Final Report

Soil Investigation Part B 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

September 2012

CH2MHILL

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
95%UCL	95 percent upper confidence limit of the mean
AOC	Area of Concern
ARAR	applicable or relevant and appropriate requirement
BaP TEQ	benzo(a)pyrene toxic equivalents
bgs	below ground surface
BTV	background threshold value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CHHSL	California human health screening level
CMS/FS	corrective measures study/feasibility study
COC	chemical of concern
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
Cr(VI)	hexavalent chromium
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
HHCV	human health comparison value
mg/kg	milligrams per kilogram
Navy	United States Department of the Navy
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
SCADA	Supervisory Control and Data Acquisition
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	toxicity equivalence quotients
TPH	total petroleum hydrocarbons
TTLC	total threshold limit concentration
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
XRF	x-ray fluorescence
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region

1.0 Introduction

As described in the main text of this Soil Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) Work Plan (hereafter referred to as the Soil RFI/RI 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. 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* (hereafter referred to as 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 nine newly identified AOCs, for a total of 28 units. With the exception of AOC 33, which is addressed as part of AOC 17, each unit is addressed in a separate subappendix to this appendix. Investigation areas outside the compressor station fence line are addressed in Appendix A of this Soil RFI/RI Work Plan, 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 included in Appendices C and D, respectively, of this Soil RFI/RI Work Plan.

The *Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part B, PG&E Topock Compressor Station, Needles, California* (Draft Soil Part B Work Plan) was submitted to the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and the United States Department of the Interior (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*" (DTSC, 2008a)

2. DTSC Human and Ecological Risk Division (HERD): "Comments on *Draft RCRA Facility Investigation Soil Investigation Work Plan Part B, PG&E Topock Compressor Station, Needles, California*" (DTSC, 2008b)

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*" (2008)
5. Colorado River Indian Tribes: *RCRA Facility Investigation/Remedial Investigation Work Plan, Part B, PG&E Topock Compressor Station, Needles, CA* (2008)

DTSC withdrew its comments on Section 3.0 (Data Quality Objectives [DQOs]) and Section 4.0 (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, 2011a) (hereafter referred to as the Soil Part B DQO Tech Memo). The Soil Part B DQO Tech Memo is provided in Subappendix 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 made directly on the Draft Part B Work Plan, DTSC also provided comments on compressor station construction-related photographs in "DTSC Geological Services Unit Comments on the 1950s Photographs of the Pacific Gas and Electric Company Topock Compressor Station, Needles, California" (DTSC, 2008c). These comments led to the addition of six new AOCs and one new SWMU.

These comments were addressed, and a revised soil investigation program for the area within the fence line was provided in Appendix B to the *Soil RCRA Facility Investigation/Remedial Investigation Work Plan, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California* submitted to the DTSC and DOI in May 2011 (CH2M HILL, 2011b). This work plan is hereafter referred to as the 2011 Draft Soil RFI/RI Work Plan. Comments on the 2011 Draft Soil RFI/RI Work Plan were received from the following:

- Karen Baker of DTSC Geological Services Unit, August 19, 2011
- Pamela S. Innis of the DOI, August 16,2011
- Leo S. Leonhart of Hargis + Associates, Inc on behalf of the Fort Mojave Indian Tribe, August 1, 2011
- Loretta Jackson-Kelly of the Hualapai Department of Cultural Resources, July 21, 2011

These comments led to the addition of two AOCs within the fence line: the Oil Storage Tanks and Waste Oil Sump (AOC 32) and the Potential Former Burn Area Near AOC 17 (AOC 33).

The units addressed by this Soil Part B RFI/RI Work Plan are therefore as follows:

- SWMU 5 – Sludge Drying Beds (Subappendix B2)
- SWMU 6 – Chromate Reduction Tank (Subappendix B3)

- SWMU 8 – Process Pump Tank (SubappendixB4)
- SWMU 9 – Transfer Sump (Subappendix B5)
- SWMU 11 –Former Sulfuric Acid Tanks (SubappendixB6)
- AOC 5 – Cooling Tower A (SubappendixB7)
- AOC 6 – Cooling Tower B (SubappendixB8)
- AOC 7– Hazardous Materials Storage Area (SubappendixB9)
- AOC 8 – Paint Locker (Subappendix B10)
- AOC 13 – Unpaved Areas within the Compressor Station (Subappendix B11)
- AOC 15 – Auxiliary Jacket Cooling Water Pumps (Subappendix B12)
- AOC 16 – Sandblast Shelter (Subappendix B13)
- AOC 17 – Onsite Septic System (Subappendix B14)
- AOC 18 – Combined Hazardous Waste Transference Pipelines (Subappendix B15)
- AOC 19 – Former Cooling Liquid Mixing Area and Former Hotwell (Subappendix B16)
- AOC 20 – Industrial Floor Drains (Subappendix B17)
- AOC 21 –Round Impoundment Near Sludge Drying Bed (Subappendix B18)
- AOC 22 – Unidentified Three-sided Structure (Subappendix B19)
- AOC 23 – Former Water Conditioning Building (Subappendix B20)
- AOC 24 – Stained Area and Former API Oil/Water Separator (Subappendix B21)
- AOC 25 – Compressor and Generator Engine Basements (Subappendix B22)
- AOC 26 – Former Scrubber Oil Sump (Subappendix B23)
- AOC 32 – Oil Storage Tanks and Waste Oil Sump (Subappendix B24)
- AOC 33 – Potential Former Burn Area Near AOC 17 (included in discussion of AOC 17 in Subappendix B14)
- Unit 4.3 – Oil/Water Holding Tank, Unit 4.4 – Oil/Water Separator, and Unit 4.5 – Portable Waste Oil Holding Tank (Subappendix B25)

These units are shown in Figure B-1, Part B Investigation Areas.

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, 4.4, and 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 (within AOC 13). PG&E has also chosen to collect soil samples during maintenance and construction activities that require intrusive work. These samples are termed “opportunistic” soil samples. Opportunistic soil samples have been collected in various locations within the fence line. As of July 2012, 98 opportunistic samples have been collected and have been incorporated into the database.

Opportunistic samples are identified by the letters "OS" in the sample number (for example, samples AOC24-OS1 and AOC24-OS2 were collected as part of a trench excavation for electrical conduit near AOC 24). PG&E will continue to collect of soil samples during future maintenance or new construction activities. Data from these opportunistic soil sampling events will be reported at least once a year or provided upon agency request.

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. Three-hundred-thirty-three soil samples have been 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 have been evaluated in the *Data Usability Assessment Technical Memorandum, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2006); the majority of the existing data (70 percent) have 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.

1.1 Purpose of Soil Part B RFI/RI 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.
- Describe the proposed investigation approach for the area within the fence line and present proposed sampling recommendations.

This document identifies potential sample locations based on specific DQO rules as developed at the direction of DTSC and DOI and the jointly-developed phased investigation approach discussed in Section 4.0 of this work plan.

1.2 Work Plan Organization

This Soil Part B Work Plan is organized into six 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 five DQO decisions applicable to the Soil Part B 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, Phased Sampling Approach for Areas Inside the Fence Line**, provides a description of the sampling approach developed to optimize sampling locations while addressing specific safety concerns and access limitations associated with the Soil Part B investigation.
- **Section 5.0, 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 6.0, References,** presents a list of works cited when preparing this document.
- **Subappendix B1** provides the Soil Part B DQO Tech Memo.
- **Subappendices B2 through B25** contain the soil investigation programs for the 28 units addressed by this work plan.
- **Subappendix B26** provides the accessibility evaluation photograph log.
- **Subappendix B27** provides the responses 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

[1] The recently installed Topock Compressor Station wells 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 unevenly distributed, 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 Subappendix 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 Subappendix 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 Steps 1 and 2 of the Part B investigation (discussed in Section 4.0) have been implemented. For constituents where the detected concentrations exceed the SSLs, vadose zone modeling may 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 may 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 Subappendix 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 Subappendix 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 Subappendix 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 limitations of the data 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 B25. Decisions 3 and 4 evaluations will be performed after Steps 1 and 2 of the investigation have been implemented.

Once the data to be collected pursuant to this Soil Part B RFI/RI 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, including relevant data from the Perimeter Area and Storm Drain investigations.

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 Subappendices B2 through B25.

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 Subappendix B1. The following subsections describe the inputs required to evaluate Decision 1 – Nature and Extent.

2.1.1.1 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.

2.1.1.2 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 was shown in Figure 7 of the Soil Part B DQO Tech Memo in Subappendix B1 and has been updated slightly to reflect new information on site activities, as shown in Figure B-2. 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 B25.

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, including configuration of structures, where appropriate. 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.

2.1.1.3 Soil Comparison Values

Soil comparison values were used to screen the existing data and will be used to screen the combined soil data for the areas within the fence line. The six types of soil 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)
- Project-specific screening levels developed for Step 1 (x-ray fluorescence [XRF] screening). The XRF screening level is the higher of the instrument detection limit or the background soil concentration. Refer to Section 4.1 for more information.

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):

- **Fifty 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).
- **Two hundred 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 was evaluated. The evaluation relied primarily on the accessibility evaluation presented in Section 3.0 of this report, and the phased sampling approach outlined in Section 4.0. 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 include 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 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 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 (that is, simultaneous lateral and vertical assessments). All data for a given area were compared to the comparison values described in Section 2.1.1. (Data tables by constituent group and by individual unit are included in Appendices B2 through B25.) 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 B25. 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 also include field duplicate (quality control) soil samples. 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 (that is, 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 B25. For smaller units in proximity to each other, all data for a given area are presented on one figure (for example, existing data for SWMUs 5, 6, and 9, and the Units 4.3, 4.4, and 4.5 are shown on one figure), as well as on individual figures where requested by DTSC. Following completion of the Part B investigation (that is, as part of the RFI/RI Volume 3), 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 (that is, potential hot spot) within a unit.
- Vertical concentration trends in each boring and throughout a given unit or area.
- Distribution of detections and nondetections 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. Proposed additional data collection follows the phased sampling approach in Section 4.0The evaluation of access constraints is described in Section 3.0. The additional sampling recommendations for each unit are included in Appendices B2 through B25; 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 investigation data have been collected and the newly validated Part B 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 (that is, 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 United States Department of the Navy (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 evaluation 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 2.1.1.3.

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 data have been collected. Additional sampling is recommended if existing data are 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, and
- 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.

- 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 shows (by 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 investigation has been completed.

In general, with the exception of polycyclic aromatic hydrocarbons (PAHs) in shallow soil, existing data are already adequate to support EPC development for detected chemicals that exceeded one or more comparison values, as described in Sections 2.2.2.1 and 2.2.2.2.

2.2.2.1 Metals

Sufficient data (numbers of samples and detections) are available to calculate EPCs for total chromium, hexavalent chromium, and lead using ProUCL.

2.2.2.2 Polycyclic Aromatic Hydrocarbons

Sufficient data (numbers of samples and detections) are available to calculate EPCs for benzo(a)pyrene 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 benzo(a)pyrene TEQs.

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 combined Part B data are available. Results of the Decision 3 evaluation, including proposed Part B sample locations if recommended, are provided in this section.

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 subsurface soil data, the Decision 3 evaluation will be completed after the implementation of the Part B 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 Part A Phase 1 Data Gaps Evaluation Report).
- Groundwater background values for inorganics, calculated as 95%UCLs 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 (that is, 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 will serve as the sources 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 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.

  The comparison to background evaluation was completed for all metals detected in a given unit/area; however, there were insufficient data to perform a central tendency comparison.

  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 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 indicate 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 of COPC increase or remain elevated with depth.
  - Soil data indicate elevated concentrations of compounds (as compared to the BTVs) in samples throughout the boring *and* at the depth of the soil/groundwater interface.

If there are insufficient data to complete this step, a data gap will be identified and assessed. Additionally, if the data show a potential concern for transport of COPCs in soil to groundwater, existing groundwater monitoring well data in the vicinity (if available) will be reviewed to assess whether there is a potential link between the constituents found at the given unit/area and known groundwater contamination. 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 modeling results in a COPC in groundwater at a concentration exceeding groundwater background values, existing groundwater monitoring well data will be reviewed to assess whether there is a potential link between the constituents found at the given unit/area and known groundwater contamination. If there is an apparent link, groundwater effects will be addressed through the groundwater investigation and remediation program. If there is no apparent link between available groundwater data and the COPC(s) in question, the need for model refinement and possible additional data collection will be evaluated. If the deepest sample(s) in a boring or area exceeded the BTV, a data gap may be identified for Decision 3.[2]

The Step 3 modeling approach, model inputs, and assumptions will be further refined during 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 uneven distribution of existing soil data, the Decision 4 evaluation will be completed after the implementation of the Part B 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 are present at a site are adequately understood and sufficient information is available to evaluate potential migration: (1) usable and appropriate COPC concentration data for surface soils (and near-surface soils in erosion-prone areas), (2) potential transport mechanisms and pathways, and (3) screening comparison values, as described in the Soil Part B DQO Tech Memo provided in Subappendix B1 and summarized in Section 2.11.

[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 both Decision 1 and 3.

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 and near-surface soils that may be prone to erosion are evaluated because only these soils would be mobilized. Potential groundwater concerns are addressed by Decision 3.

Subsections 2.4.1.1 through 2.4.1.3 describe the inputs required to evaluate Decision 4.

2.4.1.1 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.

2.4.1.2 Potential Transport Mechanisms and Pathways

As described in Section 2.1.1.2, 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 B25. The site-specific fate and transport mechanism address potential transport and migration pathways to areas outside the fence line.

However, while the CSMs provide overall 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:

- Areas within the fence line prone to soil erosion
- 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. Surface soils in unpaved areas could also be transported outside the fence line through wind dispersion.

2.4.1.3 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 Part A Phase 1 Data Gaps Evaluation Report.
- Ecological comparison values (ECVs), 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 (Water Board, 2008).
- Project-specific screening levels developed for COPCs and chemicals of potential ecological concern (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. 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-3 provides an overview of the paved and unpaved areas. Gravel-covered areas are considered unpaved, as there is some potential for constituents in soil to be released to stormwater runoff. Gravel-covered areas are not expected to pose a potential migration risk via wind dispersion. 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 new 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 (for example, 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 (such as 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 nonhazardous 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 nonaqueous-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 potentially 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 (that is, 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 extents 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 (that is, total threshold limit concentrations [TTLC], soluble threshold limit concentrations [STLC], and toxicity characteristic leaching procedure [TCLP] results). 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 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. STLC and TCLP analyses will be considered at each AOC where TTLC concentrations exceed approximately 10 x STLC and/or 20 x TLCP concentrations.
- Specific soil physical properties that may affect the performance of the various technologies (that is, 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 (that is, 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 (that is, 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 Appendices B2 through B25) 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 general types of data gaps currently existing with regard to Decision 5 include:

- 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 (that is, 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 B-10. Table B-11 provides a summary of DQO Steps 1 through 5.

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 (that is, to identify the release point) and transport pathways (to identify likely contaminant locations), as well as the XRF screening step of the phased sampling approach discussed in Section 4.0. 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 storm drain system investigation program discussed in Appendix D of this 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 phased sampling design presented in this work plan.

Step 7 for the Part B 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 factored into the sample design, as reflected in the phased sampling approach (see Section 4.0), and optimizing of the sample design will continue at each step of the phased investigation.. Access constraints associated with each unit and the resulting effects on the sample design are discussed in Section 3.0 and are described for each individual unit in Appendices B2 through B25. The phased investigation approach developed jointly with DTSC and DOI optimizes the sample collection process by integrating accessibility considerations into a progressively more focused sampling program.

As with done with Part A Phase 1, PG&E has performed an initial assessment of candidate locations for additional characterization. These proposed locations were modified during the December 15, 2011 site walk with DTSC, DOI, and the Tribes, and are presented in Appendices B2 through B25 and summarized in Section 2.7 and Table B-12of this work plan. Some of these proposed locations will be screened and potentially adjusted subject to the results of the XRF screening step, as described in Section 4.1 of this appendix.

2.7 Data Gaps Evaluation Summary for Part B

This section presents a summary of the data gaps evaluation described in Section 2.0 and in Appendices B2 through B25. 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 25 of the 27 SWMUs, AOCs, and units included in this work plan. No sampling is proposed at AOC 25 – Compressor and Generator Engines and Basements or AOC 32 - Oil Storage Tanks and Waste Sump because of access restrictions; however, soil and soil vapor samples will be collected near these AOCs as part of the AOC 13 sampling program.

- **Decision 2**: In general, with the exception of PAHs in shallow soil, existing data are adequate to support EPC 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, the PAH data gap will be 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; additional site-specific information is 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 (and near-surface soil in erosion-prone areas) 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 and constituents 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 proposed locations will be refined during the first step of the phased investigation approach, as described in Section 4.0 of this appendix.

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, and other fluids with elevated temperatures or hazardous characteristics, and the facility also contains 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 documented access to the various investigation units photographically. In addition, a site walk with DTSC and DOI was conducted on April 24, 2012 to further define access constraints associated with specific areas of interest. Photographs for each of the units are provided in Subappendix B26.

3.1 Safety and Access Considerations for Intrusive Work within the Fence Line of the Compressor Station

As noted above, the area within the fence line of the Topock Compressor Station is subject to numerous aboveground and subsurface sampling obstructions. Aboveground obstructions may entirely prevent sampling (for example, if buildings are present) or may partially restrict sampling (for example, if there is no access for large equipment). However, even areas that are free of aboveground obstructions may be subject to various types of belowground obstructions.

As discussed in Section 2.0 of the main text of this Final Soil RFI/RI Work Plan, due to the potentially high hazard associated with encountering belowground infrastructure at the gas compressor station, PG&E requires that all subsurface intrusive work be cleared either by hand-digging or by hydrovacuum (hydrovac) excavation of soils. Hydrovac is preferred due to the higher excavation speed and deeper depths achievable without shoring. However, the feasibility of hydrovac excavation is limited by the fact that the hydrovac truck must be in proximity (typically within 15 feet or so) of the sampling location, and may also experience obstruction from aboveground piping and similar features. This means that many areas of interest within the facility cannot be accessed by hydrovac.

The phased investigation approach is designed to minimize the potential hazards associated with subsurface intrusive activities; however, station operators have the final authority in determining which locations are safe for subsurface intrusion and, if drilling is required, at which depth drilling may commence.

3.2 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-3. Each of the areas was characterized to define the surface access available within the areas and to provide a preliminary assessment of the potential extent of subsurface utilities. Five levels of surface access were identified (see Figure B-3):

- Color code blue: Away from aboveground operational infrastructure without asphalt or concrete cover. Accessible for hand-sampling and XRF screening. Likely to be accessible by hydrovac.
- Color code purple: Proximate to or immediately below aboveground operational infrastructure without asphalt or concrete cover, potentially accessible for hydrovac in some cases; otherwise, suitable for hand-sampling and XRF screening.
- Color code yellow: Asphalt or thin concrete cover away from aboveground infrastructure or known dense underground utilities. Likely to be accessible by hydrovac; however, not suitable for XRF screening.
- Color code orange: Covered operational structure or area of thick concrete. No sampling is feasible at this time.
- Color code red: Operational compressor station building or element of operation infrastructure (for example, aboveground storage tanks). No sampling is feasible at this time.

Hand-sampling in this context refers to samples that can likely be collected using hand tools (such as trowels or shovels) only. In some areas that were rated as accessible for hand-sampling (for example, 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.

In areas that are paved, the pavement will be cut and removed, and soil sampling will begin below the bottom of the pavement, expected to typically be approximately 6 inches below the top of the pavement. Thus, in paved areas, the surface interval will typically be within the 0-to-1-foot-bgs interval.

In addition to conducting a general assessment of surface access, PG&E also conducted a point-by-point assessment of accessibility for each of the proposed sample locations within the fence line. Key locations were reviewed in conjunction with DTSC and DOI during the April 24, 2012 site walk. The proposed sample tables included in each of the subappendices to this appendix provide the accessibility assessment for each of the proposed sample locations. Optimization of the proposed sample locations (Step 1 of the phased sampling approach) may result in changes to the accessibility assessment.

3.3 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 (that is, 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 simply on a review of the number of risers.

PG&E previously conducted a focused utility clearing event in support of the monitoring well installation within the fence line of the compressor station. Experience from this limited effort indicated that subsurface utility clearance within the compressor station fence line is imprecise due to the large number of utilities within the area. Location of subsurface utilities is made more difficult by interference caused by the density of subsurface facilities in many areas of the station. Additionally, subsurface facilities were found to appear to stop, start, and turn in unexpected locations. Finally, facilities such as septic, water, and storm drain lines are not always visible to utility-locating equipment especially when constructed of clay, concrete, or polyvinyl chloride.

4.0 Phased Sampling Approach for Areas Inside the Fence Line

As described in Section 3.0, there are substantial safety and access constraints on intrusive investigation within the fence line of the compressor station. A phased approach to sampling was developed to optimize the sampling program (that is, minimize the overall number of soil sampling locations and depths of samples) given the existing constraints. The phased sampling approach uses a combination of XRF screening (see Section 2.2 of the main body of this work plan), hand excavation, hydrovac excavation, and drilling to evaluate constituent concentrations in soil and safely to collect data from the appropriate depth intervals. As discussed in Section 3.0, the sampling program for the area within the fence line recognizes that some portions of the station cannot be sampled until the station is decommissioned or at some time in the future.

The sampling approach is divided into three steps, consisting of XRF screening, soil sample collection, and a final drilling phase, where needed. After each step, PG&E will review the data with DTSC and DOI and will refine the sampling requirements for any subsequent step(s). An overview of this phased sampling approach is presented in Figure B-4.

Contingent sample locations may be defined for areas where data from the selected sample locations indicate that further sampling is required to assess the nature and extent of COPCs in a specific area. Contingent sample locations may be defined after Step 2 or Step 3; the total number of contingent sample locations is limited to 20 percent of the total number of soil sample locations currently proposed. One-hundred-seventeen sample locations are currently proposed; therefore, up to 23 contingent sample locations may be defined.

4.1 Step 1: XRF Screening

XRF screening of exposed (unpaved) soil will be conducted to optimize locations where soil samples will be collected for offsite laboratory analysis. Metals to be screened by the XRF are shown in Table 2-1 in Section 2.0 of the main text of this work plan, along with the approximate detection limits, Topock-specific background values (where available), and commercial screening levels. The XRF screening level is the higher of the instrument detection limit or the background soil concentration. The XRF screening process will not be applied to those proposed sample locations chosen based on existing data with elevated concentrations or features (that is, topographic low spot, visibly stained area, etc.).

An XRF screening approach to optimize the soil sampling locations to be sampled in Step 2 was initially submitted for agency review on November 12, 2011; it was subsequently modified in conjunction with DTSC and DOI during the development of the phased sampling approach. The XRF screening process for each of the applicable proposed soil sample locations is as follows:

a) Establish circular area around the proposed soil sample location with a radius of approximately 10 feet.

b) Screen the surface soils at the perimeter of the established area, as practicable. The exact number of locations to be analyzed using the XRF in a given screening area will be determined in the field but would typically be conducted to the north, south, east, and west, excluding the direction in which existing data may be located. Surface infrastructure (for example, pipes, pavement, aboveground utilities, etc.) may limit the area that can be screened.

c) Repeat the screening/sample collection process (Steps a and b) until metal concentrations measured by XRF at the outermost locations no longer exceed screening levels, or the soil is no longer unpaved (that is, the ground surface is covered by concrete, asphalt paving, building foundation, etc.) or further XRF screening is otherwise obstructed.

d) Tabulate the XRF data and post-XRF sample locations on figures.

e) Discuss XRF results during data calls with the agencies to assess where soil samples will be collected for offsite laboratory analysis and identify potential alternate locations, if necessary.

XRF screening of large areas, such as portions of AOC 13 (lower yard), will occur on a grid. XRF locations to be collected on a grid are presented in the proposed sampling figures and tables associated with the specific units.

All soil samples to be screened by XRF will be collected and analyzed following Standard Operating Procedure B16, *Field-portable X-Ray Fluorescence Soil Sampling*. XRF sample points will be identified by the proposed sample location to which they are linked, followed by an alpha designation (for example, the first XRF point at proposed sample location AOC5-1 would be identified as XRF5-1-A). Distances between XRF screening points may be adjusted as appropriate given the specific unit.

PG&E will schedule periodic data discussions (conference calls) with DTSC and DOI to review XRF results and refine proposed soil sample locations as appropriate based on XRF results and other factors (for example, topography, past soil sampling results, etc.). PG&E will initiate soil sampling as described in Step 2 once agreement has been reached on a sufficient number of soil sample locations. To expedite the investigation effort, completion of the XRF screening step will overlap with a portion of the soil sample collection effort.

4.2 Step 2: Soil Sample Collection

Proposed soil sample locations for the various units within the fence line are shown in Appendices B2 through B25. Proposed sample locations will be modified, as appropriate, based on the results of the XRF screening. Soil sample locations will generally be sampled at the surface and from the shallow subsurface soil interval (0.0 to 0.5 foot bgs and 2.0 to 3.0 feet bgs, respectively). If the sample location is covered with asphalt, the surface sampling interval will begin at the bottom of the asphalt or gravel subbase. In most cases, this first interval will be from 0.5 to 1 foot bgs. At select soil sample locations, samples will also be collected from the 5.0-to-6.0-feet-bgs and 9.0-to-10-feet-bgs intervals. These designated deeper locations were selected based on existing soil data, information from the CSMs, and other factors. The designated deeper soil sample locations are identified in the proposed sample tables for each unit, as discussed in Appendices B2 through B25. Where feasible, the soil sample collection phase will be implemented using hydrovac to excavate the locations to the target sampling depth. Sampling at hydrovac excavation locations will be conducted as described in Section 2.2 of the main body of the Soil RFI/RI Work Plan. All soil sample locations in areas not accessible by hydrovac will be hand-dug to a minimum of 3 feet bgs (if feasible) and will be sampled using conventional soil protocols as described in Section 2.2 of the main body of the Soil RFI/RI Work Plan.

Should subsurface obstructions at the chosen sample location prevent sampling at the desired depth(s), up to two additional points will be attempted in the vicinity of the original location. Should the sampling team be unable to reach the desired sampling depth at any of the three points, deeper sampling will be eliminated at that location.

After data for a given unit or area have been validated, PG&E will tabulate the data and provide figures showing sample locations. Tables and figures will be submitted to DOI and DTSC for review. PG&E will schedule periodic conference calls to discuss the data and the need for any supplemental data collection to complete the evaluation of the nature and extent of contamination for the specific unit or group of units. These conference calls will be used to determine whether any additional data collection is required. This may include extending the sampling depth at a given location to 10 feet bgs using hydrovac, installing a deep boring using a drill rig, and/or identifying contingency sample locations. Data will be discussed in geographical clusters of units to ensure that relevant data from one unit will be considered in the assessment of other units. Any additional shallow soil sampling and/or sampling requiring hydrovac excavation will then be implemented as the final element of the Step 2 soil sampling.

Once the data from any additional shallow and/or hydrovac locations have been validated, PG&E will update the data tables to include the additional sample results and will provide the updated tables to DTSC and DOI. PG&E will continue to schedule periodic conference calls with the agencies to review and discuss the data. The additional data will be used to refine the locations requiring further investigation to satisfy the DQO decisions, if any. If deeper borings are required at any location, they will be implemented as part of Step 3, the drilling program.

4.3 Step 3: Drilling Program

Step 2 may identify areas that require deeper (that is, deeper than 10 feet bgs) soil borings to fully characterize the nature and extent of contamination and potential threat to groundwater. Deeper borings will only be installed in areas that are accessible by drill rig. Any deeper soil boring would either be installed in a prior hydrovac location, or the sample location would first be excavated to 10 feet bgs by hydrovac. Drilling would commence at 10 feet bgs or whenever the plant operations representative determines that it is safe to do so.

As with Steps 1 and 2, PG&E will tabulate validated data, update sample location figures, and provide tables and figures to DTSC and DOI for review. The total number of contingent soil sample locations from all three steps combined will be limited to 20 percent of the initially proposed total number of sample locations. The final contingent soil sample locations, if any, would be installed as the final element of Step 3.

5.0 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.

6.0 References

ARCADIS. 2008a. *Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California.* August 25.

__________. 2008b. *Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil.* May 28.

__________. 2009a. *Revised Addendum to the Human Health and Ecological Risk Assessment Work Plan (August 2008), Pacific Gas and Electric Company Topock Compressor Station Needles, California*. February 4.

__________. 2009b. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil*. July 1.

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2008a. "DTSC Geological Services Unit Comments on RCRA Facility Investigation/Remedial Investigation Soil Investigation B Work Plan Part, PG&E Topock Compressor Station, Needle, California." March 25.

__________. 2008b. "Comments on *Draft RCRA Facility Investigation Soil Investigation Work Plan Part B, PG&E Topock Compressor Station, Needles, California.*" January 22.

__________. 2008c. "DTSC Geological Services Unit Comments on the 1950s Photographs of the Pacific Gas and Electric Company Topock Compressor Station, Needles, California." February 12.

__________. 2009. Interim guidance. *Remedial Goals for Dioxins and Dioxin-like Compounds for Consideration at California Hazardous Waste Sites*. Human and Ecological Risk Division. May. California Environmental Protection Agency, 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.

California Regional Water Quality Control Board, San Francisco Bay Region (Water Board). 2008. *Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater.* May 27.

CH2M HILL. 2006. *Data Usability Assessment Technical Memorandum, PG&E Topock Compressor Station, Needles, California.* August 29.

__________. 2007a. *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California.* August 10.

__________. 2007b. *Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan, Part B, PG&E Topock Compressor Station, Needles, California*. November.

__________. 2008a. *Final Soil and Sediment Data Usability Technical Memorandum, PG&E Topock Compressor Station, Needles, California*. August 29.

__________. 2008b. *Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station, Needles, California.* August 1.

__________. 2008c. *Final Corrective Measures/Feasibility Study Work Plan, Topock Compressor Station, Needles, California.* March 6.

__________. 2008d. *Draft PG&E Program Quality Assurance Project Plan*. March.

__________. 2009. *Final Soil Background Investigation at Pacific Gas and Electric Company Topock Compressor Station, Needles, California*. May.

Colorado River Indian Tribes. 2008. "Comments on *RCRA Facility Investigation/Remedial Investigation Work Plan, Part B, PG&E Topock Compressor Station, Needles, CA*. January 18.

Fort Mojave Indian Tribe. 2008. "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.

New Mexico Environment Department. 2006. Hazardous Waste Bureau and Groundwater Quality Bureau, Voluntary Remediation Program: *Technical Background Document for Development of Soil Screening Levels, Revision 4.0*.

Pacific Gas and Electric Company. 2009a. Letter from Ms. Yvonne Meeks/PG&E to Ms. Karen Baker/DTSC. "May 15, 2009 DTSC Direction to Sample Wells and Request to Document Burn Activities At and Near the Topock Compressor Station." August 14.

__________. 2009b. Letter from Ms. Yvonne Meeks/PG&E to Mr. Aaron Yue/DTSC. "October 15 Burn Activities Update." October 15.

__________. 2010a. Letter from Ms. Yvonne Meeks/PG&E to Ms. Karen Baker/DTSC. "December 10, 2009 DTSC Letter Regarding Historical Burn Activities and Disposal Practices At and Near the Topock Compressor Station." January 15.

__________. 2010b. Letter from Ms. Yvonne Meeks/PG&E to Ms. Karen Baker/DTSC. "December 10, 2009 DTSC Letter Regarding Historical Burn Activities and Disposal Practices At and Near the Topock Compressor Station." January 29.

Simunek, J., M. Sejna, and M. Th. van Genuchten. 1998. *The HYDRUS-1D Software Package for Simulating the One-Dimensional Movement of Water, Heat, and Multiple Solutes in Variably Saturated Media*. International Groundwater Modeling Center-TPS 70.

__________. 2008. *Topock Compressor Station RFI/RI Project Document Review Sheet; RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part* B. December.

United States Environmental Protection Agency (USEPA). 1996. *Soil Screening Guidance: User's Guide.* Second Edition. Publication 9355.4-23. July.

__________. 2000. *Data Quality Objectives Process for Hazardous waste Site Investigations (EPA QA/G-4HW)*. Final. January.

__________. 2005. *Partition Coefficients for Metals in Surface Water, Soil, and Waste. EPA/600/R-05/074.* July.

__________. 2006a. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)*. February.

__________. 2006b. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)*. February.

__________. 2009. *ProUCL Version 4.00.04 Technical Guide (Draft)*, Office of Research and Development. February.

__________. 2010. *Regional Screening Levels for Chemical Contaminants at Superfund Sites*. http://epa-prgs.ornl.govchemicals/index.shtml.

United States Department of the Navy (Navy). 2002. *Guidance for Environmental Background Analysis, Volume I: Soil*. Naval Facilities Engineering Command, Washington, DC. April.

Xu, M. and Y. Eckstein. 1995. Use of Weighted Least-Squares Method in Evaluation of the Relationship Between Dispersivity and Scale. *Ground Water*, 33(6): 905-908.

Tables

TABLE B-1

Soil Analyte Comparison Table - Metals and Cyanide

Soil Investigation Part B Work Plan, PG&E Topock Compressor Station, Needles, California

				DTSC CHHSL		EPA Regional SL (December 2009)						
	Analyte	CAS	QAPP RL (mg/kg)	Residential (mg/kg)	Commercial (mg/kg)	Residential (mg/kg)	Commercial (mg/kg)	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?
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
4	Chromium, Hexavalent	18540-29-9	0.4	17	37	0.29	1,400	0.83	139.6	No	0.83	No
1	Chromium, total	7440-47-3	1	NE	NE	280	1,400	39.8	36.3	No	39.8	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	150	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
2	Mercury	NA	0.1	18	180	10	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
5	Thallium	7440-28-0	2	5.0	63	5.1	66	---	2.32	No	2.32	No
3	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 USEPA residential regional screening level from April 2009 is used.

2 Mercury: mercury, inorganic salts; elemental mercury.

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.

4 USEPA residential screening level from May 2012 was used.

5 The 2008 residential RSL is used. This value is the best regulatory toxicity information available for thallium for use in the soil risk assessment.

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 and Detected Organics
Soil Investigation Part B Work Plan, 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)	Does RL Exceed Screening Level?
Metals						
Aluminum	7429-90-5	10	16400	NE	NE	---
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
Calcium	7440-70-2	100	66500	NE	NE	---
Chromium, Hexavalent	18540-29-9	0.4	0.83	NE	NE	No
Chromium, total	7440-47-3	1	39.8	43.4	111	No
Cobalt	7440-48-4	1	12.7	NE	NE	No
Copper	7440-50-8	1	16.8	31.6	149	No
Iron	7439-89-6	10	---	NE	NE	---
Lead	7439-92-1	1	8.39	35.8	128	No
Magnesium	7439-95-4	100	12100	NE	NE	---
Manganese	7439-96-5	1	402	NE	NE	---
[1] 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
Potassium	7440-09-7	100	4400	NE	NE	---
Selenium	7782-49-2	1	1.47	NE	NE	No
Silver	7440-22-4	1	---	NE	NE	---
Sodium	7440-23-5	100	2070	NE	NE	---
[2] 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
Organics						
B(a)P Equivalent	50-32-8E	5	---	NE	NE	---
Benzo (b) fluoranthene	205-99-2	5	---	NE	NE	---
Benzo (b) fluoranthene	205-99-2	330 [4]	---	NE	NE	---
Chrysene	218-01-9	5	---	0.166	1.29	---
Chrysene	218-01-9	330 [4]	---	0.166	1.29	---
Fluoranthene	206-44-0	5	---	0.423	2.23	---
Fluoranthene	206-44-0	330 [4]	---	0.423	2.23	---
Phenanthrene	85-01-8	5	---	0.204	1.17	---
Phenanthrene	85-01-8	330 [4]	---	0.204	1.17	---
Pyrene	129-00-0	5	---	0.195	1.52	---
Pyrene	129-00-0	330 [4]	---	0.195	1.52	---

TABLE B-2

Sediment Analyte Comparison Table - Metals and Detected Organics

Soil Investigation Part B 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)	
Organics						
TPH as motor oil	52892904-MO	10	---	NE	NE	---

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.

[4] Analyzed by SW8270C, analyte was also analyzed by SW8270SIM to achieve the lower reporting limit.

[5] The empirically based threshold effects concentrations and probably effects (TECs and PECs) were developed as 'consensus-based' screening concentrations (MacDonald et al., 2000). Consensus-based SQGs were developed to provide a unifying synthesis of existing sediment guidelines and to account for chemical mixtures (MacDonald et al., 2000). The two sets of consensus-based SQGs developed are the TEC (below which adverse effects are not expected to occur) and the PEC (above which adverse effects are expected to occur).

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 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?
	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 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?
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 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 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?
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 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?
	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 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?
	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 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?
	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 B 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?	Interim Screening Level [1] (µg/kg)	Does RL Exceed Screening Level?
	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 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 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 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					1,400 mg/kg	None	
0-0.5 ft bgs	Y	47 of 47	2,100	mg/kg	Y		Compound exceeds HHCV. Existing data are adequate for EPC.
0-3 ft bgs	Y	68 of 68	2,100	mg/kg	Y		
0-6 ft bgs	Y	69 of 69	2,100	mg/kg	Y		
0-10 ft bgs	Y	69 of 69	2,100	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 are 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 are 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.

BaP TEQ = benzo(a)pyrene toxic equivalents
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 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 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.	**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 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 COPECs 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], 26, 32, and 33; and AOC 31 the motor-oil pit at the former Teapot Dome facility (located within the Perimeter Area). *For the Perimeter Area:* initially from the facility fence line outward to the toe of the slope. *For storm drains:* Initially, the lateral extent of the storm drain alignment, including the area in the immediate vicinity of current and former outfall locations. **Vertical Extent** Vertical study area boundaries extend from the ground surface to the water table. **Analytical Parameters** *Chemical Parameters (COPC):* • Title 22 metals, hexavalent chromium, 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, TPH, VOCs, SVOCs (including PAHs), PCBs, and pH for Unit 4.3 (sample locations for Unit 4.3 also address Units 4.4 and 4.5) • Title 22 metals, hexavalent chromium, and pH for AOCs 5, 6, 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, dioxins/furans, and asbestos for AOC 13. Location AOC13-13 also addresses AOC 32; locations AOC 13-4, AOC13-5, AOC13-6, AOC 13-7, AOC 13-10, AOC 13-11, AOC13-14, and AOC 13-15 also address AOC 25. Soil gas will be collected at locations AOC 13-5, AOC 13-6, AOC 13-11, and AOC13-13. • Title 22 metals, hexavalent chromium, SVOCs, PAHs, PCBs, and pH for AOC 15 • Title 22 metals for AOC 16 • Title 22 metals, hexavalent chromium,, VOCs, TPH, PAHs, SVOCs, PCBs, dioxins/furans, and pH for AOC 17. Locations AOC17-2 and AOC17-4 also address AOC 33. • Title 22 metals, hexavalent chromium,, VOCs, TPH, PAHs, PCBs, and SVOCs for AOC 18 • Title 22 metals, hexavalent chromium,, TPH, PCBs, VOCs, and PAHs for AOC 20	See Part B DQO Tech Memo Figure 2 for the Decision 1 decision rule (CH2M HILL, 2006a)

TABLE B-11
Data Quality Objectives – Part B Soil Investigation
Soil Investigation Part B 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, SVOCs, PAHs, TPH, PCBs, calcium, sodium, hexavalent chromium,, pH, and Title 22 metals for AOC 21 • VOCs and SVOCs including PAHs, PCBs, TPH, hexavalent chromium,, pH, and Title 22 metals for AOCs 22, 23, 24, and 26. Soil gas will also be collected at AOC26-1. • TPH, PAHs, PCBs, hexavalent chromium, and Title 22 metals for the perimeter area. VOCs and SVOCs will be added for the location PA-08, which also addresses AOC 31. • Title 22 metals, hexavalent chromium, TPH, PAHs, and PCBs for the storm drain outfall samples and any accumulated soils samples from within the catch basins. *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 as determined on total metals concentrations, 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 (CH2M HILL, 2006a)
	<u>Decision 3</u> Determine whether residual soil concentrations resulting from historical compressor station practices may threaten groundwater.	• Nature and extent of contamination assessment from Decision 1 • Data collected from compressor station wells installed during East Ravine/Topock Compressor Station groundwater investigation	**Lateral Extent** Those portions of each AOC/SWMU where COPC concentrations exceed SSLs. **Vertical Extent** Same as for Decision 1.	See Part B DQO Tech Memo Figure 4 for the Decision 3 decision rule (CH2M HILL, 2006a)

TABLE B-11
Data Quality Objectives – Part B Soil Investigation
Soil Investigation Part B 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
	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.	• 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 • 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	**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.	
	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 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 from the surface 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** Unpaved areas within the lateral boundaries shown 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 (CH2M HILL, 2006a)
	Decision 5 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	• 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	**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**	See Part B DQO Tech Memo Figure 6 for the Decision 5 decision rule (CH2M HILL, 2006a)

TABLE B-11
Data Quality Objectives – Part B Soil Investigation
Soil Investigation Part B 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
	sample data is not feasible, document impediments and uncertainties in the risk assessment and/or CMS/FS or interim measures.	• 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 • AOC/SWMU location and use history information • Historical information by AOC/SWMU • Infrastructure information by AOC/SWMU	*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.	

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 = chemical of concern.
Cr(VI) = hexavalent chromium.
TPH = total petroleum hydrocarbons.

TABLE B-12
Proposed Part B Sampling Summary
Soil Investigation Part B Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Unit	Additional Number of Samples and Locations Proposed to Address Data Gaps[a]			
	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 (SubappendixB2, Table B2-3)
SWMU 6	Not applicable	Not applicable	Not applicable	One additional locations (SubappendixB3, Table B3-3)
SWMU 8	Not applicable	Not applicable	Not applicable	One additional locations (SubappendixB4, Table B4-3)
SWMU 9	Not applicable	Not applicable	Not applicable	Potentially one additional location (SubappendixB5, Table B5-2)
SWMU 11	Five additional borings (Subappendix B6, Table B6-2)	None	One sample to evaluate soil physical properties	None
AOC 5	Six additional borings (Subappendix B7, Table B7-5)	None	Two samples from various depths intervals to evaluate soil physical properties	None
AOC 6	Seven additional borings (Subappendix B8, Table B8-4)	None	Two samples from various depths intervals to evaluate soil physical properties	None
AOC 7	Five additional borings (Subappendix B9, Table B9-2)	None	One sample to evaluate soil physical properties	None
AOC 8	Two additional borings (Subappendix B10, Table B10-2)	None	One sample to evaluate soil physical properties	None
AOC 13	Thirty-two additional borings (Subappendix B11, Table B11-10 Four soil gas sampling location (Subappendix B11, Table B11-10)	None	Two sample from various depths intervals to evaluate soil physical properties	None
AOC 15	Seven additional borings (Subappendix B12, Table B12-4)	None	One sample to evaluate soil physical properties	None

TABLE B-12
Proposed Part B Sampling Summary
Soil Investigation Part B Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Unit	Additional Number of Samples and Locations Proposed to Address Data Gaps[a]			
	Decision 1 – Nature and Extent	**Decision 2 – Data Sufficiency to Calculate EPCs**	**Decision 5 – Data Sufficiency for CMS/FS**	**Other**
AOC 16	Four additional borings (Subappendix B13, Table B13-4)	None	One sample to evaluate soil physical properties	None
AOC 17	Five additional borings (Subappendix B14, Table B14-2)	None	One sample to evaluate soil physical properties	None
AOC 18	Not applicable	Not applicable	Not applicable	Twelve additional borings (Subappendix B15, Table B15-4)
AOC 19	Six additional borings (Subappendix B16, Table B16-5)	None	One sample to evaluate soil physical properties	None
AOC 20	Seven additional borings (Subappendix B17, Table B17-2)	None	One sample to evaluate soil physical properties	None
AOC 21	One boring (Subappendix B18, Table B18-2)	None	One sample to evaluate soil physical properties	None
AOC 22	Two borings (Subappendix B19, Table B19-2)	None	One sample to evaluate soil physical properties	None
AOC 23	Three borings (Subappendix B20, Table B20-2)	None	One sample to evaluate soil physical properties	None
AOC 24	Two borings (Subappendix B21, Table B21-2)	None	One sample to evaluate soil physical properties	None
AOC 25	None; access restrictions prevent sampling. Addressed by AOC 13 boring and soil gas sampling (Subappendix B11, Table B11-10; see also discussion in Subappendix B22)	None	None; access restrictions prevent sampling. Addressed by AOC 13 boring (Subappendix B11, Table B11-10; see also discussion in Subappendix B22)	None
AOC 26	Five borings (Subappendix B23, Table B23-2)	None	One sample to evaluate soil physical properties	None

TABLE B-12
Proposed Part B Sampling Summary
Soil Investigation Part B Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Unit	Additional Number of Samples and Locations Proposed to Address Data Gaps[a]			
	Decision 1 – Nature and Extent	**Decision 2 – Data Sufficiency to Calculate EPCs**	**Decision 5 – Data Sufficiency for CMS/FS**	**Other**
	One soil gas sampling location (Subappendix B23, Table B23-2)			
AOC 32	None; access restrictions prevent sampling. Addressed by AOC 13 boring and soil gas sampling (Subappendix B11, Table B11-10; see also discussion in Subappendix B24)	None	None; access restrictions prevent sampling. Addressed by AOC 13 boring (Subappendix B11, Table B11-10; see also discussion in Subappendix B24)	None
Units 4.3, 4.4, and 4.5	Not applicable	Not applicable	Not applicable	Two additional locations for organics (Subappendix B25, Table B25-2)

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 Work Plan,
Pacific Gas and Electric Company Topock Compressor Station Needles, California

Area No.	Area Name	Type of Risers							Comments
		No. of Risers[a]	Gas	Elect.	Odor[b]	Water[c]	ESD[d]	WW[e]	
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 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 northwest
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 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 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 (for example, 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).

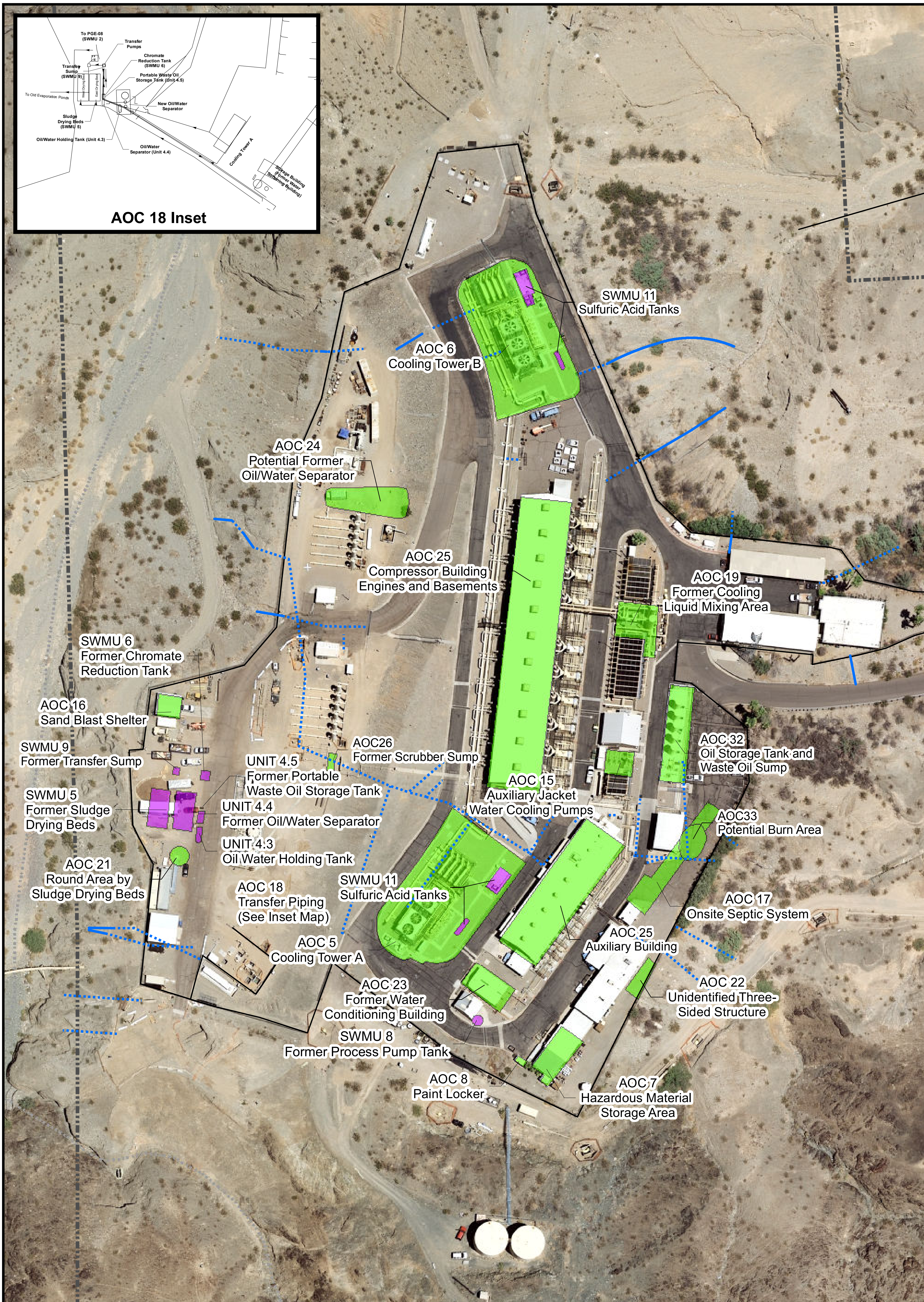
[f] Main gas pipeline (typically 30- to 34-inch pipeline).

[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.

SCADA = Supervisory Control and Data Acquisition.

Figures



LEGEND

- Area of Concern (AOC)
- Solid Waste Management Unit (SWMU)
- Site Fence Boundary
- Stormwater Piping Above Ground (Approximate Location)
- 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

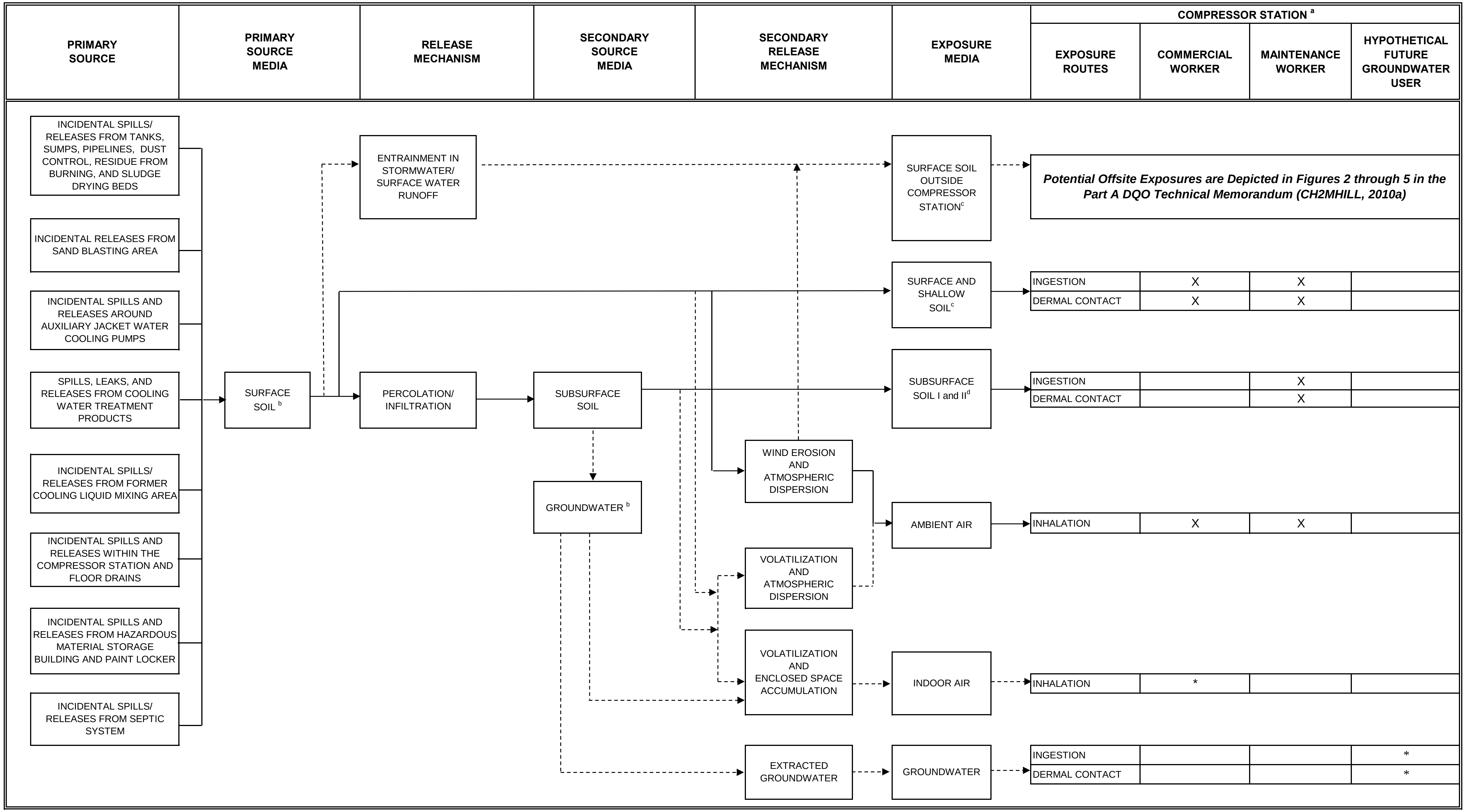
FIGURE B-1
PART B INVESTIGATION AREAS

SOIL INVESTIGATION PART B
PAHSE 1 WORK PLAN
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\ALL_SWMU_AOC_11X17.mxd Date Saved: 12/6/2012 3:57:39 PM

FIGURE B-2
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 in Appendix A).

c Surface soils defined as soils collected at depths between 0 and 0.5 feet below ground surface (bgs); shallow soil defined as soils collected between 0 and 3 feet bgs. (See Figure 3-1 in the RAWP (ARCADIS, 2008a)).

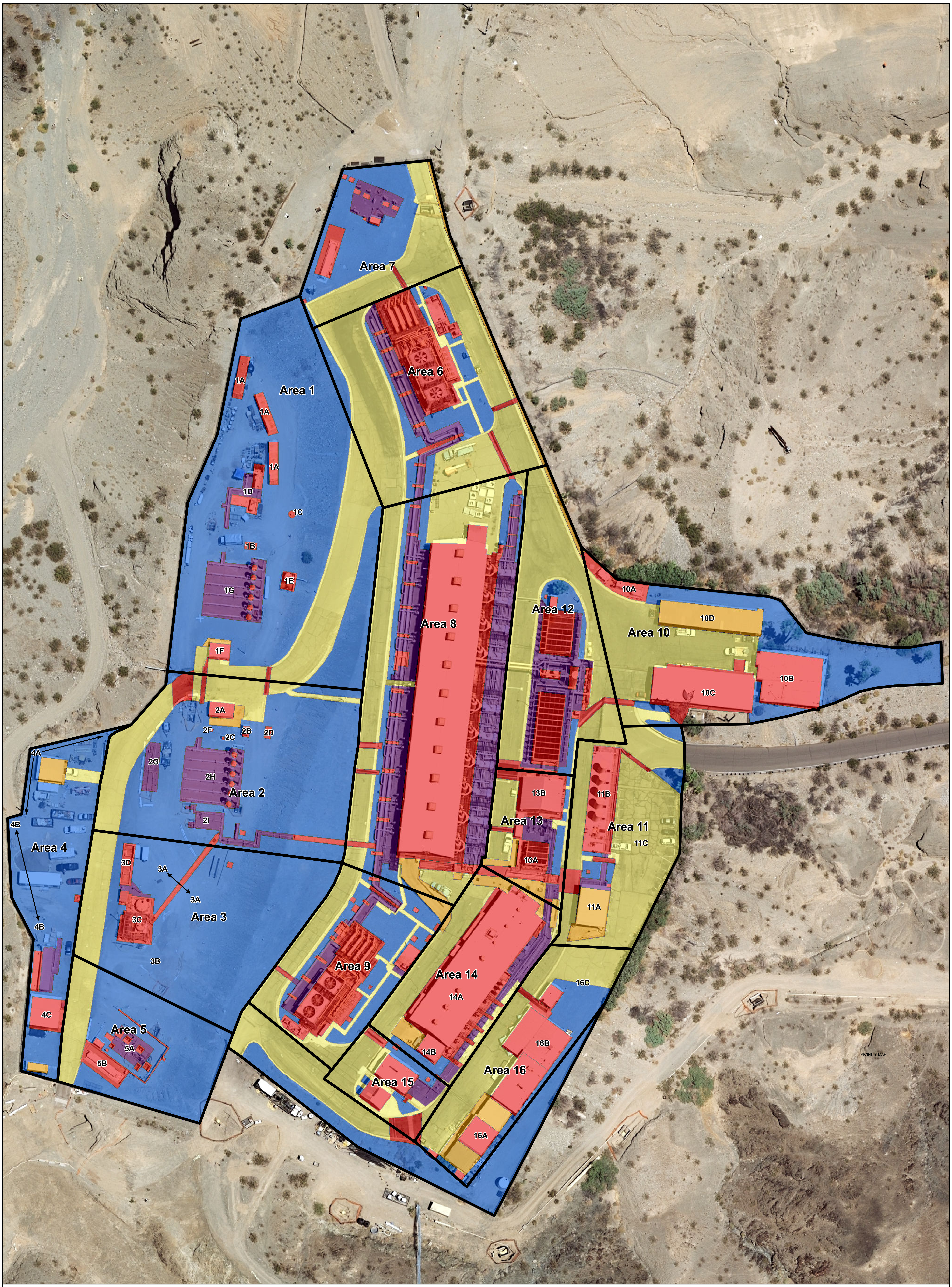
d Subsurface soil I defined as soil collected between depths of 0 an 6 feet bgs; subsurface soil II defined as soil collected between 0 and 10 feet bgs (See Figure 3-1 in the RAWP (ARCADIS, 2008a)).

$\longrightarrow$ 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.



Color Code [1]	Description	Direct Access to Soil?	Suitable for XRF Screening?	Accessibility for Hydrovac Sampling	Accessibility for Surface/Shallow Soil [3] Hand Sampling
Red	Operation TCS Building or element of operation infrastructure.	No	No	Not Accessible	Not Accessible
Orange	Covered operational structure or area of thick concrete	No	No	Not Accessible	Not Accessible
Yellow	Asphalt or thin concrete cover[2] away from above ground infrastructure or known dense underground utilities.	No	No	Likely Accessible [4]	Accessible
Purple	Close proximity to or immediately below above ground operational infrastructure without asphalt or concrete cover.	Yes	Yes	Potentially Accessible [4]	Accessible [5]
Blue	Away from above ground operational infrastructure without asphalt or concrete cover.	Yes	Yes	Likely Accessible [4]	Accessible

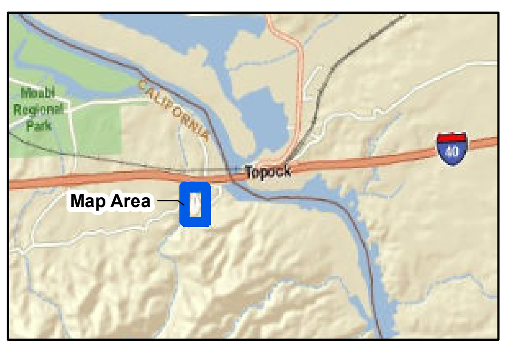
Notes:

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.

See Table B-13 for additional notes related to utilities in each area.

See the Access Constraints section in each subappendix for details on access restrictions.

1. Color code boundaries were established based on field observation only and are not surveyed or based on as-built records.
2. Given the presence of asphalt/concrete, any potential surface exposure/migration risks associated with contaminants that may be present are currently mitigated.
3. The term "surface/shallow soils" is intended to apply to depths sampled using small hand tools.
4. Hydrovac sampling may not be feasible (safe) in these areas due to the proximity of operational infrastructure, or access suitable for the hydrovac rig may be too far from the proposed sample location. Access by hydrovac must be verified in the field for the final sample location selected during the phased sampling effort.
5. While there is direct access to surface soils at these locations, above ground operational structures likely limit workers ability to collect soil samples deeper than the ground surface.



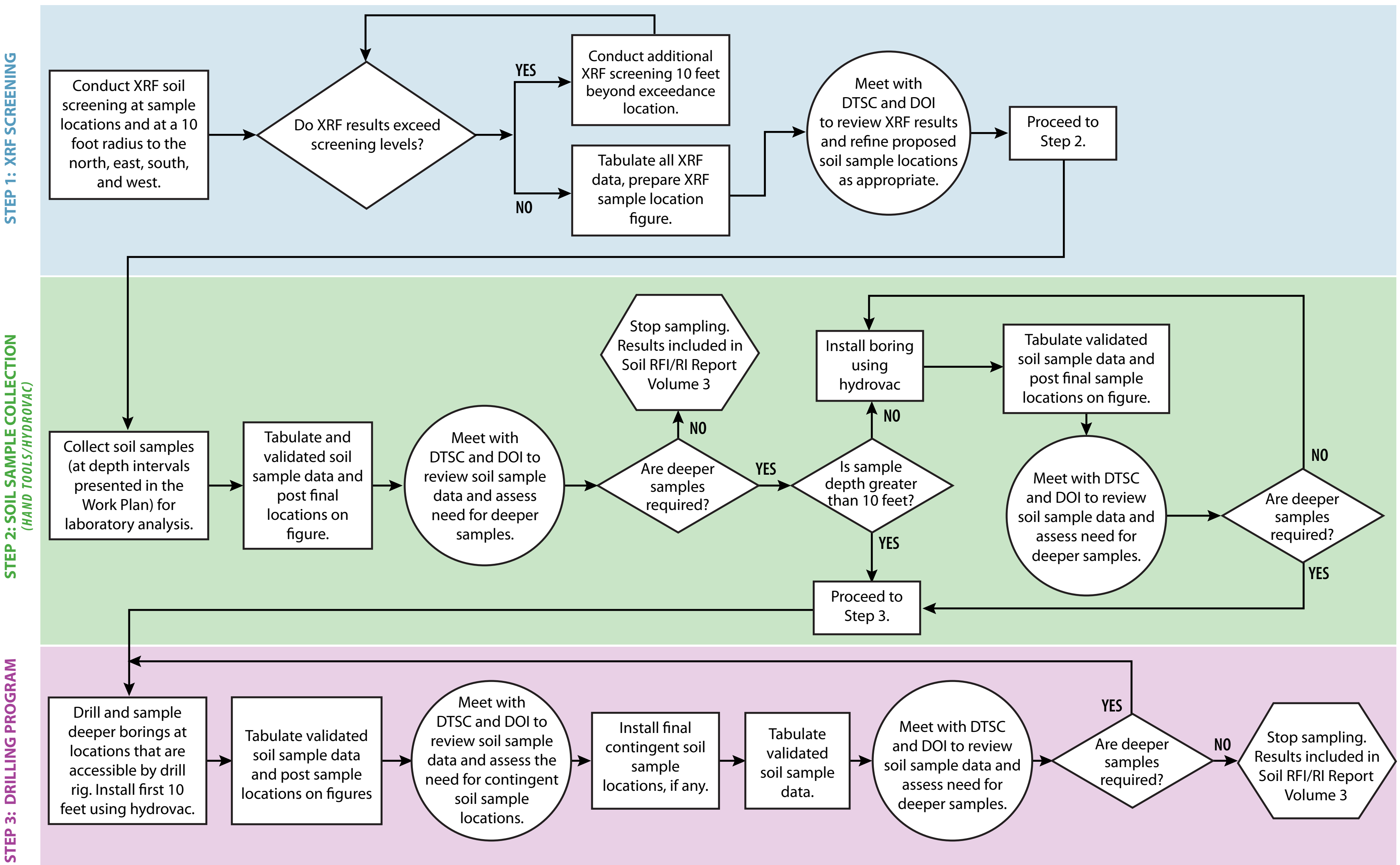
N

0 25 50
Feet

FIGURE B-3
Topock Compressor Station Accessibility Map
PG&E Company Topock Compressor Station
Topock, California

Pacific Gas and Electric Company

Document Path: D:\Projects\Topock\MapFiles\2012\SWP_B\CS_drilling.mxd



Notes:

See section 4.0 of Appendix B for further details regarding Phased Sampling Approach for areas inside the fence line.

1. XRF Surface soil screening will only be conducted if location is in an unpaved area
2. Sample locations will be posted on figures by investigation unit and/or group of investigation units

XRF	X-ray fluorescence
DOI	United States Department of the Interior
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
RFI/RI	RCRA facility investigation/remedial investigation

FIGURE B-4
Overview: Phased Sampling Approach for Areas Inside the Fence Line
PG&E Topock Compressor Station
Needles, California

CH2MHILL.

Subappendix B1

Data Quality Objectives Technical Memorandum – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

(on CD only)

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

[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.

[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

ARCADIS. 2008a. *Human Health and Ecological Risk Assessment Work Plan, Topock Compressor Station, Needles, California.* August.

__________. 2008b. *Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil.* May 28.

__________. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

__________. 2010. Comments on the Pacific Gas and Electric Company (PG&E) "Response to Comments to the Draft Soil Part B Work Plan." July 20.

California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). 2005. *Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision).* January.

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. *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.* November 1.

California Regional Water Quality Control Board, San Francisco Bay Region (Water Board). 2008. *Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater.* May 27.

CH2M HILL. 2007a. *Topock Compressor Station, Needles, California Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part B.* December.

__________. 2007b. *Revised Final RCRA Facility Investigation and Remedial Investigation Report. Volume 1 – Site Background and History.* August.

__________. 2008a. *Draft PG&E Program Quality Assurance Project Plan*. March.

__________. 2008b. *Final Soil and Sediment Data Usability Technical Memorandum, PG&E Topock Compressor Station*. August 29.

__________. 2008c. *Draft Soil Addendum for the Topock Compressor Station, RCRA Facility Investigation/Remedial Investigation*. May.

__________. 2008d. *Draft Calculation of Soil Screening Levels for Protection of Groundwater at the PG&E Topock Compressor Station.* August 1.

__________. 2009a. *RCRA Facility Investigation/Remedial Investigation Report, Revised Final, Volume 2, PG&E Topock Compressor Station, Needles, California*. February 11.

__________. 2009b. *Soil Background Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California.* July.

__________. 2010a. *Data Quality Objectives Steps 1 through 5 – Part A Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California. December 14, 2009.* Revised March 12, 2010.

__________. 2010b. *Soil Investigation Part A Phase 1 Data Gaps Evaluation Report PG&E Topock Compressor Station, Needles, California*. September.

Simunek, J., M. Sejna, and M. Th. van Genuchten. 1998. *The HYDRUS-1D Software Package for Simulating the One-Dimensional Movement of Water, Heat, and Multiple Solutes in Variably Saturated Media*. International Groundwater Modeling Center-TPS 70.

United States Department of the Interior (DOI). 2010. *Comments on Draft Data Quality Objectives Steps 1 – 5 – Part B Soil Investigation.* October 29.

United States Environmental Protection Agency (USEPA). 2000. *Data Quality Objectives Process for Hazardous waste Site Investigations* (EPA *QA/G-4HW).* Final. January.

__________. 2006a. *Guidance on Systematic Planning Using the Data Quality Objectives Process (EPA QA/G-4)*. February.

__________. 2006b. *Systematic Planning: A Case Study for Hazardous Waste Site Investigations (EPA QA/CS-1)*. February.

__________. 2010. *Regional Screening Levels for Chemical Contaminants at Superfund Sites.* http://epa-prgs.ornl.govchemicals/index.shtml. May 17.

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

<table>
<tr><th>STEP 1
Problem
Statement</th><th>STEP 2
Decision
Statement</th><th>STEP 3
Inputs to the
Decision</th><th>STEP 4
Study Area
Boundaries</th><th>STEP 5
Decision Rules</th></tr>
<tr>
<td>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</td>
<td><u>Decision 1</u>
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.</td>
<td>• 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</td>
<td>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</td>
<td>See Figure 2 for the Decision 1 decision rule</td>
</tr>
</table>

[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).	
	<u>Decision 2</u> 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
	<u>Decision 3</u>	• 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

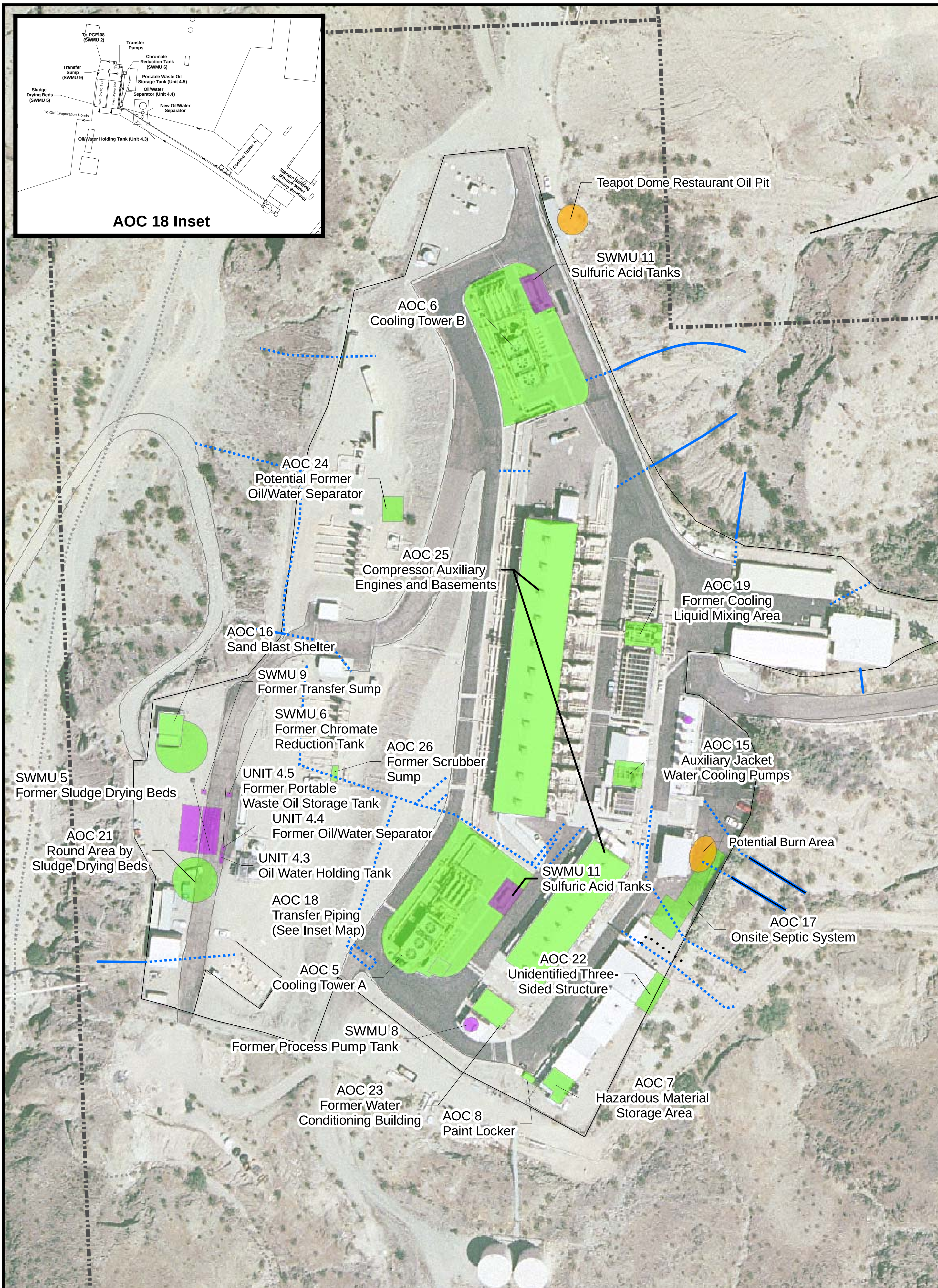
TABLE 1
Data Quality Objectives – Part B Soil Investigation
Final Data Quality Objectives Steps 1 through 5 – Part B Soil Investigation at the Pacific Gas and Electric Company Topock Compressor Station, Needles, California

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

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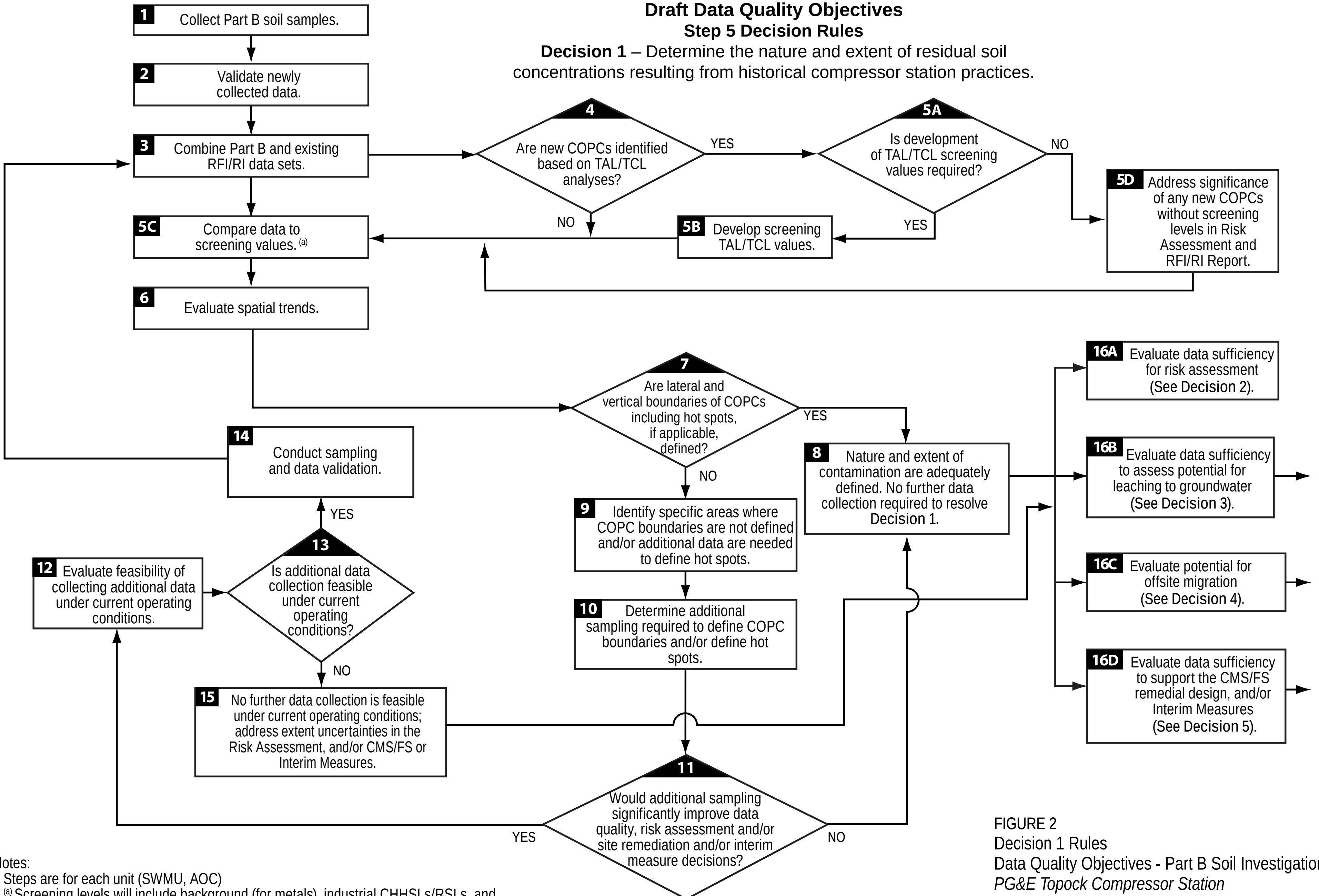

Notes:
– Steps are for each unit (SWMU, AOC)
– (a) Screening levels will include background (for metals), industrial CHHSLs/RSLs, and soil screening levels for protection of groundwater
COPCs: chemicals of potential concern

FIGURE 2
Decision 1 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

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Draft Data Quality Objectives

Step 5 Decision Rules

Decision 2 – Determine representative EPCs for residual soil contamination resulting from historical compressor station practices.

