dinitro-2-methylphenol	534-52-1	1600	6,100	62,000	6,100	No	29	137	30
4-Bromophenyl phenyl ether	101-55-3	330					46	125	30
4-Chloro-3-methylphenol	59-50-7	600					46	125	30
4-Chloroaniline	106-47-8	700	9,000	32,000	9,000	No	10	125	30
4-Chlorophenyl phenyl ether	7005-72-3	330					47	125	30
4-Methylphenol (p-Cresol)	106-44-5	330	310,000	3,100,000	310,000	No	41	125	30
4-Nitroaniline	100-01-6	700	23,000	82,000	23,000	No	34	125	30
4-Nitrophenol	100-02-7	700					25	138	30
Acenaphthene	83-32-9	330	3,400,000	33,000,000	3,400,000	No	46	125	30
Acenaphthylene	208-96-8	330					44	125	30
Anthracene	120-12-7	330	17,000,000	170,000,000	17,000,000	No	53	125	30
Benzo (a) anthracene	56-55-3	330	150	2,100	150	Yes	52	125	30
Benzo (a) pyrene	50-32-8	330	15	210	15	Yes	50	125	30
Benzo (b) fluoranthene	205-99-2	330	150	2,100	150	Yes	45	125	30
Benzo (g,h,i) perylene	191-24-2	330					38	126	30
Benzo (k) fluoranthene	207-08-9	330	1,500	21,000	1,500	No	45	125	30
Benzoic acid	65-85-0	5,000	240,000,000	2,500,000,000	240,000,000	No	25	125	30
Benzyl alcohol	100-51-6	600	31,000,000	310,000,000	31,000,000	No	25	125	30
bis (2-chloroethoxy) methane	111-91-1	330	180,000	1,800,000	180,000	No	43	125	30
bis (2-chloroethyl) ether	111-44-4	330	190	900	190	Yes	38	125	30
bis (2-chloroisopropyl) ether	108-60-1	330	3,500	17,000	3,500	No	25	125	30
bis (2-ethylhexyl) phthalate	117-81-7	700	35,000	120,000	35,000	No	47	127	30

TABLE 4-7A

Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

Constituent	CAS	QAPP RL (µg/kg)	EPA Regional Screening Levels 2008 Residential (µg/kg)	EPA Regional Screening Levels 2008 Commercial (µg/kg)	Most Stringent Screening Level (µg/kg)	Does RL Exceed Screening Level?	LCS/MS/MSD Accuracy Control Limits (%R) Lower Limit	LCS/MS/MSD Accuracy Control Limits (%R) Upper Limit	Precision Soil % RPD
Butyl benzylphthalate	85-68-7	1000	260,000	910,000	260,000	No	49	125	30
Chrysene	218-01-9	330	15,000	210,000	15,000	No	53	125	30
Dibenzo (a,h) anthracene	53-70-3	330	15	210	15	Yes	41	125	30
Dibenzofuran	132-64-9	330					51	125	30
Diethyl phthalate	84-66-2	330	49,000,000	490,000,000	49,000,000	No	50	125	30
Dimethyl phthalate	131-11-3	330					49	125	30
Di-n-butylphthalate	84-74-2	330	6,100,000	62,000,000	6,100,000	No	56	125	30
Di-n-octylphthalate	117-84-0	1000					41	132	30
Fluoranthene	206-44-0	330	2,300,000	22,000,000	2,300,000	No	54	125	30
Fluorene	86-73-7	330	2,300,000	22,000,000	2,300,000	No	49	125	30
Hexachlorobenzene	118-74-1	330	300	1,100	300	Yes	47	125	30
Hexachlorobutadiene	87-68-3	330	6,200	22,000	6,200	No	40	125	30
Hexachloroethane	67-72-1	330	35,000	120,000	35,000	No	34	125	30
Indeno (1,2,3-c,d) pyrene	193-39-5	330	150	2,100	150	Yes	38	125	30
Isophorone	78-59-1	330	510,000	1,800,000	510,000	No	43	125	30
Naphthalene	91-20-3	330	3,900	20,000	3,900	No	40	125	30
Nitrobenzene	98-95-3	330	31,000	280,000	31,000	No	41	125	30
n-Nitrosodi-n-propylamine	621-64-7	330	69	250	69	Yes	40	125	30
n-Nitrosodiphenylamine	86-30-6	330	99,000	350,000	99,000	No	49	125	30
Pentachlorophenol	87-86-5	700	3,000	9,000	3,000	No	25	125	30
Phenanthrene	85-01-8	330					50	125	30
Phenol	108-95-2	330	18,000,000	180,000,000	18,000,000	No	39	125	30
Pyrene	129-00-0	330	1,700,000	17,000,000	1,700,000	No	46	125	30