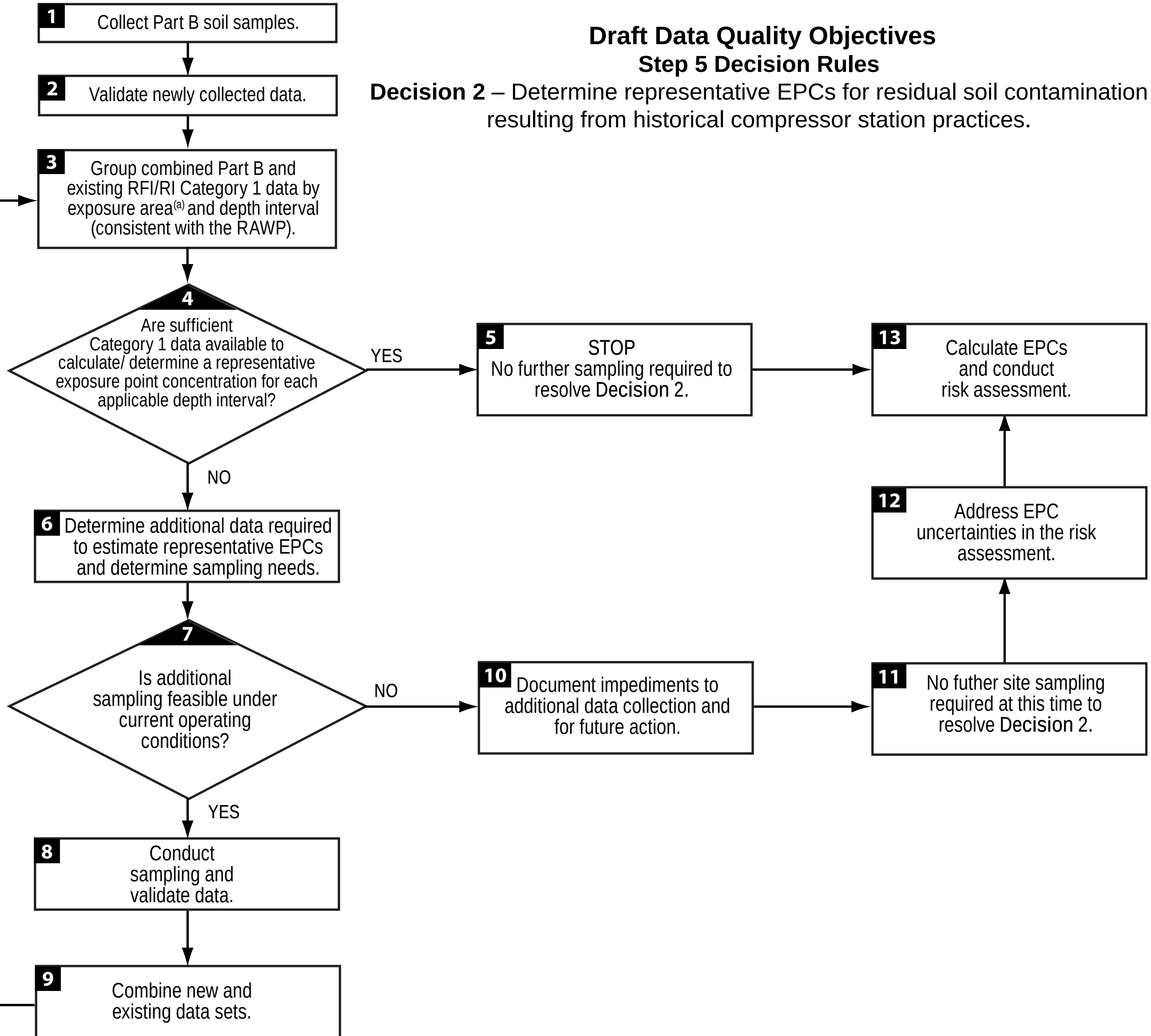

FIGURE 3
Decision 2 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

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

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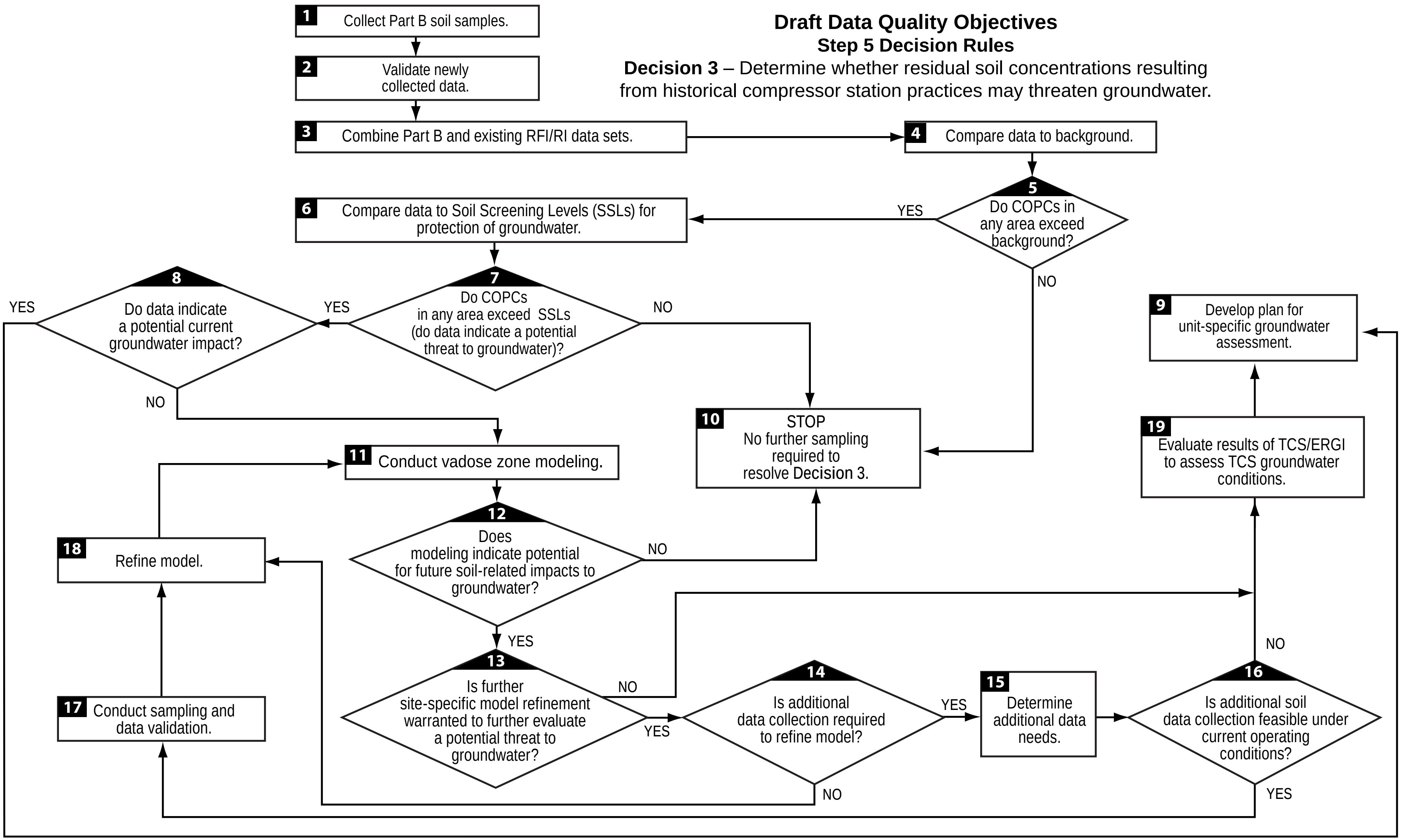

Notes:
SSL: soil screen levels for protection of groundwater
COPCs: chemicals of potential concern
TCS/ERGI: Topock compressor station/East Ravine Groundwater Investigation

FIGURE 4
Decision 3 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

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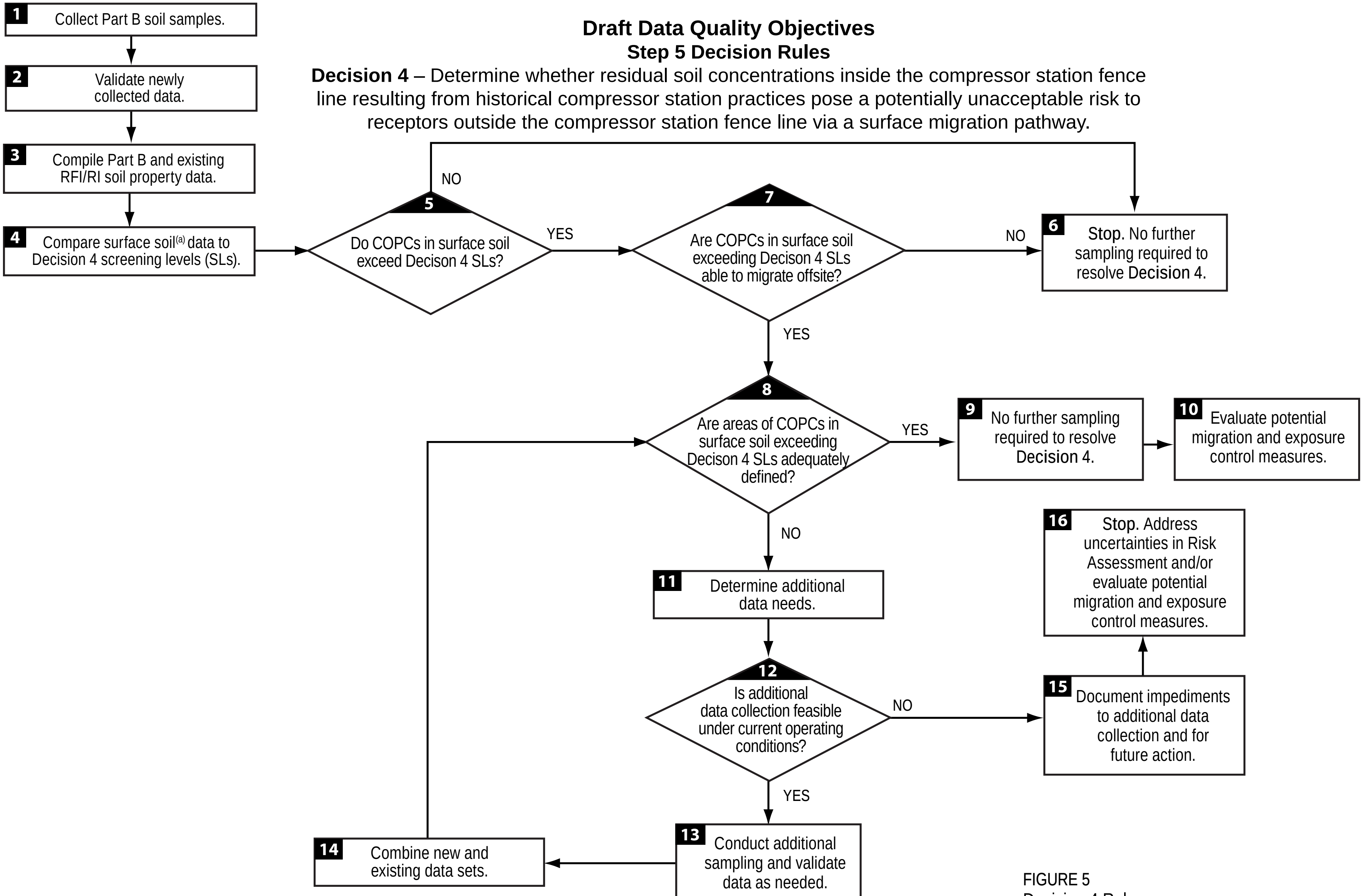

Notes:
– [a] Shallow soil defined as 0 to 0.5 feet/bgs
COPCs: chemicals of potential concern
Decison 4 SLs: Interim screening levels as defined in the Soil Part A Phase 1 Data Gaps Evaluation Report

FIGURE 5
Decision 4 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

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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.

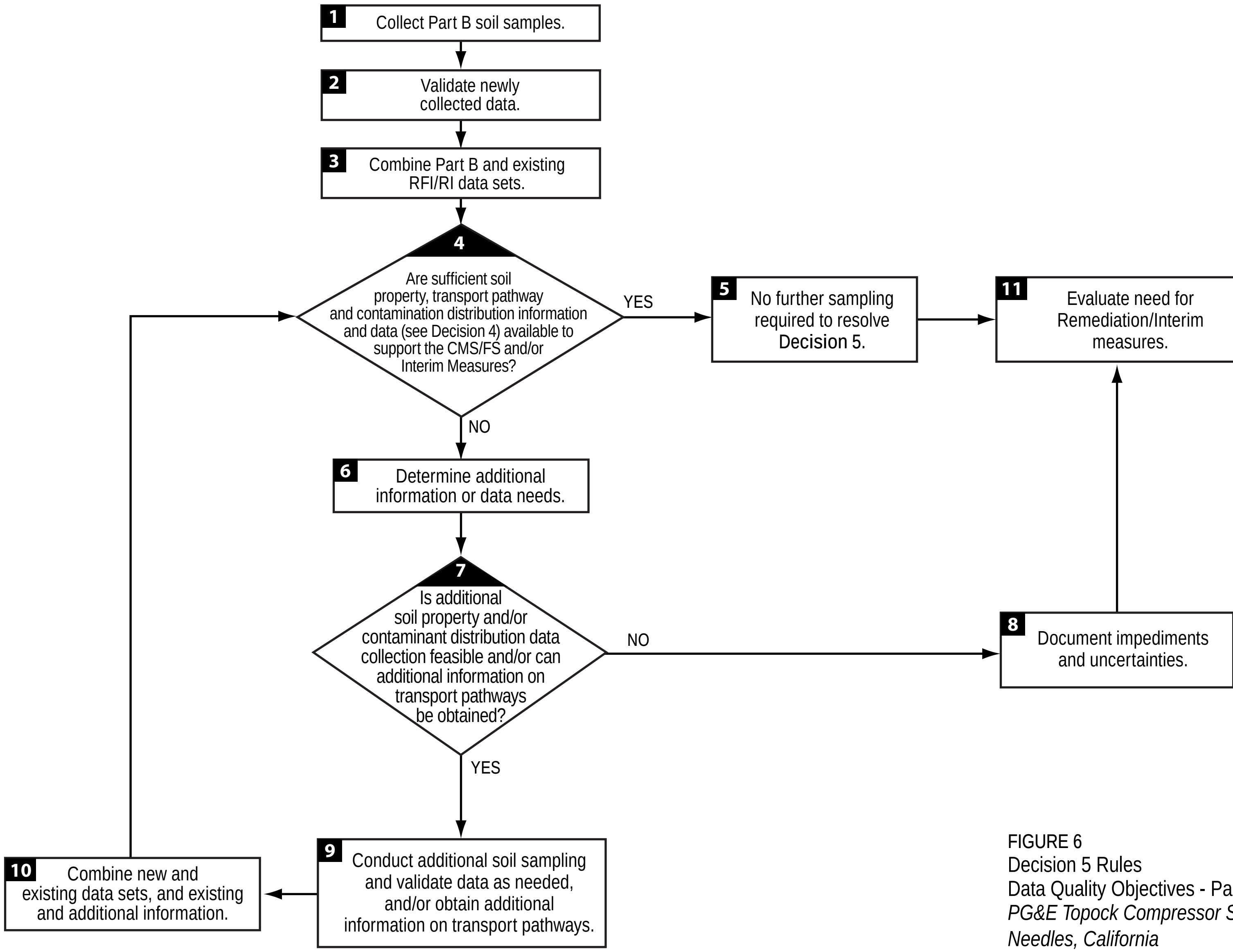
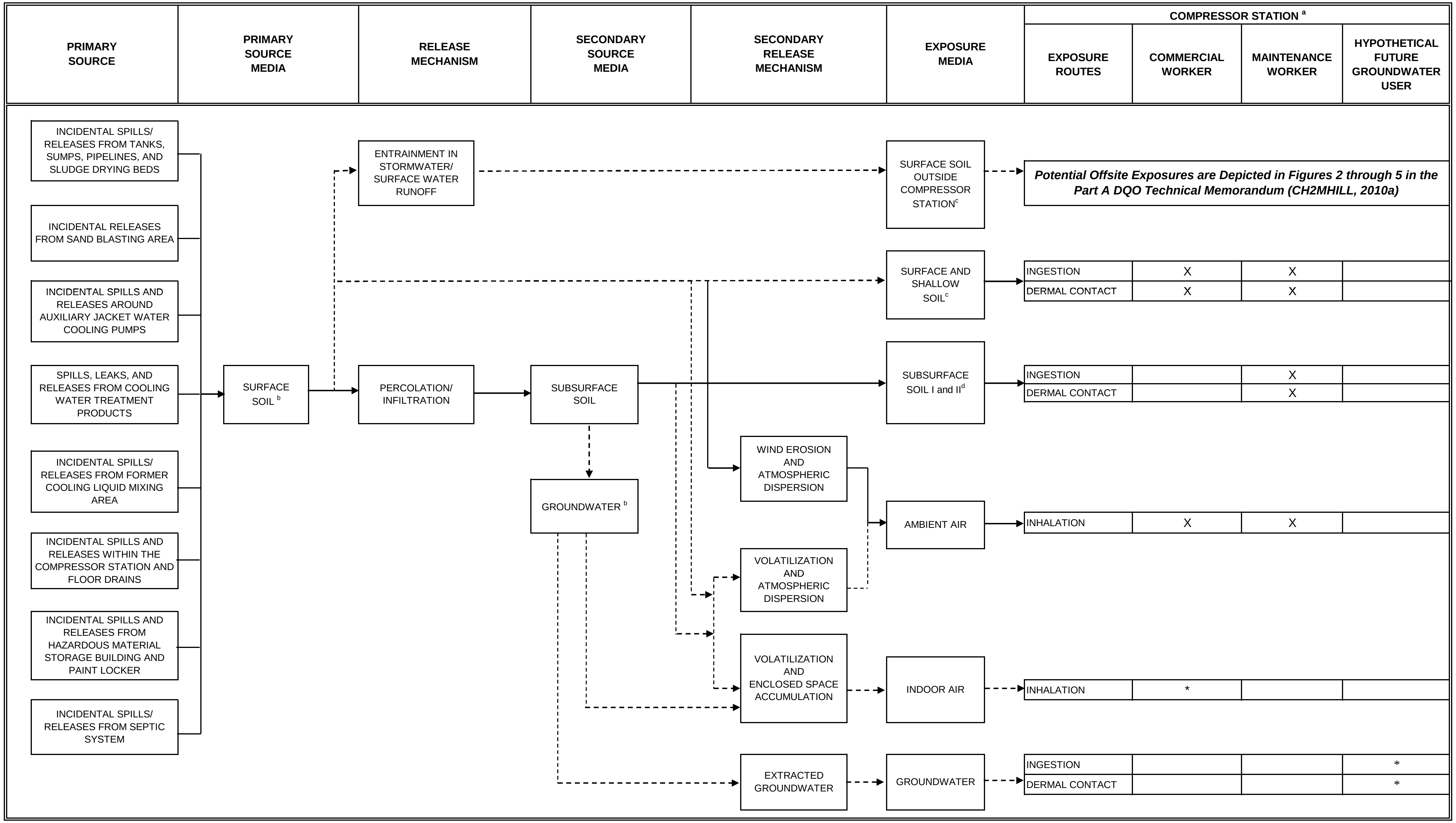


FIGURE 6
Decision 5 Rules
Data Quality Objectives - Part B Soil Investigation
PG&E Topock Compressor Station
Needles, California

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.

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				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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					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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		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~~ <u>support the CMS/FS or Interim Measures</u>*?"	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 <u>or excess onsite exposure</u> 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	

[a] Comment Types: M = Mandatory, S = Suggested, E = Editorial

				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.	

[a] Comment Types: M = Mandatory, S = Suggested, E = Editorial

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

Subappendix B2
SWMU 5 – Sludge Drying Beds
Investigation Program

Contents

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
PG&E	Pacific Gas and Electric Company
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
XRF	x-ray fluorescence
Water Board	California Regional Water Quality Control Board

SUBAPPENDIX B2

SWMU 5 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU) 5 comprises the two former sludge drying beds. Sludge Drying Bed 1 (the eastern bed) was constructed in 1951. It was divided into two equal compartments by a wall running north to south along the center of the bed. Sludge Drying Bed 2 (the western bed) was constructed between 1967 and 1969 as part of the conversion to the two-step chromium treatment process. Both were located within the current facility fence line in the southern part of the lower yard, as shown in Figure B2-1. (All figures and tables appear at the end of this subappendix.) The two sludge drying beds were located directly adjacent to one another and were connected by piping near the southern (deeper) end, as shown on Drawing Number 485352 (Pacific Gas and Electric Company [PG&E], 2001). 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). A cross-section view of the sludge drying beds is provided in Figure B2-2.

Sludge Drying Bed 1 was 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, Sludge Drying Bed 1 contains whitish material. A round, whitish area is also present just south of Sludge Drying Bed 1. This round area, which has been designated Area of Concern (AOC) 21, is discussed in Appendix B18.

From 1964 through 1969, a portion of Sludge Drying Bed 1 was used to treat wastewater containing chromium (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.

Sludge Drying Bed 2 was constructed as part of the reconfiguration of the hazardous waste treatment system, originally intended to support deep well injection of treated wastewater into well PGE-8. From 1969 through October 1985, the two 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 (Water Board) Order 70-73 was issued on December 10, 1970 (Water Board, 1970), and it appears that the chromium hydroxide 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 to 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 hydrocarbons (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 (that is, 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 twice at location WDB-4 (detected concentrations of 100 mg/kg and 93 mg/kg (duplicate sample) 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 and shown on Figure B-3 in Appendix B, there are substantial access constraints within the compressor station. SMWU 5 is located on the boundary of Area 3 and Area 4 on the Topock Compressor Station Accessibility Map. The majority of the eastern former drying bed, including sampling location SWMU5-2, is located within a paved roadway, making this location unsuitable for analysis using x-ray fluorescence (XRF). The western former drying bed is located in an unpaved section of Area 3 adjacent to the paved road surface. All SMWU 5 sampling locations are likely accessible by hydrovac. The accessibility assessment for each of the sampling locations can be found in Table B2-3. 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. 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. Photographs 60 and 61 in Subappendix B26 show the accessibility constraints in SMWU 5. Sample locations and depths identified for SMWU 5 take into account the identified access constraints and the phased sampling approach described in Section 4.0 of Appendix B.

3.2 SMWU 5 Proposed Sampling

Although this unit was closed in 1995, additional sampling for 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 (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B2-3. The figure also shows proposed samples associated with nearby SWMUs and AOCs. The proposed SMWU 5 sample locations were defined in collaboration with DTSC and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Samples are proposed at two locations, SWMU 5-1 and SWMU 5-2, within the footprint of the former sludge drying beds. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B2-3. Samples are proposed to be collected at the surface (0 to 1 foot bgs) and from the shallow subsurface interval, between 2 and 3 feet bgs, in accordance with the phased sampling protocol. 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 below the pavement. 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, Data Sufficiency to Support Corrective Measures Study/Feasibility Study and/or Interim Measures, 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 in Table B2-3 as SWMU5-1; however, the specific sample to be analyzed will be determined 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

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.

California Regional Water Quality Control Board (Water Board). 1970. *Resolution No. 70-73, Waste Discharge Requirements for Pacific Gas and Electric Company – Topock Compressor Station, Colorado River – San Bernardino County*. December 10.

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.

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). 1962. PG&E Work Order 473-D: Installation of Water Softener for Hot Well Make-Up. April 17.

__________. 1968. Author Unknown. Handwritten Notes Listing Ordered Chemicals.

__________. 1984. Letter from H. Howe/PG&E to Mr. Angelo Bellomo/CDHS. "Interim Status Document for Topock Compressor Station, USEPA ID Number CAT080011729." May 25.

__________. 2001. Location Plan of Tanks, Equipment & Piping, Waste Water Well Disposal System- Areas 13 & 14, Topock Compressor Station Gas Operations. Drawing Number 485352.

Tables

TABLE B2-1
Sample Results: Metals
Solid Waste Management Unit 5 – Sludge Drying Beds Investigation Program
Soil Investigation Part B 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**
			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	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	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	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	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
	12/09/88	3	FD	ND (0.3)	1.3	78	ND (1)	0.2	ND (1)	18	2.3	3.1	4	0.012	ND (1)	6.5	ND (0.5)	ND (1)	ND (5)	8.1	**93**	10.21	130
WDB-5	12/09/88	3	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 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)
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)
Fluoride	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	791	NA	(NE)	NA	(NE)	NA	(NE)
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)
pH	pH units	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	11.25	NA	(NE)	NA	(NE)	NA	(NE)
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, Solid Waste Management Unit 5 – Sludge Drying Beds
Soil Investigation Part B Work Plan,
Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/ Rationale	Analytes	Accessibility Assessment
SWMU 5-1	0-1[a] and 3, if feasible	Collect additional soil samples to analyze	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.	Not suitable for XRF Likely accessible by hydrovac
SWMU 5-2	0-0.5 and 3, if feasible	Collect additional soil samples to analyze	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and PAHs	Suitable for XRF Likely accessible by hydrovac

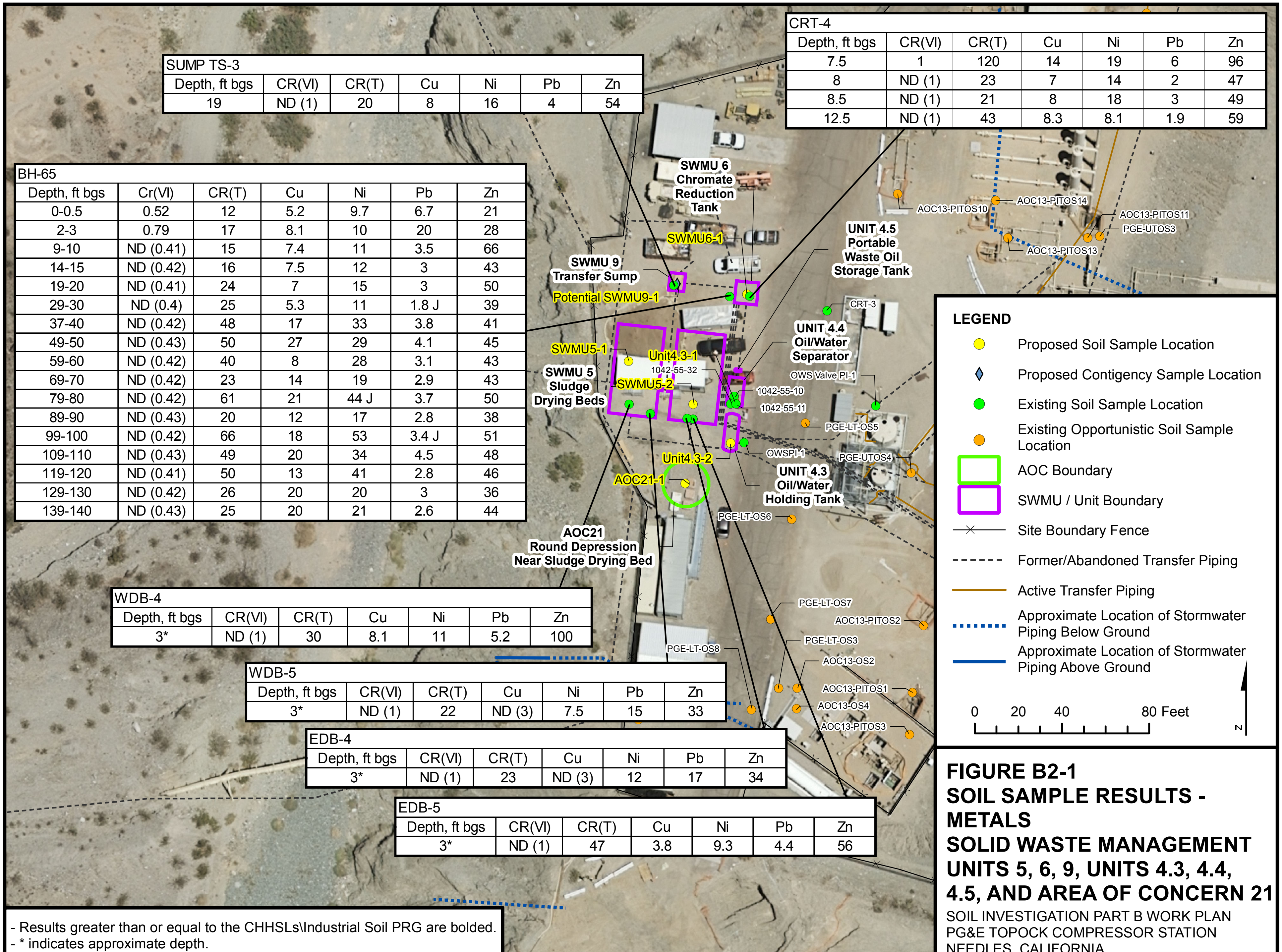
Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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	ND (1)	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	ND (1)	23	7	14	2	47
8.5	ND (1)	21	8	18	3	49
12.5	ND (1)	43	8.3	8.1	1.9	59

BH-65

Depth, ft bgs	Cr(VI)	CR(T)	Cu	Ni	Pb	Zn
0-0.5	0.52	12	5.2	9.7	6.7	21
2-3	0.79	17	8.1	10	20	28
9-10	ND (0.41)	15	7.4	11	3.5	66
14-15	ND (0.42)	16	7.5	12	3	43
19-20	ND (0.41)	24	7	15	3	50
29-30	ND (0.4)	25	5.3	11	1.8 J	39
37-40	ND (0.42)	48	17	33	3.8	41
49-50	ND (0.43)	50	27	29	4.1	45
59-60	ND (0.42)	40	8	28	3.1	43
69-70	ND (0.42)	23	14	19	2.9	43
79-80	ND (0.42)	61	21	44 J	3.7	50
89-90	ND (0.43)	20	12	17	2.8	38
99-100	ND (0.42)	66	18	53	3.4 J	51
109-110	ND (0.43)	49	20	34	4.5	48
119-120	ND (0.41)	50	13	41	2.8	46
129-130	ND (0.42)	26	20	20	3	36
139-140	ND (0.43)	25	20	21	2.6	44

WDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	30	8.1	11	5.2	100

WDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	22	ND (3)	7.5	15	33

EDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	23	ND (3)	12	17	34

EDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	47	3.8	9.3	4.4	56

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- * 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 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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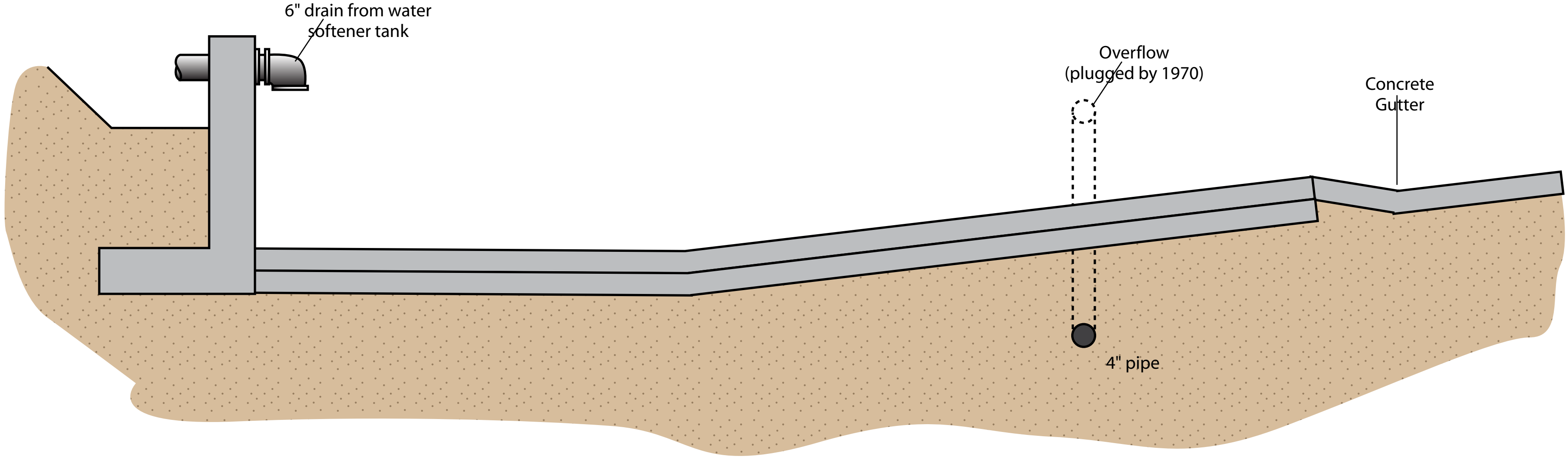

NOT TO SCALE

Based on PG&E Engineering Drawing No.38337, Rev. 2 (dated January 8, 1970)

FIGURE B2-2
Cross Section for SWMU 5
Sludge Drying Bed
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

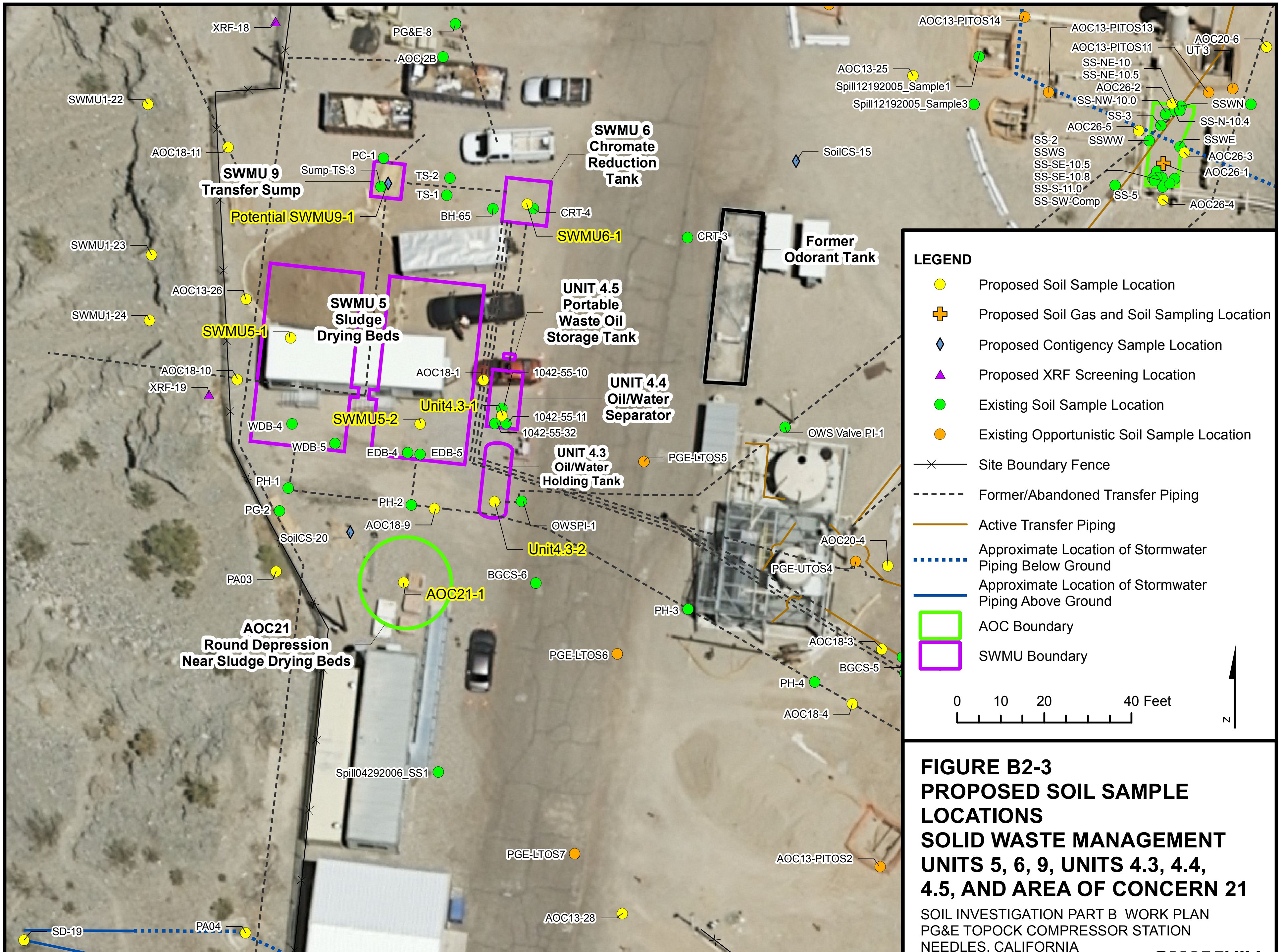

FIGURE B2-3
PROPOSED SOIL SAMPLE LOCATIONS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Subappendix B3
SWMU 6 – Chromate Reduction Tank Investigation Program

Contents

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
PG&E	Pacific Gas and Electric Company
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

SUBAPPENDIX B3

Solid Waste Management Unit 6 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU) 6 is the chromate reduction tank that was a component of the two-step wastewater treatment system established 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), as well as ancillary transfer and holding tanks and transfer piping. 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 located within the current 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 subappendix.)

The chromate reduction tank was approximately 10 feet high and 5 feet in diameter, with a capacity of 1,500 gallons (Pacific Gas and Electric Company [PG&E], 1982; Kearny, 1987). The tank was of steel construction, had an open top, and was originally one of the chemical feed tanks relocated from the water softening process (PG&E, 1970). The tank was partially set below grade within a pit that measured 10 feet wide by 10 feet long. There is some uncertainty with regard to the depth of the pit; the Mittelhauser closure report describes the tank as being "lifted out of the 4-foot hole in which it sat" (Mittelhauser, 1990). The tank was located on 2-foot footings, and it is unclear from the report whether the 4-foot hole included the footings or whether the footings were located below the hole. As a conservative assumption, the investigation approach for this unit was designed assuming the bottom of the footings was located at approximately 6 feet below ground surface (bgs). 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). A conceptual cross-section of SWMU 6 is shown in Figure B3-2.

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

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[1] Historic documents indicate that the system was installed and began operation sometime between November 1969 and March 1970.

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). The closure report noted that during closure of the chromate reduction tank, a "bathtub ring" was noted on the wall of the tank excavation after the tank was removed, and that the soil beneath the tank "appeared compacted as though water had sat on it" (Mittelhauser, 1990). As a precaution, approximately 1 foot of soil was removed from the sides and bottom of the tank excavation and was disposed of as hazardous waste (Mittlhauser, 1990). It does not appear soil samples were collected because the closure only indicates that the soil was removed because it "could have been contaminated" (Mittelhauser, 1990). Oily staining was also noted in the tank excavation, from 1 inch to 1 foot below the excavation, primarily in the southwest corner of the excavation.

The chromate reduction tank was removed from service when the compressor station switched to the nonhazardous, 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 nonhazardous, 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.

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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.

- Excavation of a shallow trench across the floor of the excavation for collection of confirmation samples.
- Removal of the wooden shoring from the excavation, backfilling with local (nonnative) fill material, and final grading.

The confirmation samples were collected from the wall of the trench at one location at depths of 0.5, 1.0, 1.5, and 5.0 feet below the bottom of the excavation. Because the tank pit may have been as deep as 6 feet and another 1 foot of soil was removed during closure activities, actual sample depths from the trench have been assumed to be 7.5, 8, 8.5, and 12 feet bgs. Samples were analyzed for Title 22 metals, hexavalent chromium, fluoride, specific conductance, and pH. As noted above, the closure report identified oil-stained soil on the south wall of the excavation, primarily in the southwest corner; however, no analysis for organic constituents was conducted.

2.0 Summary of Past Soil Characterization

Four historical subsurface soil samples and one duplicate subsurface soil sample (collected approximately 7.5, 8.0, 8.5, and 12.0 feet bgs, as described above) were collected from one location in the bottom of the tank excavation (CRT-4) in 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. The duplicate soil sample collected at 7.5 feet bgs was only analyzed for total chromium, hexavalent chromium, copper, nickel, 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 fifteen detected constituents. None of the detected constituents in the 8-foot-bgs and 8.5-foot-bgs samples exceeded their respective background threshold values (BTVs). Three constituents in the 7.5-foot-bgs sample (total chromium, hexavalent chromium, and zinc) exceeded their 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 at sample location CRT-4. Hexavalent chromium was detected in one sample at concentration of 1 mg/kg (compared to the BTV of 0.83 mg/kg). The duplicate sample collected at the sample location did not contain hexavalent chromium; however, the reporting limit was 1 mg/kg. Total chromium and zinc were detected in all five samples. The maximum detected concentration total chromium of 120 mg/kg exceeded the BTV (39.8 mg/kg). The maximum detected zinc concentration of 96 mg/kg also exceeded the BTV (58 mg/kg). The detected concentrations of the three metals exceeding their respective BTVs are only marginally above the BTV, and the duplicate sample from this location contained concentrations of total chromium and zinc very close to their BTVs (43 mg/kg and 59 mg/kg, respectively). The overall concentration and distribution of constituents in the five 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 and on Figure B-3 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. SWMU 6, including sample location SWMU6-1, is located within a paved roadway making this location unsuitable for x-ray fluorescence screening. SWMU 6 is likely accessible by hydrovac. Table B3-3 provides the accessibility assessment for this proposed sampling location. 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 Subappendix B26 show the accessibility constraints in SMWU 6. Sample locations and depths identified for SMWU 6 take into account the identified access constraints and the phased sampling approach described in Section 4.0 of Appendix B.

3.2 SMWU 6 Proposed Sampling

Although this unit was closed in 1995, additional sampling for COPCs and sampling of the fill used to backfill the excavation is proposed as required by DTSC. As shown in Table B3-3 and Figure B3-3, one sample location (SWMU6-1) is proposed in SWMU 6 due to the small size of the unit and PG&E’s ability to locate the unit precisely based on engineering drawings that include existing well PGE-08 as a reference point (PG&E, undated). Table B3-2 summarizes the proposed SMWU 6 sample location, depth, description/rationale, and analytes. Figure B3-3 also shows proposed samples associated with nearby SWMUs and Areas of Concern. The proposed SMWU 6 sample location was defined in collaboration with DTSC and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

The sample location will be placed as close as possible to the center of the area that was excavated as part of the closure activity. Due to the nature of SWMU 6, this location is a deeper sample location. Samples are proposed to be collected at the surface (0 to 1 feet bgs) and from 2 to 3, 5 to 6, and 9 to 10 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. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons. Proposed samples for nearby Areas of Concern will also be used to characterize soil for this unit, as shown on Figure B3-1. 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.

__________. 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.

__________. 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). 1970. *Piping Plan for Waste Water Well Disposal System Area No. 5, Topock Compressor Station, Gas Operations*. Drawing 485349. February 25.

__________. 1982. *Operation Plan for Hazardous Waste Facility at the Topock Compressor Station.* December.

__________. undated. Location Plan of Tanks, Equipment & Piping, Waste Water Well Disposal System – Areas 13 & 14 *Topock Compressor Station, Gas Operations*. Drawing 485352.

Tables

TABLE B3-1
Sample Results: Metals and General Chemistry
Solid Waste Management Unit 6 – Chromate Reduction Tank Investigation Program
Soil Investigation Part B 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**	**Fluoride**	**pH**	**Specific conductance**
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**	380	8.42	170
	11/15/89	7.5	FD	---	---	---	---	---	ND (1)	**43**	---	8.3	---	---	---	8.1	---	---	---	---	---	**59**	---	10.01	---
	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	490	9.03	65
	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	400	9.52	45
	11/15/89	12 - 12.5	N	ND (1)	1.9	56	0.1	0.2	ND (1)	**43**	3	8.3	1.9	ND (0.02)	0.67	8.1	ND (0.1)	ND (0.05)	ND (1)	43	14	**59**	650	10.01	380

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 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	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	650	NA	(NE)	NA	(NE)	NA	(NE)
pH	pH units	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	10.01	NA	(NE)	NA	(NE)	NA	(NE)
Specific conductance	µS/cm	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	380	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Antimony	mg/kg	0 / 4 (0%)	0 / 0 (0%)	0 / 4 (0%)	0 / 0 (0%)	ND (1)	NA	(NE)	NA	(NE)	0	(380)
Arsenic	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	4.3	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	168	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	1 / 4 (25%)	0 / 0 (0%)	1 / 4 (25%)	0 / 0 (0%)	0.1	0	(0.672)	0	(NE)	0	(190)
Cadmium	mg/kg	1 / 4 (25%)	0 / 0 (0%)	1 / 4 (25%)	0 / 0 (0%)	0.2	0	(1.1)	0	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	1 / 4 (25%)	0 / 0 (0%)	1 / 4 (25%)	0 / 0 (0%)	1	1	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	120	2	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	10	0	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	14	0	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	6	0	(8.39)	0	(NE)	0	(320)
Mercury	mg/kg	0 / 4 (0%)	0 / 0 (0%)	0 / 4 (0%)	0 / 0 (0%)	ND (0.02)	NA	(NE)	NA	(NE)	0	(180)
Molybdenum	mg/kg	1 / 4 (25%)	0 / 0 (0%)	1 / 4 (25%)	0 / 0 (0%)	0.67	0	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	19	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)
Trivalent Chromium	mg/kg	1 / 1 (100%)	0 / 0 (0%)	1 / 1 (100%)	0 / 0 (0%)	43	NA	(NE)	NA	(NE)	NA	(NE)
Vanadium	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	25	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	4 / 4 (100%)	0 / 0 (0%)	4 / 4 (100%)	0 / 0 (0%)	96	2	(58)	0	(NE)	0	(100,000)

TABLE B3-3
Proposed Sampling Plan, Solid Waste Management Unit 6 – Chromate Reduction Tank
Soil Investigation Part B Work Plan, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
SWMU 6-1	0-1[a], 3, 6, and 10 if feasible	Collect additional soil samples	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons	Not suitable for x-ray fluorescence Likely accessible by hydrovac

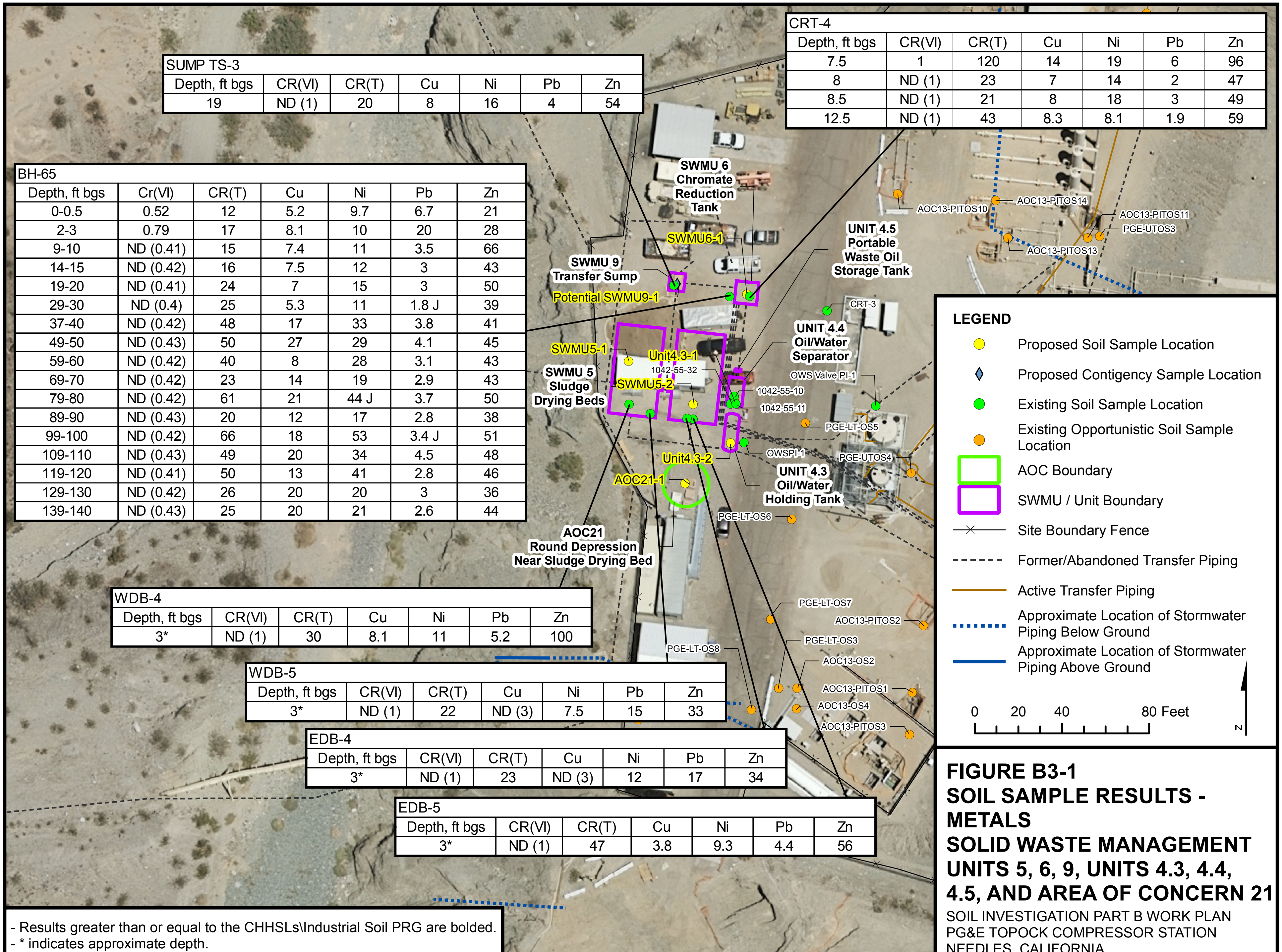
Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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	ND (1)	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	ND (1)	23	7	14	2	47
8.5	ND (1)	21	8	18	3	49
12.5	ND (1)	43	8.3	8.1	1.9	59

BH-65

Depth, ft bgs	Cr(VI)	CR(T)	Cu	Ni	Pb	Zn
0-0.5	0.52	12	5.2	9.7	6.7	21
2-3	0.79	17	8.1	10	20	28
9-10	ND (0.41)	15	7.4	11	3.5	66
14-15	ND (0.42)	16	7.5	12	3	43
19-20	ND (0.41)	24	7	15	3	50
29-30	ND (0.4)	25	5.3	11	1.8 J	39
37-40	ND (0.42)	48	17	33	3.8	41
49-50	ND (0.43)	50	27	29	4.1	45
59-60	ND (0.42)	40	8	28	3.1	43
69-70	ND (0.42)	23	14	19	2.9	43
79-80	ND (0.42)	61	21	44 J	3.7	50
89-90	ND (0.43)	20	12	17	2.8	38
99-100	ND (0.42)	66	18	53	3.4 J	51
109-110	ND (0.43)	49	20	34	4.5	48
119-120	ND (0.41)	50	13	41	2.8	46
129-130	ND (0.42)	26	20	20	3	36
139-140	ND (0.43)	25	20	21	2.6	44

WDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	30	8.1	11	5.2	100

WDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	22	ND (3)	7.5	15	33

EDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	23	ND (3)	12	17	34

EDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	47	3.8	9.3	4.4	56

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- * 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 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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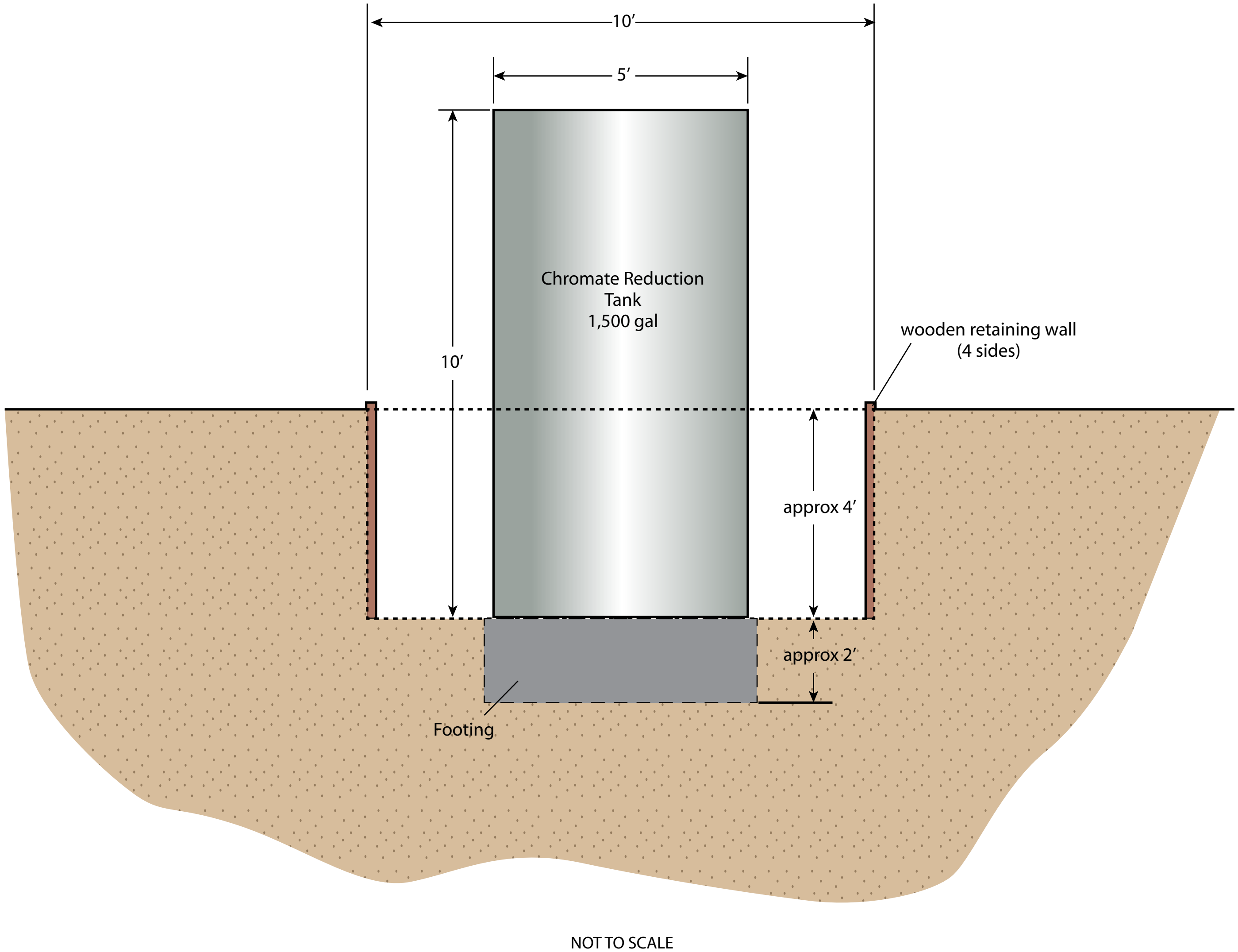
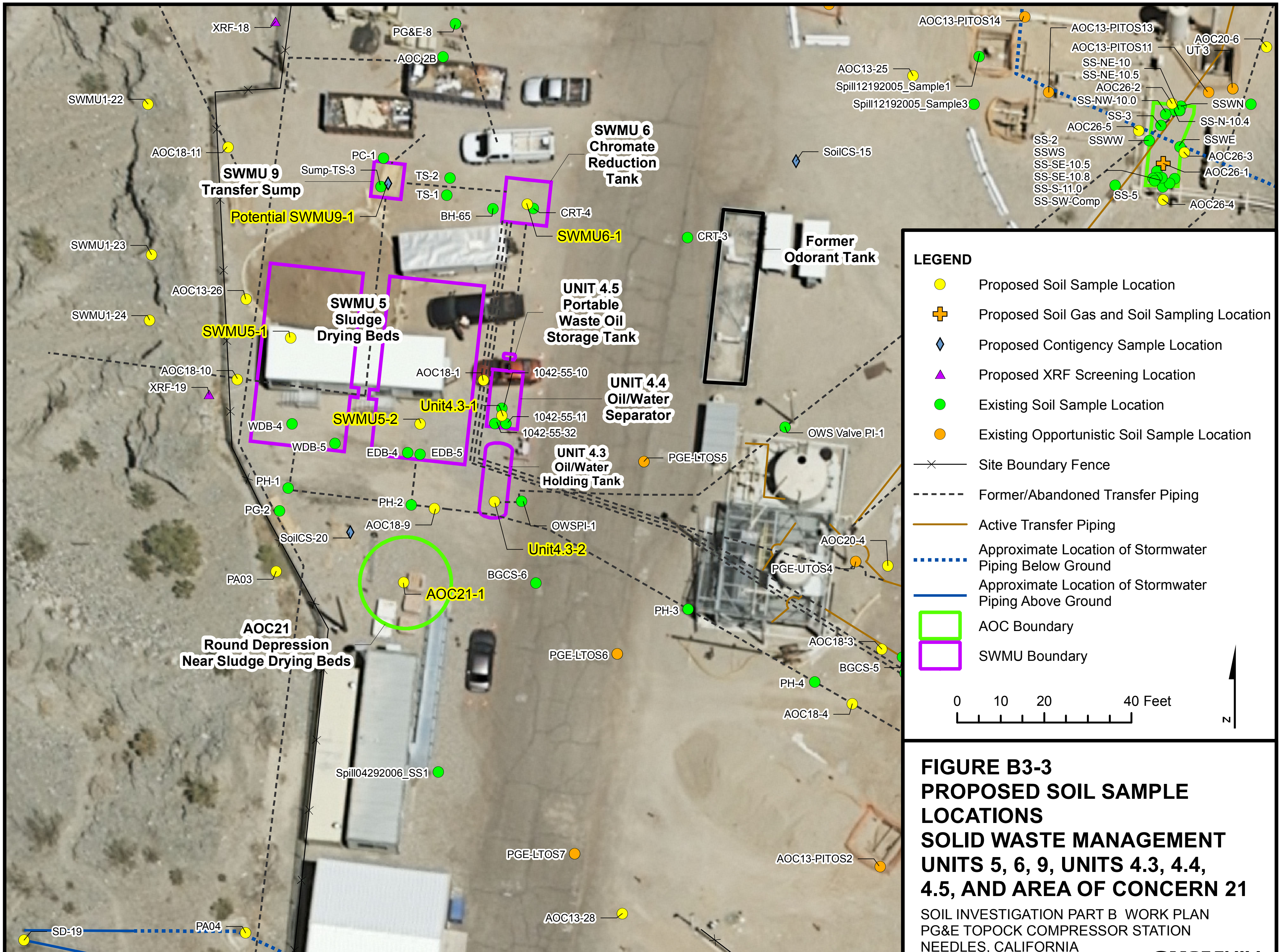


FIGURE B3-2
Conceptual Cross Section for SWMU 6–
Chromate Reduction Tank
PG&E Topock Compressor Station
Needles, California

Based on Mittlehauser Phases 1 and 2 Closure Certification Report, Hazardous Waste Management Facilities, Topock Compressor Station, Needles, CA (Mittlehauser, June 1990)



LEGEND

- Proposed Soil Sample Location
- Proposed Soil Gas and Soil Sampling Location
- Proposed Contigency Sample Location
- Proposed XRF Screening Location
- Existing Soil Sample Location
- Existing Opportunistic Soil Sample Location
- Site Boundary Fence
- Former/Abandoned Transfer Piping
- Active Transfer Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground
- AOC Boundary
- SWMU Boundary

0 10 20 40 Feet

N

FIGURE B3-3
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 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Subappendix B4
SWMU 8 – Process Pump Tank Investigation Program

Contents

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

SUBAPPENDIX B4

SWMU 8 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU) 8 is 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 subappendix.) The process pump tank was a 1,500-gallon-capacity, steel holding tank about 8 feet high and 5.5 feet in diameter (Pacific Gas and Electric Company, 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 as a chemical feed tank 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 (Area of Concern 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). However, as discussed below, subsequent work conducted during the closure of this unit indicated that a limited release had occurred (Mittelhauser, 1990).

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 dismantled 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 (nonnative) material and final grading.

Following removal of the tank, concrete foundation, and contaminated soil (to approximately 2 feet below ground surface [bgs]), 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 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 volatile organic compounds (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 of this subappendix 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 and shown on Figure B-3 in 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 . The boundary of SWMU 8 is located under the current fire suppression building, making all areas within the boundary inaccessible. Sample location SWMU8-1, located to the south of the SWMU boundary, is within a paved road surface and is unsuitable for x-ray fluorescence screening; however, this sampling location is likely accessible by hydrovac. The accessibility assessment for this proposed sampling location is located in Table B4-3. Thirty-five utility risers, including gas, electrical, Supervisory Control and Data Acquisition, 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.

3.2 SMWU 8 Proposed Sampling

Although this unit was closed in 1995, additional sampling for 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 (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B4-2. The proposed SMWU 8 sample location was defined in collaboration with DTSC and the United States Department of the Interior.

Samples will be collected at one proposed location (SWMU8-1). Samples will initially be sampled at the surface (0 to 1 feet bgs) and shallow subsurface intervals (2 to 3 feet bgs), in accordance with the phased sampling protocol. Proposed samples for nearby Areas of Concern will also be used to characterize soil for this unit, as shown on Figure B4-1. 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. 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 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 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												
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 - Solid Waste Management Unit 8 Process Pump Tank
Soil Investigation Part B Work Plan,
Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
SWMU 8-1	0-1[a] and 3, if feasible	Collect additional soil samples	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, and polycyclic aromatic hydrocarbons	Not suitable for X-ray fluorescence Likely accessible by hydrovac

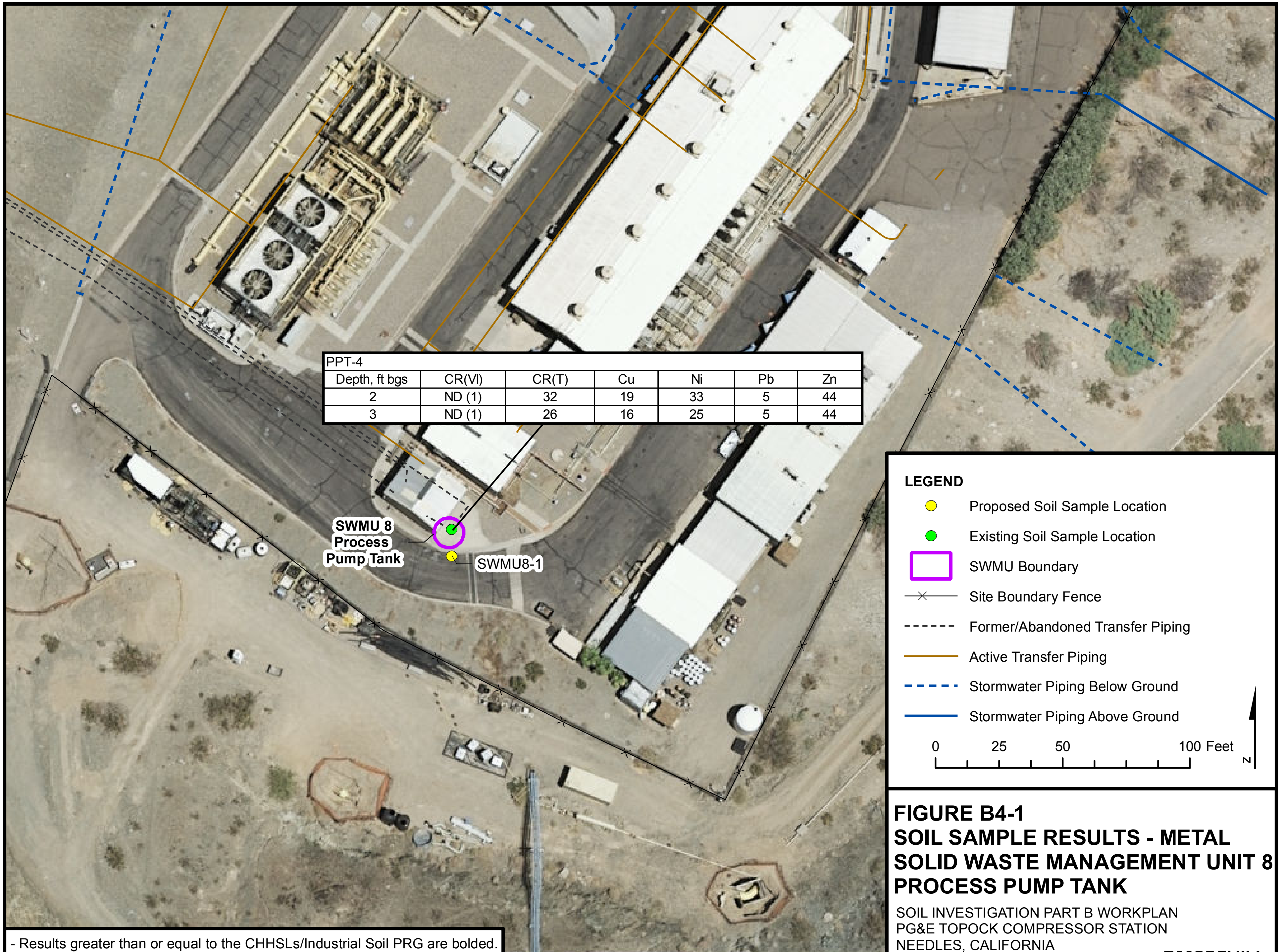
Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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	ND (1)	32	19	33	5	44
3	ND (1)	26	16	25	5	44

- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.

LEGEND

- Proposed Soil Sample Location
- Existing Soil Sample Location
- SWMU Boundary
- Site Boundary Fence
- Former/Abandoned Transfer Piping
- Active Transfer Piping
- Stormwater Piping Below Ground
- Stormwater Piping Above Ground

0 25 50 100 Feet

N

FIGURE B4-1
SOIL SAMPLE RESULTS - METAL
SOLID WASTE MANAGEMENT UNIT 8
PROCESS PUMP TANK

SOIL INVESTIGATION PART B WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\SWMU8\SWMU_8_RESULT_METAL.mxd

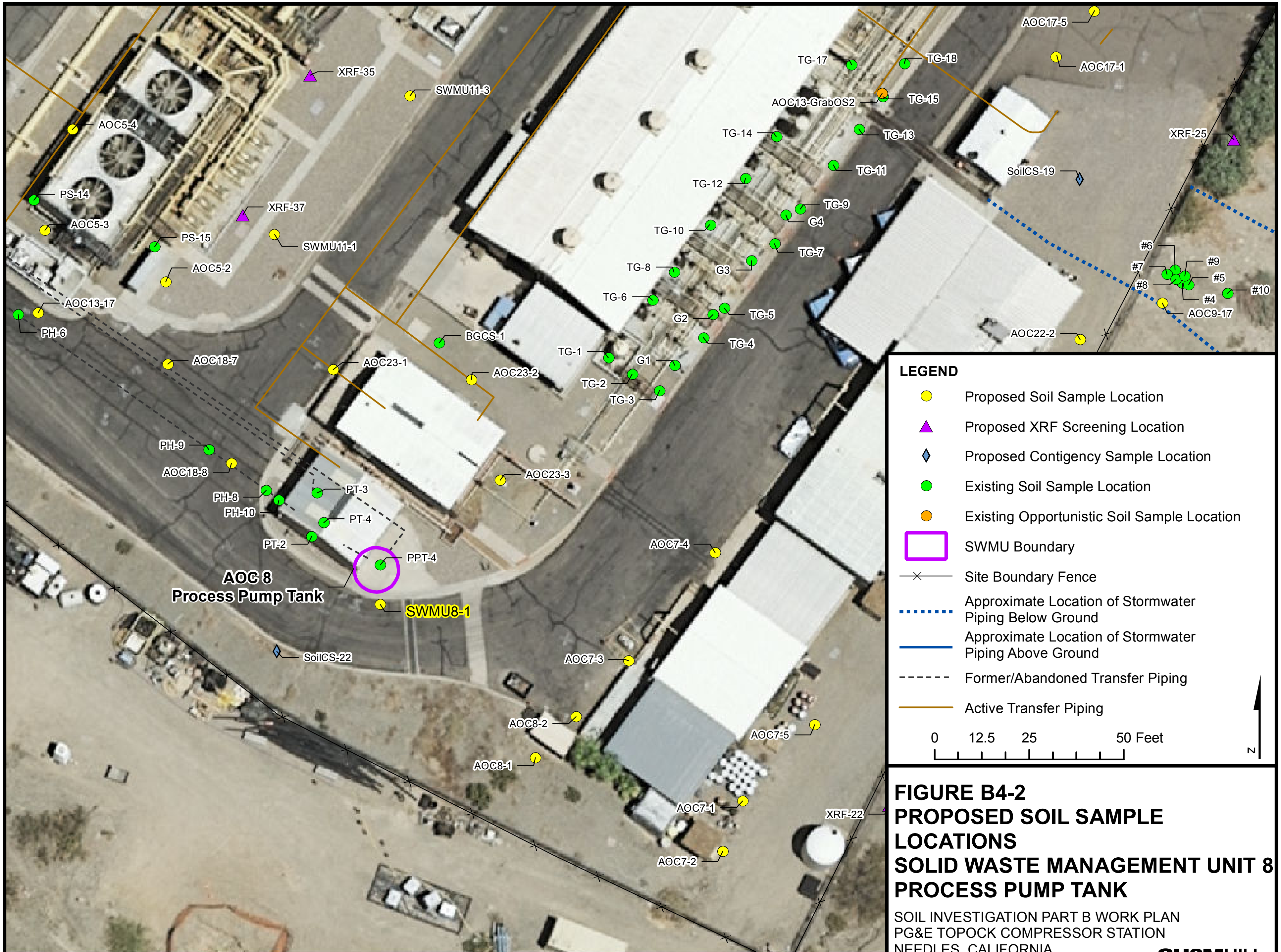


FIGURE B4-2
PROPOSED SOIL SAMPLE LOCATIONS
SOLID WASTE MANAGEMENT UNIT 8
PROCESS PUMP TANK

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Subappendix B5
SWMU 9 – Transfer Sump
Investigation Program

Contents

Acronyms and Abbreviations

COPC	chemical of potential concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
mg/kg	milligrams per kilogram
SWMU	Solid Waste Management Unit

SUBAPPENDIX B5

SWMU 9 Investigation Program

1.0 Introduction and Background

Solid Waste Management Unit (SWMU 9) is the transfer sump that was part of the two-step wastewater treatment system and was located within the current 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 subappendix.) The transfer sump was a prefabricated concrete septic tank with a capacity of 1,500 gallons (Pacific Gas and Electric Company, 1982a; 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 oil/water separator (either directly or through the chromate reduction tank) (Kearny, 1987). A 1982 process flow diagram (Pacific Gas and Electric Company, 1982b) originally prepared in 1970 shows flow went from the oil/water separator to the chromate reduction tank and then to the transfer sump. From November 1985 to October 1989, the transfer sump received nonhazardous (that is, phosphate-based) cooling water blowdown, and 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 nonhazardous and was used as onsite fill.

- 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 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, cadmium, hexavalent cadmium, 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; the detected concentration of 1 milligram per kilogram (mg/kg) exceeds the background threshold value (0.672 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, total petroleum hydrocarbons, and semivolatile organic compounds in soil at SWMU 9 (DTSC, 2006). Chemicals of potential concern (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 and as shown on Figure B-3 in Appendix B, there are substantial access constraints within the compressor station. SMWU 9 is located in Area 4 on Figure B-3, Topock Compressor Station Accessibility Map. SWMU 9 is located in an unpaved area of the compressor station making this a suitable location for x-ray fluorescence screening and likely accessible by hydrovac. 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 61 in Subappendix B26 shows the accessibility constraints in SMWU 9. Sample locations and depths identified for SMWU 9 reflect the identified access constraints and reflect the phased sampling approach described in Section 4.0 of Appendix B.

3.2 SMWU 9 Proposed Sampling

Although this unit was closed in 1995, additional sampling for COPCs and sampling of the fill used to backfill the excavation may be required by DTSC. As agreed upon in the

March 29, 2012 comment resolution meeting, the decision to collect samples at SWMU 9 will be made during the data reviews calls described in Section 4.0 of Appendix B. If sampling is determined to be necessary, it will be performed directly beneath the footprint of the former sump, as shown in Figure B5-2. The proposed sample depths and analytical suite would also be determined during the data call and would be based on the COPCs detected at nearby units.

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. 1982a. *Operation Plan for Hazardous Waste Facility at the Topock Compressor Station*. December.

__________. 1982b. *Flow Diagram, Waste Water Treatment & Disposal System, Topock Compressor Station*. October.

Table

TABLE B5-1
Sample Results: Metals
Solid Waste Management Unit 9 – Transfer Sump Investigation Program
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

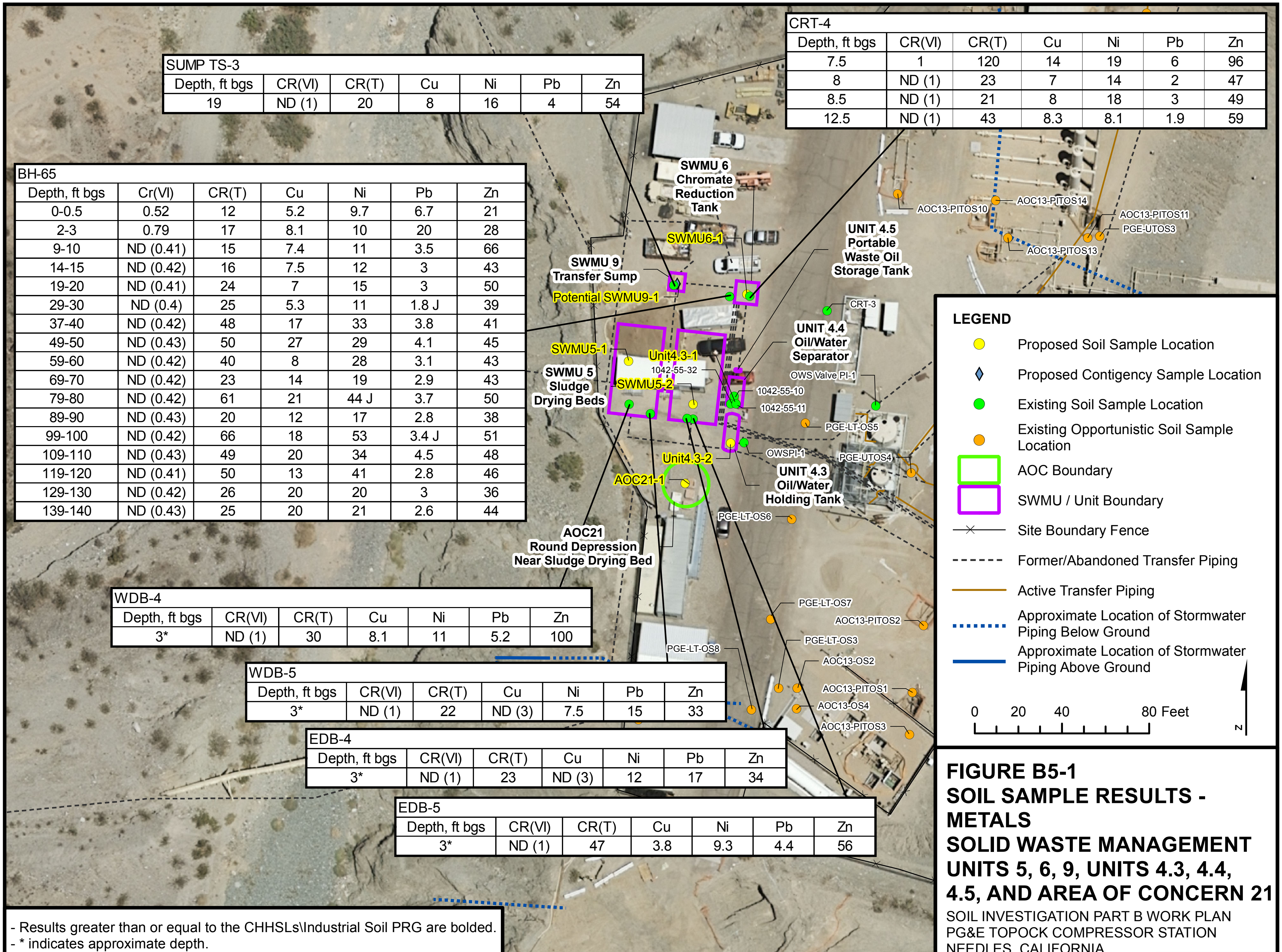
				Metals (mg/kg)																		General Chemistry		
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**	**NE**	**NE**	**NE**
RWQCB Environmental Screening 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.

Figures



SUMP TS-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
19	ND (1)	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	ND (1)	23	7	14	2	47
8.5	ND (1)	21	8	18	3	49
12.5	ND (1)	43	8.3	8.1	1.9	59

BH-65

Depth, ft bgs	Cr(VI)	CR(T)	Cu	Ni	Pb	Zn
0-0.5	0.52	12	5.2	9.7	6.7	21
2-3	0.79	17	8.1	10	20	28
9-10	ND (0.41)	15	7.4	11	3.5	66
14-15	ND (0.42)	16	7.5	12	3	43
19-20	ND (0.41)	24	7	15	3	50
29-30	ND (0.4)	25	5.3	11	1.8 J	39
37-40	ND (0.42)	48	17	33	3.8	41
49-50	ND (0.43)	50	27	29	4.1	45
59-60	ND (0.42)	40	8	28	3.1	43
69-70	ND (0.42)	23	14	19	2.9	43
79-80	ND (0.42)	61	21	44 J	3.7	50
89-90	ND (0.43)	20	12	17	2.8	38
99-100	ND (0.42)	66	18	53	3.4 J	51
109-110	ND (0.43)	49	20	34	4.5	48
119-120	ND (0.41)	50	13	41	2.8	46
129-130	ND (0.42)	26	20	20	3	36
139-140	ND (0.43)	25	20	21	2.6	44

WDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	30	8.1	11	5.2	100

WDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	22	ND (3)	7.5	15	33

EDB-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	23	ND (3)	12	17	34

EDB-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3*	ND (1)	47	3.8	9.3	4.4	56

LEGEND

- Proposed Soil Sample Location
- Proposed Contigency Sample Location
- Existing Soil Sample Location
- Existing Opportunistic Soil Sample Location
- AOC Boundary
- SWMU / Unit Boundary
- Site Boundary Fence
- Former/Abandoned Transfer Piping
- Active Transfer Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground

0 20 40 80 Feet

N

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.
- * 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 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\SWMU5-9\SWMU5_9_RESULT_METAL.mxd

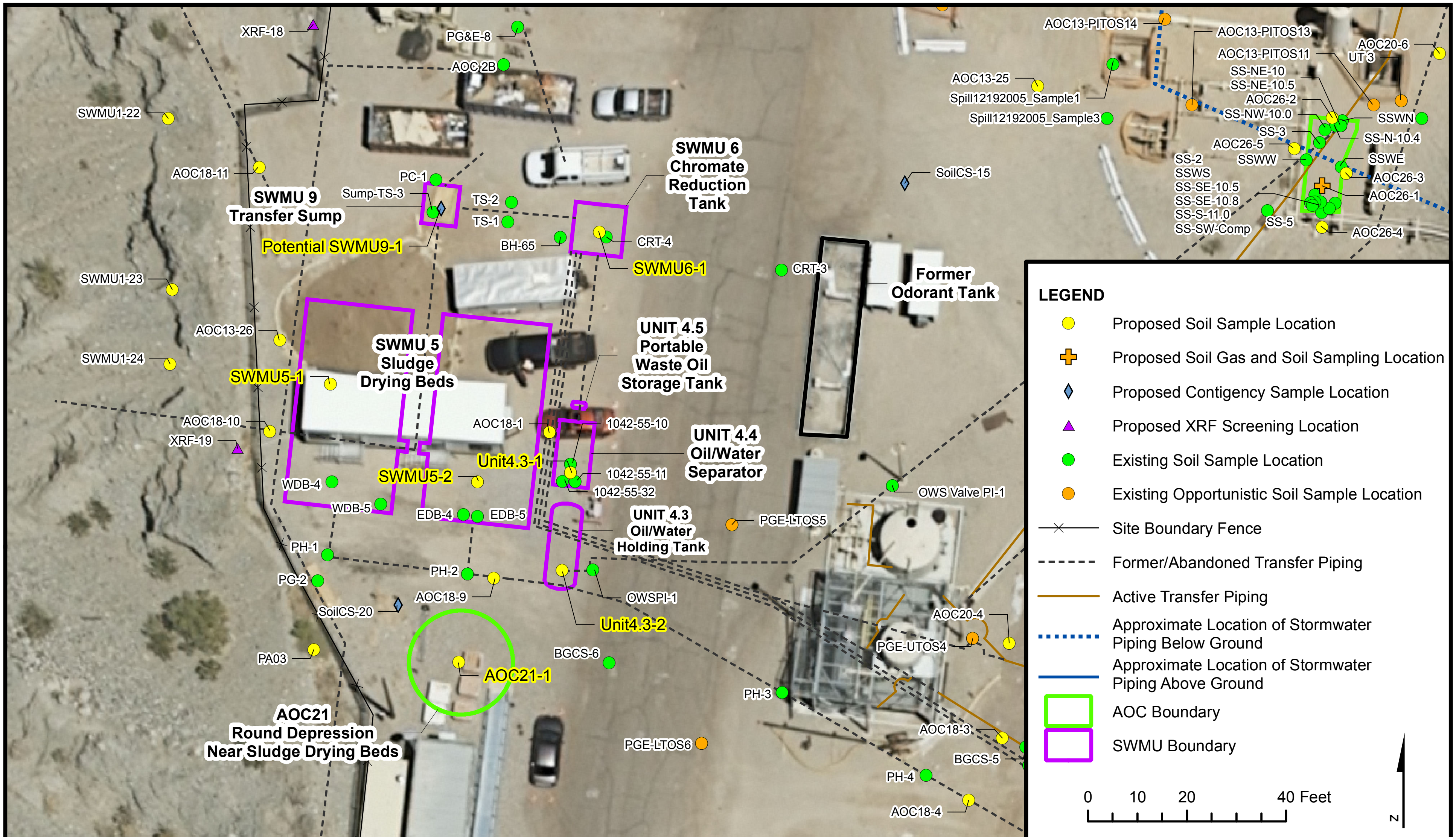


FIGURE B5-2
PROPOSED SOIL SAMPLE LOCATIONS
SOLID WASTE MANAGEMENT UNITS 5, 6, 9, UNITS 4.3, 4.4, 4.5, AND AREA OF CONCERN 21

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Subappendix B6
SWMU 11 – Former Sulfuric Acid Tanks Investigation Program

Contents

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
PG&E	Pacific Gas and Electric Company
SWMU	Solid Waste Management Unit
XRF	x-ray fluorescence

SUBAPPENDIX B6

SWMU 11 Investigation Program

1.0 Introduction and Background

1.1 Background

Solid Waste Management Unit (SWMU) 11 consists of the locations of two former 2,600-gallon sulfuric acid tanks. Sulfuric acid tanks have been located at both Cooling Tower A (Area of Concern [AOC] 5) and Cooling Tower B (AOC 6) since circa 1958 (Pacific Gas and Electric Company [PG&E, 1961]). Two locations for the tanks were identified at each cooling tower. A conceptual site model for the tanks is shown in Figure B6-1. The locations of the sulfuric acid tanks have changed over time; the former locations are shown in Figures B6-2 and B6-3; the currently used 400-gallon portable tanks have recently been relocated into new containment areas, and the new areas are not part of the SWMU (see discussion of chemical storage tanks in AOCs 5 and 6). The locations of all former sulfuric acid tanks were incorporated into SWMU 11 and included in 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 active sulfuric acid feed drums were located in the acid houses (also known as chemical storage sheds) located at the cooling towers, as shown on Figures B6-2 and B6-3.[1] The original tanks were unlined steel aboveground storage tanks with a capacity of 2,600 gallons each and were installed between 1957 and 1958 as part of an overall effort to improve the chemical addition process for the cooling towers (PG&E, 1961). Because the tanks were unlined, sulfuric acid sludge was generated and required periodic removal (PG&E, 1972, 1982a). The steel tanks were replaced with new epoxy-lined tanks between 1982 and 1984 (PG&E, 1982b, 1984). It appears that the tanks may have been relocated from their former locations to the locations indicated by the concrete secondary containment at this time. Secondary containment was provided for the sulfuric acid tanks in 1988 (PG&E, 1988). The steel tanks were replaced with polyethylene-lined 400-gallon tanks in 2006. Until early 2012, these tanks were located within the original epoxy-coated concrete containment structures. In 2012, the chemical feed facilities were relocated again. The facilities at Cooling Tower A overlie the location of the original sulfuric acid tank and at Cooling Tower B are just south of the cooling tower, as shown on Figure B6-3. For ease of discussion, the tank locations are referred to as the first tank location (for the tanks installed in 1957-1958), second tank

[1] Full sulfuric acid drums were stored in the Chemical Storage Building and moved to the acid houses as needed (PG&E, 1953).

location (for the tanks installed between 1982 and 1984), and the current tank location (the location of the chemical feed tanks and addition system in 2012).

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 subappendix.) 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. Early chemical handling procedures at Topock indicated that baking soda was maintained at the station to neutralize sulfuric acid spills (PG&E, 1953). 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 this work plan.

The primary source medium at SMWU 11 is surface soil. Because the majority of the area around the former tank locations 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 second 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 data gaps identified for Decision 1 include:

1. Data Gap #1 – Lateral and vertical extents of contamination in area around the sulfuric acid tank locations in AOC 5
2. Data Gap #2 – Lateral and vertical extents of contamination in area around the sulfuric acid tank locations 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. The Decision 2 data evaluation performed using the existing data will be expanded to include the combined data set and considered in the exposure point concentrations developed for the risk assessment once the Part B investigation has been completed.
- **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 and as shown on Figure B-3 in 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. Sample locations designated for

SWMU 11 are located in both concrete walkways and unpaved areas near active compressor station facilities including both Cooling Tower A and Cooling Tower B. The accessibility assessment for each sample location is shown in Table B6-2. 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 Supervisory Control and Data Acquisition cabinet, and two anodes were identified in Area 9. Photographs 4, 10, and 11 in Subappendix B26 show the accessibility constraints in SMWU 11. Sample locations and depths identified for SMWU 11 reflect the identified access constraints and the phased sampling approach as described in Section 4.0 of the main text of Appendix B.

3.3 SMWU 11 Proposed Sampling

Table B6-2 summarizes the proposed SMWU 11 sample locations, depths, description/ rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figures B6-2 and B6-3. The figures also show proposed sample locations for nearby AOCs. The proposed SMWU 11 sample locations were defined in collaboration with DTSC and United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Samples are proposed to be collected at five locations: SWMU 11-1 through SWMU 11-5. The sample locations in this unit will initially be sampled at the surface (0 to 0.5 feet bgs) and shallow subsurface intervals (2 to 3 feet bgs) in accordance with the phased sampling protocol. 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B6-2 and B6-3. 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 US EPA Method 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 (DTSC). 2010. Letter. "Response to Comments to the Soil Part B Work Plan." July 20.

Pacific Gas and Electric Company (PGE). 1953. *Proper Method of Handling Sulphuric Acid Drums, Topock Station*. September 23.

———. 1961. *Piping Plan – Area No 12, North Cooling Tower Area, Topock Compressor Station*. Drawing Number GM 134695.

———. 1972. Letter from John S. Thomas (Dow Industrial Services) to Mr. Andy Andrews (PG&E). "Our May 10, 1972 Estimate for cleaning your Two Sulfuric Acid Storage Tanks." May 11.

———. 1982a. *Operation Plan for Hazardous Waste Facility at the Topock Compressor Station*. December.

———. 1982b. Letter from J. L. Robertson/PG&E to Mr. D. D. Craig (company unknown). "Acid Tanks at Topock." May 19.

———. 1984. Author unknown. Handwritten notes summarizing correspondence of waste water disposal history and dates of importance (1969–1984), with emphasis on Injection Well PGE-8.

———. 1988. Memorandum from Robert A Cook/PG&E to Marvin E. Bennett (company unknown). "SPCC Secondary Containment." October 27.

Tables

TABLE B6-1
Conceptual Site Model – SWMU 11 Former Sulfuric Acid Tanks
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company, 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
				Potential extracted groundwater[a]

Notes:

[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 B6-2
Proposed Sampling Plan - SWMU 11 Former Sulfuric Acid Tanks
Soil Investigation Part B Work Plan, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
SWMU11-1	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in area around the sulfuric acid tank locations in AOC 5	Title 22 metals, hexavalent chromium, and pH	No XRF refinement at this location; location selected to assess former acid tank Likely accessible by hydrovac
SWMU11-2	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in area around the sulfuric acid tank locations in AOC 5	Title 22 metals, hexavalent chromium, and pH	Unsuitable for XRF Likely accessible by hydrovac
SWMU11-3	0-1[a] and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in area around the sulfuric acid tank locations in AOC 5	Title 22 metals, hexavalent chromium, and pH	Unsuitable for XRF Likely accessible by hydrovac
SWMU11-4	0-0.5 and 3, if feasible	To resolve Data Gap #2, lateral and vertical extents of contamination in area around the sulfuric acid tank locations 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	Unsuitable for XRF Likely accessible by hydrovac
SWMU11-5	0-0.5 and 3, if feasible	To resolve Data Gap #2, lateral and vertical extents of contamination in area around the sulfuric acid tank locations in AOC 6.	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF; stay within former acid tank footprint shown in Figure B6-3 Likely accessible by hydrovac

Notes:

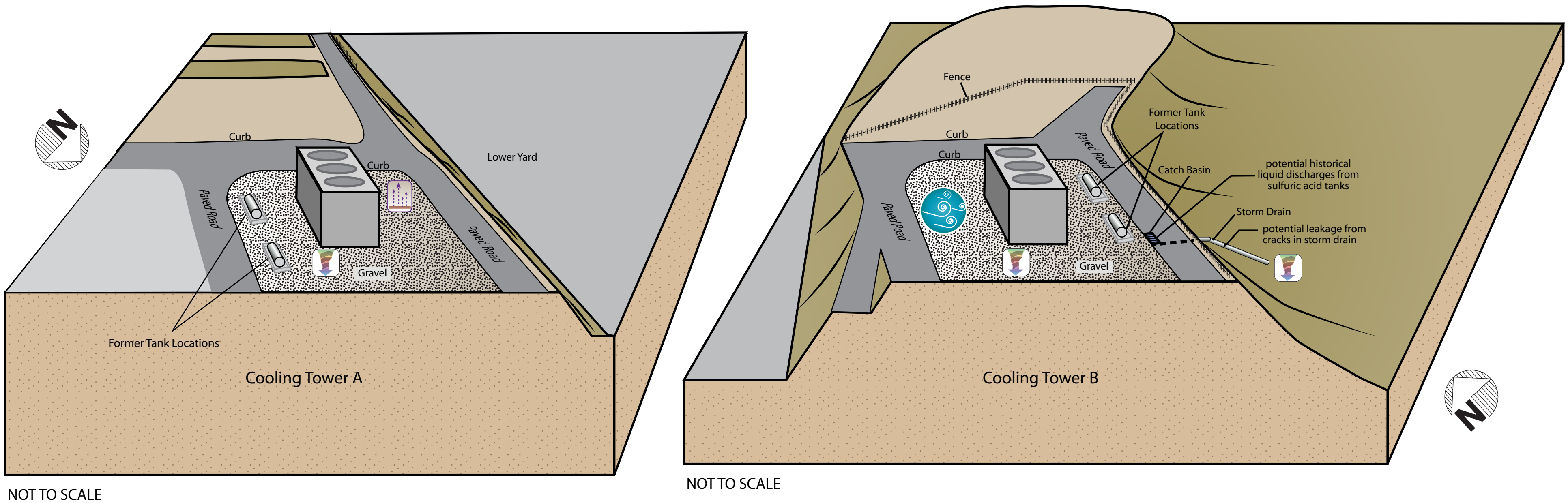
[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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.

XRF = X-ray fluorescence

Figures



LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration

FIGURE B6-1
Conceptual Site Model for SWMU 11
Sulfuric Acid Tanks
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

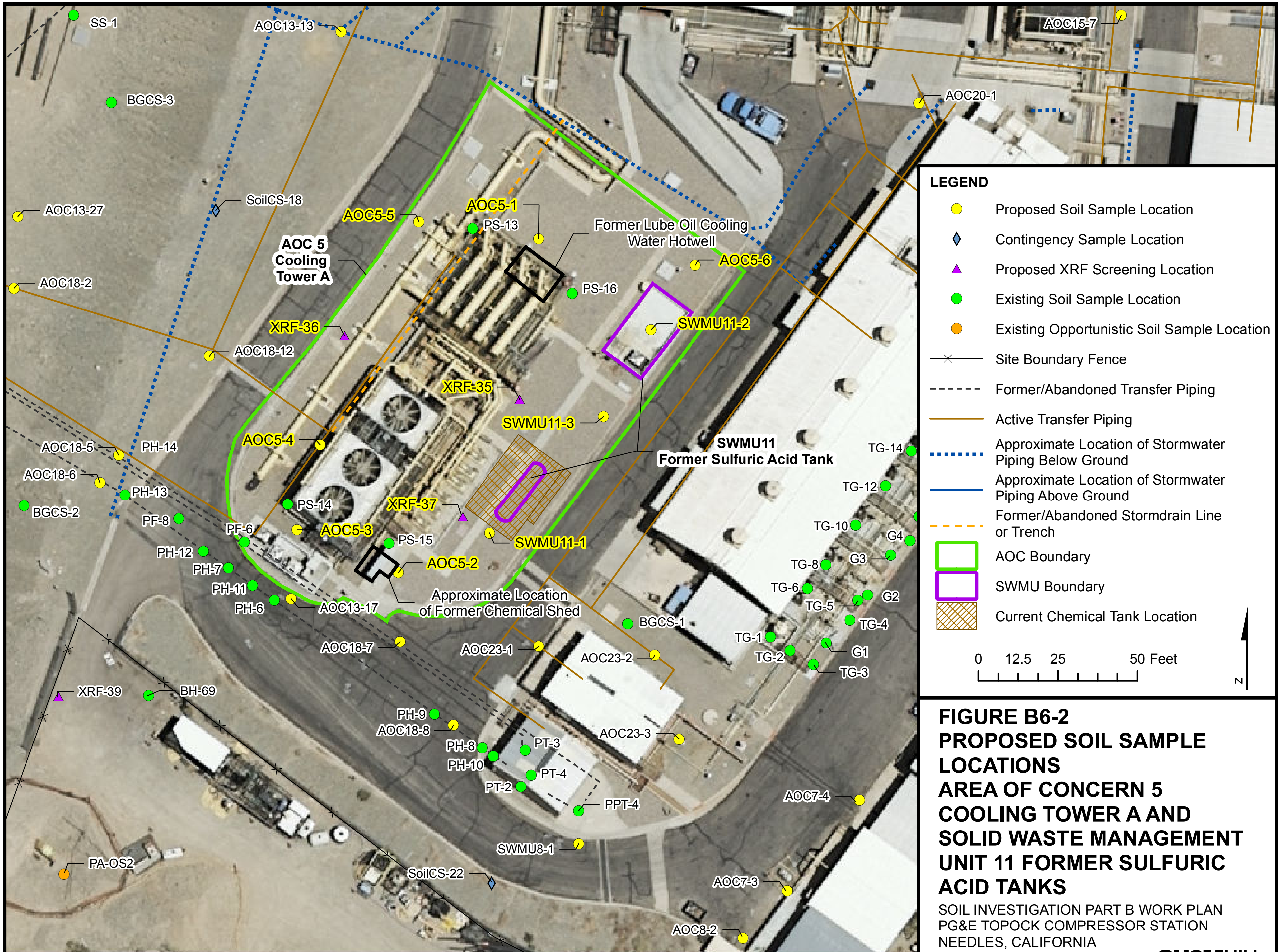


FIGURE B6-2
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 5 COOLING TOWER A AND SOLID WASTE MANAGEMENT UNIT 11 FORMER SULFURIC ACID TANKS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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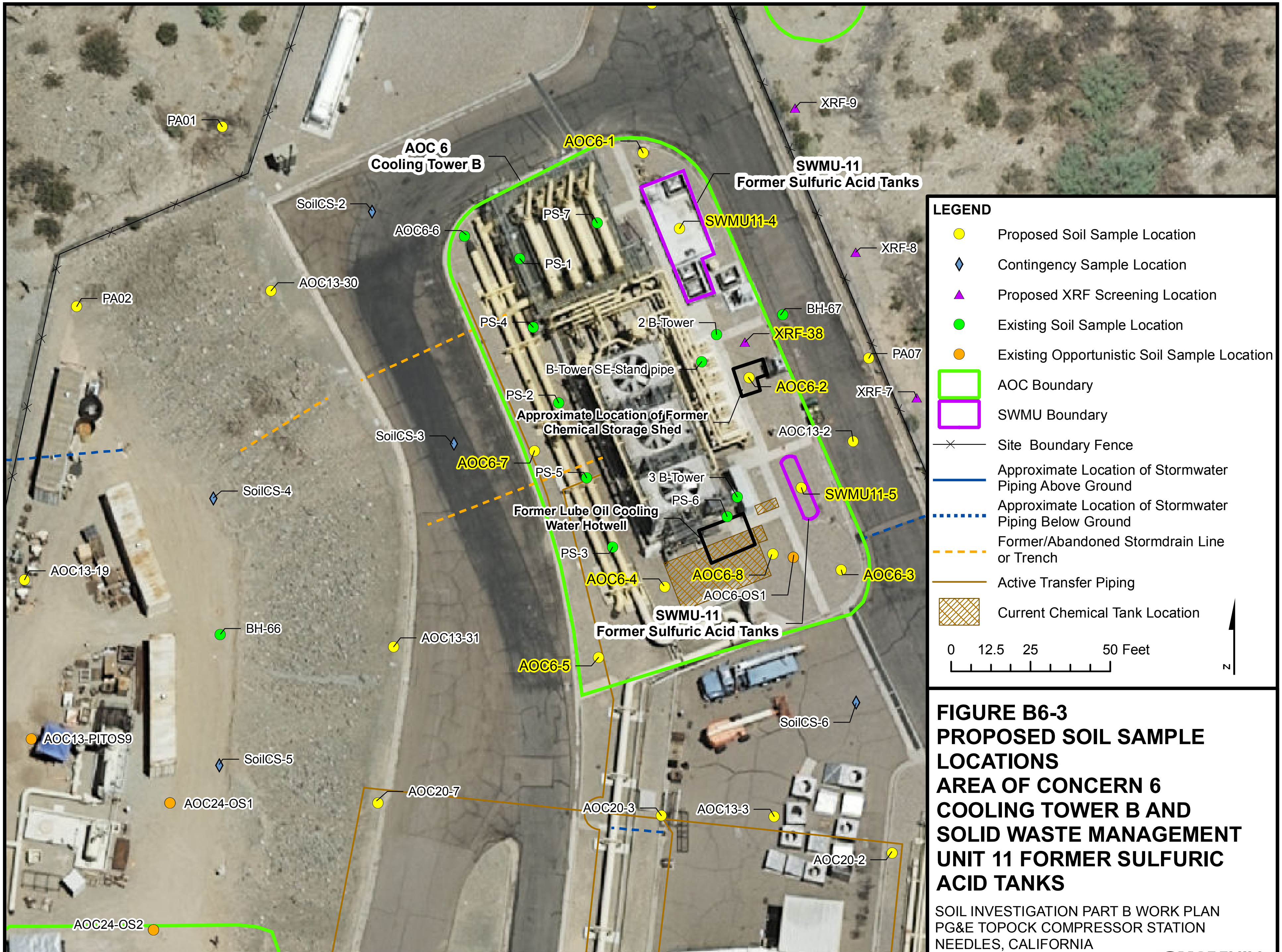

FIGURE B6-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 6
COOLING TOWER B AND SOLID WASTE MANAGEMENT UNIT 11 FORMER SULFURIC ACID TANKS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Subappendix 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
MSDS	material safety data sheet
PG&E	Pacific Gas and Electric Company
RSL	regional screening level
SWMU	Solid Waste Management Unit
XRF	x-ray fluorescence

SUBAPPENDIX B7

1.0 Introduction and Background

1.1 Background

Area of concern (AOC) 5 consists of the area below and surrounding original Cooling Tower A, as shown in Figure B7-1. (All tables and figures appear at the end of this subappendix.) 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), the current cooling water treatment chemical tanks, and 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 include 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, nonhazardous, phosphate-based inhibitors, scale-control agents, and biocides have been used. The closed-loop cooling 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 new cooling towers were installed into the existing cooling tower basin, which was partially filled with concrete. No earthwork (filling or grading) or geotechnical investigation was required to install the new cooling towers. However, as discussed during the October 24, 2011 site walk, the former cooling tower basins at both AOCs 5 and 6 were extended to the north to allow installation of the replacement heat exchangers. The location of the new concrete is visible. Concrete pathways were also installed in a portion of the areas formerly occupied by the acid houses at each cooling tower (the acid house at AOC 5 was located off the cooling tower). 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 (the hot water basin). The basin is no longer used for collecting cooling water. 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). Betz reports from various years indicate that target chromate concentrations gradually decreased to this range over the years from higher concentrations in use during earlier periods (CH2M HILL, 2007). Betz reports from various years indicate that target chromate concentrations gradually decreased to this range over the years from higher concentrations in use during earlier periods (CH2M HILL, 2007).

Lubricating-oil Cooling Water Hot Water Basin: A separate hot water basin for the closed-loop lubricating-oil cooling system was located to the north of Cooling Tower A. This hot water basin acted as a surge tank for the lubricating oil cooling water. The lubricating oil hot water basin was covered; however, it was not completely sealed. The hot water basin was removed when the new heat exchangers were installed during the cooling tower replacement project.

Former Chemical Shed (Acid House): 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, as well as sulfuric acid prior to the installation of the sulfuric acid tanks (see description of SWMU 11, Subappendix B6). 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 (Pacific Gas and Electric Company [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.

Portable Chemical Storage Tanks (Totes): Cooling water treatment chemicals, including sulfuric acid, are stored in aboveground portable chemical storage tanks with built-in secondary containment. These tanks are located in concrete secondary containment and are maintained and managed by the cooling additive vendor. At Cooling Tower A, these tanks were located at the southern end of the cooling tower until 2012 and are now located in newly constructed secondary containment on the eastern side of the AOC. Currently, there are six additives, including sulfuric acid, that are used to manage corrosion and microbiological activity in the cooling towers; each additive is contained within its own tank. The tanks are replaced by the vendor as needed.

The current cooling water chemicals stored in these tanks are listed below and are described in more detail in Attachment B7-1:

- NALCO 2597, a concentrated sulfuric acid
- 3D TRASAR 3DT184, an aqueous solution of phosphoric acid
- 3D TRASAR 3DT192, containing sulfuric acid, phosphinosuccinic oligomer, a tagged high-stress polymer dispersant, benzotriazole, and tolytriazole
- NALCO 90005, containing dimethyl-dioctyl-ammonium chloride and alkyl alcohol
- STA-BR-EX ST70, containing sodium hydroxide, sodium hypochlorite, and chlorine sodium bromide
- TRASAR TRAC101, containing sodium nitrite, nitrite molybdate, polymer, and azole

PG&E has reviewed the material safety datasheets (MSDSs) in Attachment 1 for these chemicals to ensure that the analytical suite proposed is adequate. No new chemicals of potential concern (COPCs) were identified from the MSDSs.

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 hot-water basin (that is, while the old cooling tower was in operation), the lubricating-oil cooling system hot-water basin, and potentially incidental spills of cooling system additives during storage and/or transfer of the additive chemicals. The quantity of liquid released from the hot-water basin 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 but is expected to be relatively small because any spills or incidental leaks would have been small. If a large release from the hot-water basin 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 approximately 1964, cooling water blowdown containing hazardous constituents was discharged to Bat Cave Wash. Engineering drawings also indicate that some of the blowdown from AOC 5 may have initially been discharged to the western edge of the station via Storm Drain 11 (PG&E, 1957). From approximately 1964 to 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 hot-water basins 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 basins. As part of the cooling tower replacement project, the hot-water basins were cleaned, scaled, and inspected. According to the monthly status report provided by ICF Kaiser, the vendor managing the cooling tower replacement project, the basin floor did not exhibit "…any structural cracks or other injurious flaws that would have allowed basin water to leak out through the containment of the floor" (ICF Kaiser, 2000). The report also indicated that while some minor repairs to the basin walls were required and there were many visible cracks or fissures in the concrete side walls, they appeared to be only hairline at and below the water mark of the walls. Once the walls were repaired, an epoxy coating was applied to the basins (ICF Kaiser, 2000).

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* (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

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 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 Appendix B, and additional sampling for these decisions, if necessary, are included in this subappendix.

All eight constituents analyzed were detected in soil samples collected in AOC 5(Table B7-2). Iron, manganese, and sulfate were detected above laboratory reporting limits in the surface soil sample collected at PS-16. 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 (BTV) 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 BTVs. 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 in Section 3.0 of this subappendix.

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 had been adequately delineated. Constituents that may require further evaluation are summarized in Section 3.5, and Section 4.0 of this subappendix 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 below background. The lateral extent of contamination has not been adequately delineated in the unpaved areas to the south, 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 south, 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 Tables 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 south, 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 Tables 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 south, 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 extents 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* (CH2M HILL, 2011), data gaps were identified for Decision 1 as follows:

- Data Gap #1 – Lateral and vertical extents of contamination in the unpaved areas to the south, north, east, and west of the cooling tower
- Data Gap #2 – Lateral and vertical extents of contamination near previous samples PS13, 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, as shown on Figure B-3. The area beneath the cooling tower and portions of the area immediately adjacent to the cooling tower are considered inaccessible. All six of the proposed sampling locations are considered suitable for x-ray fluorescence (XRF) screening and likely accessible by hydrovac. Table B7-5 provides the accessibility assessment for each of the six proposed sample locations in AOC 5. 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 Subappendix B26 show the accessibility constraints in AOC 5. Proposed sample locations and depths identified for AOC 5 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of Appendix B.

The area beneath the cooling tower and portions of the area immediately adjacent to the cooling tower are considered inaccessible.

4.2 AOC 5 Proposed Sampling

Table B7-5 summarizes the proposed AOC 5 sample locations, depths, description/rationale for each location (that is, 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. Locations were defined in collaboration with the California Environmental Protection Agency, Department of Toxic Substances Control and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Samples are proposed to be collected at six locations: AOC 5-1 through AOC 5-6. Sample locations AOC5-1, AOC 5-3, and AOC5-5 are designated deeper sample locations, and samples are proposed to be collected at the surface (0 to 0.5 feet bgs), from 2 to 3 feet bgs, 5 to 6 feet bgs, and 9 to 10 feet bgs. The remaining sample locations in this unit will initially be sampled at 0 to 1 and 2 to 3 feet bgs in accordance with the phased sampling protocol. 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. In addition, three XRF soil sample locations (XRF-35, XRF-36, and XRF-37) have been added to assist with the nature and extent evaluation. The XRF results from these locations will be discussed during the data calls described in Section 4.0 of Appendix B to decide if soil samples should be collected from these locations for offsite laboratory analysis. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B7-3. 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, as shown in 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 US EPA Method 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.

ICF Kaiser Engineers, Inc. (ICF Kaiser). 2000. *Monthly Progress and Status Report, Cooling Tower Replacement*. March 31.

Mittelhauser Corporation. 1986. *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station*. Revision 1. August.

Pacific Gas & Electric Company (PG&E). 1957. Engineering Drawing 482629, Revision 5: *Sewers, Domestic, Utility & Fire Water System, Topock Compressor Station*. January 9 (original drawing). Revision 5 is undated.

———. 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 Work Plan, Pacific Gas and Electric Company 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 Shallow Soil	Wind erosion and atmospheric dispersion of surface soil Potential volatilization and atmospheric dispersion 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 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 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 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 Work Plan, *Pacific Gas and Electric Company Topock Compressor Station, Needles, California*

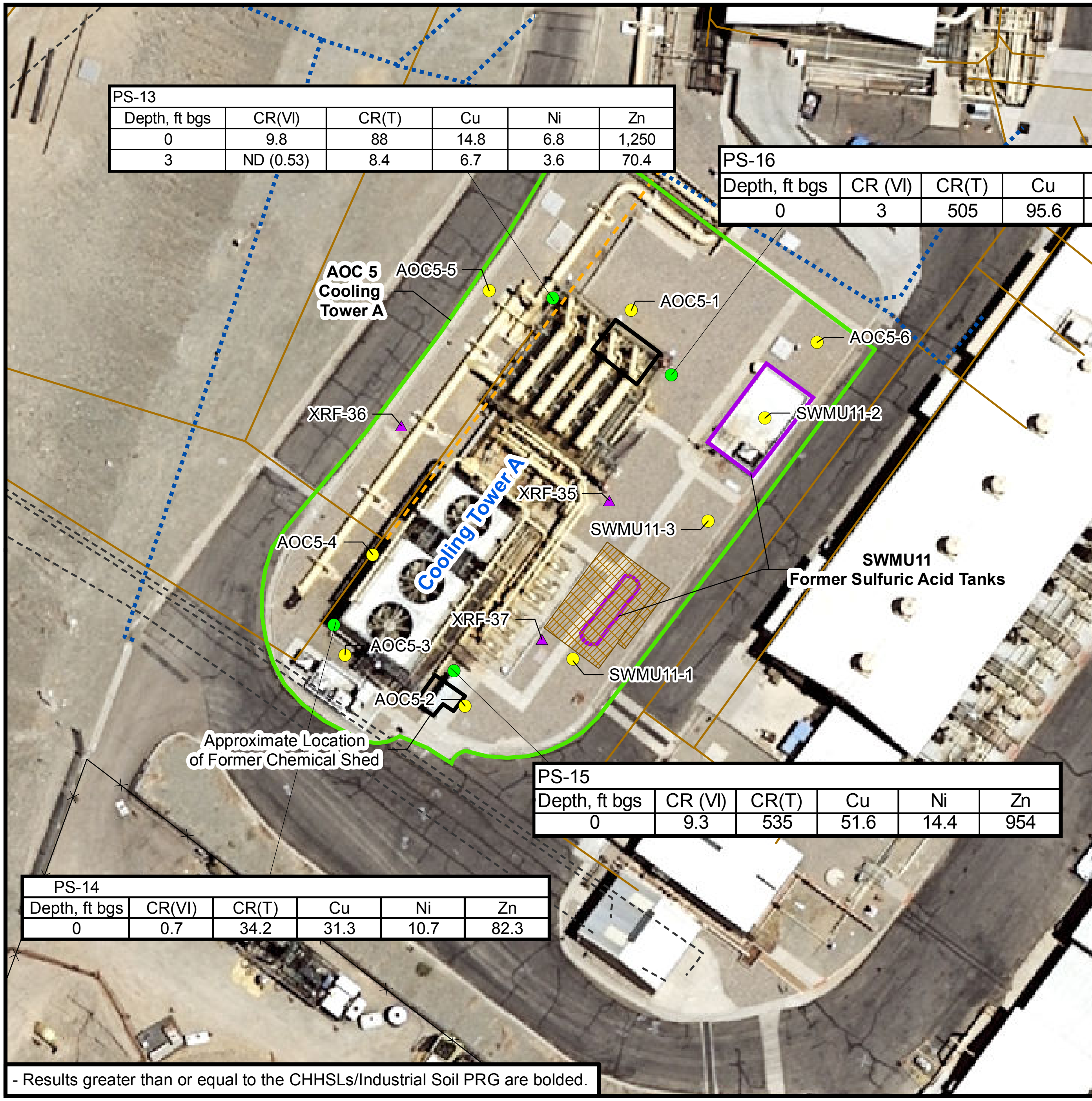
Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 5-1	0-0.5 and 3, 6, and 10 feet bgs	To resolve Data Gap #2 - Lateral and vertical extents of contamination near previous samples PS-13 and PS-16	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Likely accessible by hydrovac
AOC 5-2	0-0.5 and 3, if feasible	To resolve Data Gaps #2 and #3 - Lateral and vertical extents of contamination near previous samples PS-15 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	No XRF refinement at this location; location selected to assess former chemical shed Likely accessible by hydrovac
AOC 5-3	0-0.5 and 3, 6, and 10 feet bgs	To resolve Data Gap #1 - Lateral and vertical extents of contamination in the unpaved areas to the north, east, south, and west of the cooling tower	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Likely accessible by hydrovac
AOC 5-4	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extents of contamination in the unpaved areas to the north, east, south, and west of the cooling tower	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Likely accessible by hydrovac
AOC 5-5	0-0.5 and 3, 6, and 10 feet bgs	To resolve Data Gap #1 - Lateral and vertical extents of contamination in the unpaved areas to the north, east, south, 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	Suitable for XRF. Likely accessible by hydrovac.
AOC 5-6	0-0.5 and 3, if feasible	To resolve Data Gap #1 - Lateral and vertical extents of contamination in the unpaved areas to the north, east, south, and west of the cooling tower	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Likely accessible by hydrovac

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	ND (0.53)	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

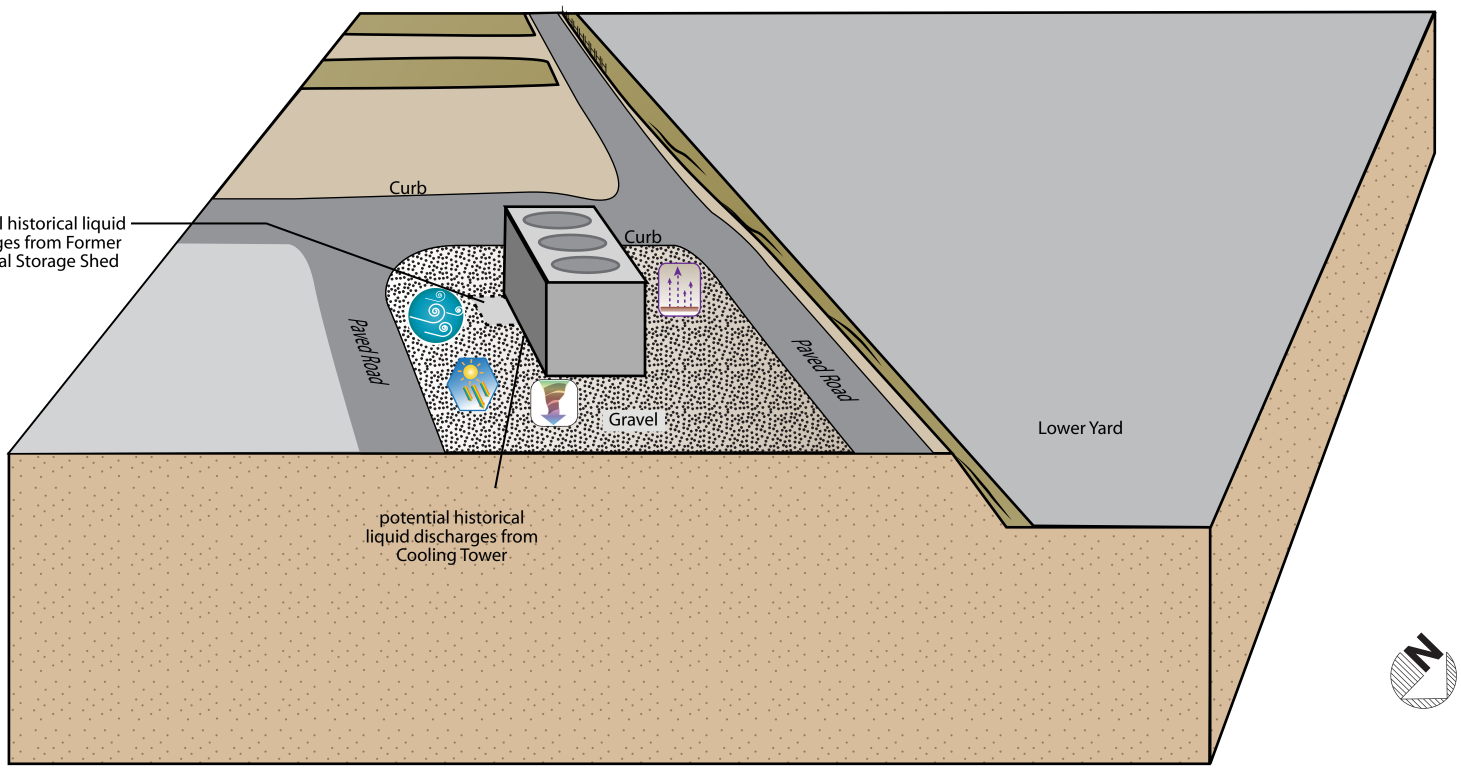
- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.

FIGURE B7-1
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 5 COOLING TOWER A AND SOLID WASTE MANAGEMENT UNIT 11 FORMER SULFURIC ACID TANKS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC5\AOC5_RESULT_METAL.mxd



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 Work Plan
PG&E Topock Compressor Station
Needles, California

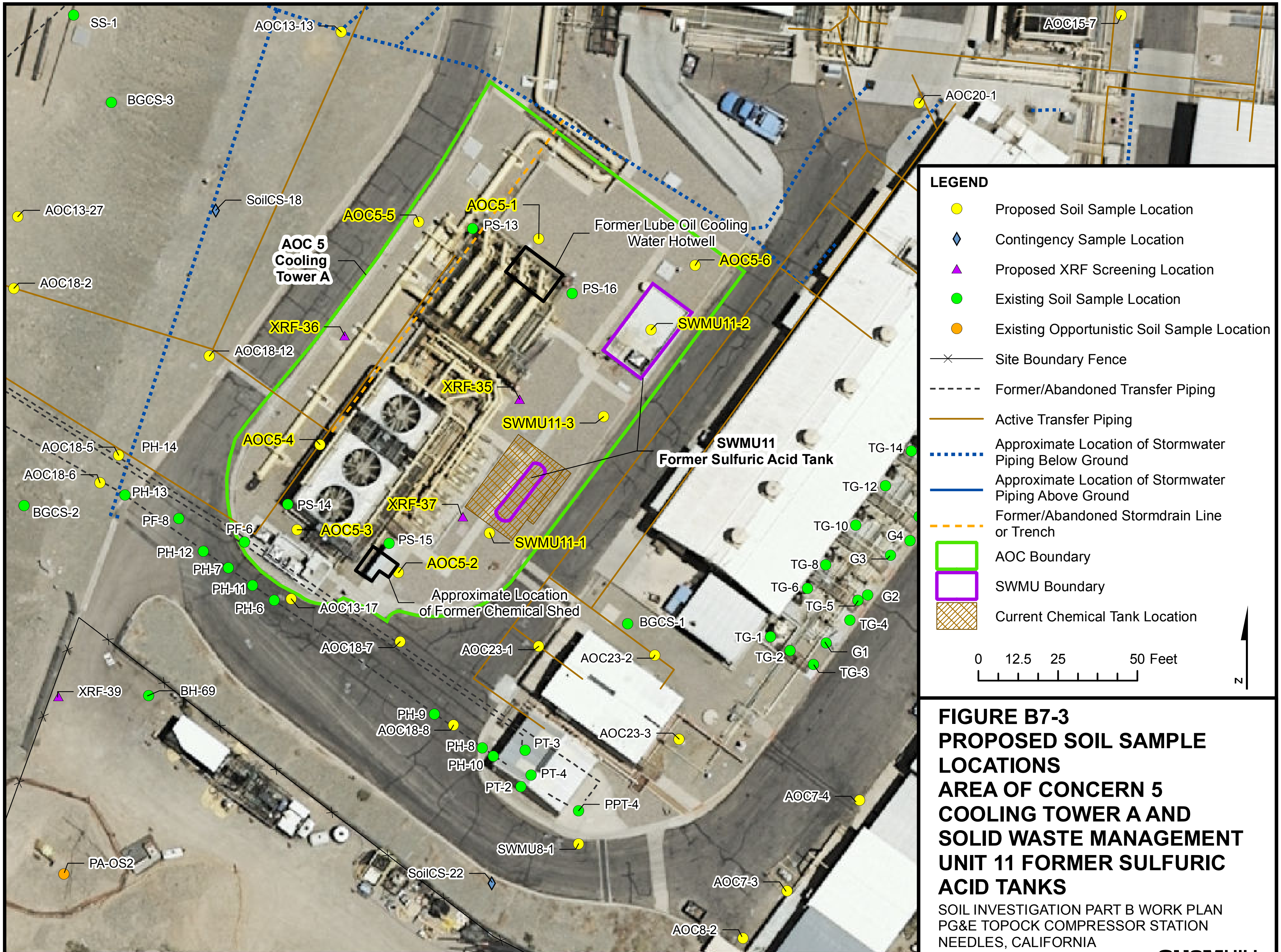


FIGURE B7-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 5 COOLING TOWER A AND SOLID WASTE MANAGEMENT UNIT 11 FORMER SULFURIC ACID TANKS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC5\AOC5_Proposed_Sample_Locs.mxd Date Saved: 12/7/2012 11:55:20 AM

Attachment B7-1
Material Safety Data Sheets

NALCO® 2597

pH Control Program

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

NALCO 2597 is concentrated sulfuric acid. The product is designed to reduce alkalinity or pH in open recirculating cooling water systems or in waste treatment effluent streams.

PHYSICAL & CHEMICAL PROPERTIES

These properties are typical. Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Form	Liquid
Density @ 77°F (25°C)	15.0 lb/gal (1.80 kg/L)
Specific Gravity @ 77°F (25°C)	1.80
pH (neat)	<1.0
Flash Point	Not Applicable
Color	Clear, Colorless
Freeze Point	-20°F (-28°C)

ACTIVE CONSTITUENTS

Component	**Function**
Sulfuric Acid	pH Adjustment

3D TRASAR® 3DT184

Cooling Water Corrosion Inhibitor

NALCO

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

3D TRASAR products are part of an innovative water treatment program that uses proven technology to prevent operational problems. **3D TRASAR** compensates for both routine and special causes of system variation. **3D TRASAR** programs provide a return on your investment through their unique control and diagnostic capabilities.

3D TRASAR 3DT184 is an aqueous solution of phosphoric acid. Its primary use is as an orthophosphate source for treatment of industrial cooling water systems. As such, it is an anodic corrosion inhibitor that must be paired up with an acceptable cathodic inhibitor from the **3D TRASAR** product line. **3DT184** also contains **TRASAR®** Technology for superior program monitoring and control.

MATERIALS OF COMPATIBILITY

Compatible	Not Compatible
Viton	Phenolic
EPDM	Stainless Steel 304
Polyethylene	Stainless Steel 316
Polypropylene	Neoprene
PVC	Brass
Plasite 4300	Buna-N
Hypalon	Polyurethane
HDPE	Plasite 7122

DOSAGE AND FEEDING

For complete dosage and feeding recommendations, consult your Nalco sales engineer.

ENVIRONMENTAL AND TOXICITY DATA

Refer to SECTIONS 11 and 12 of the Material Safety Data Sheet (MSDS) for all available mammalian and aquatic toxicity information.

Biological Oxygen Demand (5-day BOD5)	2,460 ppm
Chemical Oxygen Demand (COD)	3,000 ppm
Total Organic Carbon (TOC)	1,000 ppm

For environment permit information purposes, 1 ppm of **3DT184** contributes 0.347 ppm of PO_4.

PHYSICAL & CHEMICAL PROPERTIES

These properties are typical. Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Physical State	Liquid
Density	9.3 lb/gal
Specific Gravity at 77°F [25°C]	1.12
pH (neat)	4.7
Flash Point	Not Applicable
Odor	None
Freeze Point	18°F [-8°C]
Solubility in Water	Complete
Appearance	Clear, Light Yellow
Viscosity @ 77°F [25°C]	84 cp

ACTIVE CONSTITUENTS

Active	**Function**
Tagged High Stress Polymer (THSP)	Dispersant
Phosphinosuccinic Oligomer (PSO)	Mild steel corrosion and CaCO3 scale inhibition
Benzotriazole (BZT)/Tolyltriazole (TT)	Copper corrosion inhibition

REGULATORY APPROVALS

Refer to the Material Safety Data Sheet (MSDS), SECTION 15 for the most recent information on approvals. This product is intended for industrial use only. It must not be fed to potable water systems of any type.

NALCO® 90005

Microbiocide Low Foam Water Treatment

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

NALCO 90005 is a nonoxidizing quaternary ammonium biocide effective for controlling algae and bacteria in recirculating cooling water systems, such as encountered within industrial and commercial building applications. Bacteria and algae set up conditions that promote deposition, corrosion and fouling. **NALCO 90005** aids in cleaning and loosening slime deposits from cooling water systems and killing the microorganisms that form these deposits.

Program Benefits

- Broad-spectrum biocide, designed to control algae and bacteria:
  - Increases system efficiency by maintaining clean heat exchangers and tower fill
  - Minimizes repair and maintenance costs
  - Avoids unsightly visible contamination
- Promotes a healthier operating environment by lowering system bacterial activity.
- Helps reduce overall biocide treatment costs.
- Functions over a wide pH range, either with or without halogens present, to ensure effective algae control in a broad range of applications.
- Helps reduce bacterial growth by minimizing nutrients that are produced from algae.
- Effective dispersant, which can remove slime deposits.

MATERIALS OF COMPATIBILITY

Compatible	Not Compatible
PVC	Natural Rubber
Polyethylene	Neoprene
Polypropylene	Buna-N
Teflon	Viton
Kynar	
Kalrez	
Vinyl ester	
Stainless Steel 316L	

DOSAGE AND FEEDING

For complete dosage and feeding recommendations, contact your Nalco sales engineer.

ENVIRONMENTAL AND TOXICITY DATA

Refer to the Material Safety Data Sheet (MSDS), SECTIONS 11 and 12, for the most current data.

SAFETY AND HANDLING

HANDLING: Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not use, store, spill or pour near heat, sparks or open flame. Refer to the Material Safety Data Sheet (MSDS), SECTIONS 3 and 8, for the most current data.

STORAGE

STORAGE CONDITIONS: Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers. Store separately from reducing agents.

The recommended in-plant storage limit for **NALCO 90005** is six months. Refer to the Material Safety Data Sheet (MSDS), SECTION 7, for the most current data.

- **STA·BR·EX ST70** is a stable liquid bromine biocide in one package for easy dosing and control. Unlike liquid chlorine bleach, it does not lose its activity in a matter of days (see Figure 1). It reduces operator time and makes dosing easy.

- **STA·BR·EX ST70** kills bacteria and helps prevent slime problems. Combined with Nalco services, it helps keep heat exchangers and tower fill clean for low maintenance and cost-efficient operation.

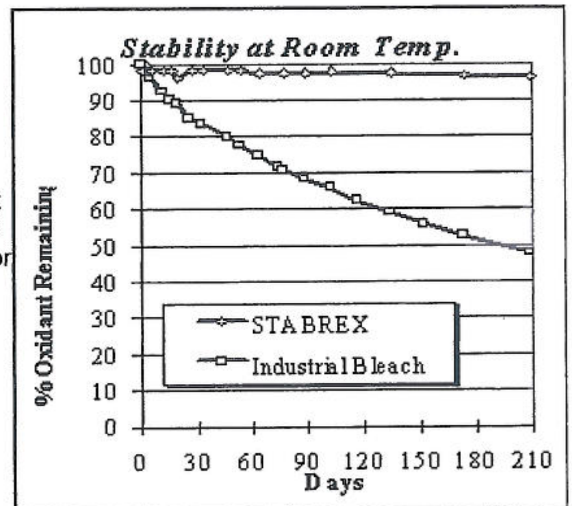


Figure 1 -- Stability of **STA·BR·EX ST70** at 70°F (20°C)

- Because **STA·BR·EX ST70** is bromine-based, it will work effectively in systems where chlorine is challenged by amine or ammonia contamination.

- **STA·BR·EX ST70** has low volatility that reduces product loss from the cooling tower. This results in more active product retained in the system to kill microorganisms. Equipment lasts longer because STA·BR·EX significantly reduces vapor-phase corrosion.

- **STA·BR·EX ST70** is packaged and delivered in PORTA-FEED® units. Nalco's delivery specialist does all of the chemical handling. Operators have less chance of exposure and a safer work environment.

- **STA·BR·EX ST70** generates less disinfection by-products as measured by the concentration of Adsorbable Organic Halide (AOX).

PHYSICAL & CHEMICAL PROPERTIES

Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.
These properties are typical.

TRASAR® TRAC101

Traced Closed System Treatment

NALCO

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

TRASAR TRAC101 is a traced, liquid corrosion and deposit inhibitor for use in closed cooling and hot water heating systems. **TRASAR TRAC101** is effective in high heat flux systems where heat transfer surface experience high skin temperatures and corrosion control challenges are demanding. **TRASAR TRAC101** is a multicomponent inhibitor that provides ferrous metal corrosion protection, copper alloy corrosion protection, scale inhibition and dispersancy.

Optional TRASAR technology constantly monitors, displays and automatically doses product to a target concentration keeping your system continuously protected.

PHYSICAL & CHEMICAL PROPERTIES

Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Form	Liquid
Density	10.4 - 10.75 lb/gal (1.25- 1.29 kg/L)
Specific Gravity at 60°F (15.6 °C)	1. 25-1.29
pH (neat)	12- 14
Freeze-Thaw Recovery	Complete
Flash Point (PMCC)	Not Applicable
Odor	None
Solubility in Water	Complete
Appearance	Clear , light yellow, light gold

Molybdate/Molybdenum, High Range

DR/890 Analytical Procedure

NALCO

AP-2/890

SPECIFICATIONS

Method: Colorimetric (DR/890)

Range: 0.2 to 40.0 ppm as Mo^{+6}

Testing Time: 10 minutes

DESCRIPTION

MO-1 and MO-2 Reagents are added to buffer and condition the sample. MO-3 provides the mercapto-acetic acid which reacts with molybdate/molybdenum to form a yellow color proportional to the molybdenum concentration.

ORDERING INFORMATION

Order all replacement parts and reagents by their part numbers. To be sure this product is compatible with your treatment program, contact your local Nalco representative. Items marked with an "*" are included with the kit or set. **To place your order**, please contact your local customer service department.

REPLACEMENT PARTS AND REAGENTS

Required Parts and Reagents

Description	Part No.
High Range Molybdenum 10 mL Reagent Set, 100 tests	460-P3102.88

Includes:

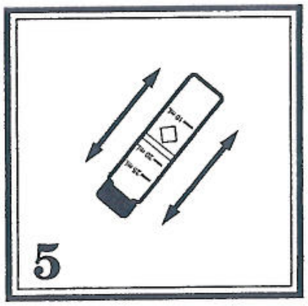
Description	Size	Quantity
MO-1 Powder Pillows*	10 mL	100/pkg
MO-2 Powder Pillows*	10 mL	100/pkg
MO-3 Powder Pillows*	10 mL	100/pkg

Nalco DR/890 Colorimeter

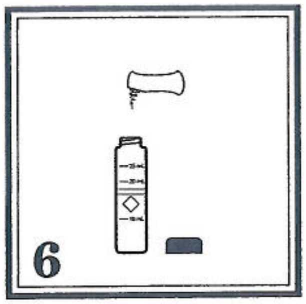
Description	Part No.
Nalco DR/890 Colorimeter	400-P0890.88
Sample cells, 10-20-25 mL w/cap, 6/pkg	500-P2555.88

Optional Parts and Reagents

Description	Size	Part No.
Sulfamic Acid	10 grams	460-S0103.80
Sulfamic Acid	500 grams	460-S0103.84
Powder Pillow Snippers		500-P1605.88

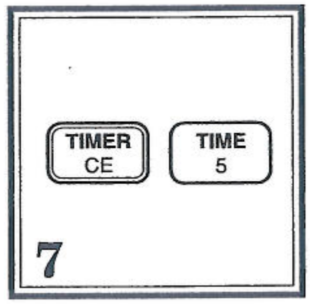


Add the contents of one MO-2 Reagent Powder Pillow. Cap the cell and invert several times to mix.



Add the contents of one MO-3 Reagent Powder Pillow. Cap the cell and invert several times to mix. This is the prepared sample.

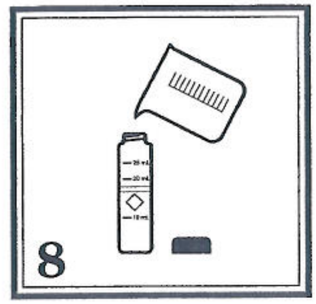
Note: Accuracy is not affected by undissolved powder.



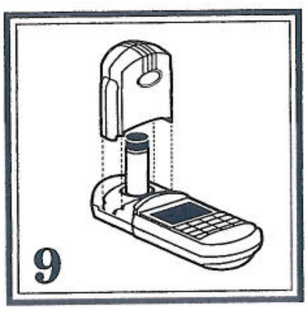
Press: **TIMER ENTER**

A five-minute reaction period will begin.

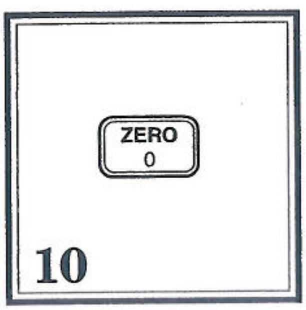
Note: Molybdenum will cause a yellow color to form.



After the timer beeps, fill a second cell with 10 mL of sample (the blank).



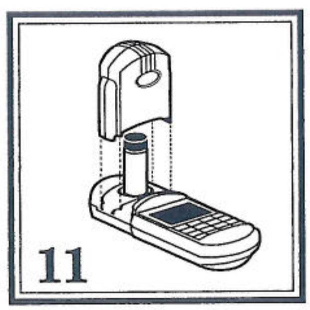
Insert the blank into the cell holder. Tightly cover the sample cell with the instrument cap.



Press: **ZERO**

The cursor will move to the right, then the display will show:

0.0 mg/L Mo6



Place the prepared sample into the cell holder. Tightly cover the sample cell with the instrument cap.

Press: **READ**

The cursor will move to the right, then the result in mg/L molybdenum (or alternate form) will be displayed.

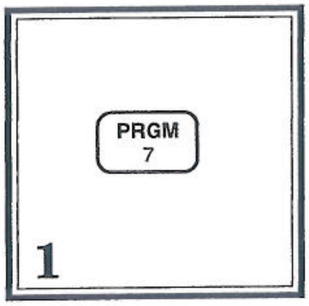
NALCO COMPANY OPERATIONS

North America: 1601 West Diehl Road • Naperville, Illinois 60563-1198 • USA
Europe: Ir.G.Tjalmaweg 1 • 2342 BV Oegstgeest • The Netherlands
Pacific Pte, Ltd: 2 International Business Park • #02-20 The Strategy Tower 2 • Singapore 609930
Latin America: Av. das Nações Unidas 17.891 • 6° Andar 04795-100 • São Paulo • SP • Brazil

www.nalco.com

HIGH RANGE NITRITE DR/890 PROCEDURE

Special Note: This test does not measure nitrates nor is it applicable to glycol-based samples.

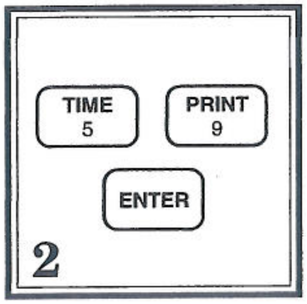


Enter the stored program number for high range nitrite (NO_2-).

Press: **PGRM**

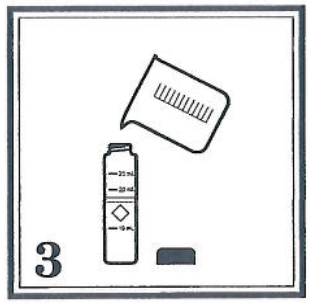
The display will show:

PGRM ?



Press: **59 ENTER**

The display will show **mg/L, NO2** and the **ZERO** icon.

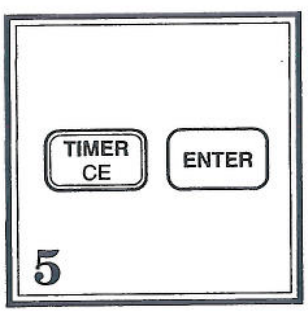


Fill a sample cell with 10 mL of sample.

Add the contents of one NT-2 Nitrite Reagent Powder Pillow. Cap the cell and invert 5-7 times to mix (the prepared sample).

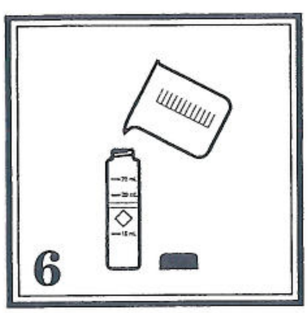
Notes: A greenish-brown color will develop if nitrite is present.

Avoid excessive mixing or low results may occur. Accuracy is not affected by undissolved powder.

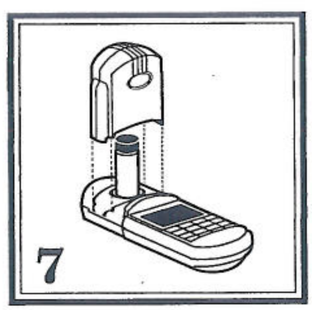


Press: **TIMER ENTER**

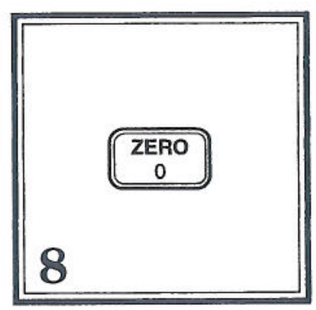
A ten-minute reaction time period will begin.



Fill another sample cell with 10 mL of the sample (the blank).



Place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.



Press: **ZERO**

The cursor will move to the right, then the display will show:

0 mg/L NO2

Steps for Calibrating Conductivity and pH

Conductivity

1. Press the "ACTIONS" button on the left side of the controller box.
2. Press the UP/DOWN arrows to select "CLEAN AND CALIBRATE" and press "SELECT" in the lower right hand of the screen.
3. You will be prompted for a password, enter "12345", and press "ACCEPT" at the lower right hand corner of the screen.
4. Press the UP/DOWN arrows to select "CONDUCTIVITY" and press "SELECT" in the lower right hand of the screen.
5. The last date of calibration will be shown, press "START" to continue.
6. Press the UP/DOWN arrows to select "1-POINT/PROCESS" and press "SELECT" in the lower right hand of the screen.
7. Press "EDIT" in lower right hand corner of the screen, type in the new conductivity reading uS/cm and press "ACCEPT" in the lower right hand corner.
8. Controller will display "Conductivity calibration was successful. Accept new values?" and press "ACCEPT" in the lower right hand corner of the screen.

IF Conductivity calibration above fails, THEN proceed to two point calibration.

1. From the main screen Press the "ACTIONS" button on the left side of the controller box.
2. Press the UP/DOWN arrows to select "CLEAN AND CALIBRATE" and press "SELECT" in the lower right hand of the screen.
3. You will be prompted for a password, enter "12345", and press "ACCEPT" at the lower right hand corner of the screen.
4. Press the UP/DOWN arrows to select "CONDUCTIVITY" and press "SELECT" in the lower right hand of the screen.
5. The last date of calibration will be shown, press "START" to continue.
6. Press the UP/DOWN arrows to select "2-POINT/STANDARDS" and press "SELECT" in the lower right hand of the screen.
7. Follow on screen instructions "Close valves and remove probe. Hold probe in air" and press "CONTINUE" in the lower right hand corner of the screen. A 120 second timer will begin while the controller measures this reading.
8. Follow the on screen instructions "Reinstall probe in process water and open valves" and press "CONTINUE".
9. The controller will ask for the conductivity of the process water, press "EDIT", enter in the conductivity in uS/cm using key pad, and press "ACCEPT".
10. A 360 second timer will begin while the controller measures this reading.
11. Controller will display "Conductivity calibration was successful. Accept new values?" and press "ACCEPT in the lower right hand corner of the screen.

IF this step fails, call Nalco 702-506-6696.

NALCO

SAFETY DATA SHEET

PRODUCT

3D TRASAR® 3DT184

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **3D TRASAR® 3DT184**

APPLICATION : CORROSION INHIBITOR

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Phosphoric Acid	7664-38-2	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Corrosive. May cause tissue damage.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
Not flammable or combustible. May evolve oxides of phosphorus (POx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
Corrosive; causes permanent skin damage.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store separately from bases.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit
Phosphoric Acid	ACGIH/TWA		1	
	ACGIH/STEL		3	
	OSHA Z1/PEL		1	

ENGINEERING MEASURES :

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product and a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	3,660 mg/l	Similar Product
Inland Silverside	96 hrs	> 5,000 mg/l	Product
Rainbow Trout	96 hrs	> 5,000 mg/l	Product

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

LAND TRANSPORT :

Proper Shipping Name :	PHOSPHORIC ACID SOLUTION
Technical Name(s) :	
UN/ID No :	UN 1805
Hazard Class - Primary :	8
Packing Group :	III
Flash Point :	> 200 F/ > 93.3 °C
DOT Reportable Quantity (per package) :	13,540 lbs
DOT RQ Component :	PHOSPHORIC ACID

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	PHOSPHORIC ACID SOLUTION
Technical Name(s) :	
UN/ID No :	UN 1805
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	821
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	PHOSPHORIC ACID SOLUTION

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation. Additional components may be unintentionally present at trace levels.

Substance(s)	Citations
• Phosphoric Acid	Sec. 311

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Phosphoric Acid	7664-38-2

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 03/04/2010
Version Number : 1.10

NALCO

SAFETY DATA SHEET

PRODUCT

3D TRASAR® 3DT192

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **3D TRASAR® 3DT192**

APPLICATION : COOLING WATER TREATMENT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sulfuric Acid	7664-93-9	1.0 - 5.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.
Wear suitable protective clothing.
Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store separately from bases.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit
Sulfuric Acid (Thoracic fraction.)	ACGIH/TWA		0.2	
Sulfuric Acid	OSHA Z1/PEL		1	

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product, unless otherwise indicated.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	3,362 mg/l	Similar Product
Rainbow Trout	96 hrs	864 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Ceriodaphnia dubia	48 hrs	1,768 mg/l		Product

CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Fathead Minnow	7 Days	/ 1,250 mg/l		Similar Product

PERSISTENCY AND DEGRADATION :

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sulfuric Acid : Corrosive

CERCLA/SUPERFUND, 40 CFR 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product contains sulfuric acid, which is listed in Sections A and B as an Extremely Hazardous Substance, but the amount in the product does not require action for reporting.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

SAFETY DATA SHEET

PRODUCT

NALCO(R) 90005

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO(R) 90005**

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Alkyl Alcohol	56-81-5	5.0 - 10.0
Dimethyl-Dioctyl-Ammonium Chloride	5538-94-3	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Corrosive. May cause tissue damage. Harmful if swallowed.
Keep container tightly closed and in a well-ventilated place. Do not get in eyes, on skin, on clothing. Do not take internally. Avoid breathing vapor. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product may pose a risk to the aquatic ecosystem if released., Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers. Store separately from reducing agents.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

VISCOSITY	< 100.0 cps @ 77.0 °F / 25.0 °C
MELTING POINT	10.4 °F / -12 °C
INITIAL BOILING POINT	203.0 °F / 95.0 °C
VOC CONTENT	9.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Reducing agents

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for the product, unless otherwise indicated.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Mouse	360 - 375 mg/kg	Product

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	259 mg/kg	80% Active Ingredient

ACUTE INHALATION TOXICITY :

Species	LC50	Test Descriptor
Rat	10 mg/l (1 hrs)	Product

PRIMARY SKIN IRRITATION : Severely irritating US DOT CORROSIVITY TEST: Corrosive

PRIMARY EYE IRRITATION : Extremely irritating (Corrosive)

SENSITIZATION :
This product is not expected to be a sensitizer.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) :	QUATERNARY AMMONIUM CHLORIDE(S)
UN/ID No :	UN 1903
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	> 200 F/ > 93.3 °C

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) :	QUATERNARY AMMONIUM CHLORIDE(S)
UN/ID No :	UN 1903
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) :	QUATERNARY AMMONIUM CHLORIDE(S)

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :
NSF Registration number for this product is : 140607
This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :
EPA Reg. No. 6836-60-1706

In all cases follow instructions on the product label.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Acetaldehyde	Sec. 311
• Dimethylnitrosoamine	Sec. 307

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Acetaldehyde • Dimethylnitrosoamine	Sec. 112

CALIFORNIA PROPOSITION 65 :
Substances known to the State of California to cause cancer are present as an impurity or residue.

Substance(s)	Concentration	EFFECTS
• Acetaldehyde • Dimethylnitrosoamine	.0001 % < .0001 %	Causes Cancer

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Alkyl Alcohol	56-81-5

Ariel Insight∟ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight∟ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS∟ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 11/03/2008
Version Number : 2.0

SAFETY DATA SHEET

PRODUCT
STABREX® ST70

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **STABREX® ST70**

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Hydroxide	1310-73-2	1.0 - 5.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
CORROSIVE. CAUSES SEVERE EYE AND SKIN INJURY. HARMFUL IF INHALED. HARMFUL IF SWALLOWED. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Remove and wash contaminated clothing before reuse. Wash thoroughly after handling.
May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Contain and absorb with sand or vermiculite and mix well. Collect up and remove to a safe place until disposal. Wash site of spillage thoroughly with water. Assistance can be obtained from waste disposal companies.
LARGE SPILLS: Dike to prevent further movement. Recover by pumping or by using a suitable absorbent. Reclaim into recovery or salvage drums. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Apply this pesticide only as specified on the label.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Light yellow Clear
ODOR	None
SPECIFIC GRAVITY	1.32 - 1.36 @ 77 °F / 25 °C
DENSITY	11.0 - 11.3 lb/gal
SOLUBILITY IN WATER	Complete
pH (100.0 %)	13.0
FREEZING POINT	17 °F / -8.3 °C
VAPOR PRESSURE	7.7 mm Hg @ 77 °F / 25 °C 27 mm Hg @ 115 °F / 46 °C
VOC CONTENT	0.00 %

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
High temperatures Direct sunlight

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with organic materials (e.g. rags, sawdust, hydrocarbon oils or solvents) and avoid reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) which can generate heat, fires, explosions and the release of toxic fumes. Do not mix with any sodium hypochlorite or bleach product. Resulting mixture will result in a violent exothermic reaction releasing large amounts of nitrogen gas and liquid sulfuric acid. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	4.3 mg/l	4.2 mg/l	Product
Ceriodaphnia dubia	48 hrs	1.6 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	27 mg/l		Product

AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Green Algae (Pseudokirchneriella subcapitata, previously Selenastrum capricornutum)	72 hrs	3.66 mg/l	Product

CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Fathead Minnow	7 Days	2.5 mg/l / 5 mg/l	Growth	Product

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Ceriodaphnia dubia	3 Brood	10.0 mg/l /	Reproduction	Product

PERSISTENCY AND DEGRADATION :

Biological Oxygen Demand (BOD) : This material is an oxidizing biocide and is not expected to persist in the environment.

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	30 - 50%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)
Reportable Quantity (per package) :	35,000 lbs
RQ Component :	SODIUM HYDROXIDE

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Hydroxide : Corrosive

CERCLA/SUPERFUND, 40 CFR 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance	RQ
Sodium Hydroxide	35,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

Sodium Hydroxide	1310-73-2

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
Substances regulated under the Pest Control Products Act are exempt from CEPA New Substance Notification requirements.

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND
All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996,and are listed on or are exempt from the New Zealand Inventory of Chemicals.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/14/2010
Version Number : 1.16

Product Bulletin

TRASAR® TRAC101

Traced Closed System Treatment

PRODUCT DESCRIPTION AND APPLICATION

TRASAR TRAC101 is a traced, liquid corrosion and deposit inhibitor for use in closed cooling and hot water heating systems. **TRASAR TRAC101** is effective in high heat flux systems where heat transfer surface experience high skin temperatures and corrosion control challenges are demanding. **TRASAR TRAC101** is a multicomponent inhibitor that provides ferrous metal corrosion protection, copper alloy corrosion protection, scale inhibition and dispersancy.

Optional TRASAR technology constantly monitors, displays and automatically doses product to a target concentration keeping your system continuously protected.

PHYSICAL & CHEMICAL PROPERTIES

Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Form	Liquid
Density	10.4 - 10.75 lb/gal (1.25- 1.29 kg/L)
Specific Gravity at 60°F (15.6 °C)	1. 25-1.29
pH (neat)	12- 14
Freeze-Thaw Recovery	Complete
Flash Point (PMCC)	Not Applicable
Odor	None
Solubility in Water	Complete
Appearance	Clear , light yellow, light gold

ACTIVE CONSTITUENTS

Active	Function
Nitrite	Mild Steel Corrosion Inhibition
Molybdate	Mild Steel Corrosion Inhibition
Polymer	Dispersion and Deposition Control
Azole	Yellow Metal Corrosion Inhibition

Recommended in-plant storage limit is six months.
TRASAR TRAC101 should be stored in a location where the product temperature can be kept in a range between - 6°F (- 21°C) and 120°F (49°C). In cold climates, heat tracing and insulation of exposed containers and transfer lines may be necessary.

Refer to the Material Safety Data Sheet (MSDS), SECTION 7, for the most current data.

REMARKS

If you need assistance or more information on this product, please call your nearest Nalco Representative. For more news about Nalco Company, visit our website at www.nalco.com.

For **Medical and Transportation Emergencies** involving Nalco products, please see the Material Safety Data Sheet for the phone number.

ADDITIONAL INFORMATION

TRASAR, NALCO and the logo are trademarks of Nalco Company (4-27-2010)
All other trademarks are the property of their respective owners.

Nalco Company, 1601 West Diehl Road, Naperville, Illinois 60563-1198

FIRE AND EXPLOSION HAZARD :
Not flammable or combustible. If product is allowed to dry, the sodium nitrite is an oxidizing agent and can initiate the combustion of other materials. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

METHODS FOR CLEANING UP :
Do not allow product to evaporate to dryness. SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not breathe vapors/gases/dust. Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store away from organic chemicals and other oxidizable materials, reducing agents, acids and alkalis.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature Do not allow product to evaporate to dryness. Dried product residue can act as an oxidizer.

MATERIALS TO AVOID :
Strong acids Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) may generate heat, fires, explosions and toxic vapors. Do not mix with amines. Sodium nitrite can react with certain amines to produce N-nitrosamines, many of which are cancer-causing agents to laboratory animals.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions:	Oxides of nitrogen, Oxides of carbon

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

ACUTE ORAL TOXICITY :

Species:	Rat
LD50:	85 mg/kg
Test Descriptor:	Hazardous component Sodium Nitrite

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, TOXIC, N.O.S
Technical Name(s) :	Sodium Nitrite
UN/ID No :	UN 2922
Hazard Class - Primary :	8
Hazard Class - Secondary :	6.1
Packing Group :	III
Flash Point :	Not applicable
Reportable Quantity (per package) :	410 lbs
RQ Component :	SODIUM NITRITE

AIR TRANSPORT (ICAO/IATA) :

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

Proper Shipping Name :	CORROSIVE LIQUID, TOXIC, N.O.S
Technical Name(s) :	Sodium Nitrite
UN/ID No :	UN 2922
Hazard Class - Primary :	8
Hazard Class - Secondary :	6.1
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)
Reportable Quantity (per package) :	410 lbs
RQ Component :	SODIUM NITRITE

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, TOXIC, N.O.S
Technical Name(s) :	Sodium Nitrite
UN/ID No :	UN 2922
Hazard Class - Primary :	8

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Nitrite	7632-00-0	10.0 - 30.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :
NSF Registration number for this product is : 141328
This product is acceptable for treating boilers, steam lines, and/or cooling systems where neither the treated water nor the steam produced may contact edible products in and around food processing areas, excluding such use in areas where meat and poultry are processed (G10).

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation. Additional components may be unintentionally present at trace levels.

Substance(s)	Citations
• Sodium Nitrite	Sec. 311

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Nitrite	7632-00-0

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/14/2010
Version Number : 2.3

Subappendix B8
AOC 6 – Cooling Tower B
Investigation Program

Contents

Figures

Attachment

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
MSDS	Material Safety Data Sheet
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
RSL	regional screening level
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
XRF	x-ray fluorescence

SUBAPPENDIX B8

AOC 6 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 6 includes the entire area below and surrounding Cooling Tower B, as shown in Figure B8-1. (All tables and figures appear at the end of this subappendix.) 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 [SWMU] 11, discussed further in 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, 2006).

Operations in this area include 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, nonhazardous, phosphate-based inhibitors, scale control agents, and biocides have been used. The closed-loop cooling 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 in Sections 1.1.1 through 1.1.4 of this subappendix.

1.1.1 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 new cooling towers were installed into the existing cooling-tower basin, which was partially filled with concrete. No earthwork (filling or grading) or geotechnical investigation was required to install the new cooling tower. However, as discussed during the October 24, 2011 site walk, the former cooling-tower basins at both AOC 5 and 6 were extended to the north to allow installation of the replacement heat exchangers. The location of the new concrete is visible in the field. Concrete pathways were also installed in a portion of the areas formerly occupied by the acid houses at each cooling tower (the acid house at AOC 6 was located on the east side of the cooling tower. In addition, at AOC 6, the cooling towers initially installed circa 1954 were expanded approximately 4 to 5 years later, and the basin was extended at the same time. The difference in construction between the two portions of the basin is readily apparent. Attachment B-1 includes photographs depicting the AOC 6 Cooling Tower B hot-water basin expansion location. 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 (hot water basin). The original hot-water basin is no longer used for collecting cooling water. 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). Betz reports from various years indicate that target chromate concentrations gradually decreased to this range over the years from higher concentrations in use during earlier periods (CH2M HILL, 2007).

1.1.2 Lubricating-oil Cooling-water Hot-water Basin

A separate hot-water basin for the closed-loop lubricating-oil cooling system was located to the south of Cooling Tower B. This hot-water basin acted as a surge tank for the lubricating-oil cooling water. The lubricating-oil hot-water basin had covers; however, it was not completely sealed. The hot-water basin was removed when the new heat exchangers were installed during the cooling tower replacement project.