Notes:

DTSC CHHSL: Residential benzo (a) pyrene 38 (µg/kg), pentachlorophenol – 4,400 (µg/kg)

DTSC CHHSL: Commercial benzo (a) pyrene 130 (µg/kg), pentachlorophenol – 130,00 (µg/kg)

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-7B

Reporting Limits, Accuracy, and Precession Limits for Semivolatile Organic Compounds – SW8270C – Additional CLP Parameters

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008				LCS/MS/MSD Accuracy Control Limits (%R)		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
1,1'-Biphenyl	92-52-4	700	3,900,000	51,000,000	3,900,000	No	*	*	30
1,2,4,5-Tetrachlorobenzene	95-94-3	700	18,000	180,000	18,000	No	*	*	30
1,4-Dioxane	123-91-1	500	44,000	160,000	44,000	No	*	*	30
2,3,4,6-Tetrachlorophenol	58-90-2	700	1,800,000	18,000,000	1,800,000	No	*	*	30
Acetophenone	98-86-2	700	7,800,000	100,000,000	7,800,000	No	*	*	30
Atrazine	1912-24-9	700	2,100	7,500	2,100	No	*	*	30
Benzaldehyde	100-52-7	700	7,800,000	100,000,000	7,800,000	No	*	*	30
Caprolactam	105-60-2	700	31,000,000	310,000,000	31,000,000	No	*	*	30
Carbazole	86-74-8	700					*	*	30
Hexachlorocyclopentadiene	77-47-4	700	370,000	3,7000,000	370,000	No	*	*	30

*Use laboratory established QC limits – Approved by the Project Chemist

Notes:

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

TABLE 4-8

Reporting Limits, Accuracy, and Precession Limits for Polynuclear Aromatic Hydrocarbon – SW8270SIM – Standard List

Addendum to the PG&E Program Quality Assurance Project Plan for the RCRA Facility Investigation/Remedial Investigation for Soil

			EPA Regional Screening Levels 2008				**LCS/MS/MSD Accuracy Control Limits (%R)**		
Constituent	**CAS**	**QAPP RL (µg/kg)**	**Residential (µg/kg)**	**Commercial (µg/kg)**	**Most Stringent Screening Level (µg/kg)**	**Does RL Exceed Screening Level?**	**Lower Limit**	**Upper Limit**	**Precision Soil % RPD**
1-methylnaphthalene	90-12-0	5	22,000	99,000	22,000	No	30	111	30
2-methylnaphthalene	91-57-6	5	310,000	4,100,000	310,000	No	30	111	30
Acenaphthene	83-32-9	5	3,400,000	33,000,000	3,400,000	No	28	110	30
Acenaphthylene	208-96-8	5					23	126	30
Anthracene	120-12-7	5	17,000,000	170,000,000	17,000,000	No	28	136	30
Benzo (a) anthracene	56-55-3	5	150	2,100	150	No	31	146	30
Benzo (a) pyrene	50-32-8	5	15	210	15	No	28	128	30
Benzo (b) fluoranthene	205-99-2	5	150	2,100	150	No	30	139	30
Benzo (g,h,i) perylene	191-24-2	5					21	149	30
Benzo (k) fluoranthene	207-08-9	5	1,500	21,000	1,500	No	42	129	30
Chrysene	218-01-9	5	15,000	210,000	15,000	No	39	134	30
Dibenzo (a,h) anthracene	53-70-3	5	15	210	15	No	30	138	30
Fluoranthene	206-44-0	5	2,300,000	22,000,000	2,300,000	No	30	142	30
Fluorene	86-73-7	5	2,300,000	22,000,000	2,300,000	No	27	116	30
Indeno (1,2,3-c,d) pyrene	193-39-5	5	150	2,100	150	No	17	164	30
Naphthalene	91-20-3	5	3,900	20,000	3,900	No	29	106	30
Phenanthrene	85-01-8	5					32	127	30
Pyrene	129-00-0	5	1,700,000	17,000,000	1,700,000	No	28	130	30

Notes:

DTSC CHHSL: Residential Benzo (a) pyrene 38 (µg/kg)

DTSC CHHSL: Commercial Benzo (a) pyrene 130 (µg/kg)

All soils sample results will be reported in dry weight unless otherwise specified in the SAP.

5.0 References

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