1.1.3 Former Chemical Shed (Acid House)

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, as well as sulfuric acid prior to the installation of the sulfuric acid tanks (see description of SWMU 11 in Appendix B6). 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.

1.1.4 Portable Chemical Storage Tanks (Totes)

Cooling-water treatment chemicals, including sulfuric acid, are stored in aboveground portable chemical storage tanks. These tanks are located in concrete secondary containment and are maintained and managed by the cooling additive vendor. At Cooling Tower B, these tanks were located east of the cooling tower until 2012 and are now located in newly constructed secondary containment on the south side of the AOC. Currently, there are six additives, including sulfuric acid, that are used to manage corrosion and microbiological activity in the cooling towers; each additive is contained within its own tank. The tanks are filled by the vendor as needed.

The current cooling-water chemicals stored in these tanks include:

- NALCO 2597, a concentrated sulfuric acid.
- 3D TRASAR 3DT184, an aqueous solution of phosphoric acid.
- 3D TRASAR 3DT192, containing sulfuric acid, phosphinosuccinic oligomer, a tagged high-stress polymer dispersant, benzotriazole, and tolytriazole.
- NALCO 90005, containing dimethyl-dioctyl-ammonium chloride and alkyl alcohol.

- STA-BR-EX ST70, containing sodium hydroxide, sodium hypochlorite, and chlorine sodium bromide.
- TRASAR TRAC101, containing sodium nitrite, nitrite molybdate, polymer, and azole.

Material Safety Data Sheets (MSDSs) for these chemicals are provided in Attachment B8-2. Pacific Gas and Electric Company reviewed the MSDSs for these chemicals to ensure that the analytical suite proposed is adequate. No new chemicals of potential concern (COPCs) were identified from the MSDSs.

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 hot water basin (that is, while the old cooling tower was in operation), the lubricating oil cooling system hot water basin, and potential incidental spills of cooling system additives during storage and/or transfer of the additive chemicals. The quantity of liquid released from the hot-water basin 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 but is expected to be relatively small because any spills or incidental leaks would have been small. If a large release from the hot-water basin 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 approximately 1964, cooling-water blowdown containing hexavalent chromium was directly discharged to Bat Cave Wash. Engineering drawings also indicate that some of the blowdown from AOC 6 may have initially been discharged to Bat Cave Wash (west of AOC 6) and the eastern edge of the station (AOC 11) via Storm Drain 9 (Pacific Gas and Electric Company, 1957). From approximately 1964 to 1985, cooling-water blowdown containing hexavalent chromium was processed by the cooling-water treatment system as part of routine operations and then discharged. 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 hot-water basin of the cooling tower lacked integrity in the past, some concerns have been expressed that it is possible that small quantities of cooling water may have been released to shallow soil directly beneath the hot-water basin. Available information indicates that the hot-water basins maintained their integrity.

As part of the cooling tower replacement project, the hot-water basins were cleaned and inspected. According to one of the monthly status reports provided by ICF Kaiser (the vendor managing the cooling tower replacement project), the basin floor did not exhibit "…any structural cracks or other injurious flaws that would have allowed basin water to leak out through the containment of the floor" (ICF Kaiser, 2000). The report also indicated that while some minor repairs to the basin walls were required and there were many visible cracks or fissures in the concrete side walls, these cracks appeared to be only hairline at and below the water mark of the walls. Once the walls were repaired, an epoxy coating was applied to the basins (ICF Kaiser, 2000).

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. 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. 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.

In November 2011, PG&E removed soil in the area of proposed soil sample location AOC6-6 as part of maintenance activities. Three soil samples (0 to 0.5, 2 to 3, and 4 to 5 feet bgs) were collected from sample location AOC6-6 and were analyzed for Title 22 metals for all depths Contract Laboratory Program inorganics (0 to 0.5 foot bgs sample only), volatile organic compounds (2 to 3 feet bgs sample only), semivolatile organic compounds (0 to 0.5 foot bgs sample only), polycyclic aromatic hydrocarbons (PAHs) (0 to 0.5 foot bgs sample only), polychlorinated biphenyls (PCBs) (0 to 0.5 foot bgs sample only), total petroleum hydrocarbons (TPH) as diesel and motor oil (0 to 0.5 foot bgs sample only), TPH as gasoline (2 to 3 feet bgs sample only), and pH (all depths). One opportunistic soil sample (AOC6-OS1) was collected from 0 to 0.5 foot bgs and was analyzed for Title 22 metals. The detected constituents are presented in Tables B8-2 through B8-6.

All data, including historical and opportunistic soil samples, 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 subappendix.

Thirty-five constituents, including one calculated quantity, were detected at AOC 6. Twenty-eight constituents (aluminum, arsenic, barium, calcium, cobalt, iron, magnesium, manganese, nickel, potassium, sodium, 1-methylnaphthalene, 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, pyrene, benzo(a)pyrene equivalents, TPH as diesel, TPH as motor oil, and vanadium) were only detected at concentrations at or below its their respective background concentrations for metals or 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). The six remaining metals detected at AOC 6 (chromium, hexavalent chromium, copper, lead, molybdenum, and zinc) were detected at concentrations above their background concentrations but below their applicable commercial screening values (CHHSLs for commercial use or RSLs for commercial use). Only one PCB was detected (Aroclor-1254), and the detected concentration exceeds the commercial screening level.

Table B8-7 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 were greater than the background or commercial screening value.

3.0 AOC 6 Nature and Extent Data Gaps Evaluation

The following section discusses the nature and extent of detected COPCs detected above background or commercial 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; Section 4.0 of this subappendix provides the recommended sampling for this unit.

3.1 Total Chromium

Total chromium was detected in 17 of 17 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 Tables B8-2 and B8-7, and Figure B8-1. Detected concentrations ranged from 4.9 mg/kg to 459 mg/kg. Concentrations in 12 of 17 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 lateral extent of contamination has not been adequately delineated in the unpaved areas to the north, east, south, 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 11 of 17 soil samples collected at AOC 6. None of the detected concentrations of hexavalent chromium exceeded the commercial screening level (37 mg/kg) (CHHSL), as shown in Tables B8-2 and B8-7, and Figure B8-1. All 11 detected concentrations exceeded the background concentration (0.83 mg/kg). Detected concentrations ranged from 1.2 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 north, east, south, 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 17 of 17 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 Tables B8-2 and B8-7, and Figure B8-1. Twelve 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 north, east, south, and west 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 Lead

Lead was detected in four of four soil samples collected at AOC 6. None of the detected concentrations of lead exceeded the commercial screening level (320 mg/kg) (CHHSL), as shown in Tables B8-2 and B8-7, and Figure B8-1. Three of the detected concentrations exceeded the background concentration (8.39 mg/kg). Detected concentrations ranged from 6.1 to 17 mg/kg. The lateral extent of contamination has not been fully delineated in the unpaved areas to the north, east, south, and west of the cooling tower and associated equipment.

3.5 Molybdenum

Molybdenum was detected in two of four soil samples collected at AOC 6. None of the detected concentrations of molybdenum exceeded the commercial screening level

(4,800 mg/kg) (CHHSL), as shown in Tables B8-2 and B8-7, and Figure B8-1. Two of the detected concentrations exceeded the background concentration (1.37 mg/kg). The two detected concentrations are 1.9 and 7.4 mg/kg. The lateral extent of contamination has not been fully delineated in the unpaved areas to the north, east, south, and west of the cooling tower and associated equipment.

3.6 Zinc

Zinc was detected in 17 of 17 soil samples collected at AOC 6. None of the detected concentrations of zinc exceeded the commercial screening level (100,000 mg/kg) (CHHSL), as shown in Tables B8-2 and B8-7, and Figure B8-1. Thirteen 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 north, east, south, and west 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.

3.7 Polychlorinated Biphenyls

Aroclor-1254 was the only PCB detected above reporting limits in the one surface soil sample collected at AOC 6. The detected concentration of Aroclor-1254 was 780 mg/kg, which slightly exceeds the commercial screening level of 740 mg/kg.

3.8 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* (CH2M HILL, 2011), data gaps were identified for Decision 1 including:

- Data Gap #1 - Lateral and vertical extents of contamination in the unpaved area to the north, east, west, and south of the cooling tower
- Data Gap #2 - Lateral and vertical extents 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 extents 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 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 and to define locations with COPCs and chemicals of potential ecological concern above Part A background or commercial 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 in Section 4.2 of this subappendix.

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. The proposed sample locations for AOC 6 are located in unpaved areas around Cooling Tower B. The accessibility assessment for each of the six proposed sampling locations can be found in Table B8-8. AOC 6 is located in Area 6, shown on Figure B-3 in the main text of Appendix B. 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 Appendix B26 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 and the phased sampling approach described in Section 4.0 of the main text of Appendix B.

4.2 AOC 6 Proposed Sampling

Table B8-8 summarizes the proposed AOC 6 sample locations, depths, description/rationale for each location (that is, 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 were defined in collaboration with the California Environmental Protection Agency, Department of Toxic Substances Control and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Samples will be collected at six locations: AOC 6-1 through AOC 6-5, and AOC 6-7 and AOC 8. Sample location AOC6-8 is a designated deeper sample location, and samples are proposed to be collected at the surface (0 to 0.5 foot bgs) and from the three typical subsurface intervals (2 to 3 feet bgs, 5 to 6 feet bgs, and 9 to 10 feet bgs). The remaining sample locations in this unit will initially be sampled at the surface (0 to 0.5 foot bgs) and shallow subsurface intervals (2 to 3 feet bgs) in accordance with the phased sampling protocol. In addition, one x-ray fluorescence (XRF) soil sample location (XRF-38) has been added to assist with the nature and extent evaluation. The XRF result from this location will be discussed during the data calls described in Section 4.0 of Appendix B to decide if soil samples should be collected from this location for offsite laboratory analysis. 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B8-3. All samples will be analyzed for Title 22 metals, hexavalent chromium, PCBs, 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 B8-8); 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 US EPA Method 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.

ICF Kaiser Engineers, Inc. (ICF Kaiser). 2000. *Monthly Progress and Status Report, Cooling Tower Replacement.* March 31.

Mittelhauser Corporation. 1986. *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station.* Revision 1. August.

Pacific Gas and Electric Company. 1957. Engineering Drawing 482629, Revision 5: *Sewers, Domestic, Utility & Fire Water System, Topock Compressor Station*. January 9 (original drawing). Revision 5 is undated.

Russell, Curt. 2006. 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 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
				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 and General Chemistry
Area of Concern 6 – Cooling Tower B
Soil Investigation Part B 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
RWQCB Environ. 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																						
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**	---
AOC6-6	11/08/11	0 - 0.5	N	ND (2)	3.5	130	ND (1)	ND (1)	**1.2**	35	4.5	16	**11**	ND (0.1)	ND (1)	9	ND (1)	ND (1)	ND (2)	24	**64 J**	9.4
	11/08/11	2 - 3	N	ND (2.1)	3.9	140	ND (1)	ND (1)	**1.7**	37	4.9	**17**	**17**	ND (0.1)	**1.9**	9.7	ND (1)	ND (1)	ND (2.1)	26	**70**	9.6
	11/08/11	4 - 5	N	ND (2.2)	3.2	190	ND (1.1)	ND (1.1)	ND (0.44)	13	5.5	9.5 6.1		ND (0.11)	ND (1.1)	9.6	ND (1.1)	ND (1.1)	ND (2.2)	26	32	10
AOC6-OS1	11/08/11	0 - 0.5	N	ND (2.1)	4.7	180	ND (1)	ND (1)	**1.5**	38	5.1	11	**12**	ND (0.11)	**7.4**	9.1	ND (1)	ND (1)	ND (2.1)	27	35	8
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.

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 B8-3

Sample Results: Contract Laboratory Program Inorganics

Area of Concern 6 – Cooling Tower B Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
			Commercial Screening Level [1]:	**990,000**	**NE**	**20,000**	**720,000**	**NE**	**23,000**	**NE**	**NE**
			RWQCB Environmental Screening Level [2]:	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Background [3]:	**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**
Category1											
AOC6-6	11/08/11	0 - 0.5	N	6,500	25,000	ND (1.02)	13,000	5,200 J	200 J	1,300 J	58

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 B8-4
Sample Results: Polycyclic Aromatic Hydrocarbons
Area of Concern 6 – Cooling Tower B Investigation Program
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
Commercial Screening Level [1]				**99,000**	**4,100,000**	**33,000,000**	**17,000,000**	**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**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acenaphthene**	**Acena phthylene**	**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**	**Phen anthrene**	**Pyrene**	**B(a)P Equivalent**
Category1																						
AOC6-6	11/08/11	0 - 0.5	N	12	17	ND (5.1)	ND (5.1)	ND (5.1)	34	39	86	20	29	44	5.1	68	ND (5.1)	18	ND (5.1)	34	61	58

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 B8-5

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 6 – Cooling Tower B Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)		
			Commercial Screening Level [1]:	**NE**	**NE**	**NE**
			RWQCB Environmental Screening Level [2]:	**540**	**540**	**1,800**
			Background [3]:	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as diesel**	**TPH as gasoline**	**TPH as motor oil**
Category1						
AOC6-6	11/08/11	0 - 0.5	N	13	---	49
	11/08/11	2 - 3	N	---	ND (1.3)	---

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 B8-6

Sample Results: Polychlorinated Biphenyls

Area of Concern 6 – Cooling Tower B Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
Commercial Screening Level [1]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**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**
Category1												
AOC6-6	11/08/11	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	780	ND (17)	ND (17)	ND (17)

Notes:

1 Commercial screening level - commercial USEPA regional screening levels

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

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 B8-7

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 6 – Cooling Tower B Investigation Program
Soil Investigation Part B 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												
Aluminum	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	6,500	0	(16,400)	0	(NE)	0	(990,000)
Calcium	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	25,000	0	(66,500)	0	(NE)	0	(NE)
Iron	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	13,000	0	(NE)	0	(NE)	0	(720,000)
Magnesium	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	5,200	0	(12,100)	0	(NE)	0	(NE)
Manganese	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	200	0	(402)	0	(NE)	0	(23,000)
Potassium	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	1,300	0	(4,400)	0	(NE)	0	(NE)
Sodium	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	58	0	(2,070)	0	(NE)	0	(NE)
Cyanide	mg/kg	0 / 1 (0%)	0 / 1 (0%)	0 / 0 (0%)	0 / 0 (0%)	ND (1.02)	NA	(NE)	NA	(NE)	0	(20,000)
General Chemistry												
pH	pH units	4 / 4 (100%)	4 / 4 (100%)	0 / 0 (0%)	0 / 0 (0%)	10	NA	(NE)	NA	(NE)	NA	(NE)
Metals												
Antimony	mg/kg	0 / 4 (0%)	0 / 4 (0%)	0 / 0 (0%)	0 / 0 (0%)	ND (2.2)	NA	(NE)	NA	(NE)	0	(380)
Arsenic	mg/kg	4 / 4 (100%)	4 / 4 (100%)	0 / 0 (0%)	0 / 0 (0%)	4.7	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	4 / 4 (100%)	4 / 4 (100%)	0 / 0 (0%)	0 / 0 (0%)	190	0	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	0 / 4 (0%)	0 / 4 (0%)	0 / 0 (0%)	0 / 0 (0%)	ND (1.1) ‡	0	(0.672)	NA	(NE)	0	(190)
Cadmium	mg/kg	0 / 4 (0%)	0 / 4 (0%)	0 / 0 (0%)	0 / 0 (0%)	ND (1.1) ‡	0	(1.1)	NA	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	11 / 17 (65%)	11 / 17 (65%)	0 / 0 (0%)	0 / 0 (0%)	15.3	11	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	17 / 17 (100%)	17 / 17 (100%)	0 / 0 (0%)	0 / 0 (0%)	459	12	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	4 / 4 (100%)	4 / 4 (100%)	0 / 0 (0%)	0 / 0 (0%)	5.5	0	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	17 / 17 (100%)	17 / 17 (100%)	0 / 0 (0%)	0 / 0 (0%)	211	12	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	4 / 4 (100%)	4 / 4 (100%)	0 / 0 (0%)	0 / 0 (0%)	17	3	(8.39)	0	(NE)	0	(320)
Mercury	mg/kg	0 / 4 (0%)	0 / 4 (0%)	0 / 0 (0%)	0 / 0 (0%)	ND (0.11)	NA	(NE)	NA	(NE)	0	(180)
Molybdenum	mg/kg	2 / 4 (50%)	2 / 4 (50%)	0 / 0 (0%)	0 / 0 (0%)	7.4	2	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	17 / 17 (100%)	17 / 17 (100%)	0 / 0 (0%)	0 / 0 (0%)	14.5	0	(27.3)	0	(NE)	0	(16,000)
Vanadium	mg/kg	4 / 4 (100%)	4 / 4 (100%)	0 / 0 (0%)	0 / 0 (0%)	27	0	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	17 / 17 (100%)	17 / 17 (100%)	0 / 0 (0%)	0 / 0 (0%)	1,130	13	(58)	0	(NE)	0	(100,000)
Polychlorinated biphenyls												
Aroclor 1254	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	780	0	(NE)	0	(NE)	1	(740)
Total PCBs	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	780	0	(NE)	0	(NE)	0	(NE)
Polycyclic Aromatic Hydrocarbons												
1-Methyl naphthalene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	12	0	(NE)	0	(NE)	0	(99,000)
2-Methyl naphthalene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	17	0	(NE)	0	(NE)	0	(4,100,000)
Benzo (a) anthracene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	34	0	(NE)	0	(NE)	0	(1,300)
Benzo (a) pyrene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	39	0	(NE)	0	(NE)	0	(130)
Benzo (b) fluoranthene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	86	0	(NE)	0	(NE)	0	(1,300)
Benzo (ghi) perylene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	20	0	(NE)	0	(NE)	0	(17,000,000)
Benzo (k) fluoranthene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	29	0	(NE)	0	(NE)	0	(1,300)
Chrysene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	44	0	(NE)	0	(NE)	0	(13,000)
Dibenzo (a,h) anthracene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	5.1	0	(NE)	0	(NE)	0	(380)
Fluoranthene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	68	0	(NE)	0	(NE)	0	(22,000,000)
Indeno (1,2,3-cd) pyrene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	18	0	(NE)	0	(NE)	0	(1,300)
Phenanthrene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	34	0	(NE)	0	(NE)	0	(17,000,000)

TABLE B8-7

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 6 – Cooling Tower B Investigation Program
Soil Investigation Part B 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)
Polycyclic Aromatic Hydrocarbons												
Pyrene	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	61	0	(NE)	0	(NE)	0	(17,000,000)
B(a)P Equivalent	µg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	58	0	(NE)	0	(NE)	0	(130)
Total Petroleum Hydrocarbons												
TPH as diesel	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	13	0	(NE)	0	(540)	0	(NE)
TPH as motor oil	mg/kg	1 / 1 (100%)	1 / 1 (100%)	0 / 0 (0%)	0 / 0 (0%)	49	0	(NE)	0	(1,800)	0	(NE)

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 B8-8
Proposed Sampling Plan – AOC 6 Cooling Tower B
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

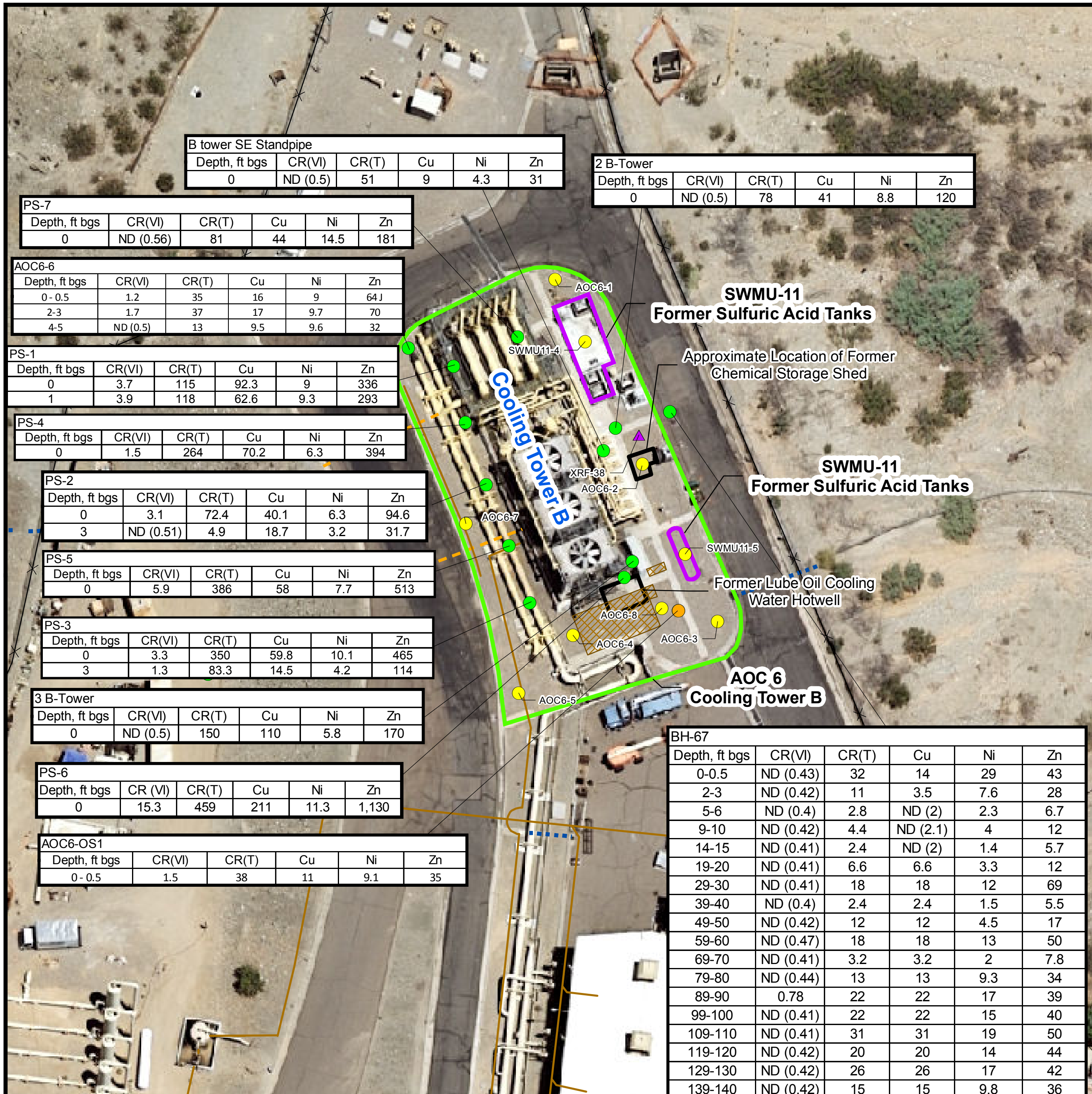
Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 6-1	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the unpaved areas to the north, east, west, and south of the cooling tower	Title 22 metals, hexavalent chromium, PCBs, and pH	Suitable for XRF Likely accessible by hydrovac
AOC 6-2	0-0.5 and 3, if feasible	To resolve Data Gaps #1 and #3, lateral and vertical extents of contamination in the unpaved and assess former chemical storage shed	Title 22 metals, hexavalent chromium, PCBs, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.	Suitable for XRF; stay within the footprint of the former chemical storage shed shown in Figure B8-3 Likely accessible by hydrovac
AOC 6-3	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the unpaved area southeast of Cooling Tower B	Title 22 metals, hexavalent chromium, PCBs, and pH	Suitable for XRF Likely accessible by hydrovac
AOC 6-4	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the unpaved area south of Cooling Tower B	Title 22 metals, hexavalent chromium, PCBs, and pH	Suitable for XRF Suitable for hand sampling
AOC 6-5	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the unpaved area southwest of Cooling Tower B	Title 22 metals, hexavalent chromium, PCBs, and pH; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation.	Suitable for XRF Likely accessible by hydrovac
AOC 6-7	0-0.5 and 3, if feasible	To resolve Data Gap #2, lateral and vertical extents of contamination in the unpaved area west of Cooling Tower B	Title 22 metals, hexavalent chromium, PCBs, and pH	Suitable for XRF. Likely accessible by hydrovac.
AOC 6-8	0-0.5, 3, 6 and 10, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the unpaved area south of Cooling Tower B	Title 22 metals, hexavalent chromium, PCBs and pH	Suitable for XRF Suitable for hand sampling

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



B tower SE Standpipe

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	ND (0.5)	51	9	4.3	31

2 B-Tower

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	ND (0.5)	78	41	8.8	120

PS-7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0	ND (0.56)	81	44	14.5	181

AOC6-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0 - 0.5	1.2	35	16	9	64 J
2-3	1.7	37	17	9.7	70
4-5	ND (0.5)	13	9.5	9.6	32

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

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	ND (0.51)	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	ND (0.5)	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

AOC6-OS1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0 - 0.5	1.5	38	11	9.1	35

BH-67

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Zn
0-0.5	ND (0.43)	32	14	29	43
2-3	ND (0.42)	11	3.5	7.6	28
5-6	ND (0.4)	2.8	ND (2)	2.3	6.7
9-10	ND (0.42)	4.4	ND (2.1)	4	12
14-15	ND (0.41)	2.4	ND (2)	1.4	5.7
19-20	ND (0.41)	6.6	6.6	3.3	12
29-30	ND (0.41)	18	18	12	69
39-40	ND (0.4)	2.4	2.4	1.5	5.5
49-50	ND (0.42)	12	12	4.5	17
59-60	ND (0.47)	18	18	13	50
69-70	ND (0.41)	3.2	3.2	2	7.8
79-80	ND (0.44)	13	13	9.3	34
89-90	0.78	22	22	17	39
99-100	ND (0.41)	22	22	15	40
109-110	ND (0.41)	31	31	19	50
119-120	ND (0.42)	20	20	14	44
129-130	ND (0.42)	26	26	17	42
139-140	ND (0.42)	15	15	9.8	36
149-150	ND (0.41)	17	17	12	36
159-160	ND (0.41)	19	19	13	41

- Results greater than or equal to the CHHSLs/Industrial Soil PRG are bolded.

LEGEND

- Proposed Soil Sample Location
- Proposed XRF Screening Location
- Existing Soil Sample Location
- Existing Opportunistic Soil Sample Location
- Current Chemical Tank Location
- AOC Boundary
- SWMU Boundary
- Site Boundary Fence
- Active Transfer Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground
- Former/Abandoned Stormdrain Line or Trench

0 20 40 80 Feet

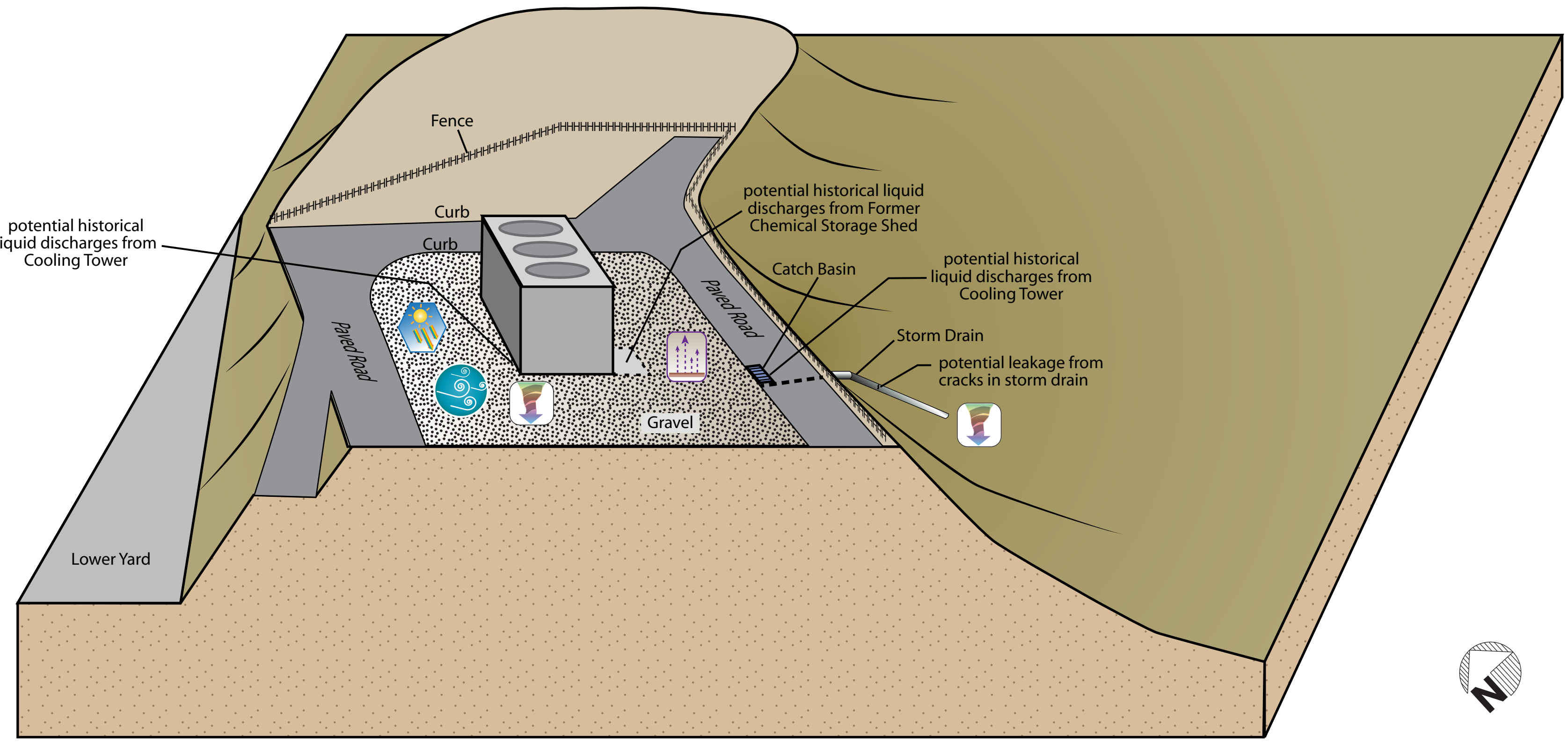
N

FIGURE B8-1
SOIL SAMPLE RESULTS - METALS AREA OF CONCERN 6 COOLING TOWER B AND SOLID WASTE MANAGEMENT UNIT 11 FORMER SULFURIC ACID TANKS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC6\AOC6_RESULT_METAL.mxd



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 Work Plan
PG&E Topock Compressor Station
Needles, California

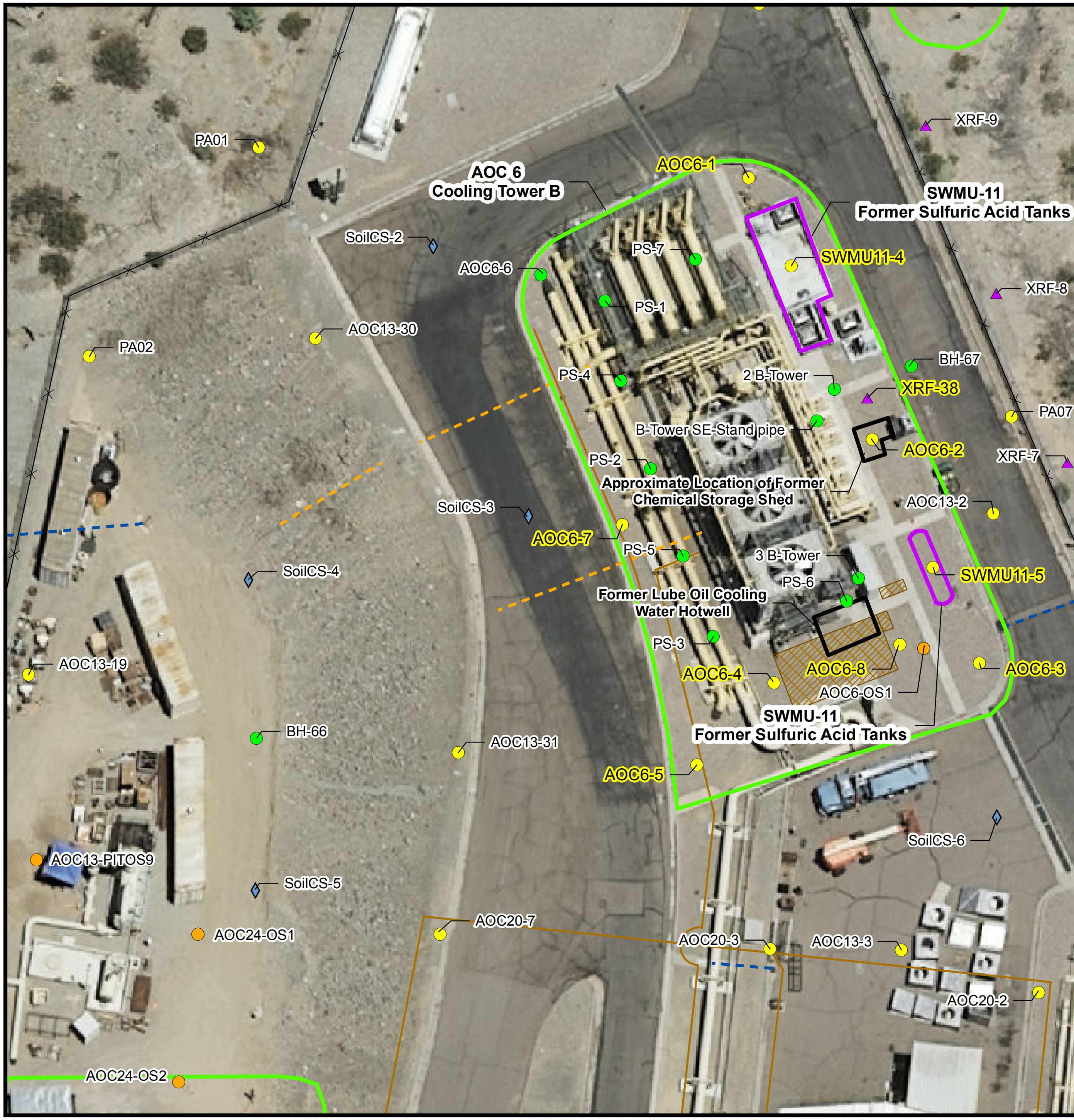


FIGURE B8-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 6
COOLING TOWER B AND SOLID WASTE MANAGEMENT UNIT 11 FORMER SULFURIC ACID TANKS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC6\AOC6_Proposed_Sample_Locs.mxd Date Saved: 12/6/2012 4:06:04 PM

Attachment B8-1
Photograph Log

ATTACHMENT B8-1

Photograph Log, AOC 6 Cooling Tower B Hot Water Basin Expansion Location

Photolog B8-1: AOC 6 Cooling Tower B, hot water basin expansion location – view from west side looking east. The Old basin is located to the right.

Photolog B8-2: AOC 6 Cooling Tower B, hot water basin expansion location – view from west side looking east-southeast. The old basin is located to the right.

Photolog B8-3: AOC 6 Cooling Tower B, hot water basin expansion location – view from west side looking north. The old basin is located to the bottom.

Photolog B8-4: AOC 6 Cooling Tower B, hot water basin expansion location – view from west side looking south. The old basin is located to the top.

Attachment B8-2
Materials Safety Data Sheets

NALCO® 2597

pH Control Program

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

NALCO 2597 is concentrated sulfuric acid. The product is designed to reduce alkalinity or pH in open recirculating cooling water systems or in waste treatment effluent streams.

PHYSICAL & CHEMICAL PROPERTIES

These properties are typical. Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Form	Liquid
Density @ 77°F (25°C)	15.0 lb/gal (1.80 kg/L)
Specific Gravity @ 77°F (25°C)	1.80
pH (neat)	<1.0
Flash Point	Not Applicable
Color	Clear, Colorless
Freeze Point	-20°F (-28°C)

ACTIVE CONSTITUENTS

Component	Function
Sulfuric Acid	pH Adjustment

3D TRASAR® 3DT184

Cooling Water Corrosion Inhibitor

NALCO

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

3D TRASAR products are part of an innovative water treatment program that uses proven technology to prevent operational problems. **3D TRASAR** compensates for both routine and special causes of system variation. **3D TRASAR** programs provide a return on your investment through their unique control and diagnostic capabilities.

3D TRASAR 3DT184 is an aqueous solution of phosphoric acid. Its primary use is as an orthophosphate source for treatment of industrial cooling water systems. As such, it is an anodic corrosion inhibitor that must be paired up with an acceptable cathodic inhibitor from the **3D TRASAR** product line. **3DT184** also contains **TRASAR®** Technology for superior program monitoring and control.

MATERIALS OF COMPATIBILITY

Compatible	Not Compatible
Viton	Phenolic
EPDM	Stainless Steel 304
Polyethylene	Stainless Steel 316
Polypropylene	Neoprene
PVC	Brass
Plasite 4300	Buna-N
Hypalon	Polyurethane
HDPE	Plasite 7122

DOSAGE AND FEEDING

For complete dosage and feeding recommendations, consult your Nalco sales engineer.

ENVIRONMENTAL AND TOXICITY DATA

Refer to SECTIONS 11 and 12 of the Material Safety Data Sheet (MSDS) for all available mammalian and aquatic toxicity information.

Biological Oxygen Demand (5-day BOD5)	2,460 ppm
Chemical Oxygen Demand (COD)	3,000 ppm
Total Organic Carbon (TOC)	1,000 ppm

For environment permit information purposes, 1 ppm of **3DT184** contributes 0.347 ppm of PO4.

PHYSICAL & CHEMICAL PROPERTIES

These properties are typical. Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Physical State	Liquid
Density	9.3 lb/gal
Specific Gravity at 77°F [25°C]	1.12
pH (neat)	4.7
Flash Point	Not Applicable
Odor	None
Freeze Point	18°F [-8°C]
Solubility in Water	Complete
Appearance	Clear, Light Yellow
Viscosity @ 77°F [25°C]	84 cp

ACTIVE CONSTITUENTS

Active	**Function**
Tagged High Stress Polymer (THSP)	Dispersant
Phosphinosuccinic Oligomer (PSO)	Mild steel corrosion and CaCO3 scale inhibition
Benzotriazole (BZT)/Tolyltriazole (TT)	Copper corrosion inhibition

REGULATORY APPROVALS

Refer to the Material Safety Data Sheet (MSDS), SECTION 15 for the most recent information on approvals. This product is intended for industrial use only. It must not be fed to potable water systems of any type.

NALCO® 90005

Microbiocide Low Foam Water Treatment

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

NALCO 90005 is a nonoxidizing quaternary ammonium biocide effective for controlling algae and bacteria in recirculating cooling water systems, such as encountered within industrial and commercial building applications. Bacteria and algae set up conditions that promote deposition, corrosion and fouling. **NALCO 90005** aids in cleaning and loosening slime deposits from cooling water systems and killing the microorganisms that form these deposits.

Program Benefits

- Broad-spectrum biocide, designed to control algae and bacteria:
  - Increases system efficiency by maintaining clean heat exchangers and tower fill
  - Minimizes repair and maintenance costs
  - Avoids unsightly visible contamination
- Promotes a healthier operating environment by lowering system bacterial activity.
- Helps reduce overall biocide treatment costs.
- Functions over a wide pH range, either with or without halogens present, to ensure effective algae control in a broad range of applications.
- Helps reduce bacterial growth by minimizing nutrients that are produced from algae.
- Effective dispersant, which can remove slime deposits.

MATERIALS OF COMPATIBILITY

Compatible	Not Compatible
PVC	Natural Rubber
Polyethylene	Neoprene
Polypropylene	Buna-N
Teflon	Viton
Kynar	
Kalrez	
Vinyl ester	
Stainless Steel 316L	

DOSAGE AND FEEDING

For complete dosage and feeding recommendations, contact your Nalco sales engineer.

ENVIRONMENTAL AND TOXICITY DATA

Refer to the Material Safety Data Sheet (MSDS), SECTIONS 11 and 12, for the most current data.

SAFETY AND HANDLING

HANDLING: Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled. Do not use, store, spill or pour near heat, sparks or open flame. Refer to the Material Safety Data Sheet (MSDS), SECTIONS 3 and 8, for the most current data.

STORAGE

STORAGE CONDITIONS: Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers. Store separately from reducing agents.

The recommended in-plant storage limit for **NALCO 90005** is six months. Refer to the Material Safety Data Sheet (MSDS), SECTION 7, for the most current data.

- **STA·BR·EX ST70** is a stable liquid bromine biocide in one package for easy dosing and control. Unlike liquid chlorine bleach, it does not lose its activity in a matter of days (see Figure 1). It reduces operator time and makes dosing easy.
- **STA·BR·EX ST70** kills bacteria and helps prevent slime problems. Combined with Nalco services, it helps keep heat exchangers and tower fill clean for low maintenance and cost-efficient operation.

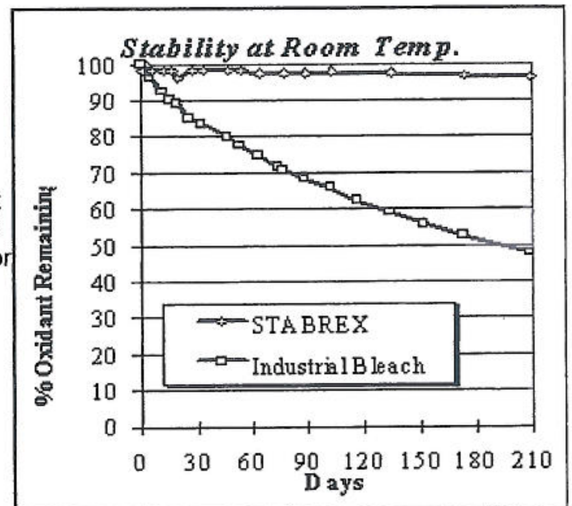


Figure 1 -- Stability of **STA·BR·EX ST70** at 70°F (20°C)

- Because **STA·BR·EX ST70** is bromine-based, it will work effectively in systems where chlorine is challenged by amine or ammonia contamination.
- **STA·BR·EX ST70** has low volatility that reduces product loss from the cooling tower. This results in more active product retained in the system to kill microorganisms. Equipment lasts longer because STA·BR·EX significantly reduces vapor-phase corrosion.
- **STA·BR·EX ST70** is packaged and delivered in PORTA-FEED® units. Nalco's delivery specialist does all of the chemical handling. Operators have less chance of exposure and a safer work environment.
- **STA·BR·EX ST70** generates less disinfection by-products as measured by the concentration of Adsorbable Organic Halide (AOX).

PHYSICAL & CHEMICAL PROPERTIES

Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.
These properties are typical.

TRASAR® TRAC101

Traced Closed System Treatment

NALCO

Product Bulletin

PRODUCT DESCRIPTION AND APPLICATION

TRASAR TRAC101 is a traced, liquid corrosion and deposit inhibitor for use in closed cooling and hot water heating systems. **TRASAR TRAC101** is effective in high heat flux systems where heat transfer surface experience high skin temperatures and corrosion control challenges are demanding. **TRASAR TRAC101** is a multicomponent inhibitor that provides ferrous metal corrosion protection, copper alloy corrosion protection, scale inhibition and dispersancy.

Optional TRASAR technology constantly monitors, displays and automatically doses product to a target concentration keeping your system continuously protected.

PHYSICAL & CHEMICAL PROPERTIES

Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Form	Liquid
Density	10.4 - 10.75 lb/gal (1.25- 1.29 kg/L)
Specific Gravity at 60°F (15.6 °C)	1. 25-1.29
pH (neat)	12- 14
Freeze-Thaw Recovery	Complete
Flash Point (PMCC)	Not Applicable
Odor	None
Solubility in Water	Complete
Appearance	Clear , light yellow, light gold

Molybdate/Molybdenum, High Range

DR/890 Analytical Procedure

NALCO

AP-2/890

SPECIFICATIONS

Method: Colorimetric (DR/890)

Range: 0.2 to 40.0 ppm as Mo^{+6}

Testing Time: 10 minutes

DESCRIPTION

MO-1 and MO-2 Reagents are added to buffer and condition the sample. MO-3 provides the mercapto-acetic acid which reacts with molybdate/molybdenum to form a yellow color proportional to the molybdenum concentration.

ORDERING INFORMATION

Order all replacement parts and reagents by their part numbers. To be sure this product is compatible with your treatment program, contact your local Nalco representative. Items marked with an "*" are included with the kit or set. **To place your order**, please contact your local customer service department.

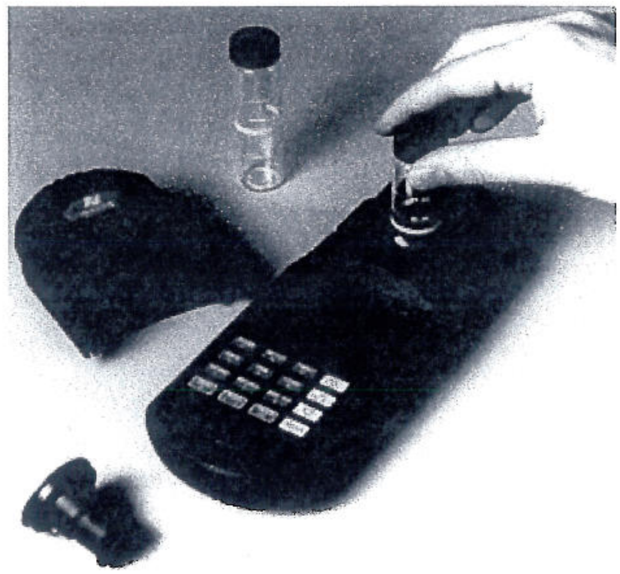
REPLACEMENT PARTS AND REAGENTS

Required Parts and Reagents

Description	Part No.
High Range Molybdenum 10 mL Reagent Set, 100 tests	460-P3102.88

Includes:

Description	Size	Quantity
MO-1 Powder Pillows*	10 mL	100/pkg
MO-2 Powder Pillows*	10 mL	100/pkg
MO-3 Powder Pillows*	10 mL	100/pkg



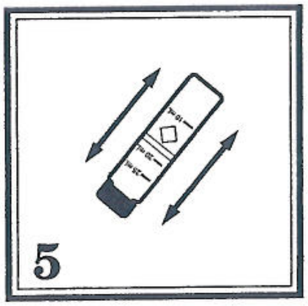
Nalco DR/890 Colorimeter

Description	Part No.
Nalco DR/890 Colorimeter	400-P0890.88
Sample cells, 10-20-25 mL w/cap, 6/pkg	500-P2555.88

Optional Parts and Reagents

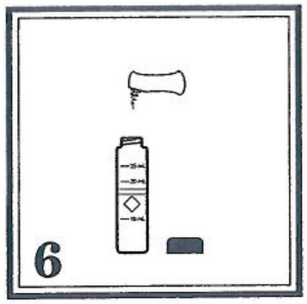
Description	Size	Part No.
Sulfamic Acid	10 grams	460-S0103.80
Sulfamic Acid	500 grams	460-S0103.84
Powder Pillow Snippers		500-P1605.88

5



Add the contents of one MO-2 Reagent Powder Pillow. Cap the cell and invert several times to mix.

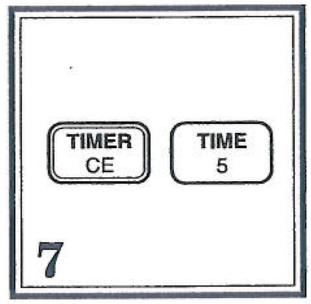
6



Add the contents of one MO-3 Reagent Powder Pillow. Cap the cell and invert several times to mix. This is the prepared sample.

> **Note:** Accuracy is not affected by undissolved powder.

7



Press: **TIMER ENTER**

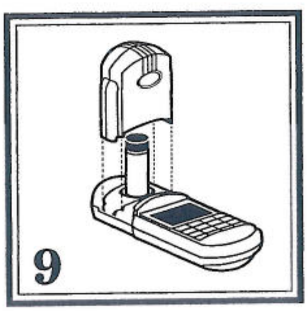
A five-minute reaction period will begin.

> **Note:** Molybdenum will cause a yellow color to form.

8

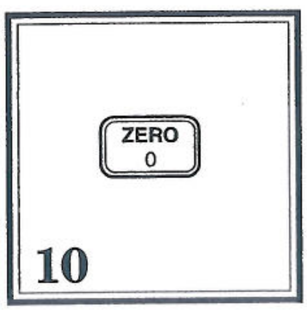
After the timer beeps, fill a second cell with 10 mL of sample (the blank).

9



Insert the blank into the cell holder. Tightly cover the sample cell with the instrument cap.

10

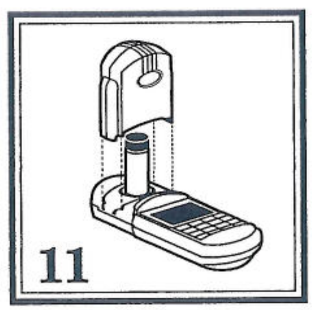


Press: **ZERO**

The cursor will move to the right, then the display will show:

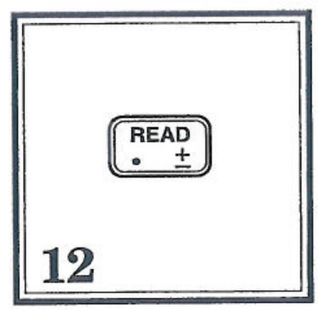
0.0 mg/L Mo6

11



Place the prepared sample into the cell holder. Tightly cover the sample cell with the instrument cap.

12



Press: **READ**

The cursor will move to the right, then the result in mg/L molybdenum (or alternate form) will be displayed.

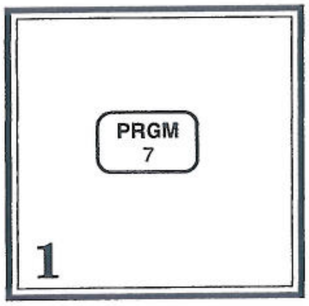
NALCO COMPANY OPERATIONS

North America: 1601 West Diehl Road • Naperville, Illinois 60563-1198 • USA
Europe: Ir.G.Tjalmaweg 1 • 2342 BV Oegstgeest • The Netherlands
Pacific Pte, Ltd: 2 International Business Park • #02-20 The Strategy Tower 2 • Singapore 609930
Latin America: Av. das Nações Unidas 17.891 • 6° Andar 04795-100 • São Paulo • SP • Brazil

www.nalco.com

HIGH RANGE NITRITE DR/890 PROCEDURE

Special Note: This test does not measure nitrates nor is it applicable to glycol-based samples.

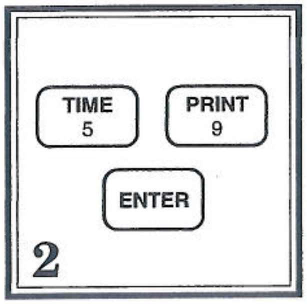


Enter the stored program number for high range nitrite (NO_2-).

Press: **PGRM**

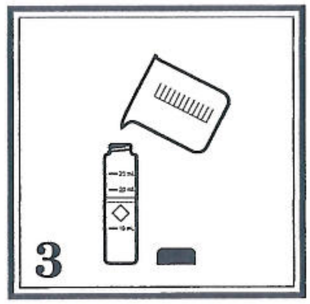
The display will show:

PGRM ?



Press: **59 ENTER**

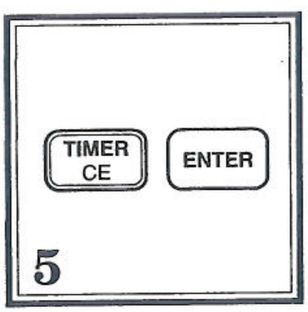
The display will show **mg/L, NO2** and the **ZERO** icon.



Fill a sample cell with 10 mL of sample.

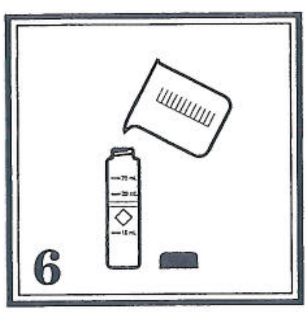
Add the contents of one NT-2 Nitrite Reagent Powder Pillow. Cap the cell and invert 5-7 times to mix (the prepared sample).

Notes: A greenish-brown color will develop if nitrite is present.
Avoid excessive mixing or low results may occur. Accuracy is not affected by undissolved powder.

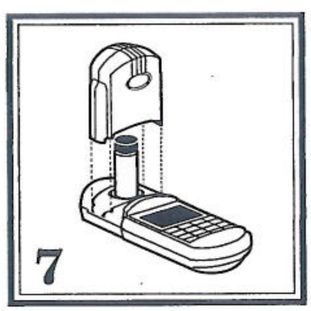


Press: **TIMER ENTER**

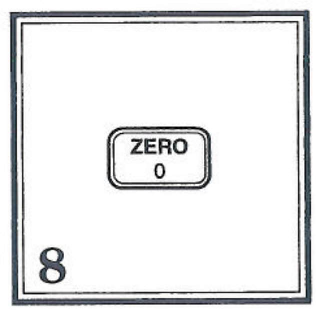
A ten-minute reaction time period will begin.



Fill another sample cell with 10 mL of the sample (the blank).



Place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.



Press: **ZERO**

The cursor will move to the right, then the display will show:

0 mg/L NO2

Steps for Calibrating Conductivity and pH

Conductivity

1. Press the "ACTIONS" button on the left side of the controller box.
2. Press the UP/DOWN arrows to select "CLEAN AND CALIBRATE" and press "SELECT" in the lower right hand of the screen.
3. You will be prompted for a password, enter "12345", and press "ACCEPT" at the lower right hand corner of the screen.
4. Press the UP/DOWN arrows to select "CONDUCTIVITY" and press "SELECT" in the lower right hand of the screen.
5. The last date of calibration will be shown, press "START" to continue.
6. Press the UP/DOWN arrows to select "1-POINT/PROCESS" and press "SELECT" in the lower right hand of the screen.
7. Press "EDIT" in lower right hand corner of the screen, type in the new conductivity reading uS/cm and press "ACCEPT" in the lower right hand corner.
8. Controller will display "Conductivity calibration was successful. Accept new values?" and press "ACCEPT" in the lower right hand corner of the screen.

IF Conductivity calibration above fails, THEN proceed to two point calibration.

1. From the main screen Press the "ACTIONS" button on the left side of the controller box.
2. Press the UP/DOWN arrows to select "CLEAN AND CALIBRATE" and press "SELECT" in the lower right hand of the screen.
3. You will be prompted for a password, enter "12345", and press "ACCEPT" at the lower right hand corner of the screen.
4. Press the UP/DOWN arrows to select "CONDUCTIVITY" and press "SELECT" in the lower right hand of the screen.
5. The last date of calibration will be shown, press "START" to continue.
6. Press the UP/DOWN arrows to select "2-POINT/STANDARDS" and press "SELECT" in the lower right hand of the screen.
7. Follow on screen instructions "Close valves and remove probe. Hold probe in air" and press "CONTINUE" in the lower right hand corner of the screen. A 120 second timer will begin while the controller measures this reading.
8. Follow the on screen instructions "Reinstall probe in process water and open valves" and press "CONTINUE".
9. The controller will ask for the conductivity of the process water, press "EDIT", enter in the conductivity in uS/cm using key pad, and press "ACCEPT".
10. A 360 second timer will begin while the controller measures this reading.
11. Controller will display "Conductivity calibration was successful. Accept new values?" and press "ACCEPT in the lower right hand corner of the screen.

IF this step fails, call Nalco 702-506-6696.

NALCO

SAFETY DATA SHEET

PRODUCT

3D TRASAR® 3DT184

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME :	**3D TRASAR® 3DT184**
APPLICATION :	CORROSION INHIBITOR
COMPANY IDENTIFICATION :	Nalco Company 1601 W. Diehl Road Naperville, Illinois 60563-1198
EMERGENCY TELEPHONE NUMBER(S) :	(800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING

HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :

0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Phosphoric Acid	7664-38-2	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER

Corrosive. May cause tissue damage.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
Not flammable or combustible. May evolve oxides of phosphorus (POx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
Corrosive; causes permanent skin damage.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store separately from bases.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit
Phosphoric Acid	ACGIH/TWA		1	
	ACGIH/STEL		3	
	OSHA Z1/PEL		1	

ENGINEERING MEASURES :

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of phosphorus

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product and a similar product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	3,660 mg/l	Similar Product
Inland Silverside	96 hrs	> 5,000 mg/l	Product
Rainbow Trout	96 hrs	> 5,000 mg/l	Product

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

LAND TRANSPORT :

Proper Shipping Name :	PHOSPHORIC ACID SOLUTION
Technical Name(s) :	
UN/ID No :	UN 1805
Hazard Class - Primary :	8
Packing Group :	III
Flash Point :	> 200 F/ > 93.3 °C
DOT Reportable Quantity (per package) :	13,540 lbs
DOT RQ Component :	PHOSPHORIC ACID

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	PHOSPHORIC ACID SOLUTION
Technical Name(s) :	
UN/ID No :	UN 1805
Hazard Class - Primary :	8
Packing Group :	III
IATA Cargo Packing Instructions :	821
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	PHOSPHORIC ACID SOLUTION

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation. Additional components may be unintentionally present at trace levels.

Substance(s)	Citations
• Phosphoric Acid	Sec. 311

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Phosphoric Acid	7664-38-2

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 03/04/2010
Version Number : 1.10

NALCO

SAFETY DATA SHEET

PRODUCT

3D TRASAR® 3DT192

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **3D TRASAR® 3DT192**

APPLICATION : COOLING WATER TREATMENT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sulfuric Acid	7664-93-9	1.0 - 5.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Use a mild soap if available.
Wear suitable protective clothing.
Not flammable or combustible. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
May cause irritation with prolonged contact.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store separately from bases.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Substance(s)	Category:	ppm	mg/m3	Non-Standard Unit
Sulfuric Acid (Thoracic fraction.)	ACGIH/TWA		0.2	
Sulfuric Acid	OSHA Z1/PEL		1	

ENGINEERING MEASURES :
General ventilation is recommended. Use local exhaust ventilation if necessary to control airborne mist and vapor.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section or when significant mists, vapors, aerosols, or dusts are generated, an approved air purifying respirator equipped with suitable filter cartridges is recommended.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Bases Contact with strong alkalies (e.g. ammonia and its solutions, carbonates, sodium hydroxide (caustic), potassium hydroxide, calcium hydroxide (lime), cyanide, sulfide, hypochlorites, chlorites) may generate heat, splattering or boiling and toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Low

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product, unless otherwise indicated.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Fathead Minnow	96 hrs	3,362 mg/l	Similar Product
Rainbow Trout	96 hrs	864 mg/l	Product

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Ceriodaphnia dubia	48 hrs	1,768 mg/l		Product

CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Fathead Minnow	7 Days	/ 1,250 mg/l		Similar Product

PERSISTENCY AND DEGRADATION :

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sulfuric Acid : Corrosive

CERCLA/SUPERFUND, 40 CFR 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product contains sulfuric acid, which is listed in Sections A and B as an Extremely Hazardous Substance, but the amount in the product does not require action for reporting.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories.

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

SAFETY DATA SHEET

PRODUCT

NALCO(R) 90005

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **NALCO(R) 90005**

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Alkyl Alcohol	56-81-5	5.0 - 10.0
Dimethyl-Dioctyl-Ammonium Chloride	5538-94-3	30.0 - 60.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
Corrosive. May cause tissue damage. Harmful if swallowed.
Keep container tightly closed and in a well-ventilated place. Do not get in eyes, on skin, on clothing. Do not take internally. Avoid breathing vapor. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water.
Wear a face shield. Wear chemical resistant apron, chemical splash goggles, impervious gloves and boots.
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin, Inhalation

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This product may pose a risk to the aquatic ecosystem if released., Prevent material from entering sewers or waterways.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Do not breathe vapors/gases/dust. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store separately from oxidizers. Store separately from reducing agents.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

VISCOSITY	< 100.0 cps @ 77.0 °F / 25.0 °C
MELTING POINT	10.4 °F / -12 °C
INITIAL BOILING POINT	203.0 °F / 95.0 °C
VOC CONTENT	9.0 % Calculated

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Reducing agents

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of nitrogen

11. TOXICOLOGICAL INFORMATION

The following results are for the product, unless otherwise indicated.

ACUTE ORAL TOXICITY :

Species	LD50	Test Descriptor
Mouse	360 - 375 mg/kg	Product

ACUTE DERMAL TOXICITY :

Species	LD50	Test Descriptor
Rabbit	259 mg/kg	80% Active Ingredient

ACUTE INHALATION TOXICITY :

Species	LC50	Test Descriptor
Rat	10 mg/l (1 hrs)	Product

PRIMARY SKIN IRRITATION : Severely irritating US DOT CORROSIVITY TEST: Corrosive

PRIMARY EYE IRRITATION : Extremely irritating (Corrosive)

SENSITIZATION :
This product is not expected to be a sensitizer.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D002

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name :	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) :	QUATERNARY AMMONIUM CHLORIDE(S)
UN/ID No :	UN 1903
Hazard Class - Primary :	8
Packing Group :	II
Flash Point :	> 200 F/ > 93.3 °C

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name :	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) :	QUATERNARY AMMONIUM CHLORIDE(S)
UN/ID No :	UN 1903
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	DISINFECTANTS, LIQUID, CORROSIVE, N.O.S.
Technical Name(s) :	QUATERNARY AMMONIUM CHLORIDE(S)

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :
NSF Registration number for this product is : 140607
This product is acceptable for treatment of cooling and retort water (G5) in and around food processing areas.

FEDERAL INSECTICIDE, FUNGICIDE AND RODENTICIDE ACT (FIFRA) :
EPA Reg. No. 6836-60-1706

In all cases follow instructions on the product label.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Acetaldehyde	Sec. 311
• Dimethylnitrosoamine	Sec. 307

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
This product may contain trace levels (<0.1% for carcinogens, <1% all other substances) of the following substance(s) listed under the regulation:

Substance(s)	Citations
• Acetaldehyde • Dimethylnitrosoamine	Sec. 112

CALIFORNIA PROPOSITION 65 :
Substances known to the State of California to cause cancer are present as an impurity or residue.

Substance(s)	Concentration	EFFECTS
• Acetaldehyde • Dimethylnitrosoamine	.0001 % < .0001 %	Causes Cancer

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Alkyl Alcohol	56-81-5

Ariel Insight∟ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight∟ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS∟ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 11/03/2008
Version Number : 2.0

SAFETY DATA SHEET

PRODUCT
STABREX® ST70

EMERGENCY TELEPHONE NUMBER(S)
(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **STABREX® ST70**

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 3 / 3 FLAMMABILITY : 0 / 0 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme * = Chronic Health Hazard

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Hydroxide	1310-73-2	1.0 - 5.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

DANGER
CORROSIVE. CAUSES SEVERE EYE AND SKIN INJURY. HARMFUL IF INHALED. HARMFUL IF SWALLOWED. Do not get in eyes, on skin or on clothing. Wear goggles or face shield and rubber gloves when handling. Remove and wash contaminated clothing before reuse. Wash thoroughly after handling.
May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Corrosive. Will cause eye burns and permanent tissue damage.

SKIN CONTACT :
May cause severe irritation or tissue damage depending on the length of exposure and the type of first aid administered.

5. FIRE FIGHTING MEASURES

FLASH POINT : None

EXTINGUISHING MEDIA :
Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve hydrogen bromide and bromine under fire conditions. May evolve HCl under fire conditions. May evolve chlorine under fire conditions. May evolve oxides of nitrogen (NOx) and sulfur (SOx) under fire conditions. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Ventilate spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Contain and absorb with sand or vermiculite and mix well. Collect up and remove to a safe place until disposal. Wash site of spillage thoroughly with water. Assistance can be obtained from waste disposal companies.
LARGE SPILLS: Dike to prevent further movement. Recover by pumping or by using a suitable absorbent. Reclaim into recovery or salvage drums. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
This pesticide is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA. Apply this pesticide only as specified on the label.

7. HANDLING AND STORAGE

HANDLING :
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating aerosols and mists. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

HYGIENE RECOMMENDATIONS :
Eye wash station and safety shower are necessary. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE Liquid

APPEARANCE Light yellow Clear

ODOR None

SPECIFIC GRAVITY	1.32 - 1.36 @ 77 °F / 25 °C
DENSITY	11.0 - 11.3 lb/gal
SOLUBILITY IN WATER	Complete
pH (100.0 %)	13.0
FREEZING POINT	17 °F / -8.3 °C
VAPOR PRESSURE	7.7 mm Hg @ 77 °F / 25 °C 27 mm Hg @ 115 °F / 46 °C
VOC CONTENT	0.00 %

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
High temperatures Direct sunlight

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with organic materials (e.g. rags, sawdust, hydrocarbon oils or solvents) and avoid reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) which can generate heat, fires, explosions and the release of toxic fumes. Do not mix with any sodium hypochlorite or bleach product. Resulting mixture will result in a violent exothermic reaction releasing large amounts of nitrogen gas and liquid sulfuric acid. Contact with reactive metals (e.g. aluminum) may result in the generation of flammable hydrogen gas.

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Daphnia magna	48 hrs	4.3 mg/l	4.2 mg/l	Product
Ceriodaphnia dubia	48 hrs	1.6 mg/l		Product
Mysid Shrimp (Mysidopsis bahia)	96 hrs	27 mg/l		Product

AQUATIC PLANT RESULTS :

Species	Exposure	EC50/LC50	Test Descriptor
Green Algae (Pseudokirchneriella subcapitata, previously Selenastrum capricornutum)	72 hrs	3.66 mg/l	Product

CHRONIC FISH RESULTS :

Species	Exposure	NOEC / LOEC	End Point	Test Descriptor
Fathead Minnow	7 Days	2.5 mg/l / 5 mg/l	Growth	Product

CHRONIC INVERTEBRATE RESULTS :

Species	Test Type	NOEC / LOEC	End Point	Test Descriptor
Ceriodaphnia dubia	3 Brood	10.0 mg/l /	Reproduction	Product

PERSISTENCY AND DEGRADATION :

Biological Oxygen Demand (BOD) : This material is an oxidizing biocide and is not expected to persist in the environment.

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	30 - 50%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
This preparation or material is not expected to bioaccumulate.

UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II
IATA Cargo Packing Instructions :	812
IATA Cargo Aircraft Limit :	30 L (Max net quantity per package)
Reportable Quantity (per package) :	35,000 lbs
RQ Component :	SODIUM HYDROXIDE

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S.
Technical Name(s) :	SODIUM HYDROXIDE, ALKALINE LIQUID BROMINE ANTIMICROBIAL
UN/ID No :	UN 3266
Hazard Class - Primary :	8
Packing Group :	II

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Sodium Hydroxide : Corrosive

CERCLA/SUPERFUND, 40 CFR 302 :
This product contains the following Reportable Quantity (RQ) Substance. Also listed is the RQ for the product. If a reportable quantity of product is released, it requires notification to the NATIONAL RESPONSE CENTER, WASHINGTON, D.C. (1-800-424-8802).

RQ Substance	RQ
Sodium Hydroxide	35,000 lbs

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
This product is a registered biocide and is exempt from State Right to Know Labelling Laws.

Sodium Hydroxide	1310-73-2

INTERNATIONAL CHEMICAL CONTROL LAWS :

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
Substances regulated under the Pest Control Products Act are exempt from CEPA New Substance Notification requirements.

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Provisions on the Environmental Administration of New Chemical Substances and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Existing and New Chemical Substances list (ENCS).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

NEW ZEALAND
All substances in this product comply with the Hazardous Substances and New Organisms (HSNO) Act 1996,and are listed on or are exempt from the New Zealand Inventory of Chemicals.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/14/2010
Version Number : 1.16

Product Bulletin

TRASAR® TRAC101

Traced Closed System Treatment

PRODUCT DESCRIPTION AND APPLICATION

TRASAR TRAC101 is a traced, liquid corrosion and deposit inhibitor for use in closed cooling and hot water heating systems. **TRASAR TRAC101** is effective in high heat flux systems where heat transfer surface experience high skin temperatures and corrosion control challenges are demanding. **TRASAR TRAC101** is a multicomponent inhibitor that provides ferrous metal corrosion protection, copper alloy corrosion protection, scale inhibition and dispersancy.

Optional TRASAR technology constantly monitors, displays and automatically doses product to a target concentration keeping your system continuously protected.

PHYSICAL & CHEMICAL PROPERTIES

Refer to the Material Safety Data Sheet (MSDS), SECTION 9, for the most current data.

Form	Liquid
Density	10.4 - 10.75 lb/gal (1.25- 1.29 kg/L)
Specific Gravity at 60°F (15.6 °C)	1. 25-1.29
pH (neat)	12- 14
Freeze-Thaw Recovery	Complete
Flash Point (PMCC)	Not Applicable
Odor	None
Solubility in Water	Complete
Appearance	Clear , light yellow, light gold

ACTIVE CONSTITUENTS

Active	Function
Nitrite	Mild Steel Corrosion Inhibition
Molybdate	Mild Steel Corrosion Inhibition
Polymer	Dispersion and Deposition Control
Azole	Yellow Metal Corrosion Inhibition

Recommended in-plant storage limit is six months.
TRASAR TRAC101 should be stored in a location where the product temperature can be kept in a range between - 6°F (- 21°C) and 120°F (49°C). In cold climates, heat tracing and insulation of exposed containers and transfer lines may be necessary.

Refer to the Material Safety Data Sheet (MSDS), SECTION 7, for the most current data.

REMARKS

If you need assistance or more information on this product, please call your nearest Nalco Representative. For more news about Nalco Company, visit our website at www.nalco.com.

For **Medical and Transportation Emergencies** involving Nalco products, please see the Material Safety Data Sheet for the phone number.

ADDITIONAL INFORMATION

TRASAR, NALCO and the logo are trademarks of Nalco Company (4-27-2010)
All other trademarks are the property of their respective owners.

Nalco Company, 1601 West Diehl Road, Naperville, Illinois 60563-1198

FIRE AND EXPLOSION HAZARD :
Not flammable or combustible. If product is allowed to dry, the sodium nitrite is an oxidizing agent and can initiate the combustion of other materials. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of nitrogen (NOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Keep people away from and upwind of spill/leak. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

METHODS FOR CLEANING UP :
Do not allow product to evaporate to dryness. SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Do not breathe vapors/gases/dust. Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Keep the containers closed when not in use. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Ensure all containers are labeled.

STORAGE CONDITIONS :
Store in suitable labeled containers. Store the containers tightly closed. Store away from organic chemicals and other oxidizable materials, reducing agents, acids and alkalis.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature Do not allow product to evaporate to dryness. Dried product residue can act as an oxidizer.

MATERIALS TO AVOID :
Strong acids Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with reducing agents (e.g. hydrazine, sulfites, sulfide, aluminum or magnesium dust) may generate heat, fires, explosions and toxic vapors. Do not mix with amines. Sodium nitrite can react with certain amines to produce N-nitrosamines, many of which are cancer-causing agents to laboratory animals.

HAZARDOUS DECOMPOSITION PRODUCTS :

Under fire conditions:	Oxides of nitrogen, Oxides of carbon

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

ACUTE ORAL TOXICITY :

Species:	Rat
LD50:	85 mg/kg
Test Descriptor:	Hazardous component Sodium Nitrite

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

LAND TRANSPORT :

Proper Shipping Name :	CORROSIVE LIQUID, TOXIC, N.O.S
Technical Name(s) :	Sodium Nitrite
UN/ID No :	UN 2922
Hazard Class - Primary :	8
Hazard Class - Secondary :	6.1
Packing Group :	III
Flash Point :	Not applicable
Reportable Quantity (per package) :	410 lbs
RQ Component :	SODIUM NITRITE

AIR TRANSPORT (ICAO/IATA) :

The presence of an RQ component (Reportable Quantity for U.S. EPA and DOT) in this product causes it to be regulated with an additional description of RQ for road, or as a class 9 for road and air, ONLY when the net weight in the package exceeds the calculated RQ for the product.

Proper Shipping Name :	CORROSIVE LIQUID, TOXIC, N.O.S
Technical Name(s) :	Sodium Nitrite
UN/ID No :	UN 2922
Hazard Class - Primary :	8
Hazard Class - Secondary :	6.1
Packing Group :	III
IATA Cargo Packing Instructions :	820
IATA Cargo Aircraft Limit :	60 L (Max net quantity per package)
Reportable Quantity (per package) :	410 lbs
RQ Component :	SODIUM NITRITE

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name :	CORROSIVE LIQUID, TOXIC, N.O.S
Technical Name(s) :	Sodium Nitrite
UN/ID No :	UN 2922
Hazard Class - Primary :	8

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

Hazardous Substance(s)	CAS NO	% (w/w)
Sodium Nitrite	7632-00-0	10.0 - 30.0

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

NSF NON-FOOD COMPOUNDS REGISTRATION PROGRAM (former USDA List of Proprietary Substances & Non-Food Compounds) :
NSF Registration number for this product is : 141328
This product is acceptable for treating boilers, steam lines, and/or cooling systems where neither the treated water nor the steam produced may contact edible products in and around food processing areas, excluding such use in areas where meat and poultry are processed (G10).

This product has been certified as KOSHER/PAREVE for year-round use INCLUDING THE PASSOVER SEASON by the CHICAGO RABBINICAL COUNCIL.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
This product contains the following substances listed in the regulation. Additional components may be unintentionally present at trace levels.

Substance(s)	Citations
• Sodium Nitrite	Sec. 311

CLEAN AIR ACT, Sec. 112 (Hazardous Air Pollutants, as amended by 40 CFR 63), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

CALIFORNIA PROPOSITION 65 :
Substances listed under California Proposition 65 are not intentionally added or expected to be present in this product.

MICHIGAN CRITICAL MATERIALS :
Substances listed under this regulation are not intentionally added or expected to be present in this product. Listed components may be present at trace levels.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Sodium Nitrite	7632-00-0

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™ CD-ROM Version),
Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH,
(TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 07/14/2010
Version Number : 2.3

Subappendix B9
AOC 7 – Hazardous Materials Storage Area Investigation Program

Contents

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
XRF	x-ray fluorescence

SUBAPPENDIX B9

AOC 7 Investigation Program

1.0 Introduction and Background

1.1 Background

Area of Concern (AOC) 7 consists of the hazardous materials storage building and loading dock located in the southeastern portion of the facility inside the current facility fence line, as shown in Figure B9-1. (All tables and figures appear at the end of this subappendix.) 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 former Chemical Storage Building, which is now known as the Carpenter Shop). The former Chemical Storage Building 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). Approved construction drawings for the building, dated April 8, 1953, were recently located; therefore, it appears the Chemical Storage Building was constructed shortly after station operations began.

In the 1955 aerial, 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 (between AOC 7 and the facility fence line) is unpaved and periodically may have been 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 current 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 (for example, 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) and is visible in a circa 1985 aerial photograph. The area is also used to store chemical products used at the compressor station (for example, 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) but is not yet present in the circa 1985 aerial photograph. Review of aerial photographs suggests that this area was open and unpaved until at least the mid-1950s.

The structures and building at AOC 7 are currently proposed to be removed as part of the groundwater remedy.

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, 2011).

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 quantities of any chemicals released in AOC 7 are also unknown; however, quantities are expected to be relatively small because the containers stored in this area are 55 gallons 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 original drawings for the Chemical Storage Building also show a sink in the southwest corner of the building. The piping diagram for the sink shows a line (presumably the water line) entering the building from the southwest and a drain line exiting to the east. The drawing indicates that the location of the drain line was to be determined during construction (Pacific Gas and Electric Company, 1953). A pipe is visible in the floor at the approximate location of the sink; however, it is unknown where the drain line led or whether it may have been connected to the septic system.

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. Discharges from potential leaks from the sink drain line could also have reached shallow soil. In the paved area, movement of contaminants with rainwater (that is, 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 data quality objectives, the following data gap was identified for Decision 1, as follows:

- Data Gap #1 – Lateral and vertical extents 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 the main text of 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. The sample design is based on the assumption that sampling beneath the structure and building at AOC 7 will occur during the baseline soil sampling proposed for the groundwater remedy, which will be after removal of the structures and buildings at AOC 7. The proposed baseline soil sampling is presented in the forthcoming *Groundwater Remedy Implementation Baseline Soil Sampling and Analysis Plan, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California*.

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 Figure B-3, Topock Compressor Station

Accessibility Map. Currently, the entire AOC is covered with concrete (foundations) and structures and is inaccessible for sampling. Once the building and structures have been removed, the entire AOC will temporarily be unpaved, will be suitable for x-ray fluorescence (XRF), and likely will be accessible by hydrovac. If the buildings and structures are not removed, only the area immediately to the east of the unit would be unpaved and suitable for XRF. The area immediately to the west of the AOC is paved. Both the area immediately to the east and immediately west of AOC 7 are likely to be accessible by hydrovac. Thirty-six utility risers, consisting of various water and electrical lines, are present in this area. Photographs 12 and 13 in Appendix B26 show the accessibility constraints in the AOC 7 and AOC 8 areas. Sample locations and depths identified for AOC 7 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of Appendix B.

3.3 AOC 7 Proposed Sampling

Table B9-2 summarizes the proposed AOC 7 sample locations, depths, description/rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B9-1. As discussed in Section 3.1 of this subappendix, the structure and building at AOC 7 are proposed to be removed as part of the groundwater remedy, so soil sampling inside the structure and building at AOC7 is not proposed in this work plan. Figure B9-1 shows the proposed sample locations, as well as the proposed sample locations for surrounding units. The proposed AOC 7 sample locations were defined in collaboration with DTSC and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

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 are proposed to be collected at five locations: AOC 7-1 through AOC 7-5. The sample locations in this unit will initially be sampled at the surface (0 to 1 feet below ground surface [bgs]) and shallow subsurface intervals (2 to 3 feet bgs) in accordance with the phased sampling protocol. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B9-1.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 subbase. 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 in 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 Environmental Protection Agency, Department of Toxic Substance Control (DTSC). 2010. "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.

Pacific Gas and Electric Company . 1953. *Floor Plan, Section and Details, Chemical Storage Building, Topock Compressor Station*. Drawing Number 383318 Revision 1. April 8.

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 B9-1
Conceptual Site Model, AOC 7 – Hazardous Materials Storage Area
Soil Investigation Part B 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 Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 7-1	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents 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	Suitable for XRF Likely accessible by hydrovac
AOC 7-2	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination to the east of this AOC	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH	Suitable for XRF Likely accessible by hydrovac
AOC 7-3	0-1[a] and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination to the west of this AOC	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH	Not suitable for XRF Likely accessible by hydrovac
AOC 7-4	0-1[a] and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination to the west of this AOC	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH	Not suitable for XRF Likely accessible by hydrovac
AOC 7-5	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination to the east of the AOC	Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, PCBs, TPH, and pH	Suitable for XRF Likely accessible by hydrovac

Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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 foot bgs).

Figures

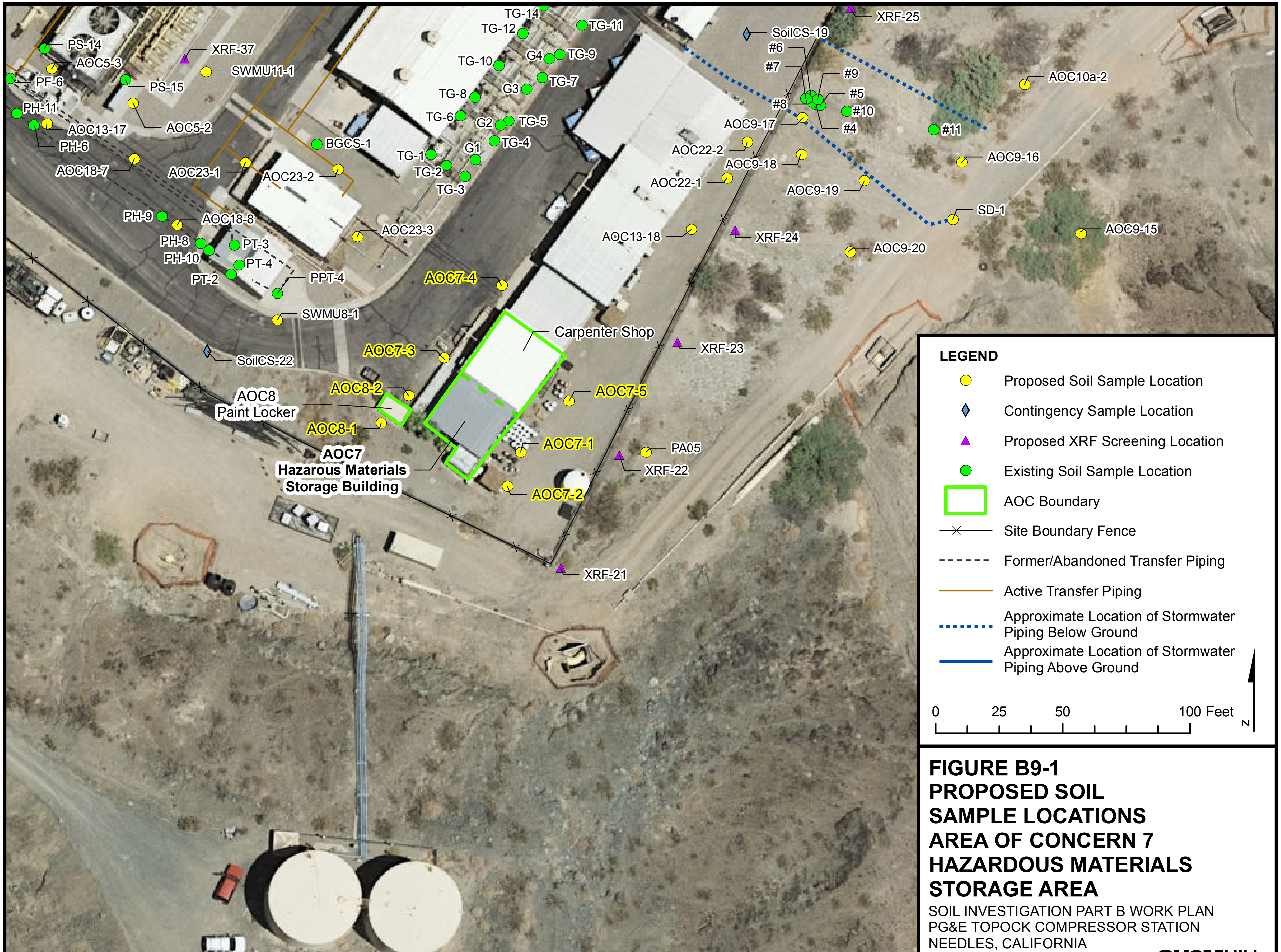


FIGURE B9-1
PROPOSED SOIL SAMPLE LOCATIONS AREA OF CONCERN 7 HAZARDOUS MATERIALS STORAGE AREA

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC7\AOC7_Proposed_sample_Locs.mxd Date Saved: 8/29/2012 11:30:20 AM

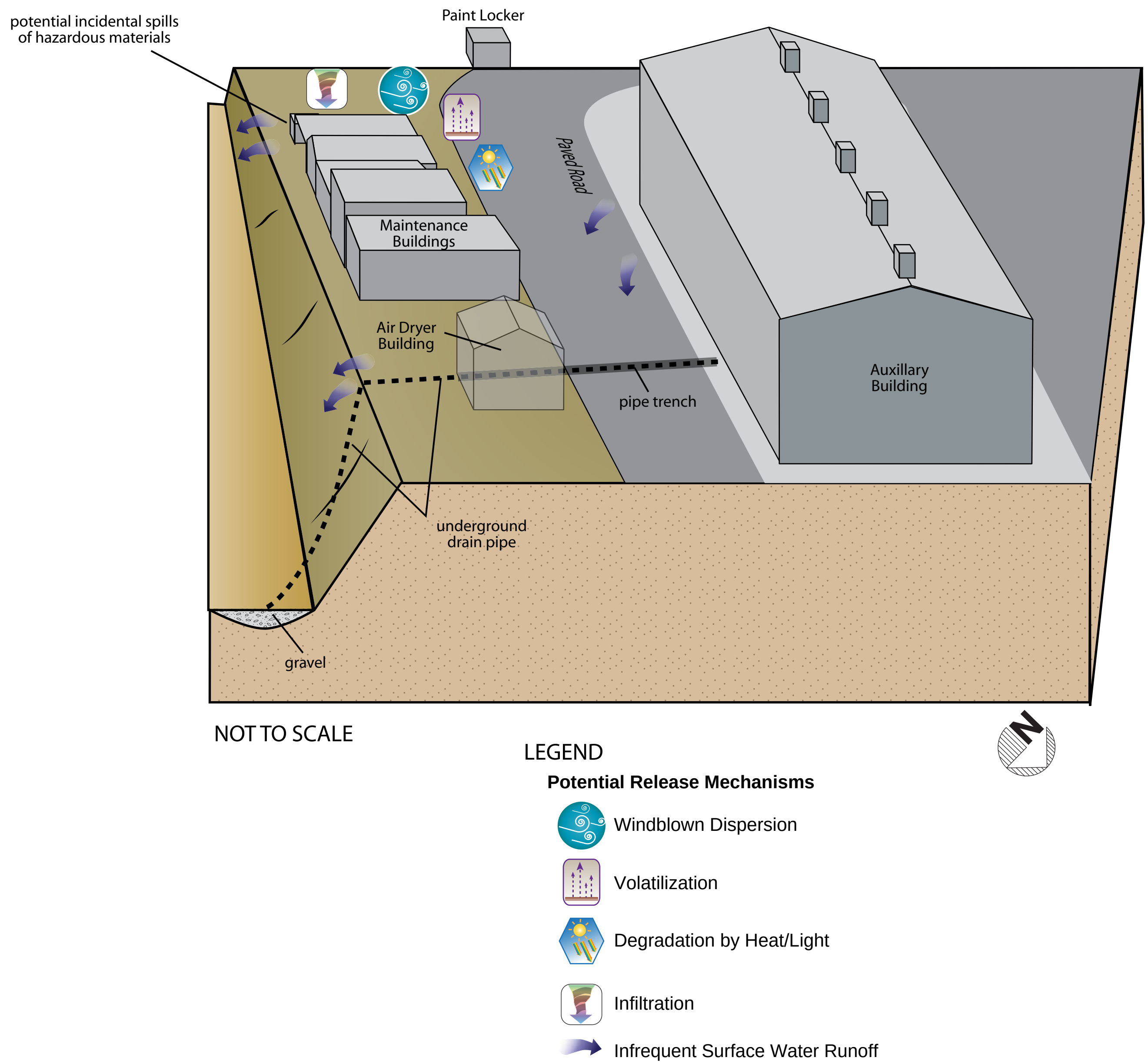


FIGURE B9-2
Conceptual Site Model for AOC7
Hazardous Materials Storage Area
and AOC 8 Paint Locker
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL.

Subappendix B10
AOC 8 – Paint Locker Investigation Program

Contents

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
PAH	polycyclic aromatic hydrocarbon
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

SUBAPPENDIX 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 subappendix.) 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. Subappendix B26 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. Nonchlorinated 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 (that is, 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 (that is, 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 extents of contamination north and northwest of the paint locker.

Data gaps for Decisions 2 through 5 are discussed in the main text of 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 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, as shown on Figure B-3 in Appendix B. The boundary of AOC 8 is located under the current Paint Shed, making all areas within the boundary inaccessible. Proposed sample locations AOC8-1 and AOC8-2 are adjacent to the Paint Shed to the southwest and northeast, respectively. The accessibility assessment for the proposed sample locations can be found in Table B10-2. Thirty-six utility risers consisting of various water and electrical lines are present in this area. Photograph 14 in Appendix B26 shows the accessibility constraints in AOC 8. Sample locations and depths identified for AOC 8 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of the main text of Appendix B.

3.3 AOC 8 Proposed Sampling

Table B10-2 summarizes the proposed AOC 8 sample locations, depths, and description/ rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B10-1. The proposed AOC 8 sample locations were defined in collaboration with the California Environmental Protection Agency, Department of Toxic Substances Control and the United States Department of the Interior, and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

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 nonchlorinated 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 United States Department of the Interior.

Samples are proposed to be collected at two locations: AOC 8-1 and AOC 8-2. The sample locations in this unit will initially be sampled at the surface (0 to 0.5 or 1 feet below ground surface [bgs]) and shallow subsurface intervals (2 to 3 feet bgs), in accordance with the phased sampling protocol. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B10-1. 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 subbase. 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 in 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 Locker
Soil Investigation Part B Work Plan, Pacific Gas and Electric Company *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 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 Locker
Soil Investigation Part B Work Plan, Pacific Gas and Electric Company Topock Compressor Station, Needles, California

Location	Depths (bgs feet)	Description/Rationale	Analytes	Accessibility Assessment
AOC 8-1	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents 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.	Suitable for x-ray fluorescence Suitable for hand sampling
AOC 8-2	0-1[a] and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination to the northeast of this AOC	Title 22 metals, VOCs, and TPH	Unsuitable for x-ray fluorescence Likely accessible by hydrovac

Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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

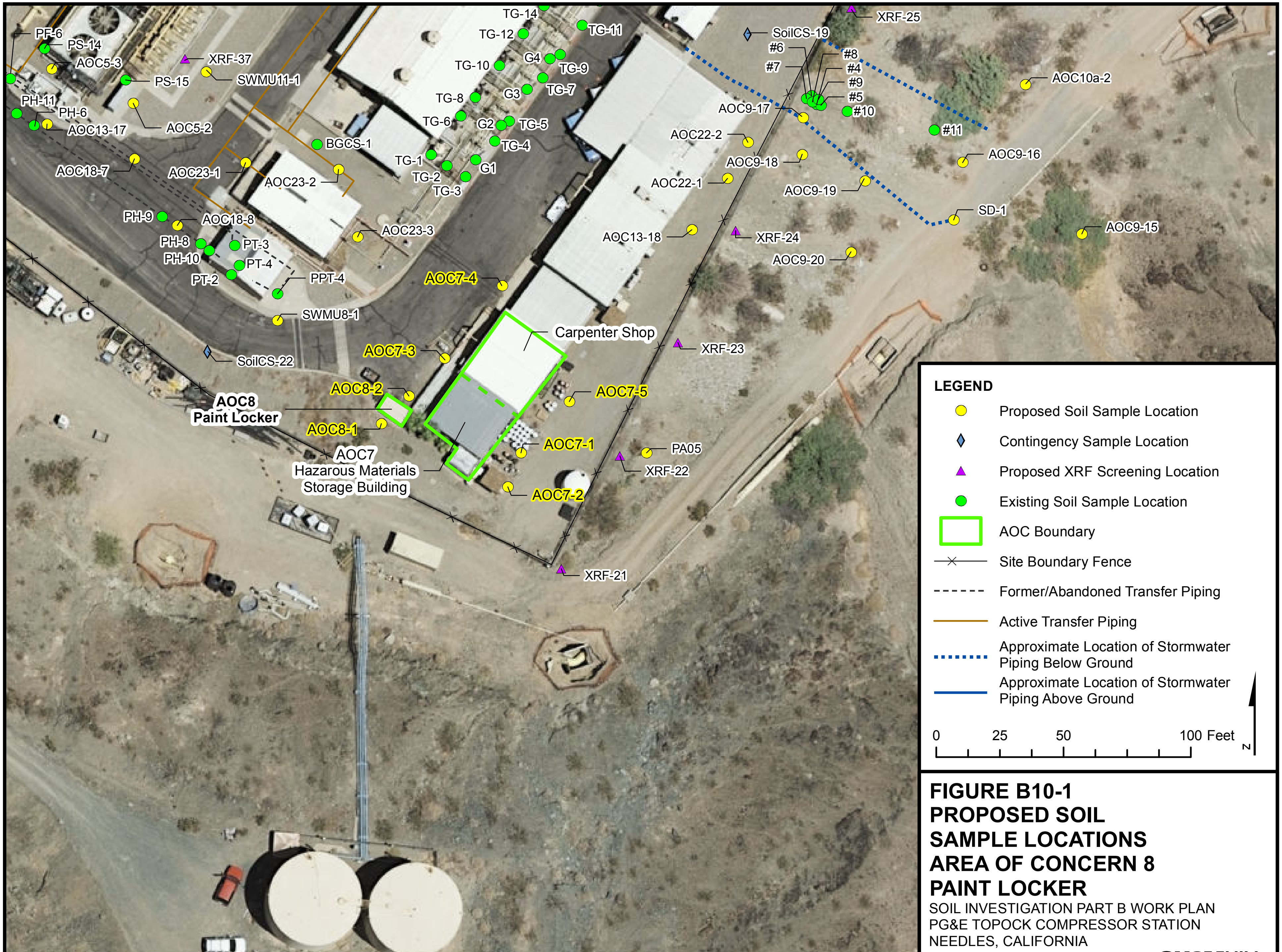
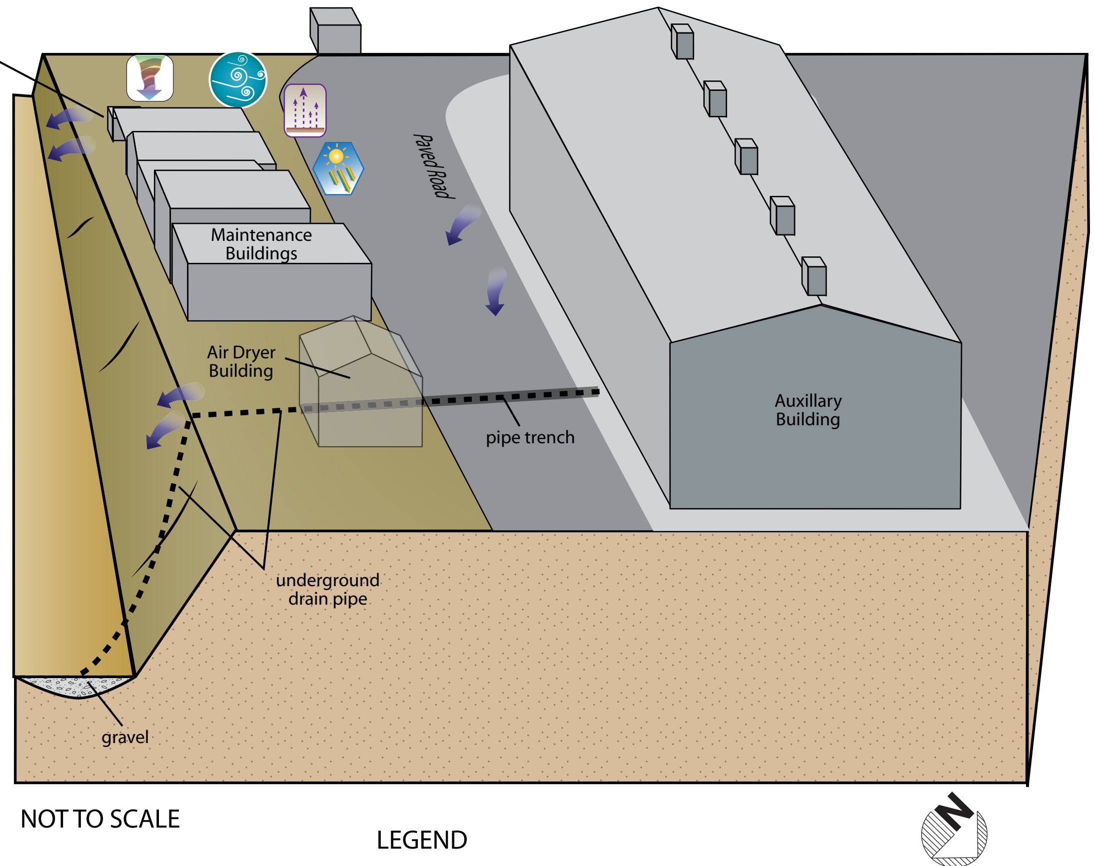


FIGURE B10-1
PROPOSED SOIL SAMPLE LOCATIONS AREA OF CONCERN 8 PAINT LOCKER

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC8\AOC8_Proposed_sample_Locs.mxd Date Saved: 8/31/2012 1:11:13 PM



NOT TO SCALE

LEGEND

Potential Release Mechanisms

- Windblown Dispersion
- Volatilization
- Degradation by Heat/Light
- Infiltration
- Infrequent Surface Water Runoff

FIGURE B10-2
Conceptual Site Model for AOC 7
Hazardous Materials Storage Area
and AOC 8 Paint Locker
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL

Subappendix B11
AOC 13 – Unpaved Areas within the Compressor Station Investigation Program

Contents

Figures

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
TEQ	toxicity equivalent
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

SUBAPPENDIX 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 in the upper yard 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 subappendix.) 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 (that is, 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, as applicable. 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). None of the spill samples was analyzed for pesticides or dioxins and furans (the available data for these constituents is presented in Tables B11-8 and B11-9). Spill samples are included in the samples counts and comparisons to screening values presented in Table B11-10.

1.2 Conceptual Site Model

Table B11-10 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 are addressed by the Perimeter Area investigation (see Appendix C of the main text of this work plan); constituents that may have been released to the storm drain system are addressed by the storm drain investigation program described in Appendix D of the main text of this work plan.

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, samples collected during monitoring well installation within the fence line, and samples collected during the installation of various utility trenches and other maintenance activities (opportunistic samples). 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. Two hundred ninety-eight historical soil samples (including 85 opportunistic soil samples), ranging in depth from 0 to 13 feet below ground surface (bgs), were collected from 147 locations in AOC 13, as shown in Figures B11-1 through B11-4. In addition, 26 field duplicates were collected in AOC 13, including nine field duplicates associated with the opportunistic sampling effort. Field duplicate samples are shown in the data tables (Tables B11-1 through B11-9) but are not included in the description of nature and extent in Section 3.0 of this subappendix.

Historical soil samples were analyzed for various constituents, including one or more of the following: Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs); semivolatile organic compounds (SVOCs), benzene, toluene, ethylbenzene, and xylenes; polycyclic aromatic hydrocarbons (PAHs); dioxins and furans; polychlorinated biphenyls (PCBs); pesticides, Contract Laboratory Program inorganics; total petroleum hydrocarbons (TPH); total recoverable petroleum hydrocarbons; oil and grease; chloride; fluoride; total organic carbon, sulfate; and pH.

[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.

Sixty-six constituents, including four calculated quantities (toxicity equivalent [TEQ]—Avian, TEQ—Human, TEQ—Mammal, and benzo(a)pyrene equivalents), were detected in AOC 13. The detected constituents included:

- Eighteen metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc)
- Eight Contract Laboratory Program inorganics (aluminum, calcium, iron, magnesium, manganese, potassium, sodium, and cyanide)
- Seventeen PAHs (1-methyl naphthalene, 2-methyl naphthalene, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene)
- Three PCBs (Aroclor-1242, Aroclor-1254, and Aroclor-1260)
- Two pesticides (4,4-DDE and 4,4-DDT)
- Seven VOCs (acetone, chloroform, isopropylbenzene, methyl acetate, methylene chloride, toluene, and total xylenes)
- One semivolatile organic compound (SVOC) (bis[2-ethylhexyl]phthalate)
- Six TPH-range compounds (TPH-diesel, TPH-motor-oil, TPH-heavy oil [$>C_{34}$], TPH-kerosene, total recoverable hydrocarbons, and oil and grease
- TEQ-Avian, TEQ-Human, and TEQ-Mammal
- Benzo(a)pyrene equivalents

Laboratory analytical results for the historical soil samples are presented in Tables B11-1 through B11-9. Table B11-11 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 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, is included in this subappendix. Section 3.0 of this subappendix presents the Decision 1 data gaps evaluation for AOC 13.

Thirteen metals (barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc) were detected at concentrations exceeding their respective background threshold values (BTVs). Lead was the only metal detected at a concentration that exceeded its 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 the lead data, all metals data are Category 1 or 2. Category 3 lead data are presented in Table B11-1 but cannot be used to resolve any of the data quality objective decisions.

Benzo(a)pyrene exceeded its commercial screening level of 130 micrograms per kilogram (µg/kg) in two samples (210 and estimated 320 µg/kg); benzo(a)pyrene equivalents exceeded the screening level in four samples. All PAH data are Category 1. One PCB cogener (Aroclor-1254) exceeded its commercial screening level of 740 µg/kg in one sample (2,400 µg/kg). Finally, one TPH compound (TPH-motor-oil) was detected at a concentration exceeding its California Regional Water Quality Control Board environmental screening level (ESLs). The TPH data include Category 1 through 3 data.

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 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 3.18 of this subappendix, and Section 4.0 of this subappendix provides the recommended sampling for this unit.

3.1 Barium

Barium was detected in 150 of 150 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of barium in soil ranged from 14 to 1,000 milligrams per kilograms (mg/kg), as shown in Table B11-1. The concentrations of barium in two samples were above the BTV (410 mg/kg), but all concentrations were below the commercial screening levels (63,000 mg/kg). The number of samples with barium data is extensive, and the lateral and vertical extents of barium concentrations exceeding the interim screening level have not been defined.

3.2 Beryllium

Beryllium was detected in 19 of 150 Category 1 samples and eight of 25 Category 2 samples. Detected concentrations of beryllium in soil ranged from 0.28 to 1 mg/kg, as shown in Table B11-1. The concentrations of beryllium in three Category 2 samples were slightly above the BTV (0.672 mg/kg) but below the maximum detected concentration of 1 mg/kg, and all concentrations were below the commercial screening level (190 mg/kg). The total number of samples with beryllium data is extensive, and the lateral and vertical extents of beryllium concentrations exceeding the interim screening level have not been defined.

3.3 Cadmium

Cadmium was detected in five of 150 Category 1 samples and 10 of 25 Category 2 samples. Detected concentrations of cadmium in soil ranged from 0.23 to 14 mg/kg, as shown in Table B11-1. The concentrations of cadmium in two Category 2 samples were above the BTV

(1.1 mg/kg), but all concentrations were below the commercial screening level (500 mg/kg). The total number of samples with cadmium data is extensive, and the lateral and vertical extents of cadmium concentrations exceeding the interim screening level have not been defined.

3.4 Hexavalent Chromium

Hexavalent chromium was detected in 22 of 161 Category 1 samples and 0 of 17 Category 2 samples. Detected concentrations of hexavalent chromium in soil ranged from 0.22 to 12.2 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of hexavalent chromium in 10 Category 1 samples were above the BTV (0.83 mg/kg), but all concentrations were below the commercial screening level (37 mg/kg). The lateral and vertical extents of hexavalent chromium concentrations exceeding the screening level have not been defined.

3.5 Total Chromium

Total chromium was detected in 161 of 161 Category 1 samples and 24 of 25 Category 2 samples. Detected concentrations of total chromium in soil ranged from 2.1 to 743 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of total chromium in 17 Category 1 and two Category 2 samples were above the BTV (39.8 mg/kg), but all concentrations were below the commercial screening level (1,400 mg/kg). The lateral and vertical extents of total chromium concentrations exceeding the screening level have not been defined.

3.6 Cobalt

Cobalt was detected in 145 of 150 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of cobalt in soil ranged from 1.1 to 18 mg/kg, as shown in Table B11-1. The concentrations of cobalt in five Category 1 and three Category 2 samples were above the BTV (12.7 mg/kg), but all concentrations were below commercial screening level (300 mg/kg). The total number of samples with cobalt data is extensive, and the lateral and vertical extents of cobalt concentrations exceeding the interim screening level have not been defined.

3.7 Copper

Copper was detected in 153 of 161 Category 1 samples and 10 of 25 Category 2 samples. Detected concentrations of copper in soil ranged from 1.5 to 760 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of copper in 42 Category 1 and two Category 2 samples were above the BTV (16.8 mg/kg), but all concentrations were below the commercial screening level (38,000 mg/kg). The lateral and vertical extents of copper concentrations exceeding the interim screening level have not been defined.

3.8 Lead

Lead was detected in 149 of 150 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of lead in soil ranged from 1.5 to 330 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of lead in Category 1 and 13 Category 2 samples were above the BTV (8.39 mg/kg); one the concentration in one sample slightly exceeded the commercial screening level (320 mg/kg). The lateral and vertical extents of lead concentrations exceeding the interim screening level have not been defined.

3.9 Mercury

Mercury was detected in three of 150 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; all concentrations of mercury were below the commercial screening level (180 mg/kg). The lateral and vertical extents of mercury concentrations exceeding the screening level have not been defined.

3.10 Molybdenum

Molybdenum was detected in 40 of 150 Category 1 samples and nine of 25 Category 2 samples. Detected concentrations of molybdenum in soil ranged from 0.3 to 16 mg/kg, as shown in Table B11-1. The concentrations of molybdenum in 16 Category 1 and nine Category 2 samples were above the BTV (1.37 mg/kg), but all concentrations were below the commercial screening level (4,800 mg/kg).

The lateral and vertical extents of molybdenum concentrations exceeding the interim screening level have not been defined.

3.11 Nickel

Nickel was detected in 161 of 161 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of nickel in soil ranged from 1.8 to 56 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of nickel in 10 Category 1 and 6 Category 2 samples were above the BTV (27.3 mg/kg), but all concentrations were below the commercial screening level (16,000 mg/kg).

The lateral and vertical extents of nickel concentrations exceeding the interim screening level have not been defined.

3.12 Selenium

Selenium was detected in seven of 150 Category 1 samples and nine of 25 Category 2 samples. Detected concentrations of selenium in soil ranged from 0.11 to 3 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of selenium in four Category 1 samples were above the BTV (1.47 mg/kg), but all concentrations were below the commercial screening level (4,800 mg/kg). The total number of samples with zinc data is extensive, and the lateral and vertical extents of zinc concentrations exceeding the interim screening level have been defined.

3.13 Vanadium

Vanadium was detected in 150 of 150 Category 1 samples and 25 of 25 Category 2 samples. Detected concentrations of vanadium in soil ranged from 6.7 to 63 mg/kg, as shown in Table B11-1 and Figures B11-1 and B11-2. The concentrations of vanadium in four Category 1 samples were above the BTV (52.2 mg/kg), but all concentrations were below the commercial screening level (5,200 mg/kg). The total number of samples with vanadium data is extensive, and the lateral and vertical extents of vanadium concentrations exceeding the screening level have been defined.

3.14 Zinc

Zinc was detected in 161 of 161 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 12 Category 1 and 16 Category 2 samples were above the BTV (58 mg/kg), but all concentrations were below commercial screening level (100,000 mg/kg).

The lateral and vertical extents of zinc concentrations exceeding the screening level have not been defined.

3.15 Benzo(a)pyrene

Benzo(a)pyrene was detected in 41 of 147 Category 1 samples, and benzo(a)pyrene equivalents were calculated for 59 of 147 samples that had one or more detected PAHs. Detected concentrations of benzo(a)pyrene in soil ranged from 5.3 to 320 µg/kg, and detected concentrations of benzo(a)pyrene equivalents in soil ranged from 4.5 to 460 µg/kg, as shown in Table B11-3 and Figure B11-3. The concentrations of benzo(a)pyrene in two surface soil samples, collected at PGE-LT-OS8 and AOC13-PITOS1, were above the commercial California human health screening level (130 µg/kg). The concentration of calculated benzo(a)pyrene equivalents in four surface soil samples were above the commercial California human health screening level (130 µg/kg).

The lateral and vertical extents of benzo(a)pyrene and benzo(a)pyrene equivalents concentrations exceeding the interim screening levels have not been defined.

3.16 Aroclor-1254 and Other PCBs

PCB Aroclor-1254 was detected in 28 of 123 Category 1 samples. Detected concentrations of Aroclor-1254 in soil ranged from 24 to 2,400 µg/kg, as shown in Table B11-7 and on Figures B11-1 and B11-2. The second highest concentration was 370 µg/kg. The concentrations of Aroclor-1254 in one sample was above the ESL (740 µg/kg). Two other PCB cogeners were also detected: Aroclor-1242 (detected in one of 123 Category 1 samples) and Aroclor-1260 (detected in four of 123 Category 1 samples). The maximum detected concentration of Aroclor-1242 was 31 µg/kg, and the maximum detected concentration of Aroclor-1260 was 140 µg/kg.

The lateral and vertical extents of Aroclor-1254 concentrations exceeding the interim screening level have not been defined.

3.17 TPH-motor-oil

TPH-motor-oil was detected in 64 of 147 Category 1 samples and 11 of 12 Category 2 samples. Detected concentrations of TPH-motor-oil in soil ranged from 11 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 five Category 2 samples were above the ESL (1,800 mg/kg).

The lateral and vertical extents of TPH-motor-oil concentrations exceeding the interim screening level have not been defined.

3.18 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 seven metals, benzo(a)pyrene, Aroclor-1254, and TPH-motor-oil have not been defined.

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:

- Data Gap #1 – Lateral and vertical extents of COPCs
- Data Gap #2 – Potential impacts associated with surface soil discoloration in historical aerial photographs

The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) has also requested that soil at select locations around the perimeter of the compressor station be characterized to assess whether COPCs may have migrated offsite. Appendix C of the Soil RFI/RI Work Plan describes the Perimeter Area monitoring program.

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 in Section 4.3 of this subappendix.

4.2 AOC 13 Access Constraints

As discussed in Section 3.0 of Appendix B, there are substantial access constraints within the compressor station. As shown on Figure B-3 in the main text of Appendix B, portions of AOC 13 are located in most areas of the compressor station, and access constraints are present throughout most of these areas. Photographs 15 and 16 in Appendix B26 show the accessibility constraints in AOC 13. The accessibility assessment for each proposed sample location can be found in Table B11-12. Sample locations and depths identified for AOC 13 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of the main text of Appendix B.

4.3 AOC 13 Proposed Sampling

Table B11-12 summarizes the proposed AOC 13 sample locations, depths, description/rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B11-5. The proposed sample locations for all solid waste management units, AOCs, and units within the fence line, the Perimeter Area, storm drain investigation, and Part A Phase 2 investigation have also been included on the figure. Figure B11-6 provides the AOC 13 existing and proposed sample locations only; however, all relevant data will be used in data evaluation process, and Figure B11-5 is therefore more representative of the distribution of potentially relevant sample locations for AOC 13. The proposed AOC 13 sample locations were defined in collaboration with DTSC and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Soil samples are proposed to be collected at the locations shown on Figures B11-5 and B11-6 and are summarized on Table B11-12. Sampling will be in both the currently paved (formerly unpaved) and currently unpaved areas. Sample locations in the lower yard 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. Samples were located to ensure adequate coverage of the paved and unpaved areas. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B11-5.

Samples are proposed to be collected at 32 locations (AOC 13-1 through AOC 13-32), including two former Perimeter Area sample locations actually located on the slope added and integrated into the overall AOC 13 sampling program. Two sample locations formerly proposed for AOC 13 (AOC13-1 and AOC13-23 in the 2011 Draft Soil RFI/RI Work Plan) were removed due to their proximity to opportunistic samples that have already been collected. The remaining AOC 13 sample locations were renumbered in sequence. Sample locations in this unit will initially be sampled at the surface (0 to 0.5 or 1 foot bgs) and shallow subsurface intervals (2 to 3 feet bgs) in accordance with the phased sampling protocol. 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. 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 AOC 33 (at location AOC13-16). 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. In addition, as noted above, data from various other units will be used to assess AOC 13. In addition, soil gas vapor probes will be installed at locations AOC13-5 and AOC13-6 to assess AOC 25, and at location AOC13-16 to assess AOC 32. The soil gas probe will be installed at a minimum depth of 4 feet bgs and a soil gas sample will be collected and analyzed for VOCs. The soil gas probe will be installed and sampled in accordance with the soil gas methodology described in Section 2.0 of the main text of this work plan.

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 in Table B11-12; 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 US EPA Method 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.

Pacific Gas and Electric Company (PG&E). 1980. Author unknown. Handwritten notes describing chemical and waste handling practices at Topock Compressor Station. November 5.

Russell, Curt. 2006. Personal Communication in "Final Field Notes Memorandum, May 8 to 9, 2006." May.

Tables

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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																					
AOC13-GrabOS1	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
AOC13-GrabOS2	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
AOC13-OS1	04/06/11	9 - 9.5	N	ND (2)	2.4	47	ND (1)	ND (1)	ND (0.4J)	4.2	1.9	ND (2)	2.7	ND (0.1J)	**2**	4.2	ND (1)	ND (1)	ND (2)	13	9.3
AOC13-OS2	11/08/11	0 - 0.5	N	ND (2.1)	3.3	130	ND (1)	ND (1)	**1.5**	17	5.6	14	**8.9**	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2.1)	26	37
	11/08/11	2 - 3	N	ND (2)	4.2	150	ND (1)	ND (1)	ND (0.41)	24	7.2	**17**	7.9	0.29	ND (1)	15	ND (1)	ND (1)	ND (2)	36	48
	11/08/11	2 - 3	FD	ND (2)	4.1	140	ND (1)	ND (1)	ND (0.41)	25	7.3	**17**	7.9	0.33	ND (1)	16	ND (1)	ND (1)	ND (2)	37	48
	11/08/11	5 - 6	N	ND (2.1)	3.4	170	ND (1)	ND (1)	ND (0.42)	30	8.2	**41**	7.3	ND (0.1)	ND (1)	25	ND (1)	ND (1)	ND (2.1)	36	**61**
AOC13-OS3	11/08/11	0 - 0.5	N	ND (2.1)	4.7	170	ND (1)	ND (1)	ND (0.42)	21	7.4	**22**	**15**	ND (0.1)	ND (1)	18	ND (1)	ND (1)	ND (2.1)	36	39
	11/08/11	2 - 3	N	ND (2.1)	4.4	99	ND (1)	ND (1)	ND (0.42)	22	8.1	**20**	4.1	ND (0.1)	ND (1)	15	1.2	ND (1)	ND (2.1)	41	44
AOC13-OS4	11/08/11	0 - 0.5	N	ND (2.1)	3.7	160	ND (1.1)	ND (1.1)	ND (0.42)	24	6.4	**18**	7.5	ND (0.1)	ND (1.1)	15	ND (1.1)	ND (1.1)	ND (2.1)	33	**66**
	11/08/11	2 - 3	N	ND (2.1)	4	150	ND (1)	ND (1)	ND (0.41)	20	6	14	5	ND (0.1)	ND (1)	14	ND (1)	ND (1)	ND (2.1)	29	30
	11/08/11	5 - 6	N	ND (2.1)	3.5	150	ND (1.1)	ND (1.1)	ND (0.43)	27	7.8	**32**	6	ND (0.11)	ND (1.1)	20	ND (1.1)	ND (1.1)	ND (2.1)	37	38
AOC13-PITOS1	07/26/11	0 - 0.5	N	ND (2)	2.4	91	ND (1)	ND (1)	**2.6**	**54**	4.8	15	**89 J**	ND (0.1)	ND (1)	9.8	ND (1)	ND (1)	ND (2)	19	**63**
	07/26/11	0 - 0.5	FD	ND (2)	2.4	86	ND (1)	ND (1)	**2.6**	**52**	3.6	15	**56 J**	ND (0.1)	ND (1)	10	ND (1)	ND (1)	ND (2)	18	**61**
	07/26/11	2 - 3	N	ND (2J)	3.3	140	ND (1)	ND (1)	ND (0.4)	21	6.7	11	6.7	ND (0.1)	ND (1)	14	ND (1)	ND (1)	ND (2J)	31	31 J
	07/26/11	9 - 9.5	N	ND (2)	2.6	110	ND (1)	ND (1)	ND (0.41)	19	5.2	9.3	4.9	ND (0.1)	ND (1)	12	ND (1)	ND (1)	ND (2)	26	29 J
AOC13-PITOS2	07/26/11	0 - 0.5	N	ND (2)	2.9	150	ND (1)	ND (1)	**0.92**	33	7	**19**	**13**	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2)	31	52 J
	07/26/11	2 - 3	N	ND (2)	3.6	170	ND (1)	ND (1)	ND (0.4)	22	6.1	11	7.4	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2)	33	34 J
	07/26/11	4 - 4.5	N	ND (2)	3.1	140	ND (1)	ND (1)	ND (0.4)	21	5.7	11	**8.7**	ND (0.1)	ND (1)	12	ND (1)	ND (1)	ND (2)	29	35 J
AOC13-PITOS3	07/26/11	0 - 0.5	N	ND (2)	3.2	150	ND (1)	ND (1)	ND (0.4)	20	6.1	12	7.2	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2)	30	33 J
	07/26/11	2 - 3	N	ND (2)	2.9	170	ND (1)	ND (1)	ND (0.4)	20	6.6	11	6.4	ND (0.1)	ND (1)	12	ND (1)	ND (1)	ND (2)	35	36 J
	07/26/11	2 - 3	FD	ND (2)	2.9	180	ND (1)	ND (1)	ND (0.4)	21	7.5	11	6.1	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2)	35	35
	07/26/11	6 - 6.5	N	ND (2.1)	2.9	170	ND (1)	ND (1)	ND (0.42)	22	6.6	10	7	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2.1)	34	36 J
AOC13-PITOS6	07/26/11	0 - 0.5	N	ND (2J)	2.7	160	ND (1)	ND (1)	ND (0.4)	20	6.8	12	7	ND (0.099)	ND (1)	12 J	ND (1J)	ND (1)	ND (2J)	35	36
	07/26/11	2 - 3	N	ND (2)	3	180	ND (1)	ND (1)	ND (0.4)	20	6.6	11	7.7	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2)	33	32
	07/26/11	5 - 6	N	ND (2.1)	2.8	160	ND (1)	ND (1)	ND (0.41)	21	6.6	11	7.2	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2.1)	35	32
	07/26/11	7 - 7.5	N	ND (2)	2.1	180	ND (1)	ND (1)	ND (0.41)	22	7.9	13	7.1	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2)	38	49
AOC13-PITOS7	07/26/11	0 - 0.5	N	ND (2)	2.9	110	ND (1)	ND (1)	ND (0.4)	13	5	13	7.5	ND (0.1)	ND (1)	9.7	ND (1)	ND (1)	ND (2)	25	28
	07/26/11	2 - 3	N	ND (2)	2.5	93	ND (1)	ND (1)	ND (0.4)	12	7.9	12	4.1	ND (0.099)	ND (1)	19	ND (1)	ND (1)	ND (2)	37	25
	07/26/11	2 - 3	FD	ND (2)	1.9	95	ND (1)	ND (1)	ND (0.4)	13	8.5	11	4	ND (0.099)	ND (1)	19	ND (1)	ND (1)	ND (2)	38	26
	07/26/11	5 - 6	N	ND (2)	1.8	96	ND (1)	ND (1)	ND (0.4)	12	8.6	12	3.3	ND (0.1)	ND (1)	20	ND (1)	ND (1)	ND (2)	38	24

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

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
				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**
Category1																					
AOC13-PITOS7	07/26/11	8 - 8.5	N	ND (2)	2.1	110	ND (1)	ND (1)	ND (0.4)	15	6.8	11	5.9	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2)	32	26
AOC13-PITOS8	07/26/11	0 - 0.5	N	ND (2)	2.8	130	ND (1)	ND (1)	0.73	22	6.5	12	**14**	ND (0.1)	ND (1)	12	ND (1)	ND (1)	ND (2)	36	38
	07/26/11	5 - 6	N	ND (2)	2.7	140	ND (1)	ND (1)	ND (0.41)	14	7.5	11	4.6	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2)	37	27
	07/26/11	9 - 10	N	ND (2)	1.8	110	ND (1)	ND (1)	ND (0.4)	14	9.3	13	4	ND (0.1)	ND (1)	21	ND (1)	ND (1)	ND (2)	43	27
	07/26/11	11 - 11.5	N	ND (2)	2	130	ND (1)	ND (1)	ND (0.4)	19	9	13	5.4	ND (0.1)	ND (1)	16	ND (1)	ND (1)	ND (2)	40	32
AOC13-PITOS9	07/26/11	0 - 0.5	N	ND (2)	2.7	130	ND (1)	ND (1)	ND (0.4)	23	5.7	11	6.4	ND (0.099)	ND (1)	12	ND (1)	ND (1)	ND (2)	31	37
	07/26/11	2 - 3	N	ND (2)	2.3	110	ND (1)	ND (1)	ND (0.41)	20	7.7	8.9	5.5	ND (0.1)	ND (1)	11	ND (1)	ND (1)	ND (2)	30	31
	07/26/11	5 - 6	N	ND (2)	2.6	110	ND (1)	ND (1)	ND (0.4)	18	5.5 J	7.8	4.7	ND (0.1)	ND (1)	10	ND (1)	ND (1)	ND (2)	28	28
	07/26/11	5 - 6	FD	ND (2)	2.4	110	ND (1)	ND (1)	ND (0.4)	17	7.7 J	8.6	4.8	ND (0.1)	ND (1)	9.7	ND (1)	ND (1)	ND (2)	27	26
AOC13-PITOS10	07/26/11	0 - 0.5	N	ND (2)	4.2	140	ND (1)	ND (1)	ND (0.16)	15	5.7	9.1	3.9	ND (0.1)	ND (1)	9.1	ND (1)	ND (1)	ND (2)	34	27 J
	07/26/11	2 - 3	N	ND (2)	2.8	150	ND (1)	ND (1)	0.29	19	6.1	**17**	7.1	ND (0.099)	ND (1)	11	ND (1)	ND (1)	ND (2)	31	35 J
	07/26/11	5 - 6	N	ND (2)	2.8	170	ND (1)	ND (1)	ND (0.16)	18	6.8	12	4.5	ND (0.1)	ND (1)	11	ND (1)	ND (1)	ND (2)	36	33 J
	07/26/11	7 - 7.5	N	ND (2)	2.4	100	ND (1)	ND (1)	ND (0.16)	12	6.2	12	3.7	ND (0.1)	ND (1)	8.4	ND (1)	ND (1)	ND (2)	26	25 J
AOC13-PITOS11	07/26/11	0 - 0.5	N	ND (2)	2.8	130	ND (1)	ND (1)	ND (0.4)	13	6	9.3	**11**	ND (0.1)	ND (1)	9.5	ND (1)	ND (1)	ND (2)	26	28 J
	07/26/11	2 - 3	N	ND (2)	2.6	82	ND (1)	ND (1)	ND (0.4)	9.7	3.5	5.5	3.8	ND (0.099)	ND (1)	6.9	ND (1)	ND (1)	ND (2)	22	18 J
	07/26/11	2 - 3	FD	ND (2)	2.4	87	ND (1)	ND (1)	ND (0.4)	9.9	3.3	5	3.4	ND (0.1)	ND (1)	6.5	ND (1)	ND (1)	ND (2)	21	16
	07/26/11	5 - 6	N	ND (2)	2.2	130	ND (1)	ND (1)	ND (0.4)	11	6.6	10	4.6	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2)	30	24 J
	07/26/11	7.5 - 8	N	ND (2)	2.3	110	ND (1)	ND (1)	ND (0.16)	11	5.4	**20**	**12**	ND (0.1)	ND (1)	12	ND (1)	ND (1)	ND (2)	24	23 J
AOC13-PITOS12	09/27/11	0 - 0.5	N	ND (2)	3.6	250 J	ND (1)	ND (1)	ND (0.41)	14	5.4	15	**25 J**	ND (0.1)	ND (1)	10	ND (1)	ND (1)	ND (2)	25 J	**60**
	09/27/11	2 - 3	N	ND (2.1)	4.6	250	ND (1)	ND (1)	ND (0.41)	15	5.9	9.4	6.2	ND (0.1)	ND (1)	10	ND (1)	ND (1)	ND (2.1)	28	35
	09/27/11	5 - 6	N	ND (2)	2.9	170	ND (1)	ND (1)	ND (0.41)	18	5.9	10	6.4	ND (0.1)	ND (1)	11	ND (1)	ND (1)	ND (2)	29	34
	09/27/11	9 - 9.5	N	ND (2)	3.8	240	ND (1)	ND (1)	ND (0.4)	13	4.9	8.7	5.1	ND (0.1)	ND (1)	8.5	ND (1)	ND (1)	ND (2)	27	25
	09/27/11	11 - 11.5	N	ND (2)	1.8	89	ND (1)	ND (1)	ND (0.4)	8.7	3.1	15 3.3		ND (0.1)	ND (1)	6.5	ND (1)	ND (1)	ND (2)	16	16
AOC13-PITOS13	07/26/11	0 - 0.5	N	ND (2)	2.6	140	ND (1)	ND (1)	ND (0.4)	13	4	12	7.4 J	ND (0.1)	ND (1)	6.8	ND (1)	ND (1)	ND (2)	21	25 J
	07/26/11	0 - 0.5	FD	ND (2)	2.9	140	ND (1)	ND (1)	0.44	13	4	12	**21 J**	ND (0.1)	1	6.9	ND (1)	ND (1)	ND (2)	24	25
	07/26/11	2 - 3	N	ND (2J)	2.5	130	ND (1)	ND (1)	ND (0.4)	17	5.4	11	**12 J**	ND (0.1)	ND (1)	9.8	ND (1)	ND (1)	ND (2J)	28	30
	07/26/11	5 - 6	N	ND (2)	2.8	170	ND (1)	ND (1)	ND (0.4)	21	6.2	12	**8.5**	ND (0.1)	ND (1)	11	ND (1)	ND (1)	ND (2)	32	35
	07/26/11	9 - 9.5	N	ND (2)	ND (1)	130	ND (1)	ND (1)	ND (0.4)	16	8	9.6	4.3	ND (0.1)	ND (1)	10	ND (1)	ND (1)	ND (2)	40	34
AOC13-PITOS14	07/26/11	0 - 0.5	N	ND (2)	3.3	150	ND (1)	ND (1)	ND (0.16)	14	5	8.1	**9.6**	ND (0.1)	ND (1)	8.5	ND (1)	ND (1)	ND (2)	25	27 J
	07/26/11	2 - 3	N	ND (2)	3.1	170	ND (1)	ND (1)	0.36	23	6.4	11 7.3		ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2)	33	34 J
	07/26/11	4 - 4.5	N	ND (2)	2.8	140	ND (1)	ND (1)	0.22	16	5.4	9.7	7.3	ND (0.1)	ND (1)	10	ND (1)	ND (1)	ND (2)	29	29 J
BH-65	03/24/11	0 - 0.5	N	ND (0.26)	2	94	ND (0.26)	ND (0.26)	0.52	12	3.4	5.2	6.7	ND (0.1)	0.86	9.7	ND (0.26)	ND (0.26)	ND (0.26)	13	21
	03/24/11	2 - 3	N	ND (0.26)	2.8	150	0.28	ND (0.26)	0.79	17	4.3	8.1	**20**	ND (0.12)	0.57	10	ND (0.26)	ND (0.26)	ND (0.26)	17	28
	03/17/11	9 - 10	N	ND (2.1)	1.7	95	ND (1)	ND (1)	ND (0.41)	15	7.1	7.4	3.5	ND (0.1)	ND (1)	11	ND (1)	ND (1)	ND (2.1)	38	**66**
	03/17/11	14 - 15	N	ND (2.1)	1.5	140	ND (1)	ND (1)	ND (0.42)	16	9	7.5	3	ND (0.1)	ND (1)	12	ND (1)	ND (1)	ND (2.1)	35	43
	03/17/11	19 - 20	N	ND (2)	1.6	140	ND (1)	ND (1)	ND (0.41)	24	8.4	7	3	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2)	36	50

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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																					
BH-65	03/17/11	29 - 30	N	ND (2J)	0.99	130	ND (1)	ND (1)	ND (0.4)	25	8.6	5.3	1.8 J	ND (0.1)	ND (1J)	11	ND (1J)	ND (1)	ND (2J)	36	39
	03/17/11	37 - 40	N	ND (2.1)	2.5	140	ND (1.1)	ND (1.1)	ND (0.42)	**48**	**14**	**17**	3.8	ND (0.1)	ND (1.1)	**33**	ND (1.1)	ND (1.1)	ND (2.1)	50	41
	03/17/11	49 - 50	N	ND (2.1)	2.7	90	ND (1.1)	ND (1.1)	ND (0.43)	**50**	12	**27**	4.1	ND (0.11)	ND (1.1)	**29**	ND (1.1)	ND (1.1)	ND (2.1)	50	45
	03/17/11	59 - 60	N	ND (2.1)	2.4	73	ND (1)	ND (1)	ND (0.42)	**40**	12	8	3.1	ND (0.1)	ND (1)	**28**	ND (1)	ND (1)	ND (2.1)	51	43
	03/18/11	69 - 70	N	ND (2.1)	2.4	94	ND (1.1)	ND (1.1)	ND (0.42)	23	10	14	2.9	ND (0.1)	ND (1.1)	19	ND (1.1)	ND (1.1)	ND (2.1)	44	43
	03/18/11	79 - 80	N	ND (2.1)	2.5	110	ND (1.1)	ND (1.1)	ND (0.42)	**61**	**13**	**21**	3.7	ND (0.1)	ND (1.1)	**44 J**	ND (1.1)	ND (1.1)	ND (2.1)	**57**	50
	03/18/11	79 - 80	FD	ND (2.1)	2.7	93	ND (1)	ND (1)	ND (0.42)	**53**	12	15	3.5	ND (0.1)	ND (1)	**35 J**	ND (1)	ND (1)	ND (2.1)	**54**	42
	03/18/11	89 - 90	N	ND (2.1)	2.4	49	ND (1.1)	ND (1.1)	ND (0.43)	20	8.8	12	2.8	ND (0.11)	ND (1.1)	17	ND (1.1)	ND (1.1)	ND (2.1)	36	38
	03/18/11	99 - 100	N	ND (2.1J)	3.3	**1,000**	ND (1)	ND (1J)	ND (0.42)	**66**	**16**	**18**	3.4 J	ND (0.1)	ND (1J)	**53**	ND (1J)	ND (1)	ND (2.1J)	**63**	51
	03/18/11	109 - 110	N	ND (2.1)	2.7	88	ND (1.1)	ND (1.1)	ND (0.43)	**49**	11	**20**	4.5	ND (0.11)	ND (1.1)	**34**	ND (1.1)	ND (1.1)	ND (2.1)	50	48
	03/18/11	119 - 120	N	ND (2.1)	2.9	50	ND (1)	ND (1)	ND (0.41)	**50**	**14**	13	2.8	ND (0.1)	ND (1)	**41**	ND (1)	ND (1)	ND (2.1)	**57**	46
	03/19/11	129 - 130	N	ND (2.1)	2.4	56	ND (1)	ND (1)	ND (0.42)	26	8.6	**20**	3	ND (0.11)	ND (1)	20	ND (1)	ND (1)	ND (2.1)	32	36
	03/19/11	139 - 140	N	ND (2.2)	2.6	140	ND (1.1)	ND (1.1)	ND (0.43)	25	9.7	**20**	2.6	ND (0.11)	ND (1.1)	21	ND (1.1)	ND (1.1)	ND (2.2)	38	44
BH-66	03/23/11	0 - 0.5	N	ND (0.27)	1.4	70	ND (0.27)	ND (0.27)	ND (0.43)	12	4	5	**8.9**	ND (0.11)	ND (0.27)	11	ND (0.27)	ND (0.27)	ND (0.27)	14	16
	03/23/11	2 - 3	N	ND (0.27)	1.3	62	ND (0.27)	ND (0.27)	ND (0.42)	9.1	3.3	5	3.2	ND (0.11)	ND (0.27)	9.3	ND (0.27)	ND (0.27)	ND (0.27)	11	15
	03/23/11	5 - 6	N	ND (0.28)	1.8	76	0.33	ND (0.28)	ND (0.45)	14	4.9	6.2	2.6	ND (0.1)	ND (0.28)	11	ND (0.28)	ND (0.28)	ND (0.28)	19	26
	04/12/11	14 - 15	N	ND (2.1)	2.3	72 J	ND (1)	ND (1)	ND (0.41)	5.3 J	2	3.8	2.7	ND (0.1)	ND (1)	4	ND (1)	ND (1)	ND (2.1)	12 J	11 J
	04/12/11	14 - 15	FD	ND (2.1)	2.8	100 J	ND (1)	ND (1)	ND (0.42)	15 J	3.5	11	3.8	ND (0.1)	ND (1)	6.7	ND (1)	ND (1)	ND (2.1)	15 J	20 J
	04/12/11	19 - 20	N	ND (2)	2.4	86	ND (1)	ND (1)	ND (0.41)	10	2.2	3	3	ND (0.1)	ND (1)	4.1	ND (1)	ND (1)	ND (2)	12	14
	04/12/11	29 - 30	N	ND (2.1)	2.3	97	ND (1)	ND (1)	ND (0.41)	7	2.2	2.6	2.7	ND (0.1)	ND (1)	4.1	ND (1)	ND (1)	ND (2.1)	12	13
	04/12/11	39 - 40	N	ND (2.1)	2	68	ND (1)	ND (1)	ND (0.41)	28	9.7	9.3	2.7	ND (0.1)	ND (1)	23	ND (1)	ND (1)	ND (2.1)	41	38
	04/12/11	49 - 50	N	ND (2.1J)	2 J	130	ND (1)	ND (1)	ND (0.41)	28	9.9	9.5	3	ND (0.1)	ND (1J)	23	ND (1)	ND (1)	ND (2.1J)	43	41
	04/13/11	59 - 60	N	ND (2.1)	1.8	28	ND (1.1)	ND (1.1)	ND (0.42)	25	8.2	8.1	2.9	ND (0.1)	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	35	40
	04/13/11	69 - 70	N	ND (2.1)	2.2	34	ND (1.1)	ND (1.1)	ND (0.43)	18	8.8	13	3.8	ND (0.11)	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	39	44
	04/13/11	79 - 80	N	ND (2.1)	1.6	100	ND (1)	ND (1)	ND (0.42)	17	8.7	10	2.7	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2.1)	37	43
	04/13/11	89 - 90	N	ND (2.1)	2	29	ND (1.1)	ND (1.1)	ND (0.43)	18	8	10	3	ND (0.1)	ND (1.1)	15	ND (1.1)	ND (1.1)	ND (2.1)	32	39
	04/13/11	99 - 100	N	ND (2.1)	1.8	80	ND (1.1)	ND (1.1)	ND (0.43)	21	7.8	12	3.6	ND (0.11)	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	34	38
	04/13/11	109 - 110	N	ND (2.1)	1.6	120	ND (1.1)	ND (1.1)	ND (0.42)	22	9.1	9.7	3.4	ND (0.1)	ND (1.1)	16	ND (1.1)	ND (1.1)	ND (2.1)	38	41
	04/14/11	119 - 120	N	ND (2.1)	1.7	39 J	ND (1)	ND (1)	ND (0.41)	20	8	12	2.6	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2.1)	33	36
	04/14/11	119 - 120	FD	ND (2.1)	1.7	23 J	ND (1)	ND (1)	ND (0.42)	23	7.7	13	2.8	ND (0.1)	ND (1)	15	ND (1)	ND (1)	ND (2.1)	33	36
	04/14/11	129 - 130	N	ND (2.1)	2.1	51	ND (1.1)	ND (1.1)	ND (0.43)	29	8.3	12	2.7	ND (0.11)	ND (1.1)	19	ND (1.1)	ND (1.1)	ND (2.1)	36	35
BH-67	03/17/11	0 - 0.5	N	ND (2.2)	3.2	120	ND (1.1)	ND (1.1)	ND (0.43)	32	10	14	5	ND (0.11)	ND (1.1)	**29**	ND (1.1)	ND (1.1)	ND (2.2)	45	43
	03/17/11	2 - 3	N	ND (2.1)	2.9	240	ND (1.1)	ND (1.1)	ND (0.42)	11	5.2	3.5	1.8	ND (0.1)	ND (1.1)	7.6	ND (1.1)	ND (1.1)	ND (2.1)	31	28
	03/17/11	5 - 6	N	ND (2)	1.9	27	ND (1)	ND (1)	ND (0.4)	2.8	1.4	ND (2)	2.2	ND (0.1)	ND (1)	2.3	ND (1)	ND (1)	ND (2)	11	6.7
	04/29/11	9 - 10	N	ND (2.1)	2.8	66	ND (1)	ND (1)	ND (0.42)	4.4	2.3	ND (2.1)	2.6	ND (0.1)	ND (1)	4	ND (1)	ND (1)	ND (2.1)	14	12
	04/29/11	14 - 15	N	ND (2)	2.1	35	ND (1)	ND (1)	ND (0.41)	2.4	ND (1)	ND (2)	1.7	ND (0.1)	ND (1)	1.4	ND (1)	ND (1)	ND (2)	7.2	5.7

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

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
				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**
Category1																					
BH-67	04/29/11	19 - 20	N	ND (2)	2.6	110	ND (1)	ND (1)	ND (0.41)	6.6	2.2	2.2	2.6	ND (0.1)	1.2	3.3	ND (1)	ND (1)	ND (2)	14	12
	04/29/11	29 - 30	N	ND (2)	ND (1)	220	ND (1)	ND (1)	ND (0.41)	18	**14**	4.5	ND (1)	ND (0.1)	**4.6**	12	ND (1)	ND (1)	ND (2)	**56**	**69**
	04/29/11	39 - 40	N	ND (2)	1.9	15	ND (1)	ND (1)	ND (0.4)	2.4	1.1	ND (2)	2	ND (0.1)	ND (1)	1.5	ND (1)	ND (1)	ND (2)	10	5.5
	04/29/11	39 - 40	FD	ND (2)	1.6	15	ND (1)	ND (1)	ND (0.4)	2.1	ND (1)	ND (2)	1.7	ND (0.1)	ND (1)	1.2	ND (1)	ND (1)	ND (2)	8.9	4.5
	04/29/11	49 - 50	N	ND (2.1)	2.7	110	ND (1)	ND (1)	ND (0.42)	12	3.3	2.7	2.8	ND (0.1)	**2.2**	4.5	ND (1)	ND (1)	ND (2.1)	20	17
	04/29/11	59 - 60	N	ND (2.3)	8.8	190	ND (1.2)	ND (1.2)	ND (0.47)	18	4.9	12	**10**	ND (0.12)	**3.5**	13	ND (1.2)	ND (1.2)	ND (2.3)	28	50
	04/29/11	69 - 70	N	ND (2.1)	2.3	110	ND (1)	ND (1)	ND (0.41)	3.2	1.4	ND (2.1)	2.6	ND (0.1)	ND (1)	2	ND (1)	ND (1)	ND (2.1)	8.1	7.8
	04/29/11	79 - 80	N	ND (2.2)	6.9	180	ND (1.1)	ND (1.1)	ND (0.44)	13	4.5	6.3	6.9	ND (0.11)	ND (2.2)	9.3	ND (1.1)	ND (1.1)	ND (2.2)	23	34
	04/29/11	89 - 90	N	ND (2.2)	4.3	74	ND (1.1)	ND (1.1)	0.78	22	8.7	7.1	4.4	ND (0.11)	**3.2**	17	ND (1.1)	ND (1.1)	ND (2.2)	41	39
	04/29/11	99 - 100	N	ND (2.1)	3.4	46	ND (1)	ND (1)	ND (0.41)	22	9.5	7.8	2.9	ND (0.1)	**3.4**	15	ND (1)	ND (1)	ND (2.1)	43	40
	04/29/11	109 - 110	N	ND (2.1)	1.6	48	ND (1)	ND (1)	ND (0.41)	31	12	8.4	3.5	ND (0.1)	**4.9**	19	ND (1)	ND (1)	ND (2.1)	52	50
	04/29/11	119 - 120	N	ND (2.1)	3	44	ND (1)	ND (1)	ND (0.42)	20	9.7	6.6	2.9	ND (0.1)	**3.5**	14	ND (1)	ND (1)	ND (2.1)	43	44
	04/30/11	129 - 130	N	ND (2.1)	3.3	90	ND (1)	ND (1)	ND (0.42)	26	9.5	12 2.6		ND (0.11)	**4.3**	17	ND (1)	ND (1)	ND (2.1)	41	42
	04/30/11	139 - 140	N	ND (2.1)	ND (5.2)	39	ND (1)	ND (1)	ND (0.42)	15	7.8	ND (10)	ND (5.2)	ND (0.1)	**3.3**	9.8	ND (1)	ND (1)	ND (2.1)	33	36
	04/30/11	139 - 140	FD	ND (2.1)	3.1	36	ND (1.1)	ND (1.1)	ND (0.42)	19	8.9	6.5	2.6	ND (0.1)	**4.2**	13	ND (1.1)	ND (1.1)	ND (2.1)	40	43
	04/30/11	149 - 150	N	ND (2.1)	2.9	**510**	ND (1)	ND (1)	ND (0.41)	17	8.9	ND (10)	1.5	ND (0.1)	**3.3**	12	ND (1)	ND (1)	ND (2.1)	37	36
	04/30/11	159 - 160	N	ND (2.1)	2.4	35	ND (1)	ND (1)	ND (0.41)	19	10	7.3	2.3	ND (0.1)	**3.9**	13	ND (1)	ND (1)	ND (2.1)	44	41
BH-68	03/17/11	0 - 0.5	N	ND (2.2)	3.8	130	ND (1.1)	ND (1.1)	ND (0.43)	17	5.7	7.4	4.2	ND (0.11)	ND (1.1)	14	ND (1.1)	ND (1.1)	ND (2.2)	30	29
	03/17/11	0 - 0.5	FD	ND (2.2)	3.5	130	ND (1.1)	ND (1.1)	ND (0.43)	22	7.4	12	5.6	ND (0.11)	ND (1.1)	19	ND (1.1)	ND (1.1)	ND (2.2)	35	33
	03/17/11	2 - 3	N	ND (2.1)	3.7	55	ND (1.1)	ND (1.1)	ND (0.42)	4.2	1.9	ND (2.1)	2.5	ND (0.11)	ND (1.1)	4.2	ND (1.1)	ND (1.1)	ND (2.1)	11	11
	03/17/11	5 - 6	N	ND (2.3)	1.8	51	ND (1.2)	ND (1.2)	ND (0.47)	4.6	1.9	2.5	3.5	ND (0.12)	ND (1.2)	3.8	ND (1.2)	ND (1.2)	ND (2.3)	12	13
	05/13/11	9 - 10	N	ND (0.26J)	4.6	130	0.61	ND (0.26)	ND (0.42)	12 J	5.8 J	8.5 J	**12 J**	ND (0.11)	1.2	13 J	ND (0.26)	ND (0.26)	ND (0.26)	27	31
	05/13/11	14 - 15	N	ND (0.25)	1.8	14	ND (0.25)	ND (0.25)	ND (0.41)	2.8	1.1	2	2	ND (0.1)	0.92	2.4	ND (0.25)	ND (0.25)	ND (0.25)	6.7	6.3
	05/13/11	19 - 20	N	ND (0.27)	3	200	0.46	ND (0.27)	ND (0.42)	31	8.8	10	3.8	ND (0.11)	0.55	21	ND (0.27)	ND (0.27)	ND (0.27)	39	38
	05/13/11	29 - 30	N	ND (0.26)	2.7	52	0.45	ND (0.26)	ND (0.42)	35	8.8	12 3.3		ND (0.1)	0.45	27	ND (0.26)	ND (0.26)	ND (0.26)	41	38
	05/13/11	39 - 40	N	ND (0.27)	2.6	55	0.51	ND (0.27)	ND (0.42)	32	8.8	16	4.5	ND (0.11)	0.47	27	ND (0.27)	ND (0.27)	ND (0.27)	42	41
	05/13/11	49 - 50	N	ND (0.26)	1.8	46	0.37	ND (0.26)	ND (0.41)	16	6.3	8.5	2.7	ND (0.1)	0.46	12	ND (0.26)	ND (0.26)	ND (0.26)	29	35
	05/13/11	59 - 60	N	ND (0.26)	2.6	100	0.5	ND (0.26)	ND (0.42)	22	7.7	12	3.8	ND (0.11)	0.45	18	ND (0.26)	ND (0.26)	ND (0.26)	35	36
	05/13/11	69 - 70	N	ND (0.26)	2.3	200	0.53	ND (0.26)	ND (0.42)	26	8.8	13	4.2	ND (0.11)	0.5	20	ND (0.26)	ND (0.26)	ND (0.26)	41	39
	05/13/11	79 - 80	N	ND (0.27)	2.5	58	0.55	ND (0.27)	ND (0.42)	36	8.6	13	4	ND (0.11)	0.49	24	ND (0.27)	ND (0.27)	ND (0.27)	40	41
	05/13/11	89 - 90	N	ND (0.27)	3.3	44	0.66	ND (0.27)	ND (0.43)	28	7.9	14	5.9	ND (0.11)	0.62	23	ND (0.27)	ND (0.27)	ND (0.27)	41	38
	05/13/11	99 - 100	N	ND (0.27)	3.2	49	0.67	ND (0.27)	ND (0.44)	37	8.3	**18**	5.3	ND (0.11)	0.62	**30**	ND (0.27)	ND (0.27)	ND (0.27)	45	44
	05/13/11	99 - 100	FD	ND (0.27)	3.1	54	0.58	ND (0.27)	ND (0.43)	38	8.6	16 5.1		ND (0.11)	0.68	**32**	ND (0.27)	ND (0.27)	ND (0.27)	44	41
	05/13/11	109 - 110	N	ND (0.26)	1.9	32	0.42	ND (0.26)	ND (0.42)	16	6.1	11 3.4		ND (0.1)	0.38	13	ND (0.26)	ND (0.26)	ND (0.26)	31	31
	05/13/11	119 - 120	N	ND (0.27)	2.4	58	0.51	ND (0.27)	ND (0.43)	25	8	16	4.2	ND (0.11)	0.49	20	ND (0.27)	ND (0.27)	ND (0.27)	41	38
	05/13/11	129 - 130	N	ND (0.26)	2.1	24	0.39	0.3	ND (0.42)	15	6.3	8.4	2.8	ND (0.11)	0.3	12	ND (0.26)	ND (0.26)	ND (0.26)	29	31

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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																					
BH-68	05/14/11	139 - 140	N	ND (0.27)	3.8	120	0.61	ND (0.27)	ND (0.43)	**45**	11	**19**	6.1	ND (0.11)	0.87	**35**	ND (0.27)	ND (0.27)	ND (0.27)	48	46
	05/14/11	149 - 150	N	ND (0.26)	3.8	68	0.5	ND (0.26)	ND (0.42)	**48**	11	**19**	4.3	ND (0.11)	0.76	**39**	ND (0.26)	ND (0.26)	ND (0.26)	50	42
	05/14/11	159 - 160	N	ND (0.26)	2.9	34	0.41	ND (0.26)	ND (0.42)	22	8.8	13	3.2	ND (0.11)	0.43	19	ND (0.26)	ND (0.26)	ND (0.26)	38	38
PGE-LT-OS5	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-LT-OS6	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-LT-OS7	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-LT-OS8	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-LT-OS9	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-UTOS1	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-UTOS2	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-UTOS3	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-UTOS4	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
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**

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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-2	09/08/88	0.5	LR	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 (5)	29	47
	09/08/88	0.5	N	ND (0.3)	3.1	180	ND (1)	ND (0.5)	---	---	8	---	5	0.039	ND (1)	---	ND (0.5)	ND (1)	ND (1)	25	---
	09/08/88	0.5	FD	---	---	---	---	---	---	9	---	ND (3)	---	---	---	12	---	---	---	---	41
	09/08/88	1	LSS1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	ND (3)
	09/08/88	1	LSS	ND (1)	3.6	180	ND (0.2)	0.8	ND (1)	24	5.3	9.9	6.7	ND (0.02)	**1.4**	17	0.11	ND (0.2)	ND (0.3)	22	28
	09/08/88	1	N	ND (0.3)	3.6	270	ND (1)	ND (0.5)	ND (1)	15	6	**26**	ND (1)	0.034	ND (1)	11	ND (0.5)	ND (1)	ND (1)	22	54
	09/08/88	1	LRE	8.5	---	ND (1)	ND (1)	ND (0.5)	---	ND (3)	ND (3)	ND (3)	5	---	ND (1)	ND (3)	---	ND (1)	ND (1)	ND (1)	ND (0.1)
	09/08/88	1.5	N	ND (0.3)	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
	09/08/88	1.5	LRE	7.5	---	ND (1)	ND (1)	ND (0.5)	---	ND (3)	ND (3)	ND (3)	4	---	ND (1)	ND (3)	---	ND (1)	ND (1)	ND (1)	ND (0.1)
BGCS-3	09/08/88	0.5	LSS	---	---	---	---	---	ND (1)	---	---	ND (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	LRE2	ND (0.3)	1.8	220	ND (1)	ND (0.5)	---	21	9	ND (3)	**12**	0.048	ND (1)	15	ND (0.5)	ND (1)	ND (1)	22	**62**
	09/08/88	1	N	ND (0.3)	1.7	180	ND (1)	ND (0.5)	ND (1)	21	6	ND (3)	**15**	0.09	ND (1)	---	ND (0.5)	ND (1)	ND (1)	19	**76**
	09/08/88	1	LSS	ND (1)	3.3	140	ND (0.2)	**14**	ND (1)	26	5.1	11	**8.4**	ND (0.02)	**2.1**	18	0.14	ND (0.2)	ND (0.3)	23	30
	09/08/88	1	LSSRE	---	---	---	---	0.31	---	---	---	6.6	---	---	---	---	---	---	---	---	---
	09/08/88	1	LSSRE2	---	---	---	---	0.09	---	---	---	2.4	---	---	---	---	---	---	---	---	---
	09/08/88	1	LRE	ND (0.3)	1.8	170	ND (1)	ND (0.5)	ND (1)	10	7	ND (3)	6	0.004	ND (1)	14	ND (0.5)	ND (1)	ND (1)	20	**63**
	09/08/88	1.5	LSS	---	---	---	---	---	ND (1)	---	---	ND (3)	---	---	---	---	---	---	---	---	---
	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)	2.2	170	ND (1)	ND (0.5)	ND (1)	11	9	ND (3)	7	0.046	ND (1)	19	ND (0.5)	ND (1)	ND (1)	29	**80**
	09/08/88	1	LR	ND (0.3)	2.42	220	ND (1)	ND (0.5)	---	9	8	ND (3)	8	0.034	ND (1)	18	ND (0.5)	ND (1)	ND (5)	23	**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	---	---	---	---	---	---	---

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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_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	---	---	---	---	---	---	---
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	---	---	---	---	---	---	---	---

TABLE B11-1
Sample Results: Metals
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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
Category3																					
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
LR = Lab replicate
LRE = Lab reanalysis
LRE2 = Second lab reanalysis
LSS = Lab split sample
LSS1 = Lab split sample 1
LSSRE2 = Lab split sample second reanalysis
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 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Commercial Screening Level [1]:				**990,000**	**NE**	**20,000**	**720,000**	**NE**	**23,000**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**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**
Category1											
AOC13-OS2	11/08/11	0 - 0.5	N	7,200	24,000	ND (1.04)	13,000	5,800	220	1,300	110
AOC13-PITOS1	07/26/11	0 - 0.5	N	7,900	15,000	ND (0.25J)	12,000	3,800	160	1,000	93
	07/26/11	0 - 0.5	FD	6,500	14,000	5 J	12,000	3,700	140	1,000	89
AOC13-PITOS2	07/26/11	0 - 0.5	N	11,000	27,000	ND (0.25)	17,000	7,000	270	1,900	290
AOC13-PITOS3	07/26/11	0 - 0.5	N	9,900	32,000	ND (0.25)	17,000	7,100	270	1,800	280
AOC13-PITOS6	07/26/11	0 - 0.5	N	12,000 J	32,000	ND (0.25J)	20,000	7,200	300	2,100 J	290 J
AOC13-PITOS7	07/26/11	0 - 0.5	N	8,300	20,000	0.73	14,000	4,900	240	1,400	320
AOC13-PITOS8	07/26/11	0 - 0.5	N	12,000 J	26,000	0.38	19,000	6,100	280	1,800	180
AOC13-PITOS9	07/26/11	0 - 0.5	N	10,000	22,000	1	17,000	5,400	260	1,600	ND (10)
AOC13-PITOS10	07/26/11	0 - 0.5	N	9,500	28,000	ND (0.25)	17,000	5,700	250	1,900	110
AOC13-PITOS11	07/26/11	0 - 0.5	N	8,100	21,000	ND (0.25)	14,000	5,200	240	1,300	310
AOC13-PITOS12	09/27/11	0 - 0.5	N	8,200 J	33,000	ND (0.25)	14,000	6,000 J	260	1,300	310
AOC13-PITOS13	07/26/11	0 - 0.5	N	6,700	24,000	ND (0.25J)	12,000	4,100	200	1,100 J	91
	07/26/11	0 - 0.5	FD	6,900	25,000	1.9 J	13,000	4,500	220	ND (100J)	84
AOC13-PITOS14	07/26/11	0 - 0.5	N	8,300	29,000	ND (0.25)	14,000	6,200	240	1,600	430
BH-65	03/17/11	14 - 15	N	10,000	17,000	---	21,000	7,000	350	4,100	650
	03/17/11	19 - 20	N	9,300	9,800	---	23,000	6,400	350	3,300	550
BH-67	03/17/11	2 - 3	N	7,200	23,000	---	15,000	5,400	210	2,200	430
	03/17/11	5 - 6	N	1,100	22,000	---	3,600	2,900	73	400	280
BH-68	03/17/11	2 - 3	N	2,000	6,900	---	6,700	2,600	70	540	320
	03/17/11	5 - 6	N	3,100	20,000	---	5,000	3,600	130	940	560
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 Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
Commercial Screening Level [1]				99,000	4,100,000	33,000,000	17,000,000	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
Location	Date	Depth (ft bgs)	Sample Type	1-Methyl naphthalene	2-Methyl naphthalene	Acenaphthene	Acena phthylene	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	Phen anthrene	Pyrene	B(a)P Equivalent
Category1																						
AOC13-GrabOS1	05/13/08	1	N	---	ND (5.2)	10	ND (5.2)	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)
AOC13-GrabOS2	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
AOC13-OS2	11/08/11	0 - 0.5	N	ND (5.2)	6.9	ND (5.2)	ND (5.2)	6.6	67	69	130	33	41 67		10	110	ND (5.2)	33	ND (5.2)	43	95	100
	11/08/11	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	12	ND (5.1)	ND (5.1)	5.8	ND (5.1)	7.8	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.1	5.4
	11/08/11	2 - 3	FD	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)	5.5	ND (5.1)	7.8	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.2	5.3
	11/08/11	5 - 6	N	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	15	12	33	7	9.1	18	ND (5.3)	28	ND (5.3)	6.7	ND (5.3)	12	24	19
AOC13-OS3	11/08/11	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 (4.5)
AOC13-OS4	11/08/11	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.9	ND (5.1)	ND (5.1)	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
	11/08/11	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 (4.6)
AOC13-PITOS1	07/26/11	0 - 0.5	N	ND (5)	7.3	9	ND (5)	30 J	260	320 J	600	72 J	430	310	ND (5)	760	7.3	79	ND (5)	260	580	460
	07/26/11	0 - 0.5	FD	ND (5)	ND (5)	7.7	ND (5)	ND (5J)	170	180 J	410	140 J	120 J	220	ND (5)	660	5.4	130	ND (5)	180	530	270
	07/26/11	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	11	15	26	18	9	ND (5J)	ND (5)	19	ND (5)	14	ND (5)	ND (5)	18	22
	07/26/11	9 - 9.5	N	ND (51)	ND (51)	ND (51)	ND (51)	ND (51)	ND (51)	ND (51)	130	58	ND (51)	ND (51J)	ND (51)	100	ND (51)	ND (51)	ND (10)	ND (51)	88	55
AOC13-PITOS2	07/26/11	0 - 0.5	N	7.4	12	ND (5)	ND (5)	12	90	120	260	32	100	120	10	230	ND (5)	35	ND (5)	75	210	170
	07/26/11	2 - 3	N	26	30	ND (5)	ND (5)	6.7	7	9.4	18	9.7	7.7	11	ND (5)	15	ND (5)	7.4	6	ND (5)	14	14
	07/26/11	4 - 4.5	N	ND (5.1)	6.4	ND (5.1)	ND (5.1)	7.4	12	20	44	5.4 17		19	ND (5.1)	31	ND (5.1)	5.7	ND (5.1)	7.4	27	29
AOC13-PITOS3	07/26/11	0 - 0.5	N	ND (5)	5	ND (5)	ND (5)	8	28	35	57	27	21 32		5.4	70	ND (5)	22	ND (5)	18	59	50
	07/26/11	2 - 3	N	ND (5.1)	5.4	ND (5.1)	ND (5.1)	6.8	8.8	16	21	9.5 11		13	ND (5.1)	16	ND (5.1)	8.4	ND (5.1)	ND (5.1)	16	22
	07/26/11	2 - 3	FD	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	14	18	33	11	13	9.4 J	ND (5.1)	22	ND (5.1)	10	ND (5.1)	ND (5.1)	21	26
	07/26/11	6 - 6.5	N	ND (5.2)	5.2	ND (5.2)	ND (5.2)	7	16	27	42	11	21 22		ND (5.2)	33	ND (5.2)	10	ND (5.2)	7.7	31	37
AOC13-PITOS6	07/26/11	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	14	18	39	13	10 12		ND (5)	21	ND (5)	12	ND (5)	5	19	26
	07/26/11	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	13	14	24	9.4	8.7	ND (5)	ND (5)	17	ND (5)	8.7	ND (5)	ND (5)	16	20
	07/26/11	5 - 6	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	10	10	18	5.9	5.9	ND (5.2)	ND (5.2)	14	ND (5.2)	5.5	ND (5.2)	ND (5.2)	13	15
	07/26/11	7 - 7.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	39	55	110	22	24 35		ND (5.1)	37	ND (5.1)	22	ND (5.1)	8.8	37	76
AOC13-PITOS7	07/26/11	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	44	57	120	24	32	58 J	ND (5)	93	ND (5)	25	ND (5)	23	85	81
	07/26/11	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.7	6	11	6.4	5	ND (5J)	ND (5)	10	ND (5)	5	ND (5)	ND (5)	9.4	9.6
	07/26/11	2 - 3	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6	11	7	5	ND (5)	ND (5)	13	ND (5)	5.4	ND (5)	ND (5)	13	9.3
	07/26/11	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5J)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)
	07/26/11	8 - 8.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	29	32	57	16	20 29		ND (5)	60	ND (5)	16	ND (5)	20	52	45
AOC13-PITOS8	07/26/11	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	16	22	130	19	27 41		ND (5)	30	ND (5)	20	ND (5)	6.7	28	43
	07/26/11	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 (4.5)
	07/26/11	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 (4.4)

TABLE B11-3

Sample Results: Polycyclic Aromatic Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
Commercial Screening Level 1				99,000	4,100,000	33,000,000	17,000,000	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
Location	Date	Depth (ft bgs)	Sample Type	1-Methyl naphthalene	2-Methyl naphthalene	Acenaphthene	Acena phthylene	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	Phen anthrene	Pyrene	B(a)P Equivalent
AOC13-PITOS8	07/26/11	11 - 11.5	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 (4.5)
AOC13-PITOS9	07/26/11	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.3 J	5.3 J	12 J	ND (5)	ND (5)	ND (5J)	ND (5)	8 J	ND (5)	ND (5)	ND (5)	ND (5)	7.3 J	8.5
	07/26/11	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	12	13	22	8.1	9.5	6.1 J	ND (5.1)	22	ND (5.1)	7.4	ND (5.1)	ND (5.1)	20	19
	07/26/11	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8.4	7.1	11	ND (5)	5	ND (5J)	ND (5)	11	ND (5)	ND (5)	ND (5)	ND (5)	10	11
	07/26/11	5 - 6	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.4	6.4	10 6		5.4	ND (5)	ND (5)	11	ND (5)	ND (5)	ND (5)	ND (5)	10	9.7
AOC13-PITOS10	07/26/11	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 (5J)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)
	07/26/11	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	19	25	51	13	20 21		ND (5)	41	ND (5)	12	ND (5)	11	37	36
	07/26/11	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	10	9.4	17	7.4	7	ND (5J)	ND (5)	22	ND (5)	6.7	ND (5)	ND (5)	19	14
	07/26/11	7 - 7.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.7	ND (5)	11	ND (5)	ND (5)	ND (5)	ND (5)	7.7	ND (5)	ND (5)	ND (5)	ND (5)	7	5.5
AOC13-PITOS11	07/26/11	0 - 0.5	N	ND (5)	5	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	7.4	ND (5)	ND (5)	6	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	4.9
	07/26/11	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5J)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)
	07/26/11	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 (4.4)
	07/26/11	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5J)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (4.4)
	07/26/11	7.5 - 8	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.5	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)	ND (5.1)	8.5	4.5
AOC13-PITOS12	09/27/11	0 - 0.5	N	ND (5.1)	5.1	ND (5.1)	ND (5.1)	ND (5.1)	11	14	22	7.8 14		17	ND (5.1)	25	ND (5.1)	7.1	ND (5.1)	13	22	20
	09/27/11	2 - 3	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	11	16	20	12	13 17		ND (5.2)	26	ND (5.2)	10	ND (5.2)	8.6	25	22
	09/27/11	5 - 6	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.8	9.5	5.1 6.	5	6.8	ND (5.1)	10	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	10	9.8
	09/27/11	9 - 9.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8.7	11	14	9.4 10		11	ND (5)	15	ND (5)	8	ND (5)	ND (5)	14	16
	09/27/11	11 - 11.5	N	ND (5)	6.4	ND (5)	ND (5)	6.7	30	27	ND (5)	8.4	ND (5)	51	ND (5)	61	ND (5)	6.7	ND (5)	31	53	33
AOC13-PITOS13	07/26/11	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6.7	5.3	14	ND (5)	5	ND (5)	ND (5)	11	ND (5)	ND (5)	ND (5)	ND (5)	9.7	9
	07/26/11	0 - 0.5	FD	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	8.4	ND (5)	ND (5)	ND (5)	ND (5)	7.7	ND (5)	ND (5)	ND (5)	ND (5)	6.3	5
	07/26/11	2 - 3	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	10 J	12 J	20 J	9.7 J	9.7 J	ND (5J)	ND (5)	19 J	ND (5)	8.7 J	ND (5)	5 J	18 J	18
	07/26/11	5 - 6	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	21	26	54	12	21 20		ND (5)	39	ND (5)	11	ND (5)	8.4	35	38
	07/26/11	9 - 9.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5J)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	5.7	4.4
AOC13-PITOS14	07/26/11	0 - 0.5	N	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	10	13	27	8.7	8.4	ND (5J)	ND (5)	15	ND (5)	7.7	ND (5)	ND (5)	14	19
	07/26/11	2 - 3	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	7.4	8.5	17	5.1	7.1	ND (5.1J)	ND (5.1)	11	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	11	13
	07/26/11	4 - 4.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	25	30	56	27	15 22		ND (5.1)	51	ND (5.1)	22	ND (5.1)	7.4	42	43
BH-65	03/24/11	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)	5.5	6.5	ND (5.1)	ND (5.1)	ND (5.1)	5.5	ND (5.1)	ND (5.1)	ND (4.5)	ND (5.1)	5.5	4.8
	03/24/11	2 - 3	N	ND (5.2)	6.3	ND (5.2)	ND (5.2)	ND (5.2)	7.3	11	16	9.8	6.3	8.7	ND (5.2)	14	ND (5.2)	6.3	ND (4.5)	ND (5.2)	13	16
	03/17/11	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 (4.5)
	03/17/11	14 - 15	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)
	03/17/11	19 - 20	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 (4.5)
	03/17/11	29 - 30	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 (4.8)	ND (5)	ND (5)	ND (4.4)
	03/17/11	37 - 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 (4.3)	ND (5.3)	ND (5.3)	ND (4.6)
	03/17/11	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 (5.3)	ND (5.3)	ND (5.3)	ND (4.6)
	03/17/11	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 (4.5)
	03/18/11	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 (4.6)
	03/18/11	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 (4.6)
	03/18/11	79 - 80	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 (4.6)	ND (5.2)	ND (5.2)	ND (4.5)

TABLE B11-3

Sample Results: Polycyclic Aromatic Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
		Commercial Screening Level 1		99,000	4,100,000	33,000,000	17,000,000	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
Location	Date	Depth (ft bgs)	Sample Type	1-Methyl naphthalene	2-Methyl naphthalene	Acenaphthene	Acena phthylene	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	Phen anthrene	Pyrene	B(a)P Equivalent
BH-65	03/18/11	89 - 90	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)
	03/18/11	99 - 100	N	ND (5.2)	5.2	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.4)	ND (5.2)	ND (5.2)	4.5
	03/18/11	109 - 110	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 (4.7)
	03/18/11	119 - 120	N	ND (5.2)	5.2	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	4.5
	03/19/11	129 - 130	N	ND (5.2)	5.2	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	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)	4.5
	03/19/11	139 - 140	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 (4.6)	ND (5.4)	ND (5.4)	ND (4.7)
BH-66	03/23/11	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 (4.8)	ND (5.4)	ND (5.4)	ND (4.7)
	03/23/11	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 (4.8)	ND (5.3)	ND (5.3)	ND (4.6)
	03/23/11	5 - 6	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 (4.5)	ND (5.6)	ND (5.6)	ND (4.9)
	04/12/11	14 - 15	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (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)
	04/12/11	14 - 15	FD	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (4.5)
	04/12/11	19 - 20	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	6.5	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.6)	ND (5.1)	5.1	4.9
	04/12/11	29 - 30	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	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 (4.5)
	04/12/11	39 - 40	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (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 (4.5)
	04/12/11	49 - 50	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (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 (4.5)
	04/13/11	59 - 60	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (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 (4.6)
	04/13/11	69 - 70	N	ND (5.4)	ND (54)	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 (4.4)	ND (5.4)	ND (5.4)	ND (4.7)
	04/13/11	79 - 80	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (6)	ND (5.2)	ND (5.2)	ND (4.5)
	04/13/11	89 - 90	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.4)	ND (5.3)	ND (5.3)	ND (4.6)
	04/13/11	99 - 100	N	5.3	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (6)	ND (5.3)	ND (5.3)	4.6
	04/13/11	109 - 110	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	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 (4.6)
	04/14/11	119 - 120	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (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 (4.5)
	04/14/11	119 - 120	FD	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.3)	ND (5.2)	ND (5.2)	ND (4.5)
	04/14/11	129 - 130	N	ND (5.4)	ND (54)	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 (4.6)	ND (5.4)	ND (5.4)	ND (4.7)
BH-67	03/17/11	0 - 0.5	N	ND (5.4)	12 J	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 (4.6)	ND (5.4)	ND (5.4)	4.7
	03/17/11	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 (5.1)	ND (5.3)	ND (5.3)	ND (4.6)
	03/17/11	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 (4.4)
	04/29/11	9 - 10	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.3)	ND (5.2)	ND (5.2)	ND (4.5)
	04/29/11	14 - 15	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.5)	ND (5.1)	ND (5.1)	ND (4.5)
	04/29/11	19 - 20	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.4)	ND (5.1)	ND (5.1)	ND (4.5)
	04/29/11	29 - 30	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (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 (4.5)
	04/29/11	39 - 40	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.7)	ND (5.1)	ND (5.1)	ND (4.5)
	04/29/11	39 - 40	FD	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.9)	ND (5.1)	ND (5.1)	ND (4.5)
	04/29/11	49 - 50	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	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 (4.5)
	04/29/11	59 - 60	N	ND (5.9)	ND (59)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.9)	ND (4.6)	ND (5.9)	ND (5.9)	ND (5.2)
	04/29/11	69 - 70	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.8)	ND (5.2)	ND (5.2)	ND (4.5)
	04/29/11	79 - 80	N	ND (5.5)	ND (55)	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 (5.3)	ND (5.5)	ND (5.5)	ND (4.8)
	04/29/11	89 - 90	N	ND (5.5)	ND (55)	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 (4.5)	ND (5.5)	ND (5.5)	ND (4.8)
	04/29/11	99 - 100	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.4)	ND (5.2)	ND (5.2)	ND (4.5)

TABLE B11-3

Sample Results: Polycyclic Aromatic Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

Location	Date	Depth (ft bgs)	Sample Type	1-Methyl naphthalene	2-Methyl naphthalene	Acenaphthene	Acena phthylene	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	Phen anthrene	Pyrene	B(a)P Equivalent
				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
Commercial Screening Level 1				99,000	4,100,000	33,000,000	17,000,000	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
BH-67	04/29/11	109 - 110	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (6.5)	ND (5.2)	ND (5.2)	ND (4.5)
	04/29/11	119 - 120	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (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 (4.5)
	04/30/11	129 - 130	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.7)	ND (5.2)	ND (5.2)	ND (4.5)
	04/30/11	139 - 140	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (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 (4.6)
	04/30/11	139 - 140	FD	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.3)	ND (5.2)	ND (5.2)	ND (4.5)
	04/30/11	149 - 150	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (4.4)	ND (5.2)	ND (5.2)	ND (4.5)
	04/30/11	159 - 160	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (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 (4.5)
BH-68	03/17/11	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 (4.7)
	03/17/11	0 - 0.5	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 (4.6)	ND (5.4)	ND (5.4)	ND (4.7)
	03/17/11	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 (4.6)
	03/17/11	5 - 6	N	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.8)	ND (5.1)
	05/13/11	9 - 10	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (6.1)	ND (5.3)	ND (5.3)	ND (4.6)
	05/13/11	14 - 15	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.6)	ND (5.1)	ND (5.1)	ND (4.5)
	05/13/11	19 - 20	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	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 (4.6)
	05/13/11	29 - 30	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	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 (4.6)
	05/13/11	39 - 40	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	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 (4.6)
	05/13/11	49 - 50	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (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 (4.5)
	05/13/11	59 - 60	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.1)	ND (5.3)	ND (5.3)	ND (4.6)
	05/13/11	69 - 70	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (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 (4.6)
	05/13/11	79 - 80	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (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 (4.6)
	05/13/11	89 - 90	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.5)	ND (5.3)	ND (5.3)	ND (4.6)
	05/13/11	99 - 100	N	ND (5.5)	ND (55)	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 (5.4)	ND (5.5)	ND (5.5)	ND (4.8)
	05/13/11	99 - 100	FD	ND (5.4)	ND (54)	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 (4.4)	ND (5.4)	ND (5.4)	ND (4.7)
	05/13/11	109 - 110	N	ND (5.2)	ND (52)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.7)	ND (5.2)	ND (5.2)	ND (4.5)
	05/13/11	119 - 120	N	ND (5.4)	ND (54)	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 (5.2)	ND (5.4)	ND (5.4)	ND (4.7)
	05/13/11	129 - 130	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.6)	ND (5.3)	ND (5.3)	ND (4.6)
	05/14/11	139 - 140	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	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 (4.6)
	05/14/11	149 - 150	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (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 (4.6)
	05/14/11	159 - 160	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.4)	ND (5.3)	ND (5.3)	ND (4.6)
PGE-LT-OS5	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-LT-OS6	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-LT-OS7	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-LT-OS8	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-LT-OS9	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)

TABLE B11-3

Sample Results: Polycyclic Aromatic Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
Commercial Screening Level 1				**99,000**	**4,100,000**	**33,000,000**	**17,000,000**	**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**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acenaphthene**	**Acena phthylene**	**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**	**Phen anthrene**	**Pyrene**	**B(a)P Equivalent**
PGE-UTOS1	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-UTOS2	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-UTOS3	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-UTOS4	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

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 B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
			RWQCB Environmental Screening Level [2]:	NE	540	540	NE	1,800	NE	NE
			Background [3]:	NE	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**	**Total Recoverable Hydrocarbons**
Category1										
AOC13-GrabOS1	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	---	---
AOC13-GrabOS2	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	---	---
AOC13-OS2	11/08/11	0 - 0.5	N	---	16	---	---	87	---	---
	11/15/11	2 - 3	N	---	---	ND (2.5)	---	---	---	---
	11/08/11	2 - 3	N	---	23	---	---	160	---	---
	11/15/11	2 - 3	FD	---	---	ND (2.7)	---	---	---	---
	11/08/11	2 - 3	FD	---	31	---	---	180	---	---
	11/15/11	5 - 6	N	---	---	ND (2.9)	---	---	---	---
	11/08/11	5 - 6	N	---	23	---	---	130	---	---
AOC13-OS3	11/08/11	2 - 3	N	---	ND (10)	---	---	ND (10)	---	---
	11/15/11	2 - 3	N	---	---	ND (2.7)	---	---	---	---
AOC13-OS4	11/15/11	2 - 3	N	---	---	ND (2.4)	---	---	---	---
	11/08/11	2 - 3	N	---	11	---	---	40	---	---
	11/08/11	5 - 6	N	---	11	---	---	50	---	---
	11/15/11	5 - 6	N	---	---	ND (3.4)	---	---	---	---
AOC13-PITOS1	07/26/11	0 - 0.5	N	---	16	---	---	35	---	---
	07/26/11	0 - 0.5	FD	---	14	---	---	68	---	---
	07/26/11	2 - 3	N	---	ND (10)	ND (1.8)	---	15	---	---
	07/26/11	9 - 9.5	N	---	56	ND (2)	---	190	---	---
AOC13-PITOS2	07/26/11	0 - 0.5	N	---	20	---	---	57	---	---
	07/26/11	2 - 3	N	---	12	ND (1.9)	---	48	---	---
	07/26/11	4 - 4.5	N	---	12	ND (1.7)	---	23	---	---
AOC13-PITOS3	07/26/11	0 - 0.5	N	---	12	---	---	23	---	---
	07/26/11	2 - 3	N	---	14	ND (1.7)	---	55 J	---	---
	07/26/11	2 - 3	FD	---	14	ND (1.8)	---	96 J	---	---
	07/26/11	6 - 6.5	N	---	15	ND (2.1)	---	59	---	---
AOC13-PITOS6	07/26/11	0 - 0.5	N	---	11	---	---	41	---	---
	07/26/11	2 - 3	N	---	11	ND (1.8)	---	33	---	---
	07/26/11	5 - 6	N	---	ND (10)	ND (2)	---	37	---	---
	07/26/11	7 - 7.5	N	---	44	ND (1.8)	---	160	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
			RWQCB Environmental Screening Level [2]:	NE	540	540	NE	1,800	NE	NE
			Background [3]:	NE	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**	**Total Recoverable Hydrocarbons**
Category1										
AOC13-PITOS7	07/26/11	0 - 0.5	N	---	12	---	---	51	---	---
	07/26/11	2 - 3	N	---	ND (10)	ND (1.7)	---	21	---	---
	07/26/11	2 - 3	FD	---	10	ND (1.7)	---	22	---	---
	07/26/11	5 - 6	N	---	ND (10)	ND (1.8)	---	ND (10)	---	---
	07/26/11	8 - 8.5	N	---	43	ND (1.6)	---	120	---	---
AOC13-PITOS8	07/26/11	0 - 0.5	N	---	11	---	---	31	---	---
	07/26/11	5 - 6	N	---	ND (10)	ND (1.6)	---	17	---	---
	07/26/11	9 - 10	N	---	ND (10)	ND (1.6)	---	ND (10)	---	---
	07/26/11	11 - 11.5	N	---	42	ND (2)	---	93	---	---
AOC13-PITOS9	07/26/11	0 - 0.5	N	---	ND (10)	---	---	32	---	---
	07/26/11	2 - 3	N	---	ND (10)	ND (1.8)	---	33	---	---
	07/26/11	5 - 6	N	---	ND (10)	ND (2)	---	38	---	---
	07/26/11	5 - 6	FD	---	ND (10)	ND (1.9)	---	38	---	---
AOC13-PITOS10	07/26/11	0 - 0.5	N	---	ND (10)	---	---	ND (10)	---	---
	07/26/11	2 - 3	N	---	23	ND (1.8)	---	100	---	---
	07/26/11	5 - 6	N	---	ND (10)	ND (1.6)	---	11	---	---
	07/26/11	7 - 7.5	N	---	ND (10)	ND (1.4)	---	26	---	---
AOC13-PITOS11	07/26/11	0 - 0.5	N	---	150	---	---	110	---	---
	07/26/11	2 - 3	N	---	ND (10)	ND (1.7)	---	ND (10)	---	---
	07/26/11	2 - 3	FD	---	ND (10)	ND (1.8)	---	ND (10)	---	---
	07/26/11	5 - 6	N	---	ND (10)	ND (1.8)	---	ND (10)	---	---
	07/26/11	7.5 - 8	N	---	36	ND (1.9)	---	55	---	---
AOC13-PITOS12	09/27/11	0 - 0.5	N	---	18	---	---	81	---	---
	09/27/11	2 - 3	N	---	ND (10)	ND (2)	---	32	---	---
	09/27/11	5 - 6	N	---	ND (10)	ND (2)	---	23	---	---
	09/27/11	9 - 9.5	N	---	ND (10)	ND (1.9)	---	25	---	---
	09/27/11	11 - 11.5	N	---	160	ND (1.7)	---	710	---	---
AOC13-PITOS13	07/26/11	0 - 0.5	N	---	ND (10)	---	---	54	---	---
	07/26/11	0 - 0.5	FD	---	ND (10)	---	---	30	---	---
	07/26/11	2 - 3	N	---	11	ND (2.4)	---	66	---	---
	07/26/11	5 - 6	N	---	26	ND (1.9)	---	170	---	---
	07/26/11	9 - 9.5	N	---	11	ND (1.7)	---	57	---	---
AOC13-PITOS14	07/26/11	0 - 0.5	N	---	ND (10)	---	---	24	---	---
	07/26/11	2 - 3	N	---	12	ND (1.9)	---	45	---	---
	07/26/11	4 - 4.5	N	---	ND (10)	ND (1.8)	---	34	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
			RWQCB Environmental Screening Level [2]:	NE	540	540	NE	1,800	NE	NE
			Background [3]:	NE	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**	**Total Recoverable Hydrocarbons**
Category1										
BH-65	03/24/11	0 - 0.5	N	---	22	ND (0.89)	---	64	---	---
	03/24/11	2 - 3	N	---	32	ND (0.89)	---	83	---	---
	03/17/11	9 - 10	N	---	ND (10)	ND (1.3)	---	ND (10)	---	---
	03/17/11	14 - 15	N	---	ND (10)	ND (1.1)	---	ND (10)	---	---
	03/17/11	19 - 20	N	---	ND (10)	ND (1.2)	---	ND (10)	---	---
	03/17/11	29 - 30	N	---	ND (10)	ND (0.95)	---	ND (10)	---	---
	03/17/11	37 - 40	N	---	ND (11)	ND (1.3)	---	ND (11)	---	---
	03/17/11	49 - 50	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---
	03/17/11	59 - 60	N	---	ND (10)	ND (1.1)	---	ND (10)	---	---
	03/18/11	69 - 70	N	---	ND (11)	ND (0.92)	---	ND (11)	---	---
	03/18/11	79 - 80	N	---	ND (11)	ND (1.2)	---	ND (11)	---	---
	03/18/11	79 - 80	FD	---	ND (10)	ND (0.99)	---	ND (10)	---	---
	03/18/11	89 - 90	N	---	ND (11)	ND (0.9)	---	ND (11)	---	---
	03/18/11	99 - 100	N	---	ND (10)	ND (0.92)	---	ND (10)	---	---
	03/18/11	109 - 110	N	---	ND (11)	ND (1)	---	ND (11)	---	---
	03/18/11	119 - 120	N	---	ND (10)	ND (0.91)	---	ND (10)	---	---
	03/19/11	129 - 130	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	03/19/11	139 - 140	N	---	ND (11)	ND (0.91)	---	ND (11)	---	---
BH-66	03/23/11	0 - 0.5	N	---	ND (11)	ND (0.95)	---	ND (11)	---	---
	03/23/11	2 - 3	N	---	ND (11)	ND (0.92)	---	28	---	---
	03/23/11	5 - 6	N	---	ND (11)	ND (0.85)	---	ND (11)	---	---
	04/12/11	14 - 15	N	---	30	ND (1)	---	53	---	---
	04/12/11	14 - 15	FD	---	29	ND (1.1)	---	53	---	---
	04/12/11	19 - 20	N	---	40	ND (1.3)	---	92	---	---
	04/12/11	29 - 30	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	04/12/11	39 - 40	N	---	ND (10)	ND (0.85)	---	ND (10)	---	---
	04/12/11	49 - 50	N	---	ND (10)	ND (1.1)	---	ND (10)	---	---
	04/13/11	59 - 60	N	---	ND (11)	ND (0.99)	---	ND (11)	---	---
	04/13/11	69 - 70	N	---	ND (11)	ND (1)	---	ND (11)	---	---
	04/13/11	79 - 80	N	---	ND (10)	ND (0.98)	---	ND (10)	---	---
	04/13/11	89 - 90	N	---	ND (11)	ND (1)	---	ND (11)	---	---
	04/13/11	99 - 100	N	---	ND (11)	ND (0.99)	---	ND (11)	---	---
	04/13/11	109 - 110	N	---	ND (10)	ND (0.98)	---	ND (10)	---	---
	04/14/11	119 - 120	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	04/14/11	119 - 120	FD	---	ND (10)	ND (0.93)	---	ND (10)	---	---
	04/14/11	129 - 130	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
			RWQCB Environmental Screening Level [2]:	NE	540	540	NE	1,800	NE	NE
			Background [3]:	NE	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**	**Total Recoverable Hydrocarbons**
Category1										
BH-67	03/17/11	0 - 0.5	N	---	12	ND (1)	---	22	---	---
	03/17/11	2 - 3	N	---	ND (11)	ND (1)	---	ND (11)	---	---
	03/17/11	5 - 6	N	---	ND (10)	ND (1.2)	---	ND (10)	---	---
	04/29/11	9 - 10	N	---	ND (10)	ND (1.1)	---	ND (10)	---	---
	04/29/11	14 - 15	N	---	ND (10)	ND (1.1)	---	ND (10)	---	---
	04/29/11	19 - 20	N	---	ND (10)	ND (1.4)	---	15	---	---
	04/29/11	29 - 30	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	04/29/11	39 - 40	N	---	ND (10)	ND (1.3)	---	ND (10)	---	---
	04/29/11	39 - 40	FD	---	ND (10)	ND (1.3)	---	ND (10)	---	---
	04/29/11	49 - 50	N	---	ND (10)	ND (1.1)	---	ND (10)	---	---
	04/29/11	59 - 60	N	---	ND (12)	ND (1.1)	---	ND (12)	---	---
	04/29/11	69 - 70	N	---	ND (10)	ND (1.2)	---	ND (10)	---	---
	04/29/11	79 - 80	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---
	04/29/11	89 - 90	N	---	ND (11)	ND (0.99)	---	ND (11)	---	---
	04/29/11	99 - 100	N	---	ND (10)	ND (0.98)	---	ND (10)	---	---
	04/29/11	109 - 110	N	---	ND (10)	ND (1.1)	---	ND (10)	---	---
	04/29/11	119 - 120	N	---	ND (10)	ND (0.92)	---	ND (10)	---	---
	04/30/11	129 - 130	N	---	ND (10)	ND (0.99)	---	ND (10)	---	---
	04/30/11	139 - 140	N	---	ND (11)	ND (0.9)	---	ND (11)	---	---
	04/30/11	139 - 140	FD	---	ND (10)	ND (0.98)	---	ND (10)	---	---
	04/30/11	149 - 150	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	04/30/11	159 - 160	N	---	ND (10)	ND (0.97)	---	ND (10)	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
			RWQCB Environmental Screening Level [2]:	NE	540	540	NE	1,800	NE	NE
			Background [3]:	NE	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**	**Total Recoverable Hydrocarbons**
Category1										
BH-68	03/17/11	0 - 0.5	N	---	ND (11)	ND (1)	---	12	---	---
	03/17/11	0 - 0.5	FD	---	ND (11)	ND (0.96)	---	ND (11)	---	---
	03/17/11	2 - 3	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---
	03/17/11	5 - 6	N	---	ND (12)	ND (1.1)	---	ND (12)	---	---
	05/13/11	9 - 10	N	---	ND (11)	ND (1.2)	---	ND (11)	---	---
	05/13/11	14 - 15	N	---	ND (10)	ND (1.3)	---	ND (10)	---	---
	05/13/11	19 - 20	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---
	05/13/11	29 - 30	N	---	ND (11)	ND (0.94)	---	ND (11)	---	---
	05/13/11	39 - 40	N	---	ND (11)	ND (1.2)	---	ND (11)	---	---
	05/13/11	49 - 50	N	---	ND (10)	ND (0.96)	---	ND (10)	---	---
	05/13/11	59 - 60	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---
	05/13/11	69 - 70	N	---	ND (11)	ND (1.2)	---	ND (11)	---	---
	05/13/11	79 - 80	N	---	ND (11)	ND (0.94)	---	ND (11)	---	---
	05/13/11	89 - 90	N	---	ND (11)	ND (0.9)	---	ND (11)	---	---
	05/13/11	99 - 100	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---
	05/13/11	99 - 100	FD	---	ND (11)	ND (1)	---	ND (11)	---	---
	05/13/11	109 - 110	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	05/13/11	119 - 120	N	---	ND (11)	ND (1)	---	ND (11)	---	---
	05/13/11	129 - 130	N	---	ND (11)	ND (0.91)	---	ND (11)	---	---
	05/14/11	139 - 140	N	---	ND (11)	ND (1)	---	ND (11)	---	---
	05/14/11	149 - 150	N	---	ND (11)	ND (0.97)	---	ND (11)	---	---
	05/14/11	159 - 160	N	---	ND (10)	ND (0.93)	---	ND (10)	---	---
PGE-LT-OS5	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-LT-OS6	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-LT-OS7	03/08/07	0.5	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	03/08/07	3	N	---	ND (10)	ND (1)	---	ND (10)	---	---
PGE-LT-OS8	03/08/07	0.5	N	---	18	ND (1)	---	240	---	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	36	---	---
PGE-LT-OS9	03/08/07	0.5	N	---	ND (10)	ND (1)	---	ND (10)	---	---
	03/08/07	3	N	---	ND (10)	ND (1)	---	ND (10)	---	---
PGE-UTOS1	03/08/07	0.5	N	---	13	ND (1.1)	---	70	---	---
	03/08/07	3	N	---	ND (10)	ND (1)	---	ND (10)	---	---
PGE-UTOS2	03/08/07	0.5	N	---	19	ND (1)	---	53	---	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---
PGE-UTOS3	03/08/07	0.5	N	---	32	ND (1)	---	26	---	---
	03/08/07	3	N	---	ND (11)	ND (1.1)	---	ND (11)	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
RWQCB Environmental Screening Level [2]:				NE	540	540	NE	1,800	NE	NE
Background [3]:				NE	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**	**Total Recoverable Hydrocarbons**
Category1										
PGE-UTOS4	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	LSS	---	---	---	---	---	14	---
	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	LRE	---	---	---	---	---	285	---
	09/08/88	1	LLD	---	---	---	---	---	ND (10)	---
	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	---
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	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
RWQCB Environmental Screening Level [2]:				NE	540	540	NE	1,800	NE	NE
Background [3]:				NE	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**	**Total Recoverable Hydrocarbons**
Category2										
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	---	---	---	---	---	---	13,500
COM-2	07/21/93	1	N	---	---	---	---	---	---	9,130
COM-3	07/21/93	1.7	N	---	---	---	---	---	---	2,610
COM-4	07/21/93	1.3	N	---	---	---	---	---	---	874
COM-5	07/21/93	2.3	N	---	---	---	---	---	---	631
COM-6	07/21/93	1	N	---	---	---	---	---	---	6,290
COM-7	07/21/93	1.5	N	---	---	---	---	---	---	5,930
COM-8	07/21/93	1.5	N	---	---	---	---	---	---	49
COM-9	07/21/93	1.5	N	---	---	---	---	---	---	8,400
COM-10	07/21/93	1	N	---	---	---	---	---	---	20,800
COM-11	07/21/93	2.5	N	---	---	---	---	---	---	7,900
COM-12	07/21/93	1.5	N	---	---	---	---	---	---	54
COM-13	07/21/93	1.5	N	---	---	---	---	---	---	2,950
COM-14	07/21/93	1.5	N	---	---	---	---	---	---	2,800
COM-15	07/21/93	1.5	N	---	---	---	---	---	---	4,120
COM-16	07/21/93	1.5	N	---	---	---	---	---	---	750
COM-17	07/21/93	1.7	N	---	---	---	---	---	---	3,930
COM-18	07/21/93	1.3	N	---	---	---	---	---	---	2,690
COM-20	07/21/93	2	N	---	---	---	---	---	---	111
G1	07/21/93	1	N	---	---	---	---	---	---	83,200
G2	07/21/93	1.7	N	---	---	---	---	---	---	57,600
G3	07/21/93	1	N	---	---	---	---	---	---	10,100
G4	07/21/93	0.83	N	---	---	---	---	---	---	25,300
	07/21/93	2	N	---	---	---	---	---	---	44,600
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	2.5	LLD	---	---	ND (5)	---	---	---	---
	06/14/94	6.5	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 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**	**NE**
			RWQCB Environmental Screening Level [2]:	**NE**	**540**	**540**	**NE**	**1,800**	**NE**	**NE**
			Background [3]:	**NE**	**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**	**Total Recoverable Hydrocarbons**
Category3										
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)	---	---
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)	---	---

TABLE B11-4

Sample Results: Total Petroleum Hydrocarbons

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE
RWQCB Environmental Screening Level [2]:				NE	540	540	NE	1,800	NE	NE
Background [3]:				NE	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**	**Total Recoverable Hydrocarbons**
Category3										
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

LLD = Lab duplicate

LRE = Lab reanalysis

LSS = Lab split sample

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 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	NE	NE	NE
			RWQCB Environmental Screening Level [2]:	NE	NE	NE	NE	NE	NE
			Background [3]:	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chloride**	**Fluoride**	**pH**	**Specific conductance**	**Sulfate**	**Total organic carbon**
Category1									
AOC13-OS1	04/06/11	0 - 0.5	N	---	---	8.7	---	---	---
	04/06/11	2.5 - 3	N	---	---	8.3	---	---	---
	04/06/11	5.5 - 6	N	---	---	8.3	---	---	---
	04/06/11	9 - 9.5	N	---	---	9.6	---	---	---
AOC13-OS2	11/08/11	0 - 0.5	N	---	---	8.5	---	---	---
	11/08/11	2 - 3	N	---	---	7.9	---	---	---
	11/08/11	2 - 3	FD	---	---	7.7	---	---	---
	11/08/11	5 - 6	N	---	---	7.6	---	---	---
AOC13-OS3	11/08/11	0 - 0.5	N	---	---	8.7	---	---	---
	11/08/11	2 - 3	N	---	---	7.8	---	---	---
AOC13-OS4	11/08/11	0 - 0.5	N	---	---	7.9	---	---	---
	11/08/11	2 - 3	N	---	---	8.2	---	---	---
	11/08/11	5 - 6	N	---	---	8.4	---	---	---
BH-65	03/24/11	0 - 0.5	N	---	---	8.3	---	---	3,700
	03/24/11	2 - 3	N	---	---	8.5	---	---	4,800
	03/17/11	9 - 10	N	---	---	9.4	---	---	1,700
	03/17/11	14 - 15	N	---	---	9.3	---	---	2,400 J
	03/17/11	19 - 20	N	---	---	9.3	---	---	1,200
	03/17/11	29 - 30	N	---	---	9.6	---	---	910
	03/17/11	37 - 40	N	---	---	9.8	---	---	12,000
	03/17/11	49 - 50	N	---	---	9	---	---	4,200 J
	03/17/11	59 - 60	N	---	---	9.1	---	---	3,800
	03/18/11	69 - 70	N	---	---	8.7	---	---	2,900
	03/18/11	79 - 80	N	---	---	8.7	---	---	5,400 J
	03/18/11	79 - 80	FD	---	---	8.8	---	---	8,000 J
	03/18/11	89 - 90	N	---	---	8.4	---	---	3,500
	03/18/11	99 - 100	N	---	---	8.6	---	---	7,600
	03/18/11	109 - 110	N	---	---	8.2	---	---	5,800 J
	03/18/11	119 - 120	N	---	---	8.5	---	---	5,300
	03/19/11	129 - 130	N	---	---	7.7	---	---	6,300
	03/19/11	139 - 140	N	---	---	8.2	---	---	3,800
BH-66	03/23/11	0 - 0.5	N	---	---	8.2	---	---	2,200
	03/23/11	2 - 3	N	---	---	8.5	---	---	2,400
	03/23/11	5 - 6	N	---	---	9.5	---	---	3,400
	04/12/11	14 - 15	N	---	---	9.8	---	---	2,200 J
	04/12/11	14 - 15	FD	---	---	9.2	---	---	2,800 J
	04/12/11	19 - 20	N	---	---	9.3	---	---	2,200
	04/12/11	29 - 30	N	---	---	9.8	---	---	2,600

TABLE B11-5
Sample Results: General Chemistry Parameters
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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	NE	NE	NE
			RWQCB Environmental Screening Level [2] :	NE	NE	NE	NE	NE	NE
			Background [3] :	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chloride**	**Fluoride**	**pH**	**Specific conductance**	**Sulfate**	**Total organic carbon**
Category1									
BH-66	04/12/11	39 - 40	N	---	---	9.3	---	---	3,900
	04/12/11	49 - 50	N	---	---	9.3	---	---	3,100
	04/13/11	59 - 60	N	---	---	9.6	---	---	2,400
	04/13/11	69 - 70	N	---	---	9.2	---	---	1,800
	04/13/11	79 - 80	N	---	---	9.3	---	---	4,900
	04/13/11	89 - 90	N	---	---	9	---	---	1,700
	04/13/11	99 - 100	N	---	---	8.8	---	---	3,500
	04/13/11	109 - 110	N	---	---	9	---	---	4,500
	04/14/11	119 - 120	N	---	---	9	---	---	2,500 J
	04/14/11	119 - 120	FD	---	---	9.2	---	---	3,200 J
	04/14/11	129 - 130	N	---	---	8.9	---	---	2,900
BH-67	03/17/11	0 - 0.5	N	---	---	8.6	---	---	4,400
	03/17/11	2 - 3	N	---	---	8.4	---	---	3,500
	03/17/11	5 - 6	N	---	---	9.4	---	---	3,500 J
	04/29/11	9 - 10	N	---	---	9.6	---	---	2,000 J
	04/29/11	14 - 15	N	---	---	9.1	---	---	3,000
	04/29/11	19 - 20	N	---	---	9.1	---	---	2,300
	04/29/11	29 - 30	N	---	---	9.2	---	---	1,600 J
	04/29/11	39 - 40	N	---	---	9.4	---	---	1,700
	04/29/11	39 - 40	FD	---	---	9.4	---	---	1,700
	04/29/11	49 - 50	N	---	---	9.2	---	---	1,800
	04/29/11	59 - 60	N	---	---	8	---	---	6,900
	04/29/11	69 - 70	N	---	---	8.4	---	---	1,900
	04/29/11	79 - 80	N	---	---	8.2	---	---	7,400
	04/29/11	89 - 90	N	---	---	8.5	---	---	2,500
	04/29/11	99 - 100	N	---	---	8.8	---	---	3,200
	04/29/11	109 - 110	N	---	---	8.2	---	---	42
	04/29/11	119 - 120	N	---	---	8.6	---	---	84
	04/30/11	129 - 130	N	---	---	8.5	---	---	6,600
	04/30/11	139 - 140	N	---	---	8.8	---	---	7,900 J
	04/30/11	139 - 140	FD	---	---	8.4	---	---	3,300 J
	04/30/11	149 - 150	N	---	---	8.3	---	---	8,700
	04/30/11	159 - 160	N	---	---	8.3	---	---	8,000
BH-68	03/17/11	0 - 0.5	N	---	---	7.9	---	---	8,500 J
	03/17/11	0 - 0.5	FD	---	---	8	---	---	4,100 J
	03/17/11	2 - 3	N	---	---	9.6	---	---	1,700
	03/17/11	5 - 6	N	---	---	9.4	---	---	3,400
	05/13/11	9 - 10	N	---	---	8.4	---	---	1,000
	05/13/11	14 - 15	N	---	---	9.3	---	---	2,600

TABLE B11-5

Sample Results: General Chemistry Parameters

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE	NE	NE
			RWQCB Environmental Screening Level [2] :	NE	NE	NE	NE	NE	NE
			Background [3]:	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chloride**	**Fluoride**	**pH**	**Specific conductance**	**Sulfate**	**Total organic carbon**
Category1									
BH-68	05/13/11	19 - 20	N	---	---	9.3	---	---	3,400
	05/13/11	29 - 30	N	---	---	9.2	---	---	3,700
	05/13/11	39 - 40	N	---	---	9.3	---	---	5,800
	05/13/11	49 - 50	N	---	---	9.2	---	---	3,200
	05/13/11	59 - 60	N	---	---	9.2	---	---	8,600
	05/13/11	69 - 70	N	---	---	9.1	---	---	8,900
	05/13/11	79 - 80	N	---	---	9.1	---	---	4,700
	05/13/11	89 - 90	N	---	---	9.1	---	---	5,600
	05/13/11	99 - 100	N	---	---	9.1	---	---	4,400 J
	05/13/11	99 - 100	FD	---	---	9.1	---	---	5,600 J
	05/13/11	109 - 110	N	---	---	9.1	---	---	7,800
	05/13/11	119 - 120	N	---	---	9	---	---	5,300
	05/13/11	129 - 130	N	---	---	9	---	---	6,200
	05/14/11	139 - 140	N	---	---	8.6	---	---	6,400
	05/14/11	149 - 150	N	---	---	8.6	---	---	4,900
	05/14/11	159 - 160	N	---	---	8.4	---	---	3,100
PS-10	04/13/99	0	N	---	---	---	---	25	---
PS-18	04/13/99	0	N	---	---	---	---	224	---
Category2									
BGCS-1	09/08/88	0.5	N	---	569	9.58 698		---	---
	09/08/88	1	N	---	1,695	9.53	566	---	---
	09/08/88	1.5	N	---	801	9.73 317		---	---
BGCS-2	09/08/88	0.5	LR	---	---	8.64	---	---	---
	09/08/88	0.5	N	---	600	8.55 213		---	---
	09/08/88	1	N	---	595	8.8	108	---	---
	09/08/88	1	LSS	---	ND (10)	7.5	360	---	---
	09/08/88	1.5	N	---	719	8.7	111	---	---
BGCS-3	09/08/88	0.5	N	---	495	9.11 111		---	---
	09/08/88	1	LRE	---	581	8.96 100		---	---
	09/08/88	1	N	---	471	8.29 224		---	---
	09/08/88	1	LSS	---	870	7.5	---	---	---
	09/08/88	1	LLD	---	ND (10)	---	435	---	---
	09/08/88	1.5	N	---	726	8.41 232		---	---
BGCS-4	09/08/88	0.5	N	---	510	8.48 329		---	---
	09/08/88	1	N	---	550	8.52 291		---	---
	09/08/88	1.5	N	---	510	8.54 345		---	---
BGCS-5	09/08/88	0.5	N	---	524	8.76 273		---	---
	09/08/88	1	N	---	657	8.79 221		---	---

TABLE B11-5

Sample Results: General Chemistry Parameters

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B 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	NE	NE	NE
			RWQCB Environmental Screening Level [2]:	NE	NE	NE	NE	NE	NE
			Background [3]:	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chloride**	**Fluoride**	**pH**	**Specific conductance**	**Sulfate**	**Total organic carbon**
Category2									
BGCS-5	09/08/88	1.5	N	---	562	8.94 203		---	---
BGCS-6	09/08/88	0.5	N	---	595	8.78	66	---	---
	09/08/88	1	N	---	550	8.87	56	---	---
	09/08/88	1.5	N	---	595	8.78	56	---	---
Spill04162006_Sample1	04/26/06	0	N	530	---	8.25	320	230	---
Spill04162006_Sample2	04/26/06	0	N	380	---	8.41	610	1,700	---
Spill04292006_SS1	05/02/06	0	N	1,900	---	8.06	900	750	---

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

LLD = Lab duplicate

LR = Lab replicate

LRE = Lab reanalysis

LSS = Lab split sample

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 and Semivolatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile and Semivolatile Organic Compounds (µg/kg)								
Commercial Screening Level 1 :				630,000,000	120,000	1,500	11,000,000	53,000	92,000,000	17,000,000	45,000,000	2,700,000
RWQCB Environmental Screening Level 2 :				NE	NE	NE	NE	NE	NE	NE	NE	NE
Background 3 :				NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Acetone**	**Bis (2-ethyl hexyl) phthalate**	**Chloroform**	**Isopropyl benzene**	**Methylene chloride**	**Methyl acetate**	**m+p-Xylenes**	**Toluene**	**Xylenes, total**
Category1												
AOC13-GrabOS1	05/13/08	1	N	---	ND (340)	---	---	---	---	---	---	---
	05/13/08	3	N	ND (55)	ND (340)	5.8	ND (5.5)	ND (5.5)	---	ND (5.5)	ND (5.5)	ND (5.5)
	05/14/08	5.5	N	ND (55)	ND (340)	ND (5.5)	ND (5.5)	5.7	---	ND (5.5)	ND (5.5)	ND (5.5)
	05/14/08	5.5	FD	ND (54)	ND (340)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
AOC13-GrabOS2	05/13/08	1	N	---	ND (340)	---	---	---	---	---	---	---
	05/13/08	3	N	ND (56)	ND (340)	ND (5.6)	ND (5.6)	ND (5.6)	---	ND (5.6)	ND (5.6)	ND (5.6)
	05/13/08	4 - 4.5	N	ND (48)	ND (340)	ND (4.8)	ND (4.8)	5.6	---	ND (4.8)	ND (4.8)	ND (4.8)
AOC13-OS2	11/08/11	0 - 0.5	N	---	ND (340)	---	---	---	---	---	---	---
	11/15/11	2 - 3	N	ND (100)	---	ND (10)	ND (10)	ND (10)	460 J	ND (10)	ND (10)	ND (10)
	11/08/11	2 - 3	N	---	ND (340)	---	---	---	---	---	---	---
	11/08/11	2 - 3	FD	---	ND (340)	---	---	---	---	---	---	---
	11/15/11	2 - 3	FD	ND (220)	---	ND (22)	ND (22)	ND (22)	1,800 J	ND (22)	ND (22)	ND (22)
	11/15/11	5 - 6	N	ND (130)	---	ND (13)	ND (13)	ND (13)	---	ND (13)	ND (13)	ND (13)
	11/08/11	5 - 6	N	---	ND (350)	---	---	---	---	---	---	---
AOC13-OS3	11/15/11	2 - 3	N	ND (140)	---	ND (14)	ND (14)	ND (14)	---	ND (14)	ND (14)	ND (14)
	11/08/11	2 - 3	N	---	ND (340)	---	---	---	---	---	---	---
AOC13-OS4	11/08/11	2 - 3	N	---	ND (340)	---	---	---	---	---	---	---
	11/15/11	2 - 3	N	ND (120)	---	ND (12)	ND (12)	ND (12)	---	ND (12)	ND (12)	ND (12)
	11/08/11	5 - 6	N	---	ND (350)	---	---	---	---	---	---	---
	11/15/11	5 - 6	N	ND (150)	---	ND (15)	ND (15)	ND (15)	---	ND (15)	ND (15)	ND (15)
AOC13-PITOS1	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	0 - 0.5	FD	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (87J)	ND (330)	ND (8.7)	ND (8.7)	ND (8.7)	ND (9)	ND (8.7)	ND (8.7)	ND (8.7)
	07/26/11	9 - 9.5	N	ND (100)	ND (340)	ND (10)	ND (10)	ND (10)	ND (9.6)	ND (10)	ND (10)	ND (10)

TABLE B11-6

Sample Results: Volatile and Semivolatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile and Semivolatile Organic Compounds (µg/kg)								
			Commercial Screening Level [1]:	630,000,000	120,000	1,500	11,000,000	53,000	92,000,000	17,000,000	45,000,000	2,700,000
			RWQCB Environmental Screening Level [2]:	NE	NE	NE	NE	NE	NE	NE	NE	NE
			Background [3]:	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Acetone**	**Bis (2-ethyl hexyl) phthalate**	**Chloroform**	**Isopropyl benzene**	**Methylene chloride**	**Methyl acetate**	**m+p-Xylenes**	**Toluene**	**Xylenes, total**
AOC13-PITOS2	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (99)	ND (330)	ND (9.9)	ND (9.9)	ND (9.9)	ND (10)	ND (9.9)	ND (9.9)	ND (9.9)
	07/26/11	4 - 4.5	N	ND (91)	ND (330)	ND (9.1)	ND (9.1)	ND (9.1)	ND (9.5)	ND (9.1)	ND (9.1)	ND (9.1)
AOC13-PITOS3	07/26/11	0 - 0.5	N	---	360	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (93)	ND (330)	ND (9.3)	ND (9.3)	ND (9.3)	ND (8.9)	ND (9.3)	ND (9.3)	ND (9.3)
	07/26/11	2 - 3	FD	ND (91)	ND (330)	ND (9.1)	ND (9.1)	ND (9.1)	ND (9.3)	ND (9.1)	ND (9.1)	ND (9.1)
	07/26/11	6 - 6.5	N	ND (110)	ND (340)	ND (11)	ND (11)	ND (11)	ND (12)	ND (11)	ND (11)	ND (11)
AOC13-PITOS6	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (78)	ND (330)	ND (7.8)	ND (7.8)	ND (7.8)	ND (8.6)	ND (7.8)	ND (7.8)	ND (7.8)
	07/26/11	5 - 6	N	ND (95)	ND (340)	ND (9.5)	ND (9.5)	ND (9.5)	---	ND (9.5)	ND (9.5)	ND (9.5)
	07/26/11	7 - 7.5	N	ND (85)	ND (340)	ND (8.5)	ND (8.5)	ND (8.5)	---	ND (8.5)	ND (8.5)	ND (8.5)
AOC13-PITOS7	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (84)	ND (330)	ND (8.4)	ND (8.4)	ND (8.4)	ND (8.3)	ND (8.4)	ND (8.4)	ND (8.4)
	07/26/11	2 - 3	FD	ND (87)	ND (330)	ND (8.7)	ND (8.7)	ND (8.7)	ND (8.6)	ND (8.7)	ND (8.7)	ND (8.7)
	07/26/11	5 - 6	N	ND (80)	ND (330)	ND (8)	ND (8)	ND (8)	ND (8.3)	ND (8)	ND (8)	ND (8)
	07/26/11	8 - 8.5	N	ND (78)	ND (330)	ND (7.8)	ND (7.8)	ND (7.8)	ND (7.6)	ND (7.8)	ND (7.8)	ND (7.8)
AOC13-PITOS8	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	5 - 6	N	ND (100)	ND (340)	ND (10)	ND (10)	ND (10)	---	ND (10)	ND (10)	ND (10)
	07/26/11	9 - 10	N	ND (87)	ND (330)	ND (8.7)	ND (8.7)	ND (8.7)	---	ND (8.7)	ND (8.7)	ND (8.7)
	07/26/11	11 - 11.5	N	ND (80)	ND (330)	ND (8)	ND (8)	ND (8)	---	ND (8)	ND (8)	ND (8)
AOC13-PITOS9	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (93)	ND (330)	ND (9.3)	ND (9.3)	ND (9.3)	ND (8.6)	ND (9.3)	ND (9.3)	ND (9.3)
	07/26/11	5 - 6	N	ND (100)	ND (330)	ND (10)	ND (10)	ND (10)	ND (9.7)	ND (10)	ND (10)	ND (10)
	07/26/11	5 - 6	FD	ND (90)	ND (330)	ND (9)	ND (9)	ND (9)	ND (9.6)	ND (9)	ND (9)	ND (9)
AOC13-PITOS10	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (96)	ND (330)	ND (9.6)	ND (9.6)	ND (9.6)	ND (9.2)	ND (9.6)	ND (9.6)	ND (9.6)

TABLE B11-6

Sample Results: Volatile and Semivolatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile and Semivolatile Organic Compounds (µg/kg)								
Commercial Screening Level [1]:				**630,000,000**	**120,000**	**1,500**	**11,000,000**	**53,000**	**92,000,000**	**17,000,000**	**45,000,000**	**2,700,000**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Acetone**	**Bis (2-ethyl hexyl) phthalate**	**Chloroform**	**Isopropyl benzene**	**Methylene chloride**	**Methyl acetate**	**m+p-Xylenes**	**Toluene**	**Xylenes, total**
AOC13-PITOS10	07/26/11	5 - 6	N	ND (83)	ND (330)	ND (8.3)	ND (8.3)	ND (8.3)	25	ND (8.3)	ND (8.3)	ND (8.3)
	07/26/11	7 - 7.5	N	ND (73J)	ND (330)	ND (7.3)	ND (7.3)	ND (7.3)	ND (7.8)	ND (7.3)	ND (7.3)	ND (7.3)
AOC13-PITOS11	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	140 J	ND (330)	ND (9.2)	ND (9.2)	ND (9.2)	ND (10)	ND (9.2)	ND (9.2)	ND (9.2)
	07/26/11	2 - 3	FD	140	ND (330)	ND (9.4)	ND (9.4)	ND (9.4)	ND (9.4)	ND (9.4)	ND (9.4)	ND (9.4)
	07/26/11	5 - 6	N	ND (90)	ND (330)	ND (9)	ND (9)	ND (9)	ND (8.5)	ND (9)	ND (9)	ND (9)
	07/26/11	7.5 - 8	N	ND (88)	ND (340)	ND (8.8)	ND (8.8)	ND (8.8)	ND (9)	ND (8.8)	ND (8.8)	ND (8.8)
AOC13-PITOS12	09/27/11	0 - 0.5	N	---	ND (340J)	---	---	---	---	---	---	---
	09/27/11	2 - 3	N	ND (110)	ND (340)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
	09/27/11	5 - 6	N	ND (110)	ND (340)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
	09/27/11	9 - 9.5	N	ND (86)	ND (330)	ND (8.6)	ND (8.6)	ND (8.6)	ND (8.6)	ND (8.6)	ND (8.6)	ND (8.6)
	09/27/11	11 - 11.5	N	ND (95)	1,200	ND (9.5)	ND (9.5)	ND (9.5)	18	19	ND (9.5)	27
AOC13-PITOS13	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	0 - 0.5	FD	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (120)	ND (330)	ND (12)	ND (12)	ND (12)	ND (11)	ND (12)	ND (12)	ND (12)
	07/26/11	5 - 6	N	ND (94)	ND (330)	ND (9.4)	ND (9.4)	ND (9.4)	ND (8.4)	ND (9.4)	ND (9.4)	ND (9.4)
	07/26/11	9 - 9.5	N	ND (85)	ND (330)	ND (8.5)	ND (8.5)	ND (8.5)	ND (8.2)	ND (8.5)	ND (8.5)	ND (8.5)
AOC13-PITOS14	07/26/11	0 - 0.5	N	---	ND (330)	---	---	---	---	---	---	---
	07/26/11	2 - 3	N	ND (91)	ND (330)	ND (9.1)	ND (9.1)	ND (9.1)	ND (9.4)	ND (9.1)	ND (9.1)	ND (9.1)
	07/26/11	4 - 4.5	N	ND (80)	ND (330)	ND (8)	ND (8)	ND (8)	ND (8.4)	ND (8)	ND (8)	ND (8)
BH-65	03/24/11	0 - 0.5	N	ND (45)	ND (340)	ND (4.5)	ND (4.5)	ND (4.5)	---	ND (4.5)	ND (4.5)	ND (4.5)
	03/24/11	2 - 3	N	ND (45)	ND (350)	ND (4.5)	ND (4.5)	ND (4.5)	---	ND (4.5)	ND (4.5)	ND (4.5)
	03/17/11	9 - 10	N	ND (69)	ND (340)	ND (6.9)	ND (6.9)	ND (6.9)	---	ND (6.9)	ND (6.9)	ND (6.9)
	03/17/11	14 - 15	N	ND (59)	ND (340)	ND (5.9)	ND (5.9)	ND (5.9)	ND (6.3)	ND (5.9)	ND (5.9)	ND (5.9)
	03/17/11	19 - 20	N	ND (48)	ND (340)	ND (4.8)	ND (4.8)	ND (4.8)	ND (4.8)	ND (4.8)	ND (4.8)	ND (4.8)
	03/17/11	29 - 30	N	ND (48)	ND (330)	ND (4.8)	ND (4.8)	ND (4.8)	---	ND (4.8)	ND (4.8)	ND (4.8)

TABLE B11-6
Sample Results: Volatile and Semivolatile Organic Compounds
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile and Semivolatile Organic Compounds (µg/kg)								
			Commercial Screening Level 1 :	630,000,000	120,000	1,500	11,000,000	53,000	92,000,000	17,000,000	45,000,000	2,700,000
			RWQCB Environmental Screening Level 2 :	NE	NE	NE	NE	NE	NE	NE	NE	NE
			Background 3 :	NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	Date	Depth (ft bgs)	Sample Type	Acetone	Bis (2-ethyl hexyl) phthalate	Chloroform	Isopropyl benzene	Methylene chloride	Methyl acetate	m+p-Xylenes	Toluene	Xylenes, total
BH-65	03/17/11	37 - 40	N	ND (43)	ND (350)	ND (4.3)	ND (4.3)	ND (4.3)	---	ND (4.3)	ND (4.3)	ND (4.3)
	03/17/11	49 - 50	N	ND (60)	ND (350)	ND (6)	ND (6)	ND (6)	---	ND (6)	ND (6)	ND (6)
	03/17/11	59 - 60	N	ND (62)	ND (340)	ND (6.2)	ND (6.2)	ND (6.2)	---	ND (6.2)	ND (6.2)	ND (6.2)
	03/18/11	69 - 70	N	ND (56)	ND (350)	ND (5.6)	ND (5.6)	ND (5.6)	---	ND (5.6)	ND (5.6)	ND (5.6)
	03/18/11	79 - 80	N	ND (53)	ND (350)	ND (5.3)	ND (5.3)	ND (5.3)	---	ND (5.3)	ND (5.3)	ND (5.3)
	03/18/11	79 - 80	FD	ND (46)	ND (350)	ND (4.6)	ND (4.6)	ND (4.6)	---	ND (4.6)	ND (4.6)	ND (4.6)
	03/18/11	89 - 90	N	ND (54)	ND (350)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
	03/18/11	99 - 100	N	ND (44)	ND (350)	ND (4.4)	ND (4.4)	ND (4.4)	---	ND (4.4)	ND (4.4)	ND (4.4)
	03/18/11	109 - 110	N	ND (50)	ND (360)	ND (5)	ND (5)	ND (5)	---	ND (5)	ND (5)	ND (5)
	03/18/11	119 - 120	N	ND (54)	ND (340)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
	03/19/11	129 - 130	N	ND (50)	ND (340)	ND (5)	ND (5)	ND (5)	---	ND (5)	ND (5)	ND (5)
	03/19/11	139 - 140	N	ND (46)	ND (360)	ND (4.6)	ND (4.6)	ND (4.6)	---	ND (4.6)	ND (4.6)	ND (4.6)
BH-66	03/23/11	0 - 0.5	N	ND (48)	ND (350)	ND (4.8)	ND (4.8)	ND (4.8)	---	ND (4.8)	ND (4.8)	ND (4.8)
	03/23/11	2 - 3	N	ND (48)	ND (350)	ND (4.8)	ND (4.8)	ND (4.8)	---	ND (4.8)	ND (4.8)	ND (4.8)
	03/23/11	5 - 6	N	ND (45)	ND (370)	ND (4.5)	ND (4.5)	ND (4.5)	---	ND (4.5)	ND (4.5)	ND (4.5)
	04/12/11	14 - 15	N	ND (52)	ND (340)	ND (5.2)	ND (5.2)	ND (5.2)	---	ND (5.2)	ND (5.2)	ND (5.2)
	04/12/11	14 - 15	FD	ND (57)	ND (340)	ND (5.7)	ND (5.7)	ND (5.7)	---	ND (5.7)	ND (5.7)	ND (5.7)
	04/12/11	19 - 20	N	ND (56)	ND (340)	ND (5.6)	ND (5.6)	ND (5.6)	---	ND (5.6)	ND (5.6)	ND (5.6)
	04/12/11	29 - 30	N	ND (51)	ND (340)	ND (5.1)	ND (5.1)	ND (5.1)	---	ND (5.1)	ND (5.1)	ND (5.1)
	04/12/11	39 - 40	N	ND (47)	ND (340)	ND (4.7)	ND (4.7)	ND (4.7)	---	ND (4.7)	ND (4.7)	ND (4.7)
	04/12/11	49 - 50	N	ND (45)	ND (340)	ND (4.5)	ND (4.5)	ND (4.5)	---	ND (4.5)	ND (4.5)	ND (4.5)
	04/13/11	59 - 60	N	ND (43)	ND (350)	ND (4.3)	ND (4.3)	ND (4.3)	---	ND (4.3)	ND (4.3)	ND (4.3)
	04/13/11	69 - 70	N	ND (44)	ND (350)	ND (4.4)	ND (4.4)	ND (4.4)	---	ND (4.4)	ND (4.4)	ND (4.4)
	04/13/11	79 - 80	N	ND (60)	ND (350)	ND (6)	ND (6)	ND (6)	---	ND (6)	ND (6)	ND (6)
	04/13/11	89 - 90	N	ND (54)	ND (350)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
	04/13/11	99 - 100	N	ND (60)	ND (350)	ND (6)	ND (6)	ND (6)	---	ND (6)	ND (6)	ND (6)

TABLE B11-6

Sample Results: Volatile and Semivolatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile and Semivolatile Organic Compounds (µg/kg)								
Commercial Screening Level [1]:				630,000,000	120,000	1,500	11,000,000	53,000	92,000,000	17,000,000	45,000,000	2,700,000
RWQCB Environmental Screening Level [2]:				NE	NE	NE	NE	NE	NE	NE	NE	NE
Background [3]:				NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	Date	Depth (ft bgs)	Sample Type	Acetone	Bis (2-ethyl hexyl) phthalate	Chloroform	Isopropyl benzene	Methylene chloride	Methyl acetate	m+p-Xylenes	Toluene	Xylenes, total
BH-66	04/13/11	109 - 110	N	ND (52)	ND (350)	ND (5.2)	ND (5.2)	ND (5.2)	---	ND (5.2)	ND (5.2)	ND (5.2)
	04/14/11	119 - 120	N	ND (49)	ND (340)	ND (4.9)	ND (4.9)	ND (4.9)	---	ND (4.9)	ND (4.9)	ND (4.9)
	04/14/11	119 - 120	FD	ND (53)	ND (350)	ND (5.3)	ND (5.3)	ND (5.3)	---	ND (5.3)	ND (5.3)	ND (5.3)
	04/14/11	129 - 130	N	ND (46)	ND (350)	ND (4.6)	ND (4.6)	ND (4.6)	---	ND (4.6)	ND (4.6)	ND (4.6)
BH-67	03/17/11	0 - 0.5	N	ND (46)	ND (360)	ND (4.6)	ND (4.6)	ND (4.6)	---	ND (4.6)	ND (4.6)	ND (4.6)
	03/17/11	2 - 3	N	ND (51)	ND (350)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.9)	ND (5.1)	ND (5.1)	ND (5.1)
	03/17/11	5 - 6	N	ND (56)	ND (330)	ND (5.6)	ND (5.6)	ND (5.6)	ND (5.5)	ND (5.6)	ND (5.6)	ND (5.6)
	04/29/11	9 - 10	N	ND (53)	ND (340)	ND (5.3)	ND (5.3)	ND (5.3)	---	ND (5.3)	ND (5.3)	ND (5.3)
	04/29/11	14 - 15	N	ND (55)	ND (340)	ND (5.5)	ND (5.5)	ND (5.5)	---	ND (5.5)	ND (5.5)	ND (5.5)
	04/29/11	19 - 20	N	ND (54)	ND (340)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
	04/29/11	29 - 30	N	ND (49)	ND (340)	ND (4.9)	ND (4.9)	ND (4.9)	---	ND (4.9)	ND (4.9)	ND (4.9)
	04/29/11	39 - 40	N	ND (57)	ND (330)	ND (5.7)	ND (5.7)	ND (5.7)	---	ND (5.7)	ND (5.7)	ND (5.7)
	04/29/11	39 - 40	FD	ND (59)	ND (330)	ND (5.9)	ND (5.9)	ND (5.9)	---	ND (5.9)	ND (5.9)	ND (5.9)
	04/29/11	49 - 50	N	ND (50)	ND (350)	ND (5)	ND (5)	ND (5)	---	ND (5)	ND (5)	ND (5)
	04/29/11	59 - 60	N	ND (46)	ND (390)	ND (4.6)	6.3	ND (4.6)	---	ND (4.6)	ND (4.6)	ND (4.6)
	04/29/11	69 - 70	N	ND (58)	ND (340)	ND (5.8)	ND (5.8)	ND (5.8)	---	ND (5.8)	ND (5.8)	ND (5.8)
	04/29/11	79 - 80	N	ND (53)	ND (360)	ND (5.3)	ND (5.3)	ND (5.3)	---	ND (5.3)	ND (5.3)	ND (5.3)
	04/29/11	89 - 90	N	ND (45)	ND (360)	ND (4.5)	ND (4.5)	ND (4.5)	---	ND (4.5)	ND (4.5)	ND (4.5)
	04/29/11	99 - 100	N	ND (44)	ND (340)	ND (4.4)	ND (4.4)	ND (4.4)	---	ND (4.4)	ND (4.4)	ND (4.4)
	04/29/11	109 - 110	N	ND (65)	ND (340)	ND (6.5)	ND (6.5)	ND (6.5)	---	ND (6.5)	ND (6.5)	ND (6.5)
	04/29/11	119 - 120	N	ND (47)	ND (340)	ND (4.7)	ND (4.7)	ND (4.7)	---	ND (4.7)	ND (4.7)	ND (4.7)
	04/30/11	129 - 130	N	ND (57)	ND (340)	ND (5.7)	ND (5.7)	ND (5.7)	---	ND (5.7)	ND (5.7)	ND (5.7)
	04/30/11	139 - 140	N	ND (46)	ND (350)	ND (4.6)	ND (4.6)	ND (4.6)	---	ND (4.6)	ND (4.6)	ND (4.6)
	04/30/11	139 - 140	FD	ND (53)	ND (350)	ND (5.3)	ND (5.3)	ND (5.3)	---	ND (5.3)	ND (5.3)	ND (5.3)
	04/30/11	149 - 150	N	ND (44)	ND (340)	ND (4.4)	ND (4.4)	ND (4.4)	---	ND (4.4)	ND (4.4)	ND (4.4)
	04/30/11	159 - 160	N	ND (48)	ND (340)	ND (4.8)	ND (4.8)	ND (4.8)	---	ND (4.8)	ND (4.8)	ND (4.8)

TABLE B11-6

Sample Results: Volatile and Semivolatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile and Semivolatile Organic Compounds (µg/kg)								
Commercial Screening Level [1]:				630,000,000	120,000	1,500	11,000,000	53,000	92,000,000	17,000,000	45,000,000	2,700,000
RWQCB Environmental Screening Level [2]:				NE	NE	NE	NE	NE	NE	NE	NE	NE
Background [3]:				NE	NE	NE	NE	NE	NE	NE	NE	NE
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Acetone**	**Bis (2-ethyl hexyl) phthalate**	**Chloroform**	**Isopropyl benzene**	**Methylene chloride**	**Methyl acetate**	**m+p-Xylenes**	**Toluene**	**Xylenes, total**
BH-68	03/17/11	0 - 0.5	N	ND (54)	ND (360)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
	03/17/11	0 - 0.5	FD	ND (46)	ND (360)	ND (4.6)	ND (4.6)	ND (4.6)	---	ND (4.6)	ND (4.6)	ND (4.6)
	03/17/11	2 - 3	N	ND (57)	ND (350)	ND (5.7)	ND (5.7)	ND (5.7)	ND (5.8)	ND (5.7)	ND (5.7)	ND (5.7)
	03/17/11	5 - 6	N	ND (59)	ND (380)	ND (5.9)	ND (5.9)	ND (5.9)	ND (5.8)	ND (5.9)	ND (5.9)	ND (5.9)
	05/13/11	9 - 10	N	ND (61)	ND (350)	ND (6.1)	ND (6.1)	ND (6.1)	---	ND (6.1)	ND (6.1)	ND (6.1)
	05/13/11	14 - 15	N	ND (56)	ND (340)	ND (5.6)	ND (5.6)	ND (5.6)	---	ND (5.6)	ND (5.6)	ND (5.6)
	05/13/11	19 - 20	N	ND (50)	ND (350)	ND (5)	ND (5)	ND (5)	---	ND (5)	ND (5)	ND (5)
	05/13/11	29 - 30	N	ND (52)	ND (350)	ND (5.2)	ND (5.2)	ND (5.2)	---	ND (5.2)	ND (5.2)	ND (5.2)
	05/13/11	39 - 40	N	ND (52)	ND (350)	ND (5.2)	ND (5.2)	ND (5.2)	---	ND (5.2)	ND (5.2)	ND (5.2)
	05/13/11	49 - 50	N	ND (48)	ND (340)	ND (4.8)	ND (4.8)	ND (4.8)	---	ND (4.8)	ND (4.8)	ND (4.8)
	05/13/11	59 - 60	N	ND (51)	ND (350)	ND (5.1)	ND (5.1)	ND (5.1)	---	ND (5.1)	ND (5.1)	ND (5.1)
	05/13/11	69 - 70	N	ND (48)	ND (350)	ND (4.8)	ND (4.8)	ND (4.8)	---	ND (4.8)	ND (4.8)	ND (4.8)
	05/13/11	79 - 80	N	ND (48)	ND (350)	ND (4.8)	ND (4.8)	ND (4.8)	---	ND (4.8)	ND (4.8)	ND (4.8)
	05/13/11	89 - 90	N	ND (55)	ND (350)	ND (5.5)	ND (5.5)	ND (5.5)	---	ND (5.5)	ND (5.5)	ND (5.5)
	05/13/11	99 - 100	N	ND (54)	ND (360)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
	05/13/11	99 - 100	FD	ND (44)	ND (350)	ND (4.4)	ND (4.4)	ND (4.4)	---	ND (4.4)	ND (4.4)	ND (4.4)
	05/13/11	109 - 110	N	ND (57)	ND (350)	ND (5.7)	ND (5.7)	ND (5.7)	---	ND (5.7)	ND (5.7)	ND (5.7)
	05/13/11	119 - 120	N	ND (52)	ND (350)	ND (5.2)	ND (5.2)	ND (5.2)	---	ND (5.2)	ND (5.2)	ND (5.2)
	05/13/11	129 - 130	N	ND (56)	ND (350)	ND (5.6)	ND (5.6)	ND (5.6)	---	ND (5.6)	ND (5.6)	ND (5.6)
	05/14/11	139 - 140	N	ND (52)	ND (350)	ND (5.2)	ND (5.2)	ND (5.2)	---	ND (5.2)	ND (5.2)	ND (5.2)
	05/14/11	149 - 150	N	ND (49)	ND (350)	ND (4.9)	ND (4.9)	ND (4.9)	---	ND (4.9)	ND (4.9)	ND (4.9)
	05/14/11	159 - 160	N	ND (54)	ND (350)	ND (5.4)	ND (5.4)	ND (5.4)	---	ND (5.4)	ND (5.4)	ND (5.4)
PGE-LT-OS5	03/08/07	0.5	N	ND (51J)	---	ND (5.1J)	ND (5.1J)	ND (10J)	---	ND (5.1J)	ND (5.1J)	ND (5.1J)
	03/08/07	3	N	ND (53J)	---	ND (5.3J)	ND (5.3J)	ND (11J)	---	ND (5.3J)	ND (5.3J)	ND (5.3J)
PGE-LT-OS6	03/08/07	0.5	N	ND (54J)	---	ND (5.4J)	ND (5.4J)	ND (11J)	---	ND (5.4J)	ND (5.4J)	ND (5.4J)
	03/08/07	3	N	ND (52J)	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	ND (5.2J)	ND (5.2J)

TABLE B11-6

Sample Results: Volatile and Semivolatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Volatile and Semivolatile Organic Compounds (µg/kg)								
Commercial Screening Level [1]:				**630,000,000**	**120,000**	**1,500**	**11,000,000**	**53,000**	**92,000,000**	**17,000,000**	**45,000,000**	**2,700,000**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Acetone**	**Bis (2-ethyl hexyl) phthalate**	**Chloroform**	**Isopropyl benzene**	**Methylene chloride**	**Methyl acetate**	**m+p-Xylenes**	**Toluene**	**Xylenes, total**
PGE-LT-OS7	03/08/07	0.5	N	ND (51J)	---	ND (5.1J)	ND (5.1J)	ND (10J)	---	ND (5.1J)	ND (5.1J)	ND (5.1J)
	03/08/07	3	N	ND (51J)	---	ND (5.1J)	ND (5.1J)	ND (10J)	---	ND (5.1J)	ND (5.1J)	ND (5.1J)
PGE-LT-OS8	03/08/07	0.5	N	ND (52J)	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	ND (5.2J)	ND (5.2J)
	03/08/07	3	N	ND (55J)	---	ND (5.5J)	ND (5.5J)	ND (11J)	---	ND (5.5J)	ND (5.5J)	ND (5.5J)
PGE-LT-OS9	03/08/07	0.5	N	ND (52J)	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	ND (5.2J)	ND (5.2J)
	03/08/07	3	N	ND (52J)	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	ND (5.2J)	ND (5.2J)
PGE-UTOS1	03/08/07	0.5	N	ND (55J)	---	ND (5.5J)	ND (5.5J)	ND (11J)	---	ND (5.5J)	ND (5.5J)	ND (5.5J)
	03/08/07	3	N	ND (52J)	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	ND (5.2J)	ND (5.2J)
PGE-UTOS2	03/08/07	0.5	N	650 J	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	5.8 J	ND (5.2J)
	03/08/07	3	N	ND (54J)	---	ND (5.4J)	ND (5.4J)	ND (11J)	---	ND (5.4J)	ND (5.4J)	ND (5.4J)
PGE-UTOS3	03/08/07	0.5	N	ND (52J)	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	5.9 J	ND (5.2J)
	03/08/07	3	N	ND (53J)	---	ND (5.3J)	ND (5.3J)	ND (11J)	---	ND (5.3J)	ND (5.3J)	ND (5.3J)
PGE-UTOS4	03/08/07	0.5	N	ND (52J)	---	ND (5.2J)	ND (5.2J)	ND (10J)	---	ND (5.2J)	ND (5.2J)	ND (5.2J)
	03/08/07	3	N	ND (53J)	---	ND (5.3J)	ND (5.3J)	ND (11J)	---	ND (5.3J)	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

TABLE B11-6

Sample Results: Volatile and Semivolatile Organic Compounds

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

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 Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
			Commercial Screening Level [1]:	21,000	540	540	740	740	740	740	740	740
			RWQCB Environmental Screening Level [2]:	NE	NE	NE	NE	NE	NE	NE	NE	NE
			Background [3]:	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**
Category1												
AOC13-OS2	11/08/11	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	150	ND (17)	ND (17)	ND (17)
	11/08/11	2 - 3	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	57	ND (17)	ND (17)	ND (17)
	11/08/11	2 - 3	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	58	ND (17)	ND (17)	ND (17)
	11/08/11	5 - 6	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	67	ND (17)	ND (17)	ND (17)
AOC13-OS3	11/08/11	2 - 3	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC13-OS4	11/08/11	2 - 3	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	30	ND (17)	ND (17)	ND (17)
	11/08/11	5 - 6	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	170	ND (17)	ND (17)	ND (17)
AOC13-PITOS1	07/26/11	0 - 0.5	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	2,400 J	ND (16)	ND (16)	ND (16)
	07/26/11	0 - 0.5	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	2,100 J	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	74	ND (17)	ND (17)	ND (17)
	07/26/11	9 - 9.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC13-PITOS2	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	370 J	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	110	ND (17)	ND (17)	ND (17)
	07/26/11	4 - 4.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	73	ND (17)	ND (17)	ND (17)
AOC13-PITOS3	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	92	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	57	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	29	ND (17)	ND (17)	ND (17)
	07/26/11	6 - 6.5	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	58	ND (17)	ND (17)	ND (17)
AOC13-PITOS6	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	210	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	370	ND (17)	ND (17)	ND (17)
	07/26/11	5 - 6	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	91	ND (17)	ND (17)	ND (17)
	07/26/11	7 - 7.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	50	ND (17)	ND (17)	ND (17)

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
Commercial Screening Level [1] **:**				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**
RWQCB Environmental Screening Level [2] **:**				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3] **:**				**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**
AOC13-PITOS7	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	140	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	8 - 8.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC13-PITOS8	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	24	ND (17)	ND (17)	ND (17)
	07/26/11	5 - 6	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	9 - 10	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	11 - 11.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC13-PITOS9	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	36	ND (17)	ND (17)	ND (17)
	07/26/11	5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	5 - 6	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	28	ND (17)	ND (17)	ND (17)
AOC13-PITOS10	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	110	ND (16)	ND (16)	ND (16)
	07/26/11	5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	7 - 7.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC13-PITOS11	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	110	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	7.5 - 8	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	30	ND (17)	ND (17)

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
			Commercial Screening Level [1]:	21,000	540	540	740	740	740	740	740	740
			RWQCB Environmental Screening Level [2]:	NE	NE	NE	NE	NE	NE	NE	NE	NE
			Background [3]:	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**
AOC13-PITOS12	09/27/11	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17J)	ND (17J)
	09/27/11	2 - 3	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17J)	ND (17J)
	09/27/11	5 - 6	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17J)	ND (17J)
	09/27/11	9 - 9.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17J)	ND (17J)
	09/27/11	11 - 11.5	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16J)	ND (16J)
AOC13-PITOS13	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	07/26/11	0 - 0.5	FD	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	70	ND (17)	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	62	ND (17)	ND (17)	ND (17)
	07/26/11	5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	84	ND (17)	ND (17)	ND (17)
	07/26/11	9 - 9.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC13-PITOS14	07/26/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	30	ND (17)	ND (17)
	07/26/11	2 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	150	ND (17)	ND (17)	ND (17)
	07/26/11	4 - 4.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	120	ND (17)	ND (17)	ND (17)

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
			Commercial Screening Level [1]:	**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**
			RWQCB Environmental Screening Level [2]:	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Background [3]:	**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**
BH-65	03/24/11	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	03/24/11	2 - 3	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	48	ND (17)	---	---
	03/17/11	9 - 10	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/17/11	14 - 15	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/17/11	19 - 20	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/17/11	29 - 30	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/17/11	37 - 40	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/17/11	49 - 50	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
	03/17/11	59 - 60	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/18/11	69 - 70	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/18/11	79 - 80	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/18/11	79 - 80	FD	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/18/11	89 - 90	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
	03/18/11	99 - 100	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/18/11	109 - 110	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
	03/18/11	119 - 120	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/19/11	129 - 130	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/19/11	139 - 140	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
			Commercial Screening Level [1]:	21,000	540	540	740	740	740	740	740	740
			RWQCB Environmental Screening Level [2]:	NE	NE	NE	NE	NE	NE	NE	NE	NE
			Background [3]:	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**
BH-66	03/23/11	0 - 0.5	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	03/23/11	2 - 3	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	03/23/11	5 - 6	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	04/12/11	14 - 15	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/12/11	14 - 15	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/12/11	19 - 20	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	38	ND (17)	---	---
	04/12/11	29 - 30	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/12/11	39 - 40	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/12/11	49 - 50	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/13/11	59 - 60	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/13/11	69 - 70	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	04/13/11	79 - 80	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/13/11	89 - 90	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	04/13/11	99 - 100	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	04/13/11	109 - 110	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/14/11	119 - 120	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/14/11	119 - 120	FD	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/14/11	129 - 130	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
			Commercial Screening Level [1]:	**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**
			RWQCB Environmental Screening Level [2]:	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
			Background [3]:	**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**
BH-67	03/17/11	0 - 0.5	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
	03/17/11	2 - 3	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/17/11	5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	04/29/11	9 - 10	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	14 - 15	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	19 - 20	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	29 - 30	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	39 - 40	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	39 - 40	FD	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	49 - 50	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	59 - 60	N	ND (19)	ND (39)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	---	---
	04/29/11	69 - 70	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	79 - 80	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	04/29/11	89 - 90	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	04/29/11	99 - 100	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	109 - 110	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/29/11	119 - 120	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/30/11	129 - 130	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/30/11	139 - 140	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/30/11	139 - 140	FD	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/30/11	149 - 150	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/30/11	159 - 160	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
			Commercial Screening Level [1] :	21,000	540	540	740	740	740	740	740	740
			RWQCB Environmental Screening Level [2] :	NE	NE	NE	NE	NE	NE	NE	NE	NE
			Background [3] :	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**
BH-68	03/17/11	0 - 0.5	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
	03/17/11	0 - 0.5	FD	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
	03/17/11	2 - 3	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	03/17/11	5 - 6	N	ND (19)	ND (38)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)	ND (19)
	05/13/11	9 - 10	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	14 - 15	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	19 - 20	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	29 - 30	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	39 - 40	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	05/13/11	49 - 50	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	59 - 60	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	69 - 70	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	79 - 80	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	05/13/11	89 - 90	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	05/13/11	99 - 100	N	ND (18)	ND (36)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	05/13/11	99 - 100	FD	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	05/13/11	109 - 110	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	05/13/11	119 - 120	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	05/13/11	129 - 130	N	ND (17)	ND (35)	ND (17)	31	ND (17)	ND (17)	ND (17)	---	---
	05/14/11	139 - 140	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	---	---
	05/14/11	149 - 150	N	ND (17J)	ND (35J)	ND (17J)	ND (17J)	ND (17J)	ND (17J)	ND (17J)	---	---
	05/14/11	159 - 160	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
Category2												
Spill03012004_Sample1	05/21/04	0	N	---	---	---	---	---	---	ND (300)	---	---
Spill03012004_Sample2	05/21/04	0	N	---	---	---	---	---	---	ND (300)	---	---

TABLE B11-7

Sample Results: Polychlorinated Biphenyls

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
			Commercial Screening Level [1] :	21,000	540	540	740	740	740	740	740	740
			RWQCB Environmental Screening Level [2] :	NE	NE	NE	NE	NE	NE	NE	NE	NE
			Background [3] :	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**
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)	---	---

Notes:

1 Commercial screening level - commercial USEPA regional screening levels

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

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 B11-8
Sample Results: Pesticides
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Pesticides (µg/kg)																				
Commercial Screening Level 1				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
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	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
Category1																								
AOC13-OS2	11/08/11	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)
	11/08/11	2 - 3	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 (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
	11/08/11	5 - 6	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 (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (5.3)	ND (53)
	11/08/11	5 - 6	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 (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
AOC13-OS3	11/08/11	2 - 3	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 (1)	ND (1)	ND (1)	ND (1)	ND (5.2)	ND (52)
AOC13-OS4	11/08/11	2 - 3	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 (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
	11/08/11	5 - 6	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 (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (5.3)	ND (53)
AOC13-PITOS1	07/26/11	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)
	07/26/11	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)
AOC13-PITOS2	07/26/11	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)
AOC13-PITOS3	07/26/11	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)
AOC13-PITOS6	07/26/11	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)
AOC13-PITOS7	07/26/11	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)
AOC13-PITOS8	07/26/11	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)
AOC13-PITOS9	07/26/11	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)
AOC13-PITOS10	07/26/11	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)
AOC13-PITOS11	07/26/11	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)
AOC13-PITOS12	09/27/11	0 - 0.5	N	ND (2)	7.2	6	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 (51J)
AOC13-PITOS13	07/26/11	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)
	07/26/11	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)
AOC13-PITOS14	07/26/11	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)

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
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 B11-9

Sample Results: Dioxin and Furans

Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Dioxins and Furans (ng/kg)																			
Commercial Screening Level [1]				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**200**	**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**	**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**	**1,2,3,4,6,7,8-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**	**TEQ Avian**	**TEQ Mammals**
Category1																							
BH-65	03/24/11	0 - 0.5	N	1,400	ND (110)	6.3 J	ND (3.3)	5.8 J	41	ND (3.6)	15	ND (2.4)	4.4 J	11,000	230	ND (1.6)	ND (1.5)	2.6 J	0.54 J	0.95 J	27	11	27
	03/24/11	2 - 3	N	510	ND (63)	3.2 J	ND (2.1)	3.4 J	13	ND (3)	4 J	1.4 J	2.7 J	6,800	80	ND (0.94)	ND (0.78)	1.2 J	ND (0.088)	ND (0.6)	11	5.1	11
BH-66	03/23/11	0 - 0.5	N	39	ND (5.3)	ND (0.42)	0.31 J	ND (0.29)	ND (1.2)	ND (0.28)	ND (0.41)	ND (0.1)	0.4 J	530	12 J	ND (0.21)	ND (0.076)	ND (0.19)	ND (0.055)	0.19 J	0.95	0.66	0.95
BH-67	03/17/11	0 - 0.5	N	0.66 J	ND (0.61)	ND (0.097)	ND (0.1)	ND (0.033)	ND (0.09)	ND (0.24)	ND (0.068)	ND (0.039)	0.11 J	ND (4.5)	ND (0.35)	ND (0.035)	ND (0.042)	ND (0.057)	ND (0.024)	ND (0.27)	0.1	0.23	0.1
	03/17/11	2 - 3	N	0.28 J	ND (0.26)	ND (0.082)	ND (0.099)	ND (0.1)	ND (0.13)	ND (0.15)	ND (0.13)	ND (0.19)	ND (0.036)	ND (0.9)	ND (0.22)	ND (0.18)	0.25 J	ND (0.16)	ND (0.15)	ND (0.33)	0.26	0.47	0.26
	03/17/11	5 - 6	N	0.27 J	ND (0.21)	ND (0.094)	0.15 J	ND (0.16)	ND (0.18)	ND (0.13)	0.16 J	ND (0.15)	ND (0.12)	ND (1)	ND (0.22)	ND (0.22)	0.33 J	0.27 J	ND (0.15)	ND (0.35)	0.37	0.72	0.37
BH-68	03/17/11	0 - 0.5	N	0.68 J	ND (0.76)	ND (0.29)	0.63 J	ND (0.64)	ND (0.58)	ND (0.75)	0.59 J	ND (0.42)	0.73 J	ND (3.2)	ND (0.38)	ND (0.68)	0.72 J	0.91 J	ND (0.18)	ND (0.33)	1.1	1.8	1.1
	03/17/11	0 - 0.5	FD	0.73 J	0.82 J	ND (0.065)	ND (0.11)	ND (0.13)	ND (0.05)	0.46 J	0.16 J	ND (0.11)	0.35 J	7.4 J	ND (0.4)	ND (0.26)	ND (0.17)	0.56 J	ND (0.13)	ND (0.48)	0.52	1.1	0.52

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

NA = not applicable

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:

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 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

ng/kg = nanograms per kilogram

TABLE B11-10
Conceptual Site Model, AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B 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 data will be reviewed during the data gaps evaluation process to evaluate potential fate impacts or current localized impacts to groundwater from soil.

TABLE B11-11

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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)
Contract Laboratory Program Inorganics												
Aluminum	mg/kg	19 / 19 (100%)	19 / 19 (100%)	0 / 0 (0%)	0 / 0 (0%)	12,000	0	(16,400)	0	(NE)	0	(990,000)
Calcium	mg/kg	19 / 19 (100%)	19 / 19 (100%)	0 / 0 (0%)	0 / 0 (0%)	33,000	0	(66,500)	0	(NE)	0	(NE)
Iron	mg/kg	21 / 21 (100%)	21 / 21 (100%)	0 / 0 (0%)	0 / 0 (0%)	23,000	0	(NE)	0	(NE)	0	(720,000)
Magnesium	mg/kg	19 / 19 (100%)	19 / 19 (100%)	0 / 0 (0%)	0 / 0 (0%)	7,200	0	(12,100)	0	(NE)	0	(NE)
Manganese	mg/kg	21 / 21 (100%)	21 / 21 (100%)	0 / 0 (0%)	0 / 0 (0%)	350	0	(402)	0	(NE)	0	(23,000)
Potassium	mg/kg	19 / 19 (100%)	19 / 19 (100%)	0 / 0 (0%)	0 / 0 (0%)	4,100	0	(4,400)	0	(NE)	0	(NE)
Sodium	mg/kg	18 / 19 (95%)	18 / 19 (95%)	0 / 0 (0%)	0 / 0 (0%)	650	0	(2,070)	0	(NE)	0	(NE)
Cyanide	mg/kg	5 / 13 (38%)	5 / 13 (38%)	0 / 0 (0%)	0 / 0 (0%)	5	0	(NE)	0	(NE)	0	(20,000)
Dioxins and Furans												
TEQ Avian	ng/kg	7 / 7 (100%)	7 / 7 (100%)	0 / 0 (0%)	0 / 0 (0%)	11	0	(NE)	0	(NE)	0	(NE)
TEQ Human	ng/kg	7 / 7 (100%)	7 / 7 (100%)	0 / 0 (0%)	0 / 0 (0%)	27	0	(NE)	0	(NE)	0	(200)
TEQ Mammals	ng/kg	7 / 7 (100%)	7 / 7 (100%)	0 / 0 (0%)	0 / 0 (0%)	27	0	(NE)	0	(NE)	0	(NE)
Metals												
Antimony	mg/kg	11 / 175 (6.3%)	2 / 150 (1.3%)	9 / 25 (36%)	0 / 0 (0%)	10	0	(NE)	0	(NE)	0	(380)
Arsenic	mg/kg	173 / 175 (99%)	148 / 150 (99%)	25 / 25 (100%)	0 / 0 (0%)	8.8	0	(11)	0	(NE)	0	(0.24) *
Barium	mg/kg	175 / 175 (100%)	150 / 150 (100%)	25 / 25 (100%)	0 / 0 (0%)	1,000	2	(410)	0	(NE)	0	(63,000)
Beryllium	mg/kg	27 / 175 (15%)	19 / 150 (13%)	8 / 25 (32%)	0 / 0 (0%)	1	3	(0.672)	0	(NE)	0	(190)
Cadmium	mg/kg	15 / 175 (8.6%)	5 / 150 (3.3%)	10 / 25 (40%)	0 / 0 (0%)	14	2	(1.1)	0	(NE)	0	(500)
Chromium, Hexavalent	mg/kg	22 / 178 (12%)	22 / 161 (14%)	0 / 17 (0.0%)	0 / 0 (0%)	12.2	10	(0.83)	0	(NE)	0	(37)
Chromium, total	mg/kg	185 / 186 (99%)	161 / 161 (100%)	24 / 25 (96%)	0 / 0 (0%)	743	19	(39.8)	0	(NE)	0	(1,400)
Cobalt	mg/kg	170 / 175 (97%)	145 / 150 (97%)	25 / 25 (100%)	0 / 0 (0%)	18	8	(12.7)	0	(NE)	0	(300)
Copper	mg/kg	163 / 186 (88%)	153 / 161 (95%)	10 / 25 (40%)	0 / 0 (0%)	760	44	(16.8)	0	(NE)	0	(38,000)
Lead	mg/kg	200 / 201 (100%)	149 / 150 (99%)	25 / 25 (100%)	26 / 26 (100%)	330	54	(8.39)	0	(NE)	1	(320)
Mercury	mg/kg	45 / 192 (23%)	3 / 150 (2.0%)	42 / 42 (100%)	0 / 0 (0%)	3.4	0	(NE)	0	(NE)	0	(180)
Molybdenum	mg/kg	49 / 175 (28%)	40 / 150 (27%)	9 / 25 (36%)	0 / 0 (0%)	16	25	(1.37)	0	(NE)	0	(4,800)
Nickel	mg/kg	186 / 186 (100%)	161 / 161 (100%)	25 / 25 (100%)	0 / 0 (0%)	56	16	(27.3)	0	(NE)	0	(16,000)
Selenium	mg/kg	16 / 175 (9.1%)	7 / 150 (4.7%)	9 / 25 (36%)	0 / 0 (0%)	3	4	(1.47)	0	(NE)	0	(4,800)
Silver	mg/kg	7 / 175 (4.0%)	0 / 150 (0.0%)	7 / 25 (28%)	0 / 0 (0%)	1	0	(NE)	0	(NE)	0	(4,800)
Thallium	mg/kg	8 / 175 (4.6%)	1 / 150 (0.67%)	7 / 25 (28%)	0 / 0 (0%)	10	0	(NE)	0	(NE)	0	(63)
Vanadium	mg/kg	175 / 175 (100%)	150 / 150 (100%)	25 / 25 (100%)	0 / 0 (0%)	63	4	(52.2)	0	(NE)	0	(5,200)
Zinc	mg/kg	186 / 186 (100%)	161 / 161 (100%)	25 / 25 (100%)	0 / 0 (0%)	315	28	(58)	0	(NE)	0	(100,000)
Pesticides												
4,4-DDE	µg/kg	1 / 18 (5.6%)	1 / 18 (5.6%)	0 / 0 (0%)	0 / 0 (0%)	7.2	0	(NE)	0	(NE)	0	(6,300)
4,4-DDT	µg/kg	1 / 18 (5.6%)	1 / 18 (5.6%)	0 / 0 (0%)	0 / 0 (0%)	6	0	(NE)	0	(NE)	0	(6,300)
Polychlorinated biphenyls												
Aroclor 1242	µg/kg	1 / 137 (0.73%)	1 / 123 (0.81%)	0 / 0 (0%)	0 / 14 (0.0%)	31	0	(NE)	0	(NE)	0	(740)
Aroclor 1254	µg/kg	28 / 137 (20%)	28 / 123 (23%)	0 / 0 (0%)	0 / 14 (0.0%)	2,400	0	(NE)	0	(NE)	1	(740)
Aroclor 1260	µg/kg	4 / 139 (2.9%)	4 / 123 (3.3%)	0 / 2 (0.0%)	0 / 14 (0.0%)	140	0	(NE)	0	(NE)	0	(740)
Polycyclic Aromatic Hydrocarbons												
1-Methyl naphthalene	µg/kg	3 / 123 (2.4%)	3 / 123 (2.4%)	0 / 0 (0%)	0 / 0 (0%)	26	0	(NE)	0	(NE)	0	(99,000)
2-Methyl naphthalene	µg/kg	16 / 129 (12%)	16 / 129 (12%)	0 / 0 (0%)	0 / 0 (0%)	30	0	(NE)	0	(NE)	0	(4,100,000)
Acenaphthene	µg/kg	2 / 147 (1.4%)	2 / 147 (1.4%)	0 / 0 (0%)	0 / 0 (0%)	10	0	(NE)	0	(NE)	0	(33,000,000)

TABLE B11-11

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B 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)
Polycyclic Aromatic Hydrocarbons												
Anthracene	µg/kg	12 / 147 (8.2%)	12 / 147 (8.2%)	0 / 0 (0%)	0 / 0 (0%)	30	0	(NE)	0	(NE)	0	(170,000,000)
Benzo (a) anthracene	µg/kg	42 / 147 (29%)	42 / 147 (29%)	0 / 0 (0%)	0 / 0 (0%)	260	0	(NE)	0	(NE)	0	(1,300)
Benzo (a) pyrene	µg/kg	41 / 147 (28%)	41 / 147 (28%)	0 / 0 (0%)	0 / 0 (0%)	320	0	(NE)	0	(NE)	2	(130)
Benzo (b) fluoranthene	µg/kg	49 / 147 (33%)	49 / 147 (33%)	0 / 0 (0%)	0 / 0 (0%)	600	0	(NE)	0	(NE)	0	(1,300)
Benzo (ghi) perylene	µg/kg	42 / 147 (29%)	42 / 147 (29%)	0 / 0 (0%)	0 / 0 (0%)	160	0	(NE)	0	(NE)	0	(17,000,000)
Benzo (k) fluoranthene	µg/kg	38 / 147 (26%)	38 / 147 (26%)	0 / 0 (0%)	0 / 0 (0%)	430	0	(NE)	0	(NE)	0	(1,300)
Chrysene	µg/kg	35 / 147 (24%)	35 / 147 (24%)	0 / 0 (0%)	0 / 0 (0%)	360	0	(NE)	0	(NE)	0	(13,000)
Dibenzo (a,h) anthracene	µg/kg	6 / 147 (4.1%)	6 / 147 (4.1%)	0 / 0 (0%)	0 / 0 (0%)	46	0	(NE)	0	(NE)	0	(380)
Fluoranthene	µg/kg	50 / 147 (34%)	50 / 147 (34%)	0 / 0 (0%)	0 / 0 (0%)	760	0	(NE)	0	(NE)	0	(22,000,000)
Fluorene	µg/kg	1 / 147 (0.68%)	1 / 147 (0.68%)	0 / 0 (0%)	0 / 0 (0%)	7.3	0	(NE)	0	(NE)	0	(22,000,000)
Indeno (1,2,3-cd) pyrene	µg/kg	37 / 147 (25%)	37 / 147 (25%)	0 / 0 (0%)	0 / 0 (0%)	140	0	(NE)	0	(NE)	0	(1,300)
Naphthalene	µg/kg	1 / 147 (0.68%)	1 / 147 (0.68%)	0 / 0 (0%)	0 / 0 (0%)	6	0	(NE)	0	(NE)	0	(18,000)
Phenanthrene	µg/kg	24 / 147 (16%)	24 / 147 (16%)	0 / 0 (0%)	0 / 0 (0%)	260	0	(NE)	0	(NE)	0	(17,000,000)
Pyrene	µg/kg	52 / 147 (35%)	52 / 147 (35%)	0 / 0 (0%)	0 / 0 (0%)	580	0	(NE)	0	(NE)	0	(17,000,000)
B(a)P Equivalent	µg/kg	59 / 147 (40%)	59 / 147 (40%)	0 / 0 (0%)	0 / 0 (0%)	460	0	(NE)	0	(NE)	4	(130)
Semivolatile Organic Compounds												
Bis (2-ethylhexyl) phthalate	µg/kg	2 / 129 (1.6%)	2 / 129 (1.6%)	0 / 0 (0%)	0 / 0 (0%)	1,200	0	(NE)	0	(NE)	0	(120,000)
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)
TPH as diesel	mg/kg	42 / 211 (20%)	42 / 147 (29%)	0 / 12 (0.0%)	0 / 52 (0.0%)	160	0	(NE)	0	(540)	0	(NE)
TPH as motor oil	mg/kg	109 / 211 (52%)	64 / 147 (44%)	11 / 12 (92%)	34 / 52 (65%)	240,000	0	(NE)	10	(1,800)	0	(NE)
TPH as gasoline	mg/kg	0 / 198 (0%)	0 / 132 (0%)	0 / 14 (0%)	0 / 52 (0%)	ND (16000)	NA	(NE)	0	(540)	NA	(NE)
Volatile Organic Compounds												
Acetone	µg/kg	2 / 132 (1.5%)	2 / 132 (1.5%)	0 / 0 (0%)	0 / 0 (0%)	650	0	(NE)	0	(NE)	0	(630,000,000)
Chloroform	µg/kg	1 / 132 (0.76%)	1 / 132 (0.76%)	0 / 0 (0%)	0 / 0 (0%)	5.8	0	(NE)	0	(NE)	0	(1,500)
Isopropylbenzene	µg/kg	1 / 132 (0.76%)	1 / 132 (0.76%)	0 / 0 (0%)	0 / 0 (0%)	6.3	0	(NE)	0	(NE)	0	(11,000,000)
m,p-Xylenes	µg/kg	1 / 132 (0.76%)	1 / 132 (0.76%)	0 / 0 (0%)	0 / 0 (0%)	19	0	(NE)	0	(NE)	0	(17,000,000)
Methyl acetate	µg/kg	3 / 34 (8.8%)	3 / 34 (8.8%)	0 / 0 (0%)	0 / 0 (0%)	1,800	0	(NE)	0	(NE)	0	(92,000,000)
Methylene chloride	µg/kg	2 / 132 (1.5%)	2 / 132 (1.5%)	0 / 0 (0%)	0 / 0 (0%)	5.7	0	(NE)	0	(NE)	0	(53,000)
Toluene	µg/kg	2 / 134 (1.5%)	2 / 132 (1.5%)	0 / 2 (0.0%)	0 / 0 (0%)	5.9	0	(NE)	0	(NE)	0	(45,000,000)
Xylenes, total	µg/kg	2 / 134 (1.5%)	1 / 132 (0.76%)	1 / 2 (50%)	0 / 0 (0%)	27	0	(NE)	0	(NE)	0	(2,700,000)

TABLE B11-11

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 13 - Unpaved Areas within the Compressor Station Investigation Program
Soil Investigation Part B Work Plan
Pacific Gas and Electric Company Topock Compressor Station Needles, California

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 B11-12
Proposed Sampling Plan - AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 13-1 (formerly AOC13-2)	0-1[a] and 3, if feasible	North of Cooling Tower B on paved road; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Not suitable for XRF Likely accessible by hydrovac
AOC 13-2 (formerly AOC13-3)	0-1[a] and 3, if feasible	East of Cooling Tower B; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Not suitable for XRF Likely accessible by hydrovac
AOC 13-3 (formerly AOC13-4)	0-0.5 and 3, if feasible	South of Cooling Tower B; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Not suitable for XRF Likely accessible by hydrovac
AOC 13-4 (formerly AOC13-5)	0-0.5 and 3, if feasible	Northwest side of Compressor Building; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC. Suitable for hand sampling
AOC 13-5[b] (formerly AOC13-6)	0-0.5 and 3, if feasible	Northeast side of Compressor Building; to resolve Data Gap #1, lateral and vertical extents of COPCs.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC. Suitable for hand sampling
AOC 13-6[b] (formerly AOC13-7)	0-0.5 and 3, if feasible	West side of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC. Suitable for hand sampling
AOC 13-7 (formerly AOC13-8)	0-0.5 and 3, if feasible	East side of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC Suitable for hand sampling
AOC 13-8 (formerly AOC13-9)	0-1[a] and 3, if feasible	Jacket Water Cooling Pumps surface water runoff area; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Not suitable for XRF Likely accessible by hydrovac
AOC 13-9 (formerly AOC13-10)	0-0.5 and 3, if feasible	Between Compressor Building and Lower Yard Scrubbers; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-10 (formerly AOC13-11)	0-0.5 and 3, if feasible	West of Compressor Building; to resolve Data Gap #1, lateral and vertical extents 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	No XRF refinement; location selected with DTSC Suitable for hand sampling

TABLE B11-12
Proposed Sampling Plan - AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 13-11[b] (formerly AOC13-12)	0-0.5 and 3, if feasible	East of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC Suitable for hand sampling
AOC 13-12 (formerly AOC13-13)	0-1[a] and 3, if feasible	Visitor Parking Area, east of new oil aboveground storage tanks; to resolve Data Gap #1 and #2, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Not suitable for XRF Likely accessible by hydrovac
AOC 13-13 (formerly AOC13-14)	0-0.5 and 3, if feasible	Southeast of Lower Yard Scrubbers; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-14 (formerly AOC13-15)	0-0.5 and 3, if feasible	Southwest corner of Compressor Building; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC. Suitable for hand sampling
AOC 13-15 (formerly AOC13-16)	0-0.5, 3, 6, and 10	Southeast side of Compressor Building, adjacent to Aqua Tower; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC. Suitable for hand sampling
AOC 13-16[b] (formerly AOC13-17)	0-1[a] and 3, if feasible	Visitor parking area, east of wash rack sump; to resolve Data Gaps #1, #2, and #3, lateral and vertical extents 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	Not suitable for XRF Likely accessible by hydrovac
AOC 13-17 (formerly AOC13-18)	0-1[a] and 3, if feasible	South of Cooling Tower A, within historical cooling water release area; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Not suitable for XRF Likely accessible by hydrovac
AOC 13-18 (formerly AOC13-19)	0-0.5 and 3, if feasible	East of Welding Shop; to resolve Data Gap #1 and #2, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-19 (formerly AOC13-21)	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	Suitable for XRF Likely accessible by hydrovac
AOC 13-20 (formerly AOC13-22)	0-0.5 and 3, if feasible	Northwest of northern scrubbers; to resolve Data Gaps #1 and #2, lateral and vertical extents 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	Suitable for XRF Likely accessible by hydrovac

TABLE B11-12
Proposed Sampling Plan - AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 13-21 (formerly AOC13-24)	0-0.5 and 3, if feasible	West of northern scrubbers; to resolve Data Gaps #1 and #2 – Lateral and vertical extents 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	Suitable for XRF Likely accessible by hydrovac
AOC 13-22 (formerly AOC13-25)	0-0.5 and 3, if feasible	Southeast of northern scrubbers; to resolve Data Gaps #1 and #2, lateral and vertical extents 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	Suitable for XRF. Likely accessible by hydrovac.
AOC 13-23 (formerly AOC13-26)	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 extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-24 (formerly AOC13-27)	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 extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-25 (formerly AOC13-28)	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 extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-26 (formerly AOC13-29)	0-0.5 and 3, if feasible	West of Sludge Drying Beds, adjacent to transfer piping; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-27 (formerly AOC13-30)	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 extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-28 (formerly AOC13-31)	0-0.5 and 3, if feasible	Northwest edge of “A” Valve Nest Area; to resolve Data Gap #1, lateral and vertical extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-29 (formerly AOC13-32)	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 extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac

TABLE B11-12
Proposed Sampling Plan - AOC 13 – Unpaved Areas within the Compressor Station
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 13-30 (formerly AOC13-33)	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 extents 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.	Suitable for XRF Likely accessible by hydrovac
AOC 13-31 (formerly AOC13-34)	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 extents of COPCs	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	Suitable for XRF Likely accessible by hydrovac
AOC 13-32 (new sample location)	0-0.5 and 3, if feasible	On the slope between the compressor building and the lower yard to assess potential impacts associated with surface soil discoloration in historical aerial photographs.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and asbestos	No XRF refinement; location selected with DTSC. Likely accessible by hydrovac

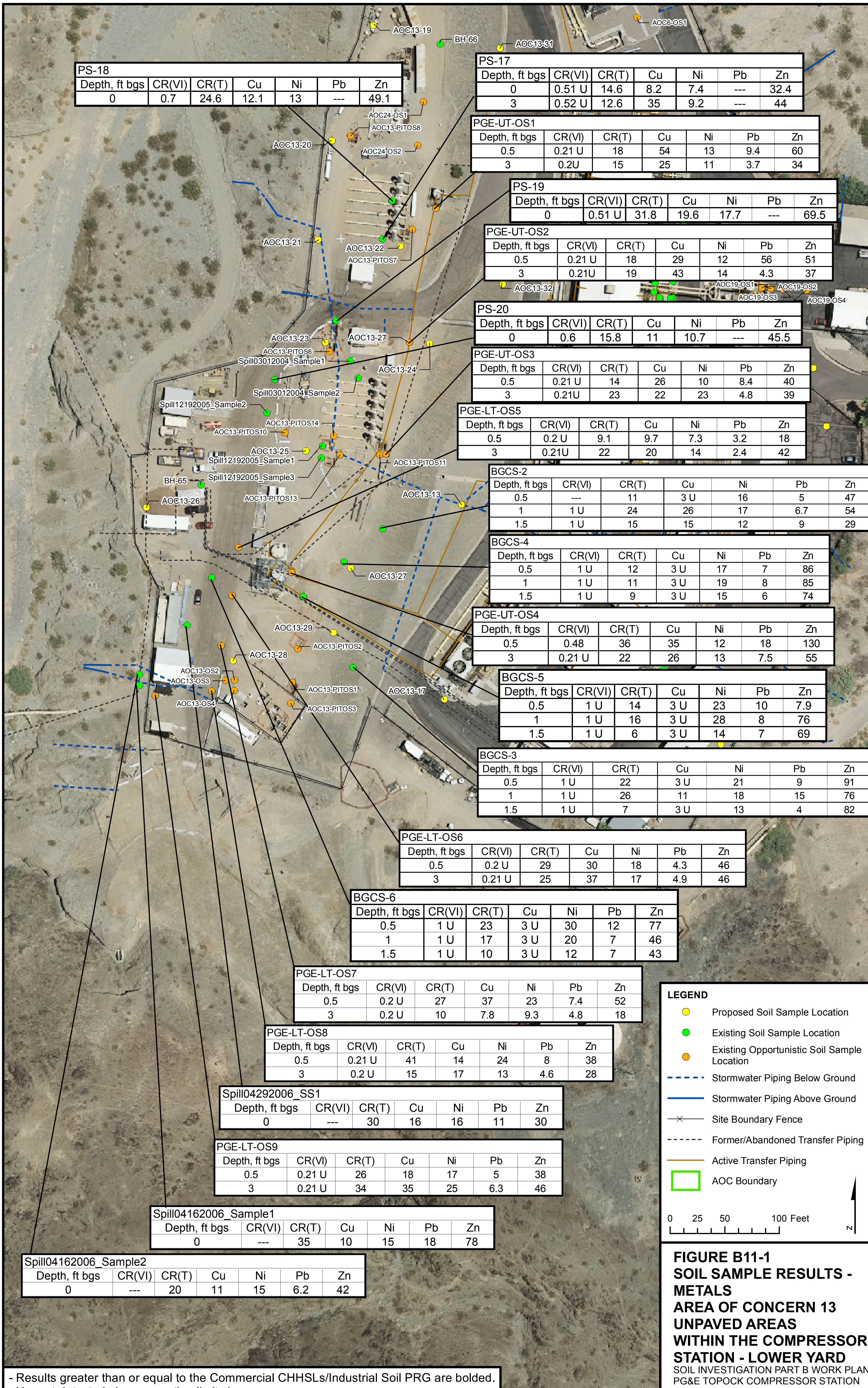
Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

[b] A soil gas vapor sampling probe will be installed at this location at approximately 4 feet bgs. One round of soil gas samples will be collected and analyzed for VOCs

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 foot bgs).

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-UT-OS1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	18	54	13	9.4	60
3	0.2U	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-UT-OS2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	18	29	12	56	51
3	0.21U	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-UT-OS3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	0.21 U	14	26	10	8.4	40
3	0.21U	23	22	23	4.8	39

PGE-LT-OS5

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	0.21U	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	11	3 U	19	8	85
1.5	1 U	9	3 U	15	6	74

PGE-UT-OS4

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

PGE-LT-OS6

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

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-LT-OS7

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-LT-OS8

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-LT-OS9

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

LEGEND

- Proposed Soil Sample Location
- Existing Soil Sample Location
- Existing Opportunistic Soil Sample Location
- Stormwater Piping Below Ground
- Stormwater Piping Above Ground
- Site Boundary Fence
- Former/Abandoned Transfer Piping
- Active Transfer Piping
- AOC Boundary

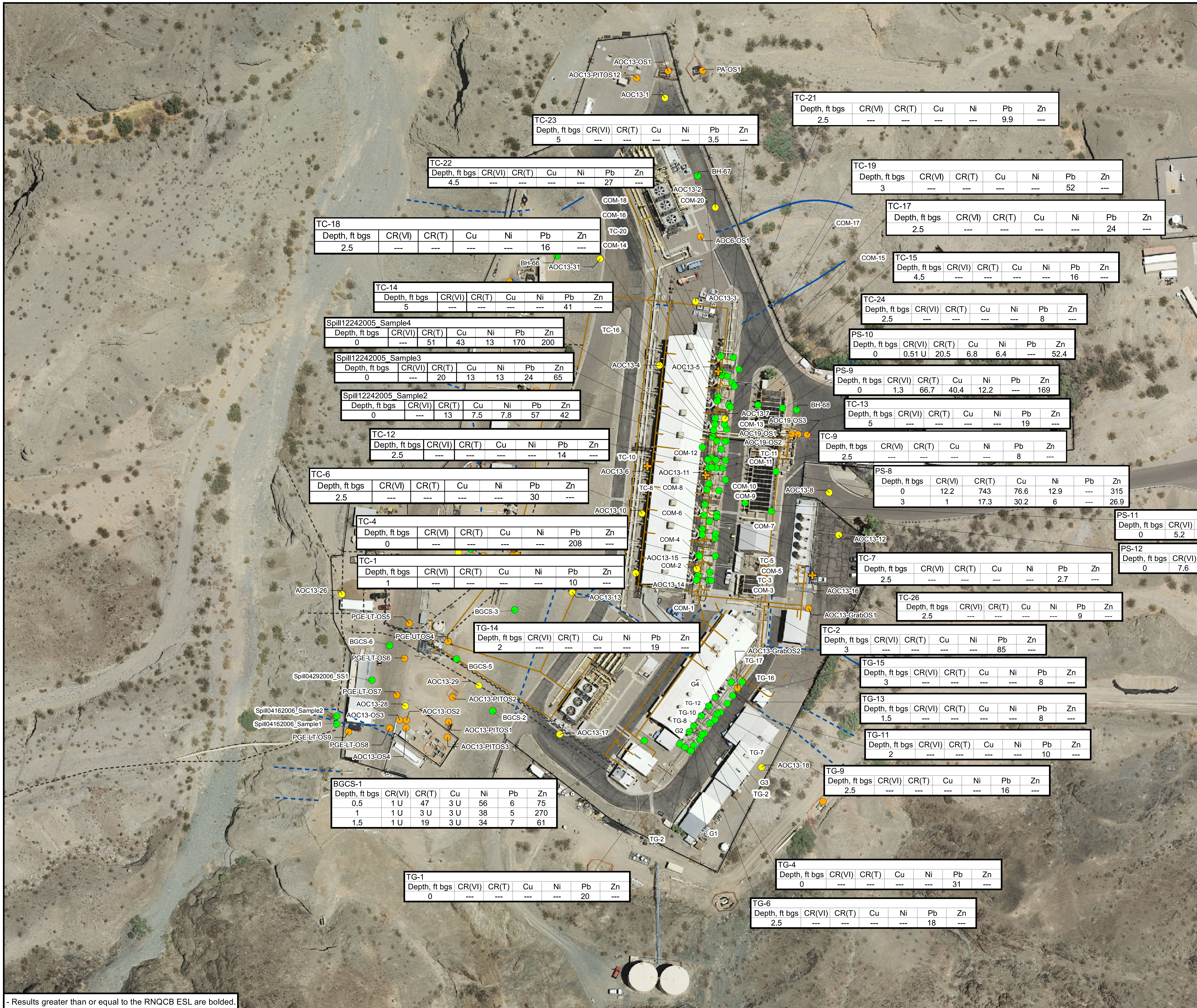
- Results greater than or equal to the Commercial CHHSLs/Industrial Soil PRG are bolded.
- U = not detected above reporting limit shown.

FIGURE B11-1
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 13
UNPAVED AREAS
WITHIN THE COMPRESSOR STATION - LOWER YARD

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC13\AOC13_RESULT_METAL_Lower.mxd



TC-21

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	9.9	---

TC-23

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
5	---	---	---	---	3.5	---

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-17

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	24	---

TC-18

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2.5	---	---	---	---	16	---

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 RNQCB ESL are bolded.
- U = not detected above reporting limit shown.

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC13\AOC13_RESULT_METAL_Upper.mxd

LEGEND

- Proposed Soil Sample Location
- Proposed Soil Gas and Soil Sample Location
- Proposed Contingency Sample Location
- Proposed XRF Screening Location
- Existing Opportunistic Soil Sample Location
- Existing Soil Sample Location
- Stormwater Piping Below Ground
- Stormwater Piping Above Ground
- Site Boundary Fence
- Former/Abandoned Transfer Piping
- Active Transfer Piping

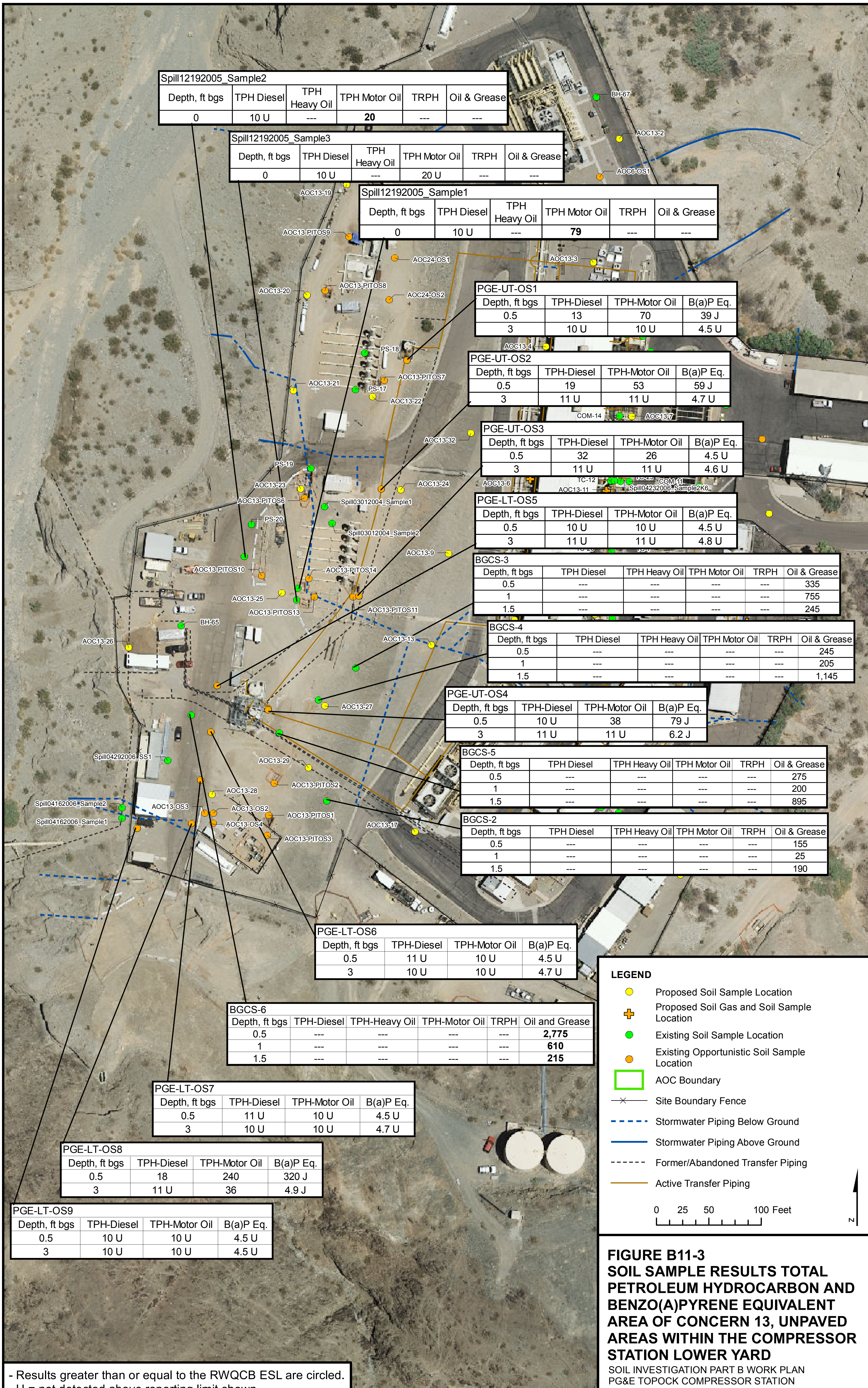
0 25 50 100 Feet

N

FIGURE B11-2
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 13
UNPAVED AREAS WITHIN THE COMPRESSOR STATION - UPPER YARD

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



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-UT-OS1

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	13	70	39 J
3	10 U	10 U	4.5 U

PGE-UT-OS2

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	19	53	59 J
3	11 U	11 U	4.7 U

PGE-UT-OS3

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	32	26	4.5 U
3	11 U	11 U	4.6 U

PGE-LT-OS5

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	10 U	10 U	4.5 U
3	11 U	11 U	4.8 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-UT-OS4

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	10 U	38	79 J
3	11 U	11 U	6.2 J

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

PGE-LT-OS6

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	11 U	10 U	4.5 U
3	10 U	10 U	4.7 U

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-LT-OS7

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	11 U	10 U	4.5 U
3	10 U	10 U	4.7 U

PGE-LT-OS8

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	18	240	320 J
3	11 U	36	4.9 J

PGE-LT-OS9

Depth, ft bgs	TPH-Diesel	TPH-Motor Oil	B(a)P Eq.
0.5	10 U	10 U	4.5 U
3	10 U	10 U	4.5 U

LEGEND

- Proposed Soil Sample Location
- Proposed Soil Gas and Soil Sample Location
- Existing Soil Sample Location
- Existing Opportunistic Soil Sample Location
- AOC Boundary
- Site Boundary Fence
- Stormwater Piping Below Ground
- Stormwater Piping Above Ground
- Former/Abandoned Transfer Piping
- Active Transfer Piping

0 25 50 100 Feet

N

- Results greater than or equal to the RWQCB ESL are circled.
- U = not detected above reporting limit shown.

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FIGURE B11-3
SOIL SAMPLE RESULTS TOTAL PETROLEUM HYDROCARBON AND BENZO(A)PYRENE EQUIVALENT AREA OF CONCERN 13, UNPAVED AREAS WITHIN THE COMPRESSOR STATION LOWER YARD

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

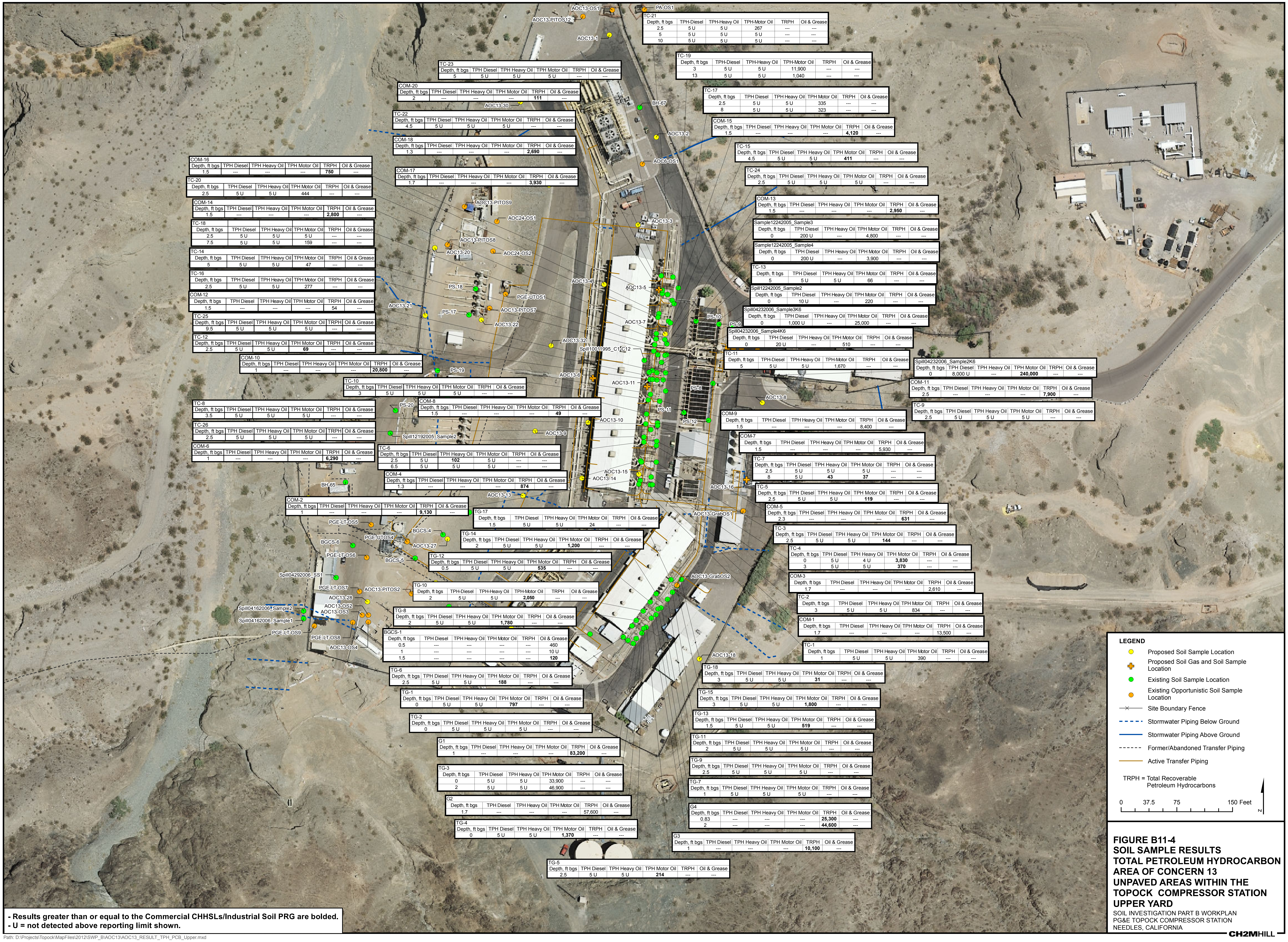
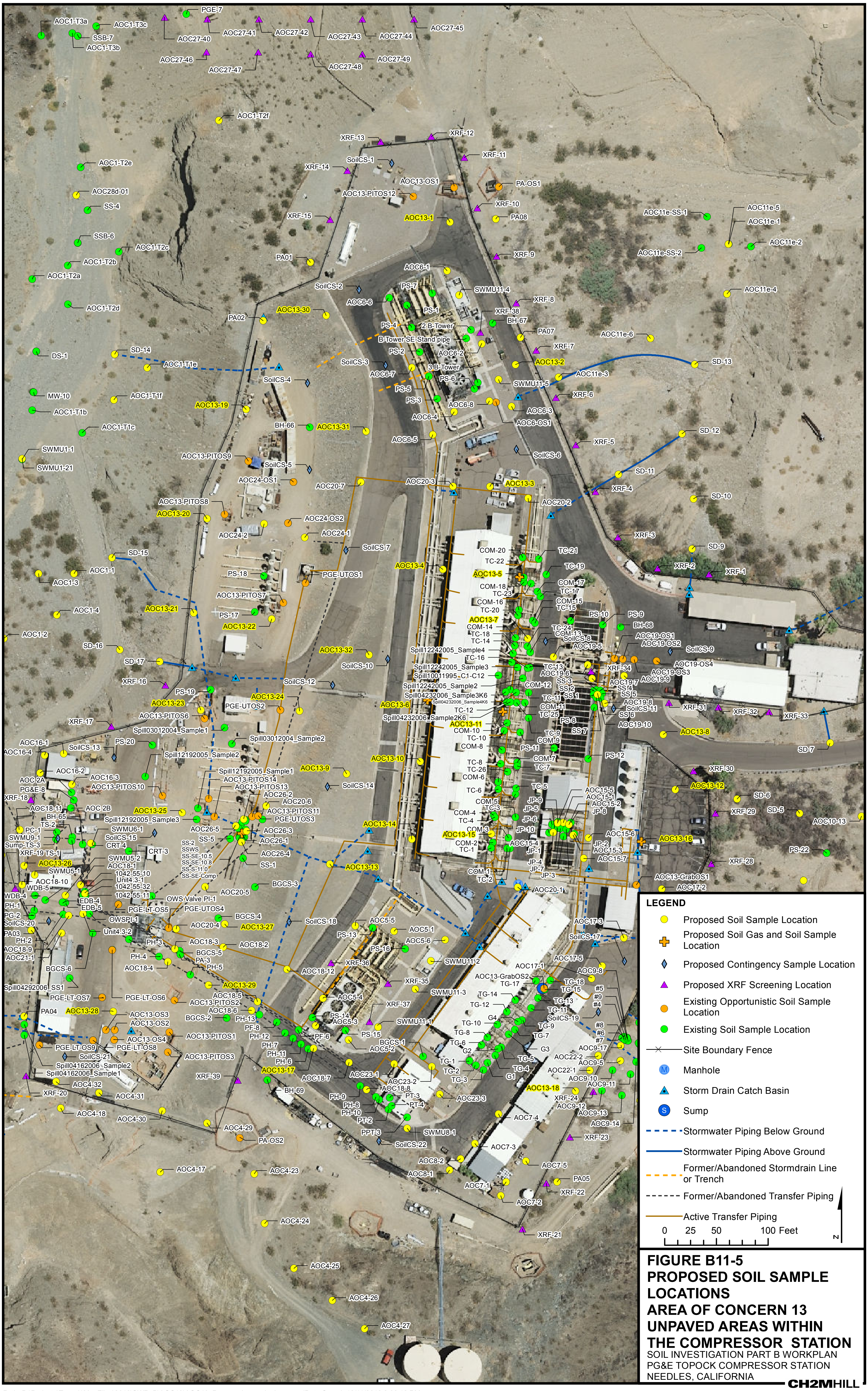


FIGURE B11-4
SOIL SAMPLE RESULTS TOTAL PETROLEUM HYDROCARBON AREA OF CONCERN 13 UNPAVED AREAS WITHIN THE TOPOCK COMPRESSOR STATION UPPER YARD

SOIL INVESTIGATION PART B WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC13\AOC13_RESULT_TPH_PCB_Upper.mxd



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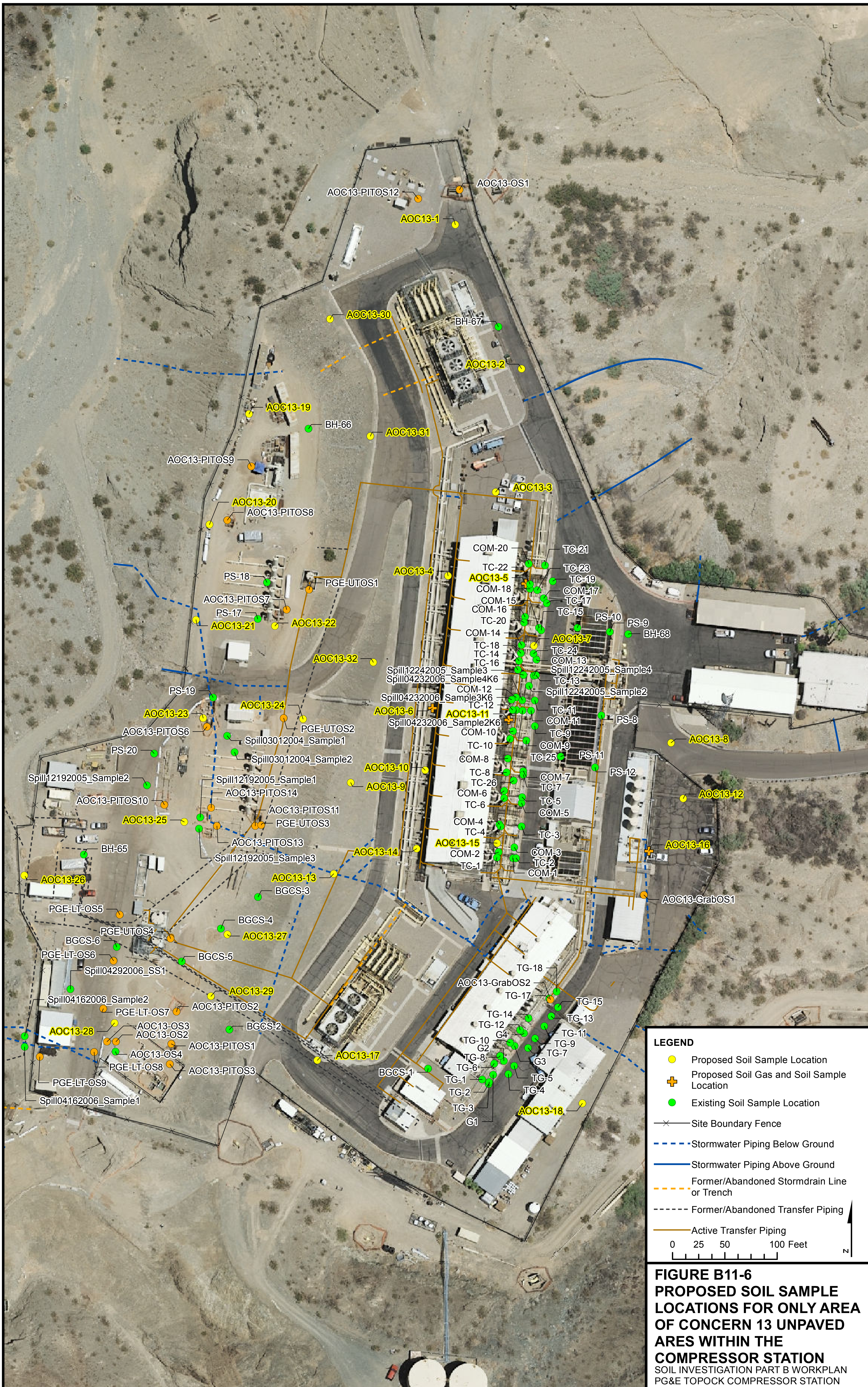


FIGURE B11-6
PROPOSED SOIL SAMPLE LOCATIONS FOR ONLY AREA OF CONCERN 13 UNPAVED ARES WITHIN THE COMPRESSOR STATION
SOIL INVESTIGATION PART B WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC13\AOC13_ONLY_Proposed_sample_Locs.mxdDate Saved: 1/8/2013 10:33:34 AM

Subappendix B12
AOC 15 – Auxiliary Jacket Cooling Water Pumps Investigation Program

Contents

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
DTSC	California Environmental Protection Agency, Department of Substances Control
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
VOC	volatile organic compound
XRF	x-ray fluorescence

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 B12-1. (All tables and figures appear at the end of this subappendix). 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 ground surface at the unit slopes slightly to the southwest. The area around the pumps is currently covered with gravel, and there is no exposed soil in this area. However, aerial photos from 1967 and earlier indicate that the area immediately adjacent to the AJCW system was unpaved. Later aerial photographs do not provide sufficient resolution to determine when the area was first paved. Chromium-based cooling water additives were used in ACJW system from 1951 through 1985. In 1985, the system was converted to using nonhazardous, molybdate-based cooling water additives. Incidental leaks and spills have occurred and 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).

In addition, a 1955 historical aerial photograph appears to show dark staining immediately to the east of the eastern edge (retaining wall) of the unit. The source of the staining is unknown but may be associated with the same types of activities described for Area of Concern (AOC) 13, discussed in Appendix B11.

1.2 Conceptual Site Model

A graphical conceptual site model has been developed for 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 the main report. In addition, any liquids released to surface soil immediately adjacent to the unit could have affected surface soil and migrated to shallow soil.

The primary source medium at AOC 15 is surface soil. Because the entire AOC is covered with gravel or concrete pavement, runoff of contaminated surface soil in rainwater is considered to be only a minor migration pathway (that is, where gravel cover is thin); however, soluble constituents located in surface soils, including in surface soils adjacent to the eastern edge of the unit, may dissolve into rain water and be carried in surface water runoff.

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 sampled in April 1997, and locations JP-8 through JP-10 were sampled 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 surface and at 3 feet bgs at all three locations and at 2 feet bgs at 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 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 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 Decisions 2 through 5 is presented in the main text of Appendix B, and additional sampling for these decisions, if necessary, is included in this subappendix.

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 for commercial use) one time.

3.0 AOC 15 Nature and Extent Data Gaps Evaluation

The following subsection discusses the nature and extent of COPCs detected above screening levels at AOC 15. As discussed in the main text of 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 of this subappendix. Section 4.0 of this subappendix 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) (regional screening level) one time (2,100 mg/kg at JP-2-S at 0 feet bgs), as shown in Table B12-2 and on 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 on 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 4.4 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 on 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 on 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 180 mg/kg. Seven of the detected zinc concentrations exceeded the BTV (58 mg/kg) but did not exceed the commercial screening level (100,000 mg/kg) (CHHSL), as shown in Table B12-2 and on 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 the lateral delineations of all metals analyzed are incomplete and that the vertical delineations of total chromium, hexavalent chromium, copper, and molybdenum are also incomplete. Data gaps remain with regard to other metals. Finally, no samples have been collected to date in the stained area immediately east of AOC 15.

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:

- Data Gap #1 – Lateral and vertical extents of contamination of Title 22 metals
- Data Gap #2 – Lateral and vertical extents of contamination in stained area immediately east of AOC 15

Data gaps for Decisions 2 through 5 are discussed in the main text of 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 in Section 4.3.

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 Figure B-3, Topock Compressor Station Accessibility Map. The eastern portion of the unit is raised approximately 3 feet above grade, and major aboveground utilities are on the eastern edge of the AOC 15 boundary. The control building is present to the north, fin fan (jacket water) coolers are present to the south, and control panel cabinets (SCADA cabinets) are present to the west. There is no concrete or pavement cover over any of the proposed sampling locations, making x-ray fluorescence (XRF) and hand sampling the preferred methods for sampling five of the seven proposed sample locations (AOC15-1 through AOC 15-5). Proposed sample location AOC15-6 and AOC15-7 are located outside of the AOC boundary to the east and southeast, respectively, and are likely accessible by hydrovac. The access assessment for each sampling location can be found in Table B12-4. 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 Supervisory Control and Data Acquisition cabinets. Photographs 17 through 24 in Appendix B26 show the accessibility constraints in AOC 15. Sample locations and depths identified for AOC 15 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of the main text of Appendix B.

4.3 AOC 15 Proposed Sampling

Table B12-4 summarizes the proposed AOC 15 sample locations, depths, description/ rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B12-3. The proposed AOC 15 sample locations were defined in collaboration with the California Environmental Protection Agency, Department of Substances Control (DTSC) and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Based on the historical use of chromium-based cooling water additives in this system and DTSC requirements, the COPCs associated with AOC 15 are Title 22 metals, hexavalent chromium, and pH. COPCs are anticipated to be limited to soil only (CH2M HILL, 2007).

Samples are proposed to be collected at seven locations: AOC 15-1 through AOC 15-7. The sample locations in this unit will initially be sampled at the surface (0 to 0.5 foot bgs) and shallow subsurface (2 to 3 feet bgs) intervals in accordance with the phased sampling protocol. 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B12-3. All samples will be analyzed for Title 22 metals, hexavalent chromium, and pH. As directed by DTSC, samples AOC15-6 and AOC15-7 will also be analyzed for SVOCs, PAHs, and polychlorinated biphenyls (PCBs), and these two sample locations will be chosen for Target Analyte List/Target Compound List (TAL/TCL) analysis. (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 sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. The sample has been tentatively identified, as discussed in 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 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

US EPA Method 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.

__________. 1989. *Topock Cooling Water Analyses Report*. March 21.

__________. 1990. *Topock Cooling Water Analyses Report*. September 26.

__________. 1991. *Topock Cooling Water Analyses Report*. January 30.

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 Cooling Water Pumps
Soil Investigation Part B 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 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 and General Chemistry

Area of Concern 15 – Auxiliary Jacket Cooling Water Pumps Investigation Program

Soil Investigation Part B 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	04/24/97	0	N	**1.2**	**81**	---	**28**	**300**	---	39	---	92
JP-1	04/25/97	3	N	**8.3 J**	**72**	---	6	**310**	---	44	---	91
JP-1	04/25/97	4.5	N	**---**	35	---	4.4	**52**	---	20	---	94
	04/25/97	4.5	RE	**3.4**	---	---	---	**---**	---	---	---	---
JP-2	04/24/97	0	N	**53**	**2,100**	---	**820**	**720**	---	**180**	---	97
JP-2	04/25/97	3	N	**1.4**	**41**	---	5.4	**24**	---	57	---	93
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	0	N	**5.9**	**920**	**316**	**---**	**---**	16.6	**133**	8.62	---
JP-8	11/13/98	3	N	**3.5**	**48.1**	9.4	**---**	**---**	12.2	28.4	9.51	---
JP-9	11/13/98	0	N	**13.7**	**1,340**	**40.2**	**---**	**---**	12	**158**	9.27	---
JP-9	11/13/98	3	N	**4**	**135**	**27.1**	**---**	**---**	17	42.7	9.44	---
JP-10	11/13/98	0	N	**32.3**	**930**	**33.5**	**---**	**---**	11.8	53.4	9.16	---
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	---

TABLE B12-3

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 15 – Auxiliary Jacket Cooling Water Pumps Investigation Program
Soil Investigation Part B 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												
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.

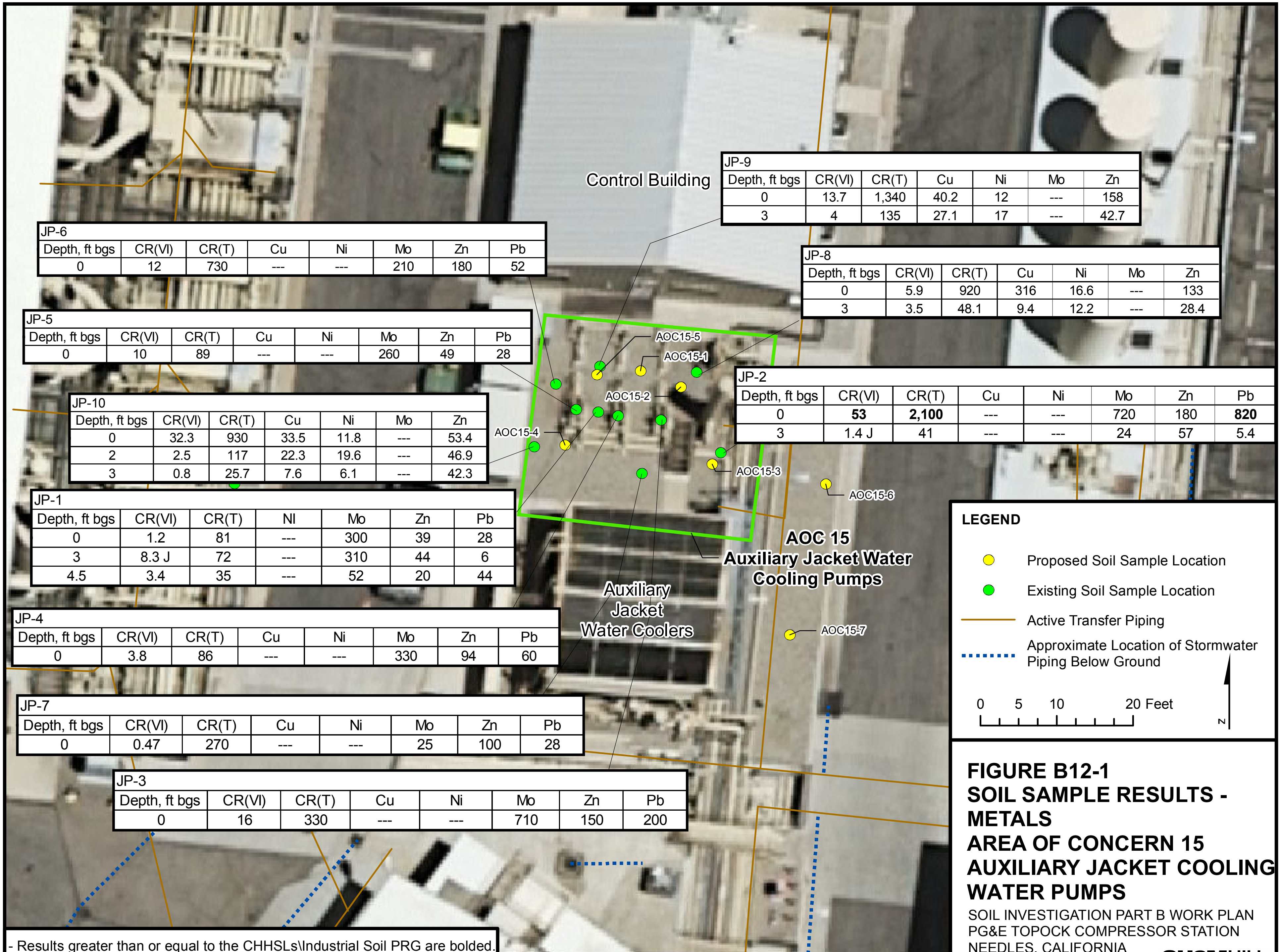
mg/kg miligrams per kilogram
µg/kg micrograms per kilogram
ng/kg nanograms per kilogram
NA not applicable
ND not detected in any of the samples
NE not established
SL screening level

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 Cooling Water Pumps
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Access Assessment
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 extents of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Suitable for hand sampling
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 extents of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Suitable for hand sampling
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 extents 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	Suitable for XRF Suitable for hand sampling
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 extents of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Suitable for hand sampling
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 extents of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Suitable for hand sampling
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 extents of contamination of Title 22 metals	Title 22 metals, hexavalent chromium, SVOCs, PAHs, PCBs, and pH (and TAL/TCL constituents, as requested by agencies)	Suitable for XRF Likely suitable for hydrovac
AOC 15-7	0-0.5 and 3, if feasible	East of the AOC to address staining in unpaved area	Title 22 metals, hexavalent chromium, SVOCs, PAHs, PCBs, and pH (and TAL/TCL constituents, as requested by agencies)	Suitable for XRF Likely suitable for hydrovac

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	Pb
0	12	730	---	---	210	180	52

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	Pb
0	10	89	---	---	260	49	28

JP-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn	Pb
0	**53**	**2,100**	---	---	720	180	**820**
3	1.4 J	41	---	---	24	57	5.4

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)	NI	Mo	Zn	Pb
0	1.2	81	---	300	39	28
3	8.3 J	72	---	310	44	6
4.5	3.4	35	---	52	20	44

JP-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn	Pb
0	3.8	86	---	---	330	94	60

JP-7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn	Pb
0	0.47	270	---	---	25	100	28

JP-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Mo	Zn	Pb
0	16	330	---	---	710	150	200

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.

FIGURE B12-1
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 15
AUXILIARY JACKET COOLING WATER PUMPS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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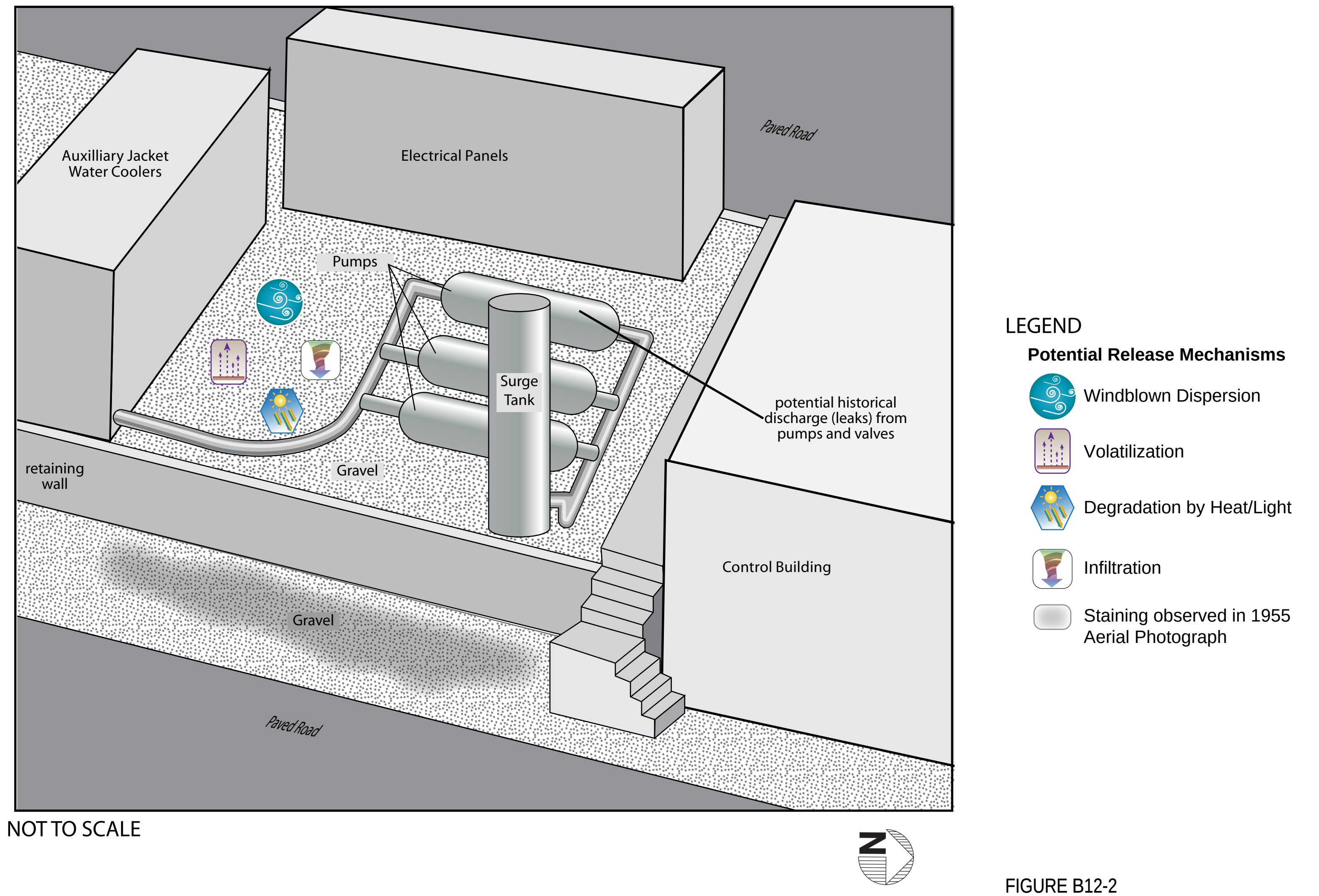


FIGURE B12-2
Conceptual Site Model for AOC15
Auxilliary Jacket Cooling Water Pumps
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

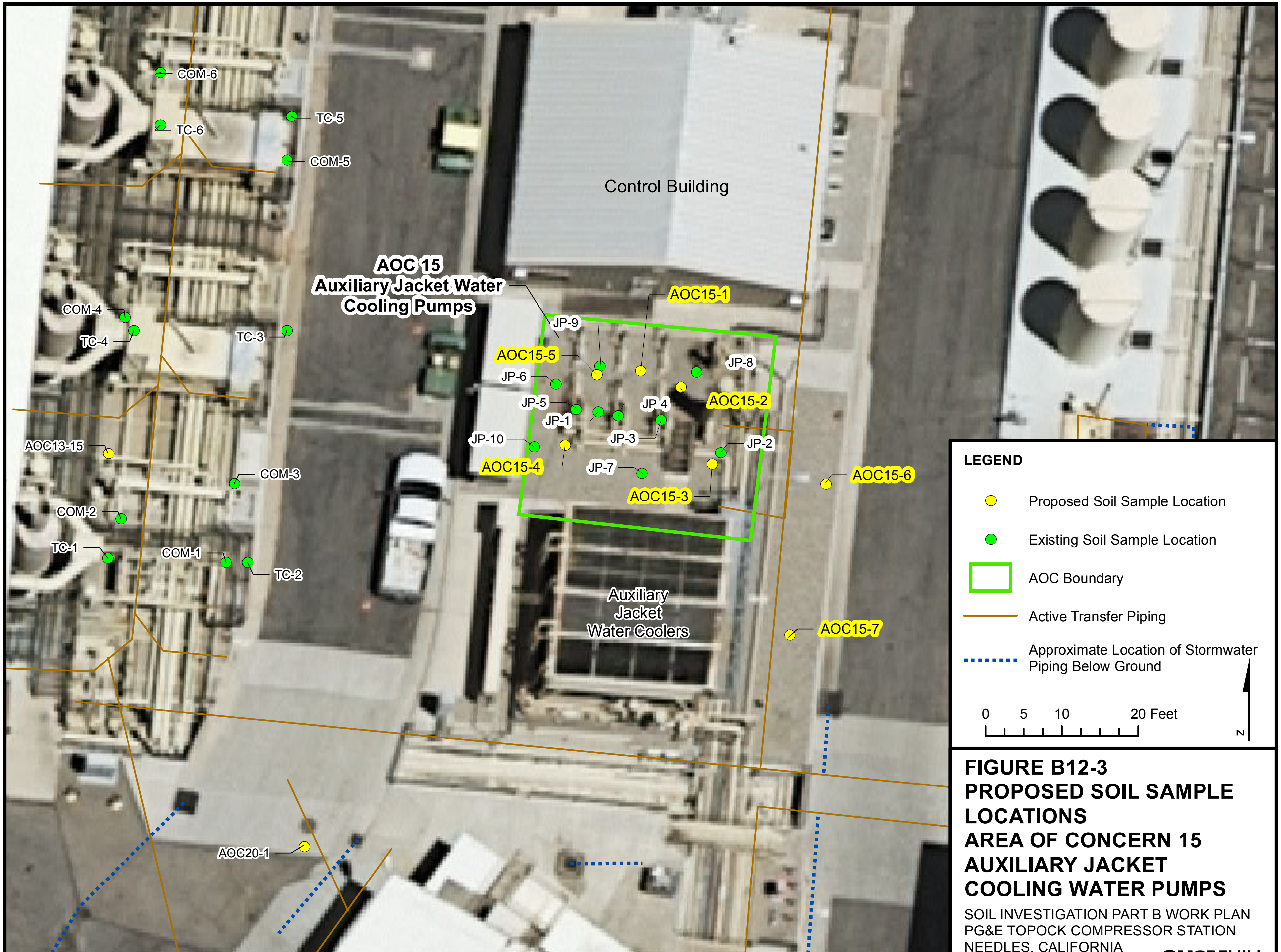


FIGURE B12-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 15
AUXILIARY JACKET COOLING WATER PUMPS

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC15\AOC15_Proposed_sample_Locs.mxd Date Saved: 8/29/2012 11:54:22 AM

Subappendix B13
AOC 16 – Sandblast Shelter
Investigation Program

Contents

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
BTV	background threshold value
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
PG&E	Pacific Gas and Electric Company
XRF	x-ray fluorescence

SUBAPPENDIX B13

AOC 16 Investigation Program

1.0 Introduction and Background

1.1 Background

The sandblast shelter is located in the lower yard near injection well PGE-08 (Solid Waste Management Unit 2), as shown in Figure B13-1, and is constructed of four supports and a roof with open sides. (All tables and figures appear at the end of this subappendix.) 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 is used to prepare metal items at the facility for protective coating and was installed in the late 1980s, although some sandblasting historically occurred in this area before the sandblast shelter was constructed. The shelter in its current configuration was used by Pacific Gas and Electric Company (PG&E) until the early 1990s. At that time regulatory requirements for sandblasting changed, and PG&E began to exclusively hire contractors to do sandblasting. The sandblasting operations are conducted offsite by contractors who follow the applicable air quality standards and best management practices, including the use of tenting, drop cloths, and post-sandblast cleaning to minimize the spreading of material during and after sandblasting operations. All sandblasting contractors are licensed, maintain the proper permits, and are required to implement best management practices to contain sand blast material. The majority of the work is conducted offsite. For any work done onsite, contractors are required to implement best management practices to contain sandblast material. No change to plant operations to minimize future risks associated with current sandblasting activities is required.

During site walks with California Environmental Protection Agency, Department of Substances Control, two different colors of apparent abrasive material were noted on the ground in the immediate vicinity of the sandblast shelter. Sandblasting operators bring abrasive materials onsite and are specified to meet standards associated with the air permit for sandblasting activities. Two types of sandblast material typically have been used in the past several years: KleenBlast and Monterey 30 Mesh sand. KleenBlast comprises mostly iron oxide, silicon dioxide, silica, alumina, calcium, and 5.9 percent of other trace metals and oxides. Monterey sand is primarily (99 percent) 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 sandblast residue. The dark material mixed with sand on the west side of the sandblast shelter that was previously identified as possible abrasive material (sandblast grit) may also be coke breeze (that is, granular carbon material used to fill the cathodic protection anodes at the station).

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. 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 sandblast grit, incidental spills of sandblasting materials, and potentially lead-based paint resulting from sandblasting activities. The quantity of any used sandblast grit released in the area is unknown; however, as noted above, sandblast grit was observed 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 sandblast grit spilled from the shelter would have been released to surface soil. Contaminants could have leached from surface soils into underlying soils. Contaminated sandblast grit could also have been carried off the station in sheet flow during high rainfall events. Windblown dust contamination from small particles of sandblast 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

One soil sample was collected within AOC 16 in 1998 as part of PG&E's routine environmental management program (PG&E, 1998). The precise location of this soil sample is not known; it was simply identified as "Sandblast Soil Sample" and was analyzed for total and soluble metals concentrations for the full Title 22 metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc). The sample was not analyzed for hexavalent chromium. While this sample cannot be precisely located, it nonetheless provides useful information on soil conditions at this unit. Nine metals were detected in the sample: arsenic, barium, total chromium, cobalt, copper, lead, nickel, vanadium, and zinc. Lead was the only metal at a concentration exceeding the background threshold value (BTV) (detected concentration of 20 milligrams per kilogram [mg/kg] compared to the BTV of 8.39 mg/kg). Five metals had a detectable soluble fraction (barium, total chromium, copper, lead, and zinc); all detected soluble concentrations were well below the respective soluble threshold limit concentrations for each metal. 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).

In addition, 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. These two soil samples were analyzed for total chromium, hexavalent chromium, copper, nickel, and zinc. Laboratory analytical results for the historical soil samples are presented in Table 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.

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. Zinc was the only constituent detected at a concentration above its BTV. At location AOC2A zinc was detected at a concentration of 367 mg/kg, compared to the BTV of 58 mg/kg. All constituent 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).

Data for samples AOC2A and AOC2B are considered Category 1 and were used as inputs to the five data quality objective decisions for AOC 16. The soil sample collected in 1998 is considered Category 3. 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 Decisions 2 through 5 is presented in the main text of Appendix B, and additional sampling for these decisions, if necessary, are included in this subappendix.

3.0 AOC 16 Nature and Extent Data Gaps Evaluation

This section discusses the nature and extent of COPCs detected above interim screening levels at AOC 16. As discussed in the main text of 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 subappendix 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 extents of potential contamination to the south, east, north, and west of this unit have not been defined, and the nature of the possible abrasive material noted in the vicinity of the unit has not been evaluated.

4.0 AOC 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:

- Data Gap #1 – Lateral and vertical extents of contamination south, east, north, and west of the structure
- Data Gap #2 – Nature of possible abrasive material in the vicinity of the structure

Data gaps for Decisions 2 through 5 are discussed in the main text of 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 COPECs above Part A interim screening levels that could become potential sources of COPCs and COPECs 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 in Section 4.3.

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 Figure B-3, Topock Compressor Station Accessibility Map. A majority of the area within the AOC 16 boundary is located within a covered structure and is unsuitable for sampling. The proposed sampling locations are located outside of the AOC 16 boundary in an unpaved area of the compressor station, making these locations suitable for x-ray fluorescence (XRF) screening. Two of the sampling locations are likely accessible by hydrovac, while two are suitable for hand sampling. Table B13-4 provides the accessibility assessment for each sampling location. 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 26 in Appendix B26 shows the accessibility constraints in AOC 16. Sample locations and depths identified for AOC 16 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of the main text of Appendix B.

4.3 AOC 16 Proposed Sampling

Table B13-4 summarizes the proposed AOC 16 sample locations, depths, description/ rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B13-2. The figure also shows proposed sample locations for surrounding solid waste management units and AOCs. The proposed AOC 16 sample locations were defined in collaboration with the California Environmental Protection Agency, Department of Toxic Substances Control and United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Samples are proposed to be collected at four locations: AOC 16-1 through AOC 16-4. The sample locations in this unit will initially be sampled at the surface (0 to 0.5 foot bgs) and shallow subsurface (2 to 3 feet bgs) intervals in accordance with the phased sampling protocol. 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B13-2. Based on the available information, COPCs for soil associated with AOC 16 consist of some metals (for example, 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 in 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 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.

Pacific Gas and Electric Company (PG&E). 1998. Letter from Rex Bell/PGE to Robert Senga/DTSC. "Analytical Results of Sandblast Soil Sample." April 13.

Tables

TABLE B13-1
Conceptual Site Model, AOC 16 – Sandblast Shelter
Soil Investigation Part B 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 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 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	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.

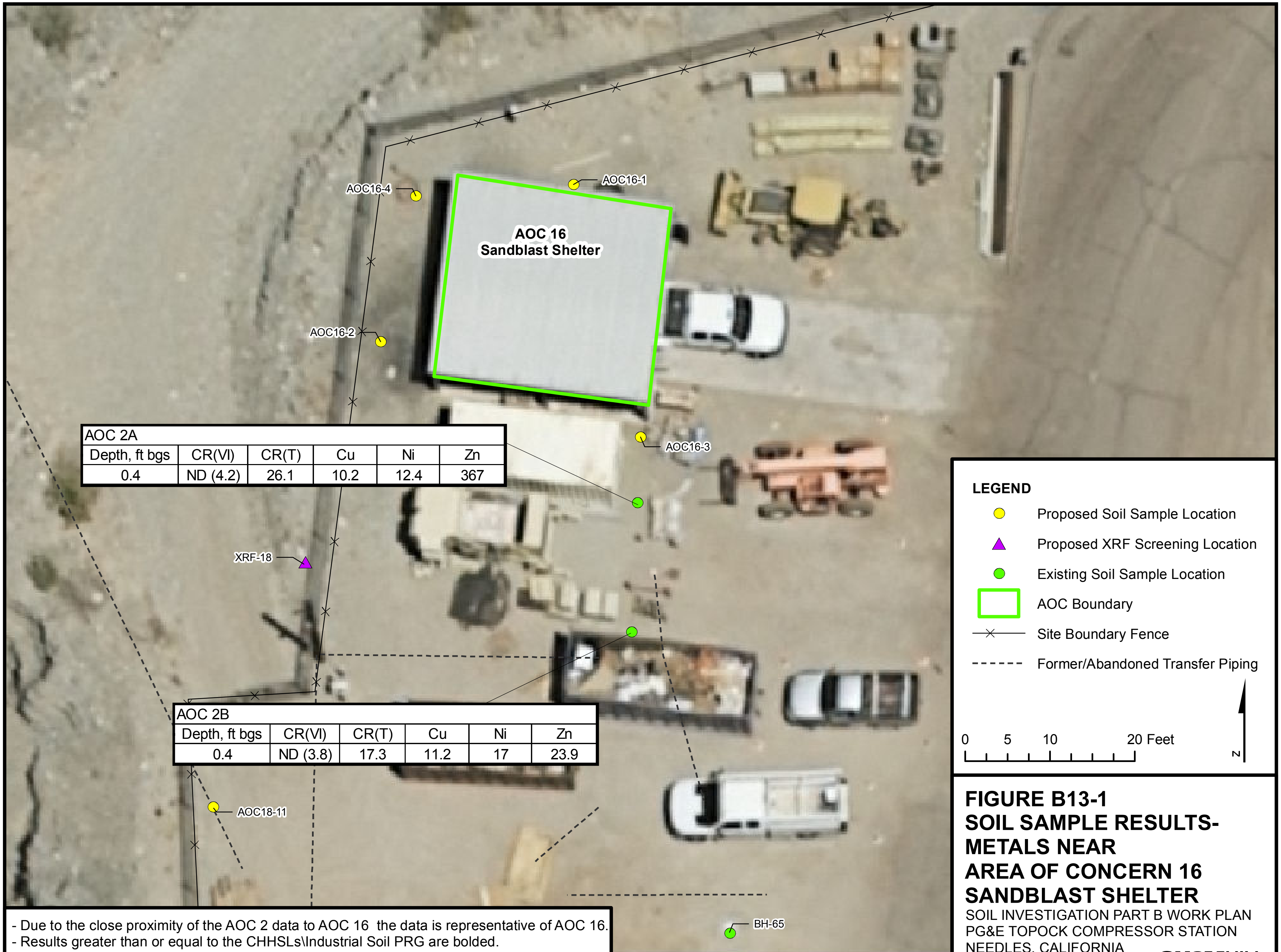
mg/kg	miligrams per kilogram
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
NA	not applicable
ND	not detected in any of the samples
NE	not established
SL	screening level

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 – Sandblaster Shelter
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 16-1	0-0.5 and 3, if feasible	North side of sandblast shelter; to resolve Data Gaps #1 and #2, lateral and vertical extents of contamination north of the structure and nature of sandblast grit in the vicinity of the structure	Title 22 metals and Target Analyte List/Target Compound List constituents, as requested by agencies	Suitable for XRF Likely accessible by hydrovac
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 extents of contamination west of the structure and nature of sandblast grit in the vicinity of the structure	Title 22 metals	Suitable for XRF Suitable for hand sampling
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 extents of contamination east and south of the structure and nature of sandblast 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	Suitable for XRF Likely accessible by hydrovac
AOC 16-4	0-0.5	Sample of sand blast grit; to resolve Data Gap #2, nature of sandblast grit in the vicinity of the structure	Title 22 metals	Suitable for XRF Suitable for hand sampling

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

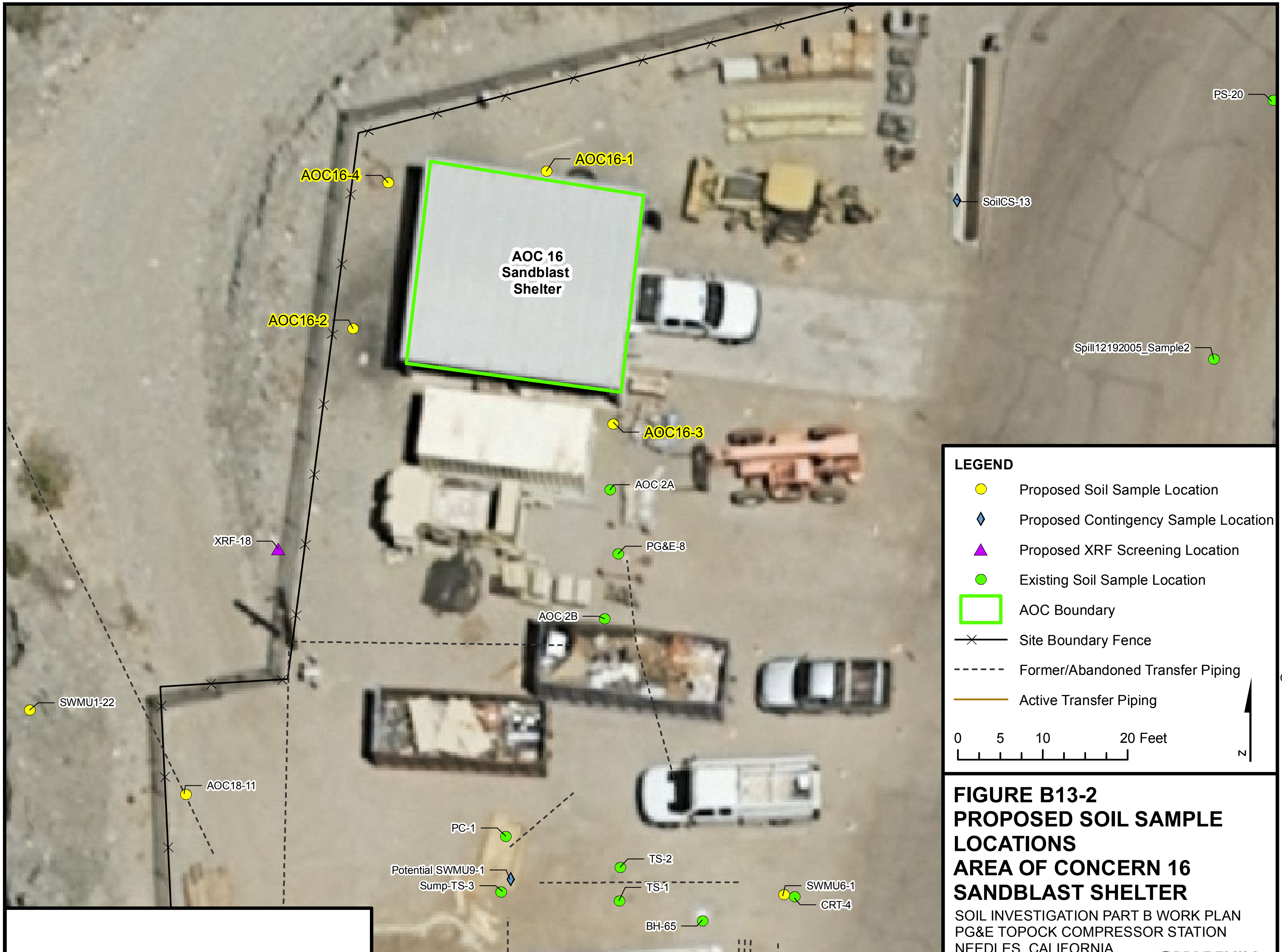
- Due to the close proximity of the AOC 2 data to AOC 16 the data is representative of AOC 16.
- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.

FIGURE B13-1
SOIL SAMPLE RESULTS-METALS NEAR AREA OF CONCERN 16 SANDBLAST SHELTER

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC16\AOC16_RESULT_METAL.mxd



C13-25

FIGURE B13-2
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 16
SANDBLAST SHELTER

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

CRT-3

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC16\AOC16_Proposed_sample_Locs.mxd Date Saved: 8/31/2012 1:56:40 PM

Subappendix B14
AOC 17 – Onsite Septic System and AOC 33 – Potential Former Burn Area near AOC 17 Investigation Program

Contents

Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
XRF	x-ray fluorescence

SUBAPPENDIX B14

AOCs 17 and 33 Investigation Program

1.0 Introduction and Background

1.1 Background for AOC 17

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 subappendix.) 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. The septic system is believed to have been installed at the same time as the Auxiliary Building (when the facility was first constructed) because locker-room facilities were part of the original design of the Auxiliary Building. The other nearby buildings were installed later, the Weld Shop and Garage in 1973 and the Technical Maintenance Building in the early 1990s. It is likely that sanitary lines from the Weld Shop, Garage, and Technical Maintenance Building also drain to AOC 17.

One of the sources of wastewater 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 5 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). Drawing 481785 (Revision 22), located during the recent review of engineering drawings, shows the approximate location of the septic system (Pacific Gas and Electric Company [PG&E], 1967). The drawing indicates that the septic system comprised 4 leach lines, spaced 6 feet apart, and 100 feet long. The previous locations of the septic tank and leach lines were based on a hand-sketched drawing and were slightly east of the position shown on the engineering drawing. The location of the leach lines and the boundary of AOC 17 have been adjusted to reflect the engineering drawing information.

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 when the area was paved.

1.2 Background for AOC 33

In response to a 2009 request from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) to collect additional information regarding potential burn activities at Topock Compressor Station, PG&E conducted additional interviews with former employees (PG&E, 2009a). To confirm the new anecdotal information about burn activities, additional site walks and interviews were conducted. Newly gathered information was provided to agencies 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 was identified in AOC 17 as a result of the additional interview and was discussed with the agencies in e-mails dated February 22, 2010 and February 24, 2010. Information provided during the interviews indicated yearly fire-training exercises involving burning of scrap lumber, pallets, stacked wood, power poles, siding from the cooling towers, natural gas pipe and diesel oil occurred east of the washrack/steam cleaning area. Because this area is located within the footprint of AOC 17, it is being investigation in conjunction with AOC 17.

1.3 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 1 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 as well as the other buildings listed above.

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 (more than 4 feet below ground surface [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.

The primary source medium at AOC 33 is surface soil and may also have included pavement if fire-training activities occurred after the area was paved. The primary release mechanisms are direct releases of contaminated particulates or leaching of contaminants from potential fire-training exercises in this area. Contaminants present in burned materials could have been deposited on surface soil as particulates or entered surface soil as dissolved constituents through infiltration of rainfall. 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. Windblown dust contamination from contaminated surface soil within AOC 33 is a potential secondary release mechanism. Windblown contamination, if any, is expected to be limited to surface soils. Surface runoff from AOC 33 to the East Ravine could also have transported chemicals of potential concern/chemicals of potential ecological concern (COPCs/COPECs) in surface soil.

2.0 Summary of Past Soil Characterization

AOCs 17 and 33 have not been previously sampled.

3.0 AOC 17 and AOC 33 Data Gaps and Proposed Sampling

3.1 AOC 17 and AOC 33 Data Gaps

Based on the site conceptual model and Part B data quality objectives, the following data gaps were identified for Decision 1:

- Data Gap #1 – Lateral and vertical extents of contamination in the vicinity of the leach field
- Data Gap #2 – Lateral and vertical extents of contamination in the vicinity of the potential former burn area

Data gaps for Decisions 2 through 5 are discussed in the main text of Appendix B and include:

- **Decision 2:** No data have been collected in these specific AOCs. Data that will be collected as part of the Part B Investigation will be combined with existing data for the site and considered in the exposure point concentrations developed for the risk assessment. 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 COPECs above Part A interim screening levels that could become potential sources of COPCs and COPECs 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 in Section 3.3 of this subappendix.

3.2 AOC 17 Access Constraints

As discussed in Section 3.0 and Figure B-3 in Appendix B, there are substantial access constraints within the compressor station. AOC 17 is located in Area 11 and Area 16 on Figure B-3, Topock Compressor Station Accessibility Map. All five proposed AOC 17 sampling locations are within a paved area of the compressor station, making them unsuitable for x-ray fluorescence (XRF) screening; however, each proposed sample is located such that access by hydrovac is likely possible. The accessibility assessment for each of the sampling locations is located in Table B14-2. Thirty-two utility risers, consisting of wastewater, water, and electrical lines, were identified in Area 11. Thirty-six utility risers, consisting of various water and electrical lines, are present in Area 16. Photograph 7 in Appendix B26 shows 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.

3.3 AOC 17 and AOC 33 Proposed Sampling

Table B14-2 summarizes the proposed AOC 17/AOC 33 sample locations, depths, description/rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B14-1. Because AOC 33 is contained within AOC 17, sample locations for AOC 17 will also be used to evaluate AOC 33.

Figure B14-1 shows nearby units and proposed sampling at nearby units. For ease of reference, Figure B14-3 shows the AOC 17/33 sample locations only. A geophysical survey will be performed to attempt to locate the exact location of the leachfield to assist with sample location placement. Details for a geophysical survey are presented in Section 2.2.4 in the main text of the work plan. The proposed AOC 17/33 sample locations were defined in collaboration with DTSC and United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Sampling is required near the septic tank and in the general vicinity of the leachfield, as well as the potential former burn area. If feasible, without endangering the integrity of the septic system, samples will be collected from within the leachfield. Based on operational history and DTSC requirements, the COPCs associated with AOC 17 are Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs) in surface soil, and SVOCs, including PAHs. Sample locations AOC 17-2 and AOC 17-4 are also proposed to be sampled for dioxins and furans to address potential contamination associated with AOC 33 (the former Burn Area). COPCs are anticipated to be limited to soil only (CH2M HILL, 2007).

Samples are proposed to be collected at five locations: AOC 17-1 through AOC 17-5. Samples will be collected at the surface (0 to 1 foot bgs), 2 to 3 feet bgs, 5 to 6 feet bgs, and 9 to 10 feet bgs. The latter two depths are expected to be below the depth of the leach lines. Proposed sample locations may be adjusted following the completion of the geophysical survey to ensure that the leach lines are avoided. The area of sampling is covered with concrete or asphalt; therefore, the surface sampling interval will begin at the bottom of the concrete/asphalt or gravel subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B14-1. All samples will be analyzed for Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs (in surface soil), and SVOCs, including PAHs. PCBs will also be analyzed in the shallow subsurface soil samples (2 to 3 feet bgs) from AOC17-2 and AOC 17-4. In addition, surface and shallow subsurface soil samples from AOC17-2 and AOC 17-4 will also be sampled for dioxins and furans to address the potential former burn area (AOC 33). 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 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.

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.

Pacific Gas and Electric (PGE). 1967. *Sewers & Drains, Topock Compressor Station.* Drawing Number 481785 (Revision 22). December 11.

__________. 2009a. Letter from Yvonne Meeks/PG&E to Mr. Aaron Yue/DTSC. “May 15, 2009 DTSC Direction to Sample Wells and Request to Document Burn Activities At and Near the Topock Compressor Station.” August 14.

__________. 2009b. Letter from Ms. Yvonne Meeks/PG&E to Mr. Aaron Yue/DTSC. "October 15 Burn Activities Update." October 15.

__________. 2010a. Letter from Yvonne Meeks/PG&E to Ms. Karen Baker/DTSC. "December 10, 2009 DTSC Letter Regarding Historic Burn Activities and Disposal Practices At and Near the Topock Compressor Station." January 15.

__________. 2010b. Letter from Ms. Yvonne Meeks/PG&E to Ms. Karen Baker/DTSC. "December 10, 2009 DTSC Letter Regarding Historic Burn Activities and Disposal Practices At and Near the Topock Compressor Station." January 29.

Russell, Curt. 2006. Personal Communication in "Final Field Notes Memorandum, May 8 to 9, 2006." May.

Tables

TABLE B14-1
Conceptual Site Model, AOC 17 – Onsite Septic System and AOC 33 – Potential Burn Area
Soil Investigation Part B 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 form Septic System	Subsurface Soil	Percolation and/or infiltration	Subsurface Soil Potential Groundwater	Potential extracted groundwater[a]
Potential Burning During Fire Training Activities	Surface Soil	Percolation and/or infiltration Surface water runoff	Subsurface Soil	Wind erosion and atmospheric dispersion

Notes:

[a] Quantitative evaluation of the groundwater pathway 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 B14-2
Proposed Sampling Plan, AOC 17 – Onsite Septic System and AOC 33 – Potential Burn Area
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 17-1	0-1[a], 3,6, and 10 if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the vicinity of the leachfield.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PCBs (surface soil), and PAHs	Not suitable for XRF Likely accessible by hydrovac
AOC 17-2	0-1[a], 3, 6, and 10 if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the vicinity of the leachfield, and Data Gap #2 – Lateral and vertical extents of contamination in the vicinity of the potential former burn area.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PCBs (surface and shallow subsurface soil (3 feet bgs), dioxins and furans (surface soil and shallow subsurface soil), and PAHs	Not suitable for XRF Likely accessible by hydrovac
AOC 17-3	0-1[a], 3, 6, and 10 if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the vicinity of the leachfield.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PCBs (surface soil), and PAHs; also will be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation	Not suitable for XRF Likely accessible by hydrovac
AOC 17-4	0-1[a], 3, 6, and 10 if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the vicinity of the leachfield, and Data Gap #2 – Lateral and vertical extents of contamination in the vicinity of the potential former burn area.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PCBs (surface and shallow subsurface soil (3 feet bgs), dioxins and furans (surface soil and shallow subsurface soil), and PAHs	Not suitable for XRF Likely accessible by hydrovac
AOC 17-5	0-1[a], 3, 6, and 10 if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination in the vicinity of the leachfield.	Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PCBs (surface soil), and PAHs	Not suitable for XRF Likely accessible by hydrovac

Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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 foot bgs).

Figures

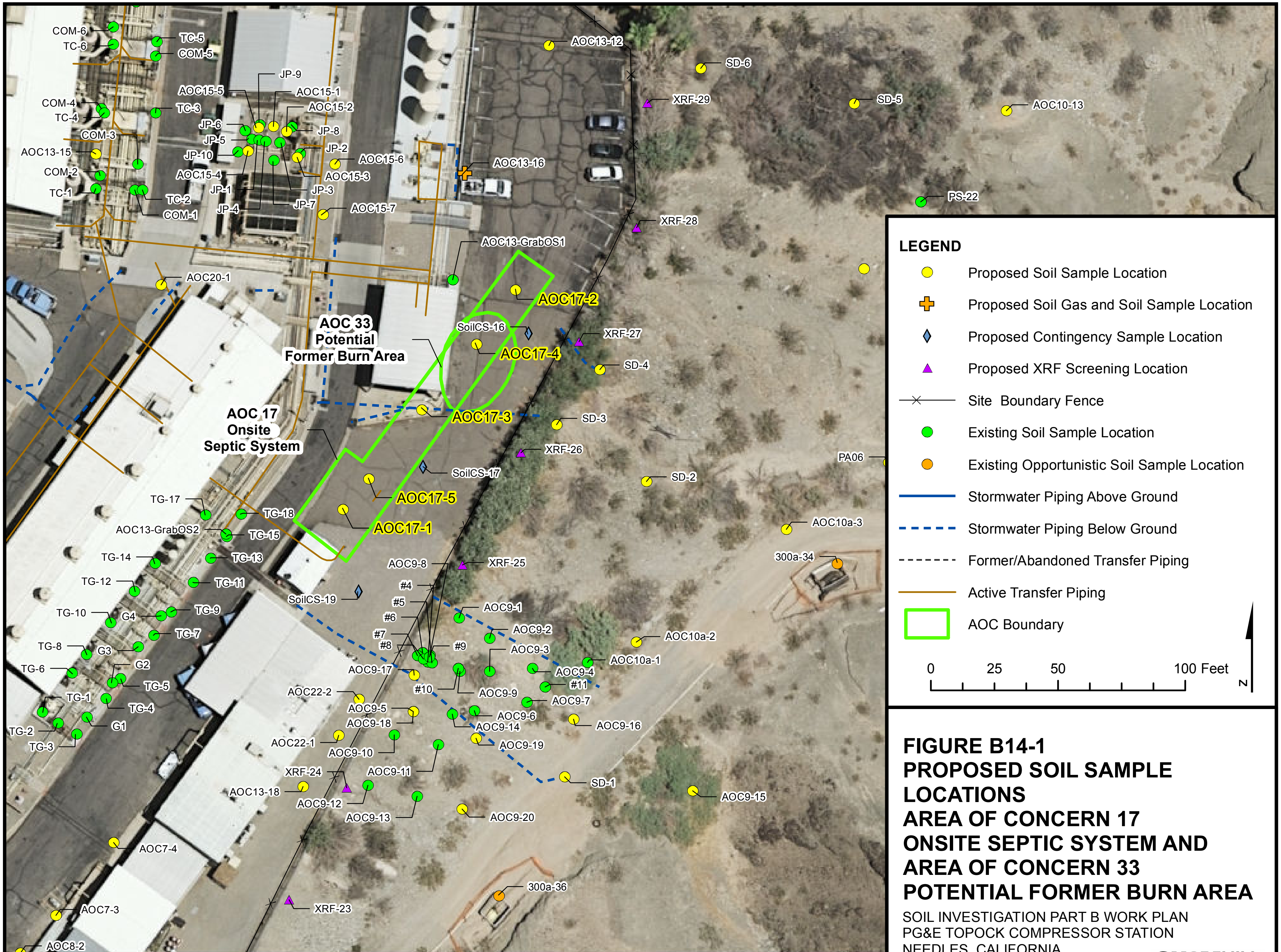


FIGURE B14-1
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 17
ONSITE SEPTIC SYSTEM AND
AREA OF CONCERN 33
POTENTIAL FORMER BURN AREA

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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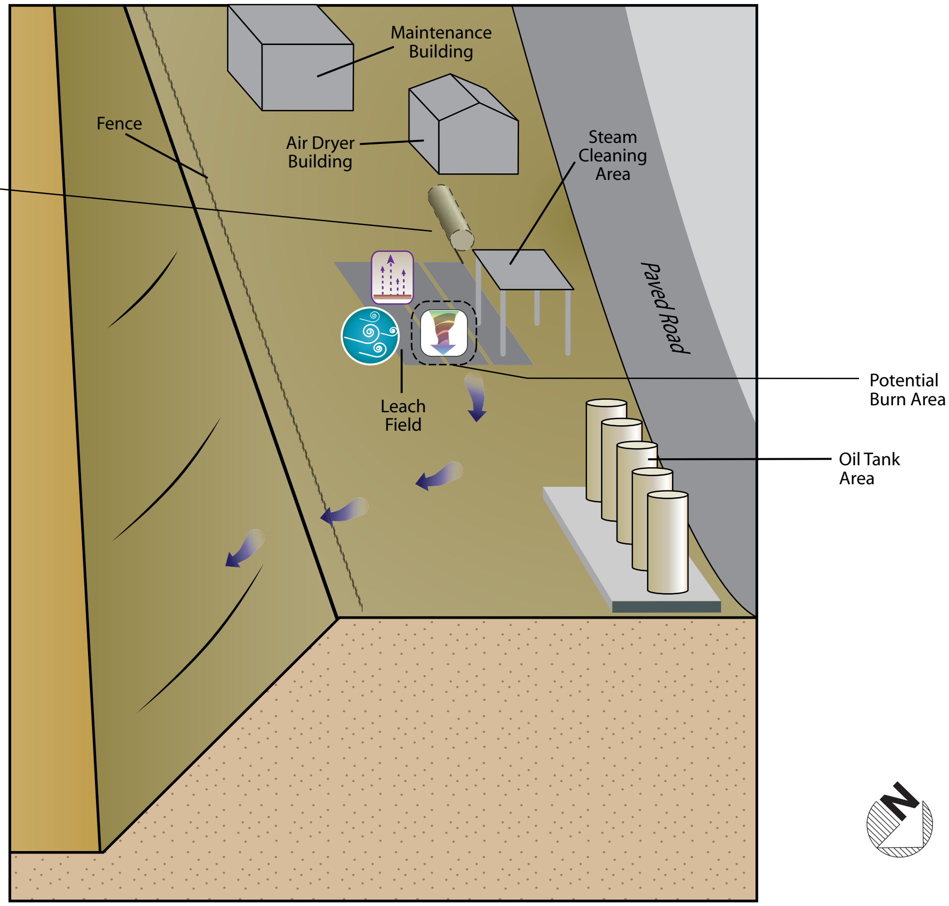

NOT TO SCALE

LEGEND

Potential Release Mechanisms

Infiltration

Infrequent Surface Water Runoff

Windblown Dispersion

Volatilization

FIGURE B14-2
Conceptual Site Model for AOC17 and AOC 33
Onsite Septic System and
Potential Former Burn Area
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

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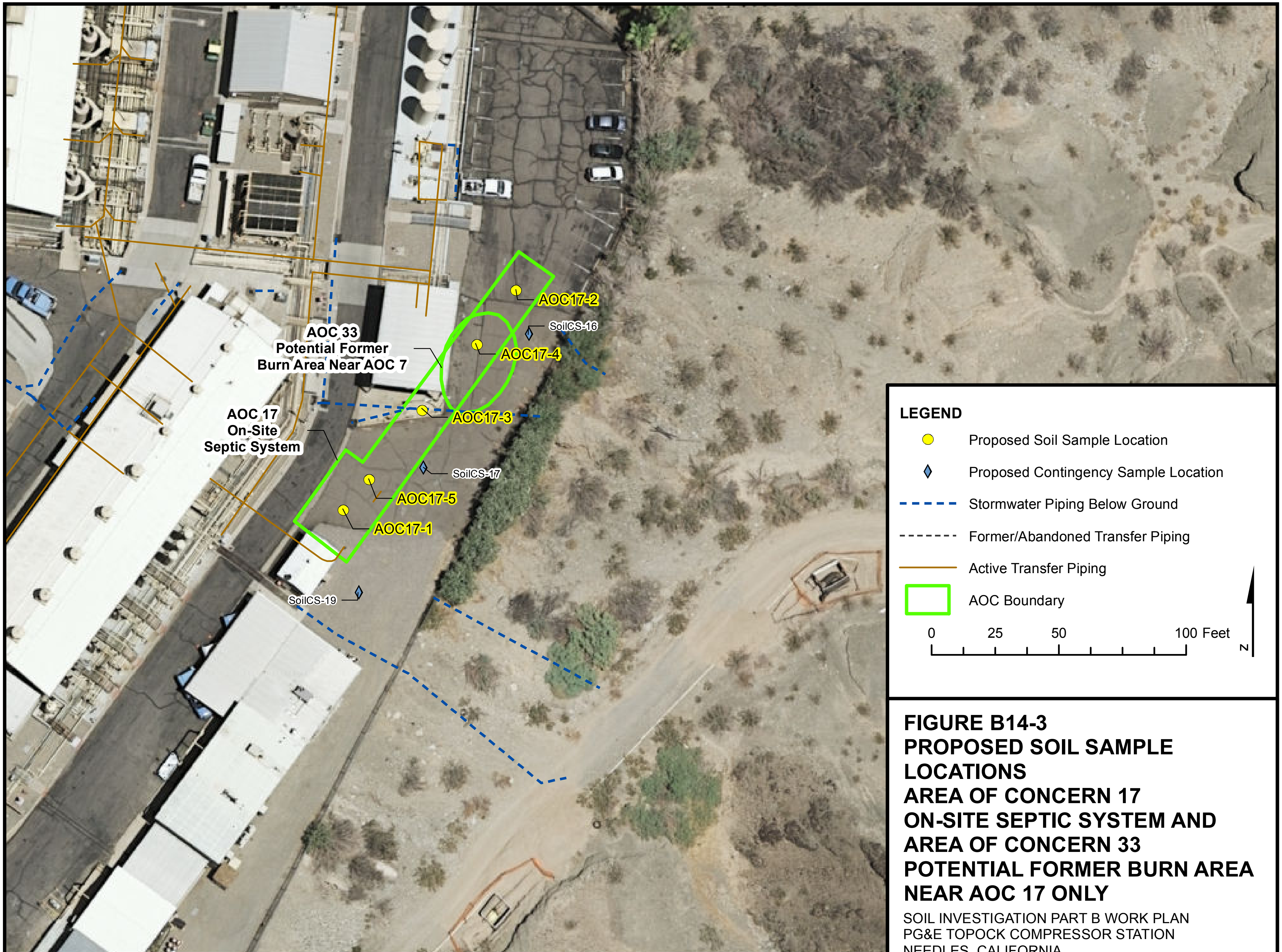

FIGURE B14-3
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 17
ON-SITE SEPTIC SYSTEM AND
AREA OF CONCERN 33
POTENTIAL FORMER BURN AREA
NEAR AOC 17 ONLY

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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Subappendix B15
AOC 18 – Combined Wastewater Transference Pipelines Investigation Program

Contents

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
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
XRF	x-ray fluorescence

SUBAPPENDIX 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, Topock Compressor Station, Needles, California* (Mittelhauser, 1990a).

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 subappendix.)

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 at pressures 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 five locations (PF-6, PF-8, PH-2, PH-3, and PH-10) 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 was backfilled again). Confirmation samples from all five 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. Samples were collected near the ends of the in-place pipelines at PF-6, PH-4, and PH-13.

The wastewater from the pressure test was also analyzed. The wastewater samples were analyzed for Title 22 metals, pH, and fluoride, as shown in Table B15-2. The interior of most of the pipelines had a visible green sludge, and the pipelines 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 (small sections of pipeline segments D-3 [20 feet], F-5 [20 feet], and G-1 [10 feet]), were sufficiently decontaminated and still active (A-3), or were sufficiently decontaminated and long and difficult to remove (G-2 and G-3). The remaining sections of 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 aluminum 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 pressure tested, extensive 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, 1990a), 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 in the pipeline segment leading from a valve box east of the new oily water treatment system to the former oil/water holding tank (Unit 4.3). This pipeline segment was identified as segment I-1, and two samples were collected. The approximate location of these samples (derived from the text description, a sample location figure is not available) is shown in Figure B15-2. These pipeline segments were tested for total petroleum hydrocarbon (TPH) compounds only. Piping was removed where accessible, but approximately 10 feet of segment I-1 (located under the concrete containment structure for the new oily water treatment system) were capped and left in place.

2.0 Summary of Past Soil Characterization

Twenty historical soil samples were collected from 20 locations in AOC 18 (PA-3, PC-1, PF-6, PF-8, PG-2, PH-1 through PH-13, OWSPI-1, and OWSValvePI-1) at depths between 1 and 6 feet below ground surface (bgs), as shown in Figure B15-2. Historical soil samples from 18 locations 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. Historical soil samples from two locations (OWSPI-1, and OWSValuePI-1) were analyzed for TPH. Laboratory analytical results for the historical soil samples are presented in Tables B15-2 and B15-3. Table B15-4 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.

All but one of the 19 metal constituents (thallium) analyzed were detected in soil samples collected in AOC 18. In addition, TPH heavier than diesel was detected in both samples from pipeline segment I-2 (OWSPI-1, and OWSValvePI-1). Table B15-2 lists the 18 detected metal constituents, and Table B15-3 presents the TPH results. Seven of the 18 metal 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). The detected TPH concentrations were below the applicable interim screening levels (California Regional Water Quality Control Board, Region 2 environmental screening levels).

Based on the confirmation soil sampling, the former treatment system piping was considered clean-closed (Mittelhauser, 1990a). 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 OWS system (Mittelhauser, 1990b). 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), 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 of this subappendix 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:

- Data Gap #1 – Collect additional soil samples to analyze for organics especially at areas where releases have been documented.
- Data Gap #2 – Define lateral and vertical extents of detected metals at historical sample location PH-2.
- 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 in Section 4.2 of this subappendix.

4.0 AOC 18 Proposed Sampling

4.1 AOC 18 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 18 is located in multiple Areas: 3, 4, 6, 8, 9, and 15, as shown on Figure B-3 of the main text of Appendix B. 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. Pipeline segments in the vicinity of Cooling Tower B and the former Water Conditioning Building in the upper yard are located in paved areas, making sample locations in these areas unsuitable for x-ray fluorescence (XRF) screening. In addition, one sample location in the lower yard is located in the paved road, and also not suitable for XRF screening. All locations are likely to be accessible by hydrovac. The accessibility assessment for each of the proposed sampling locations is provided in Table B15-5. Photographs 47, 60 and 61 in Appendix B26 show the accessibility constraints in AOC 18. Sample locations and depths identified for AOC 18 reflect the identified access constraints, and the phased sampling approach described in Section 4.0 of the main text of Appendix B.

4.2 AOC 18 Proposed Sampling

Table B15-5 summarizes the proposed AOC 18 sample locations, depths, description/ rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are shown in Figure B15-3. The figure also shows proposed sample locations for surrounding SWMUs and AOCs. The proposed AOC 18 sample locations were defined in collaboration with DTSC and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of the main text of Appendix B.

Samples will be collected at 12 locations: AOC 18-1 through AOC 18-12. For locations associated with former pipelines, samples are proposed to be collected at the surface (0 to 1 feet bgs) and from 2 to 3 feet bgs, in accordance with the phased sampling protocol. In addition, samples will be collected below the former pipe invert/maximum depth of soil removal if known, or 5 to 6 feet bgs to ensure that samples are collected beneath the invert of the former pipelines. For locations associated with existing pipelines, samples will initially be collected at the surface (0 to 1 bgs) and from below the pipeline invert. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B15-3. 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.

All samples will be analyzed for Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, polychlorinated biphenyls (PCBs), 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 US EPA Method 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.

__________. 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.

Mittelhauser Corporation. 1986. *Closure Plan for the Hazardous Waste Management Facilities at the Topock Compressor Station.* Revision 1. August.

__________. 1990a. *Phases 1 and 2 Closure Certification Report, Hazardous Waste Management Facilities, Topock Compressor Station, Needles, California.* June.

__________. 1990b. *Closure Activities Report, Oil-Water Separator System, Topock Compressor Station, Needles, California.* July.

Tables

TABLE B15-1
Wastewater Pipelines Status Summary
AOC 18 – Combined Hazardous Waste Transference Pipelines
Soil Investigation Part B 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, unable to measure volume loss			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				Not tested, active line.	PA-3 (1042-51-10)	Operating pipeline, sampled below joint at 1 foot bgs (same sample as for F-3), after underlying soil and the pipelines were removed.	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 at 1 foot bgs, 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, unable to measure volume loss			Portion of pipe removed; remainder abandoned in place (capped); clean-closed
Pipeline Segment E								
E-1	Precipitation tank to process pump tank	4	Steel	15	Short aboveground pipe, not tested, visual inspection			Removed; clean-closed
Pipeline Segment F								
	Transfer pumps to precipitation tank	3	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 (1042-51-10)	Section failed pressure test (same sample as for A-3). Sampled at 1 foot bgs, after underlying soil and the pipelines were removed.	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, unable to measure volume loss, slight seepage at coupling	PF-6 (1042-43-11 and duplicate sample 1042-43-12) PF-8 (1042-51-09)	Sampled 1 foot bgs beneath slight leak at PVC slip joint. Sampled at 1 foot bgs beneath the end of previous cut in the pipe, no visible evidence of leaks.	Portion of pipe removed; remainder abandoned in place (capped); clean-closed

TABLE B15-1
Wastewater Pipelines Status Summary
AOC 18 – Combined Hazardous Waste Transference Pipelines
Soil Investigation Part B 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), polyethylene (buried portion)	1,500				
G-1	Transfer Pumps to west bend in pipeline south of sludge drying beds				Pass, unable to measure volume loss	PG-2 (1042-51-06)	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 at 3 feet bgs 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 at 3 feet bgs after removal of soil contaminated with white sludge	
						PH-10 (1042-43-20)	Sampled 6 inches below pipe at 2 feet bgs 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 at 1.5 feet bgs 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 at 5 feet bgs after removing soil where pipe was previously broken	
						PH-11 (1042-43-21)	Sampled 6 inches beneath clay pipe at 4 feet bgs after removing soil where pipe was previously broken	
						PH-12 (1042-43-22)	Sampled 3 inches beneath clay pipe at 4 feet bgs after removing soil where pipe was previously broken	
						PH-13 (1042-43-23)	Sampled off end of previous break in pipe at 6 feet bgs; no visible evidence of leakage	

TABLE B15-1
Wastewater Pipelines Status Summary
AOC 18 – Combined Hazardous Waste Transference Pipelines
Soil Investigation Part B 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)	Sampled 3 feet beneath the end of previous break in pipe; no visible evidence of leakage	Removed; clean-closed
						PH-5 (1042-43-105)	Sampled 65 feet off end of previous break in pipe at probable location of former pipe at 6 feet bgs	
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)	Sampled 3 inches below gate valve after removal of soil contaminated with green sludge	Removed; clean-closed
						PH-2 (1042-43-02)	Sampled below gate valve, no visible evidence of leakage	
						PH-2 (1042-43-30)	Second confirmation sample following additional excavation	
						PH-3 (1042-43-03)	Sampled beneath joint in clay pipe at 3 feet bgs, no visible evidence of leakage	
						PH-3 (1042-43-31)	Second confirmation sample following additional excavation	
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	Fail	OWS-PI-1 (1042-55-4);	Sampled after removal of visibly contaminated soil at aboveground portion of pipe adjacent to OWS	Portion of pipe removed; remaining 10 feet abandoned in place (capped); clean-closed
						OWS-Valve-PI-1 (1042-55-6)	Sampled at 8 inches bgs after removal of stained soil by valve	
I-2	Oil/Water Separator to Chromate Reduction Tank			Approx. same length as A-1	Pass	None	No evidence of leak	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, 1990a); 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.

PVC = polyvinyl chloride.

TABLE B15-2
Sample Results: Metals and General Chemistry
Area of Concern 18 – Combined Hazardous Waste Transference Pipelines Investigation Program
Soil Investigation Part B 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**	**Fluoride**	**pH**	**Specific conductance**
Category2																									
PA-3	11/19/89	1	N	ND (0.3)	2.3	168	ND (1)	ND (0.5)	ND (1)	**45**	ND (3)	7	**14.8**	0.058	ND (1)	14	ND (0.5)	ND (1)	ND (5)	---	24	**87**	583	8.2	244
	11/19/89	1	FD	ND (0.3)	2.6	169	ND (1)	ND (0.5)	---	**49**	ND (3)	8	**12.4**	0.036	---	12	ND (0.5)	ND (1)	ND (5)	---	25	**91**	---	---	---
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	310	8.59	120
PF-6	11/18/89	1	N	ND (0.3)	2	80	0.12	0.11	ND (1)	26	1.8	6.7	**28.5**	ND (0.002)	0.27	8	ND (0.1)	ND (0.05)	ND (1)	26	8	51	380	8.69	980
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	519	8.5	98
PG-2	11/15/89		N	ND (0.3)	2.18	152	ND (1)	ND (0.5)	ND (1)	24.7	ND (3)	3.3	**10.6**	0.026	ND (1)	9.6	ND (0.5)	4.4	ND (5)	---	ND (1)	**92.8**	890	9	430
	11/15/89		FD	ND (0.3)	3	219	ND (1)	ND (0.5)	ND (1)	26	ND (3)	9	4.1	ND (0.002)	ND (1)	8	ND (0.5)	ND (1)	ND (5)	---	7	45	---	8.8	686
PH-1	12/05/88		N	ND (0.3)	3.19	170	ND (1)	ND (0.5)	ND (1)	23	5.1	ND (3)	**10**	0.061	ND (1)	8.5	ND (0.5)	ND (1)	ND (5)	---	13	30	498	8.57	---
	12/05/88		FD	ND (0.3)	2.48	180	ND (1)	ND (0.5)	ND (1)	22	5.1	ND (3)	**20**	0.043	ND (1)	6.8	ND (0.5)	ND (1)	ND (1)	---	15	33	502	8.4	---
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**	500	8.45	---
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	520	9.96	320
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	480	9.14	270
PH-5	11/14/89	6	N	ND (0.3)	2.2	216	ND (1)	ND (0.5)	ND (1)	12	7	5	6	0.15	ND (1)	11	ND (0.5)	ND (1)	ND (5)	---	13	29	570	8.42	160
	11/14/89	6	FD	ND (0.3)	2.7	201	ND (1)	ND (0.5)	---	11	4	5	5	0.172	**15**	9	ND (0.5)	ND (1)	ND (5)	---	8	29	---	---	---
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	506	10.3	412
PH-7	11/18/89	5	N	ND (0.3)	1.7	149	ND (1)	ND (0.5)	ND (1)	**52**	7	10	**9.6**	0.034	ND (1)	25	ND (0.5)	ND (1)	ND (5)	---	23	**118**	640	9.6	380
	11/18/89	5	FD	ND (1)	1.4	79	0.2	0.19	ND (1)	27	3.3	11	2.2	0.02	0.2	12	ND (0.1)	ND (0.05)	ND (1)	27	14	34	650	10.26	810
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	584	10.2	449
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**	851	9.7	368
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	516	10.2	418
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	617	8.6	225
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	629	8.9	303
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**	670	8.5	328

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

Sample Results: Metals and General Chemistry

Area of Concern 18 – Combined Waste Water Transference Pipelines Investigation Program

Soil Investigation Part B 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**
RWQCB Environmental Screening Level [2]:				**NE**	**540**	**540**	**1,800**
Background [3]:				**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**
Category3							
OWS PI-1	11/17/89	Unknown	N	ND (3)	ND (5)	ND (8)	1,200
OWS Valve PI-1	11/17/89	Unknown	N	ND (3)	ND (5)	ND (8)	850

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 B15-4

Constituent Concentrations in Soil Compared to Screening Values
Area of Concern 18 – Combined Hazardous Waste Transference Pipelines Investigation Program
Soil Investigation Part B 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												
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)
Total Petroleum Hydrocarbons												
TPH as motor oil	mg/kg	2 / 2 (100%)	0 / 0 (0%)	0 / 0 (0%)	2 / 2 (100%)	1,200	0	(NE)	0	(1,800)	0	(NE)

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 B15-5
Proposed Sampling Plan
AOC 18 – Combined Hazardous Waste Transference Pipelines
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes	Accessibility Assessment
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. Also addresses former pipe segments A1, D1, F1, F2, and I-2, which were not previously sampled.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	Suitable for XRF Likely accessible by hydrovac
AOC 18-2	0-0.5, and 3 and 6, If feasible	South side of northern cooling tower Blowdown line – Segment A-3, (not previously sampled); to resolve Data Gap #1, collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	Not suitable for XRF Likely accessible by hydrovac
AOC 18-3	0-0.5, and 3 and 6, If feasible	North side of pipeline segments A-3 and former F-3, near former sample PA-3; to resolve Data Gap #1, collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	Suitable for XRF Likely accessible by hydrovac
AOC 18-4	0-0.5, and 3 and 6, If feasible	South side of pipeline segments A-3, H-3 and F-3, near former sample PA-3; to resolve Data Gap #1, collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	No XRF refinement; location to assess former sample location. Likely accessible by hydrovac
AOC 18-5	0-0.5, and 3 and 6, If feasible	On pipeline segments A-3, D-2 and former F-3, west of PF-5, 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, PCBs, and PAHs	No XRF refinement; location to assess former pipeline. Likely accessible by hydrovac
AOC 18-6	0-0.5, and 3 and 6, If feasible	On former pipeline segment H--2 (removed prior to 1990), west of PH-13, 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, PCBs, and PAHs	No XRF refinement; location to assess former pipeline. Likely accessible by hydrovac
AOC 18-7	0-0.5, and 3 and 6, If feasible	North side of former pipeline segments D-3 and F-5 in an area not previously sampled, 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, PCBs, and PAHs	Not suitable for XRF Likely accessible by hydrovac
AOC 18-8	0-0.5, and 3 and 6, If feasible	South side of pipeline, southeast of Cooling Tower A to provide coverage near segment H-1; to resolve Data Gap #1, collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	Not suitable for XRF Likely accessible by hydrovac

TABLE B15-5
Proposed Sampling Plan
AOC 18 – Combined Hazardous Waste Transference Pipelines
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

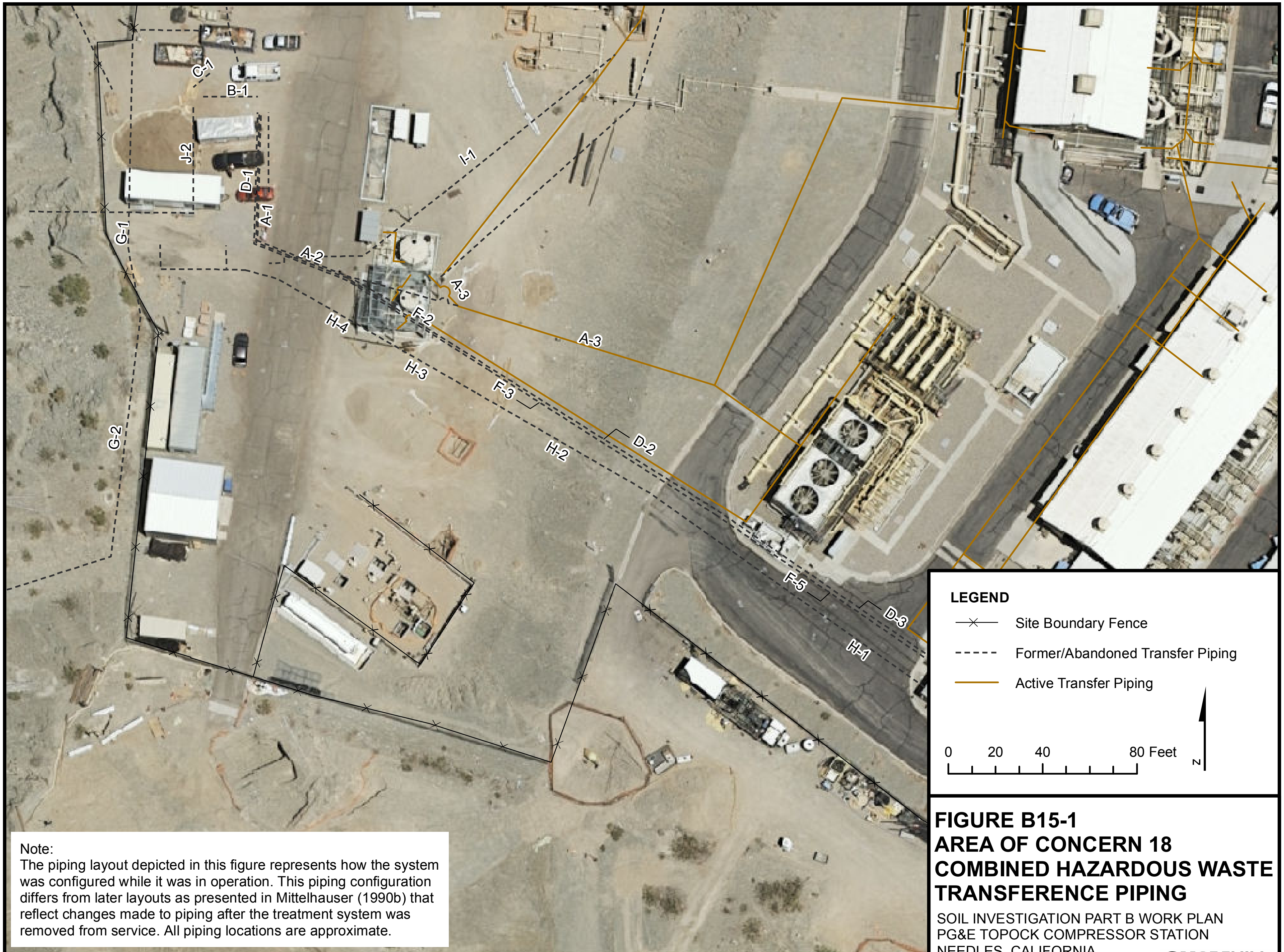
Location	Depths (feet)	Description/Rationale	Analytes	Accessibility Assessment
AOC 18-9	0-0.5, and 3 and 6, If feasible	Data Gap #2, define lateral and vertical extents of detected metals at historical sample location PH-2 (prior to soil removal PH-2 had highest concentration of total chromium in samples collected in AOC 18).	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	Not suitable for XRF Likely accessible by hydrovac
AOC 18-10	0-0.5, and 3 and 6, If feasible	At junction of pipeline segment G-1 and potential former discharge pipe to Bat Cave Wash; to resolve Data Gap #3, assess waste water transference piping near fence line.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	No XRF refinement; location to assess former pipeline. Likely accessible by hydrovac
AOC 18-11	0-0.5, and 3 and 6, If feasible	Between wastewater pipeline to Bat Cave Wash near station road and fence line; to resolve Data Gap #3, assess wastewater transference piping near fence line.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	Suitable for XRF Likely accessible by hydrovac
AOC18-12	0-0.5, and 3 and 6, If feasible	At junction of wastewater pipelines from Cooling Tower A and Cooling Tower B, west of Cooling Tower A in area with no prior sampling; to resolve Data Gap #1, collect additional soil samples to analyze for organics.	Title 22 metals, hexavalent chromium, pH, VOCs, TPH, SVOCs, PCBs, and PAHs	No XRF refinement; location to assess pipeline. Likely accessible by hydrovac

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 foot bgs).

Figures



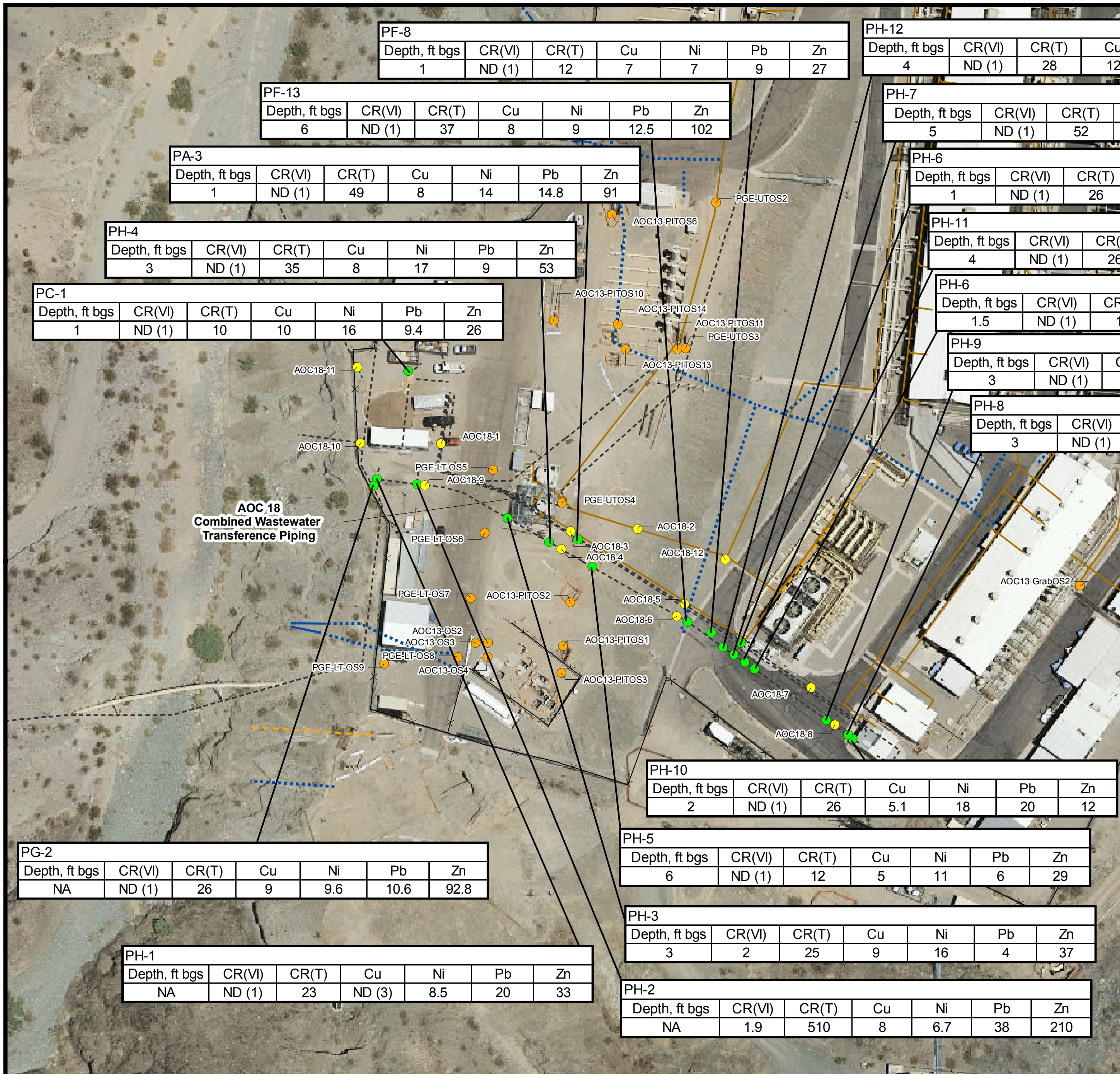
Note:
The piping layout depicted in this figure represents how the system was configured while it was in operation. This piping configuration differs from later layouts as presented in Mittelhauser (1990b) that reflect changes made to piping after the treatment system was removed from service. All piping locations are approximate.

FIGURE B15-1
AREA OF CONCERN 18
COMBINED HAZARDOUS WASTE TRANSFERENCE PIPING

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC18\AOC18_Pipes.mxd Date Saved: 8/29/2012 1:56:25 PM



PF-8

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	ND (1)	12	7	7	9	27

PF-13

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
6	ND (1)	37	8	9	12.5	102

PA-3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	ND (1)	49	8	14	14.8	91

PH-4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	ND (1)	35	8	17	9	53

PC-1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	ND (1)	10	10	16	9.4	26

PH-12

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4	ND (1)	28	12	19	8	44

PH-7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
5	ND (1)	52	11	25	9.6	118

PH-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1	ND (1)	26	6.7	8	28.5	51

PH-11

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4	ND (1)	26	12	18	8	47

PH-6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
1.5	ND (1)	10	13	32	2.3	58

PH-9

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	ND (1)	34	15	24	6.4	61

PH-8

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
3	ND (1)	37	16	25	6.1	41

PH-10

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
2	ND (1)	26	5.1	18	20	12

PG-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
NA	ND (1)	26	9	9.6	10.6	92.8

PH-5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
6	ND (1)	12	5	11	6	29

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	ND (1)	23	ND (3)	8.5	20	33

PH-2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
NA	1.9	510	8	6.7	38	210

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.

LEGEND

- Proposed Soil Sample Location
- Existing Soil Sample Location
- Existing Opportunistic Soil Sample Location
- Site Boundary Fence
- Former/Abandoned Transfer Piping
- Active Transfer Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground
- Former/Abandoned Stormdrain Line or Trench

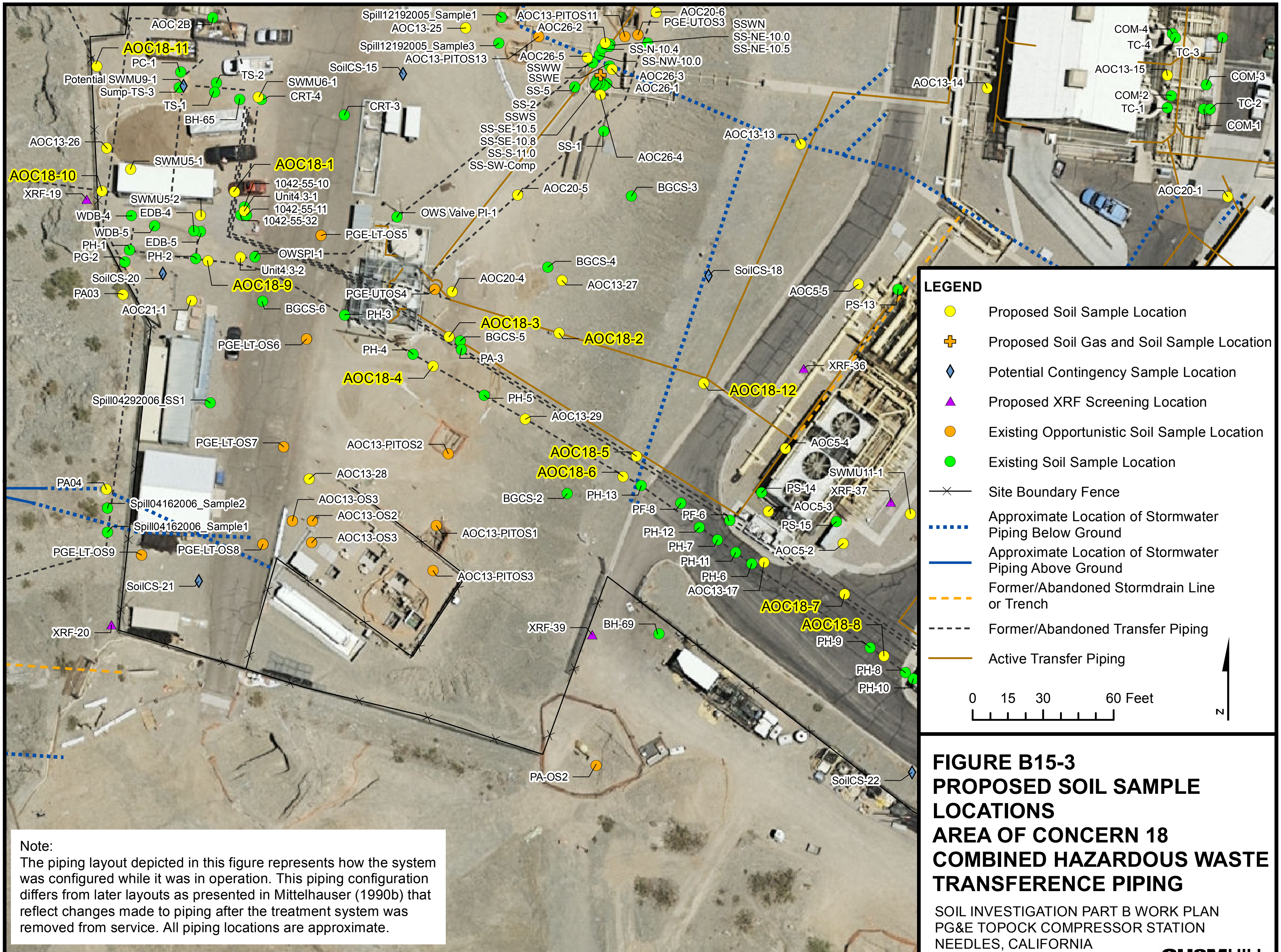
0 30 60 120 Feet

FIGURE B15-2 SOIL SAMPLE RESULTS - METALS AREA OF CONCERN 18 COMBINED HAZARDOUS WASTE TRANSFERENCE PIPING

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2012\SWP_B\AOC18\AOC18_RESULT_METAL.mxd



LEGEND

- Proposed Soil Sample Location
- Proposed Soil Gas and Soil Sample Location
- Potential Contingency Sample Location
- Proposed XRF Screening Location
- Existing Opportunistic Soil Sample Location
- Existing Soil Sample Location
- Site Boundary Fence
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground
- Former/Abandoned Stormdrain Line or Trench
- Former/Abandoned Transfer Piping
- Active Transfer Piping

0 15 30 60 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 HAZARDOUS WASTE TRANSFERENCE PIPING

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Subappendix B16
AOC 19 – Former Cooling Liquid Mixing Area and Former Hotwell Investigation Program

Contents

Figures

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
PG&E	Pacific Gas and Electric Company
ppm	parts per million
STLC	soluble threshold limit concentration
TCLP	toxicity characteristic leaching procedure
WET	Waste Extraction Test
XRF	x-ray fluorescence

SUBAPPENDIX 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 and Former Hotwell located directly east of the fin fan coolers east of the Compressor Building, as shown on Figure B16-1. (All tables and figures appear at the end of this subappendix.) 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, 2006) 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 (Pacific Gas and Electric Company [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. The hotwell was in service until approximately 1967 (PGE, 1967) and was located directly between the two current banks of fin fan coolers. Historical records indicate that the hotwell had developed cracks by 1960 (PG&E, 1960). Repairs were made at that time; however, subsequent seepage into the walls of the hotwell occurred, further damaging the reinforcing bars. Therefore, in 1966, PG&E authorized the replacement of the hotwell with the existing JCW surge tanks (PG&E, 1967). The existing JCW surge tanks are located immediately to the east of the former hotwell location. A portion of the footprint of the former hotwell is occupied by the temporary compressor engine oil holding tanks installed in 1994.[1]

Cooling water additives for this system were chromium-based until October 1985; since 1985, the additive has been molybdenum-based. Chromium concentrations in the JCW system were typically higher than the chromium concentrations in the cooling towers. Historical records indicate that concentrations of chromium as chromate were typically in the range of 200 to 300 parts per million (ppm) and may have been as high as 1,000 to 1,500 ppm for a short duration (Betz, 1978). Historic records (Betz, 1987, 1989, 1990, 1991) also indicate that concentrations of molybdenum as molybdate typically ranged from 300 to 800 ppm.

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[1] These tanks are used to hold the clean engine oil when compressor engines are being serviced. The oil is returned to the engines when they are placed back into service.

While the hotwell was in service, the JCW 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 constructed on the existing ground surface and was shallower on the western side than the eastern side. It was 9.6 feet deep on the eastern side and approximately 7 feet deep for the westernmost 10 feet (PG&E, 1954).The hotwell was 14 feet 4 inches wide by 32 feet 10 inches long (PG&E, 1967).

In 1993, PG&E authorized construction of the temporary compressor engine oil holding tanks to be placed into the area formerly occupied by the hotwell. However, the retaining wall in this area was in critical need of repair. During repairs to the retaining wall, a buried structure identified as the remnants of the former hotwell was discovered, indicating the base and much of the retaining wall for the hotwell were apparently left in place when the hotwell was decommissioned (PG&E, 1994).

During the cleanup project conducted to remove the hotwell remnants in 1994, green color was noted on the walls of the former hotwell (Trident Environmental and Engineering, undated). Samples of the green material from the bottom and sidewalls contained total chromium at 1,390 milligrams per kilogram (mg/kg) and hexavalent chromium at 35 mg/kg (Trident Environmental and Engineering, undated). The 35 mg/kg hexavalent chromium sample was also analyzed for soluble hexavalent chromium. This sample had a soluble hexavalent chromium concentration of 7.5 mg/L (APCL, 1994), exceeding the hazardous waste criterion for hexavalent chromium (5 mg/L).

The remaining concrete (side walls and base) and the soil inside the remnant hotwell were removed, and the concrete debris and soil were sampled. The soil and concrete were sampled by dividing the combined debris pile into eight equal segments and randomly selecting seven points to be sampled. Five concrete and two soil samples were collected. All samples were analyzed for total and hexavalent chromium (PG&E, 1994). No soil samples were collected under the hotwell.

The two soil samples contained total chromium at 280 and 220 mg/kg and hexavalent chromium at 4 and 3.6 mg/kg. The concrete samples contained total chromium at concentrations ranging from 530 to 2,300 mg/kg and hexavalent chromium at concentrations ranging from 37 to 330 mg/kg. The two samples with the highest total chromium were analyzed for soluble total chromium and hexavalent chromium using the California Waste Extraction Test (WET). The two samples were also tested for soluble total chromium using the toxicity characteristic leaching procedure (TCLP). Both samples exceeded the soluble threshold limit concentration (STLC) of 5 mg/L. The TCLP indicated soluble total chromium at 40 and 68 mg/L, respectively, while the WET indicated soluble total chromium at 78 and 110 mg/L, respectively. The soluble hexavalent chromium concentrations were 64 mg/kg and 80 mg/kg, respectively. The unaffected concrete sample (U1) also contained total chromium at 530 mg/kg and soluble hexavalent chromium at 37 mg/kg, suggesting that visual clues for chromium contamination may be misleading.

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 is 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.

PG&E is currently planning to remove the concrete pad to facilitate sampling below the pad. The concrete pad will be removed, sampled, and properly disposed at an offsite facility. One surface soil sample and a shallow subsurface soil sample (2 to 3 feet below ground surface [bgs]) will be collected beneath the removed concrete pad and will be analyzed for Title 22 metals and hexavalent chromium. The area beneath the pad will then be covered with 10-mil plastic and gravel (to match the adjacent gravel in this area). X-ray fluorescence (XRF) screening will be used below and around the concrete pad to assess the extent of contamination in the vicinity of the pad. Additional soil samples may be collected if XRF screening results are above screening levels. During removal of the concrete pad, XRF will be used to screen the concrete.

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. It is also possible that small quantities of JCW could have been released directly to subsurface soil through small cracks in the concrete hotwell. 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 sufficient 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 considered to be only a minor migration pathway (where gravel cover is thin); however, soluble constituents located in surface soils may dissolve into rain water and be carried in surface water runoff.

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. 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 TCLP.

Samples have not been collected in the immediate vicinity of the former hotwell; however, four opportunistic soil samples (AOC19-OS1 to AOC19-OS4) were collected along a trench excavation to the northeast of AOC 19. Samples were also collected during installation of monitoring well MW-68BR, located approximately 50 feet north of AOC 19. Soil data collected during the monitoring well installation are discussed in Appendix B11 (AOC 13 – Unpaved Areas at the Compressor Station). Laboratory analytical results for the samples are presented in Tables B16-2 through B16-4. Table B16-5 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 for commercial use).

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. The 2011 utility trench samples were collected outside the boundary of AOC 19. Eight opportunistic soil samples were collected from four locations (AOC19-OS1 through AOC 19-OS4) 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 and B16-3. Table B16-5 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 B16-3 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 were detected above respective commercial screening levels.

None of the detected concentrations of PAHs or the calculated values of benzo(a)pyrene equivalent were 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 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 subappendix.

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 the main text of 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 of this subappendix, and Section 5.0 of this subappendix 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), and concentrations in six samples exceeded the commercial regional screening level (1,400 mg/kg).

All seven of the soil samples exceeded the Title 22 WET STLC limit for chromium and/or trivalent chromium compounds (5 mg/L), as shown on Table 16-4. 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.

As discussed previously, the seven samples from the former hotwell debris pile were also analyzed for total and hexavalent chromium. The two hotwell debris pile soil samples contained total chromium at 280 and 220 mg/kg, respectively. The five hotwell debris pile concrete samples contained total chromium at concentrations ranging from 530 to 2,300 mg/kg. The two concrete samples with the highest chromium concentrations were also analyzed for soluble total chromium. Soluble hexavalent chromium in both samples exceeded the 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 two concrete samples with the highest chromium concentrations were also analyzed for soluble hexavalent chromium. 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 none of the 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 not 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 not 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 lead 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 molybdenum concentrations exceeded the commercial CHHSL (4,800 mg/kg). The lateral and vertical extents of molybdenum concentrations exceeding the screening level have not 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 zinc concentrations exceeded the commercial CHHSL (100,000 mg/kg). The lateral and vertical extents of zinc concentrations exceeding the screening level have not 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 cadmium, total and hexavalent chromium (both total and soluble forms), copper, lead, molybdenum, benzo(a)pyrene, and benzo(a)pyrene equivalents have not been defined. In addition, historical data indicates that, while above background and below screening levels, the lateral and vertical extents of elevated cadmium, copper, and molybdenum have not been determined.

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:

- Data Gap #1 – Lateral and vertical extents 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 in Section 5.3 of this subappendix.

5.2 AOC 19 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 19 is located in Area 12 on Figure B-3, Topock Compressor Station Accessibility Map, in the main text of Appendix B. Photographs 28 through 43 in Appendix B26 show the accessibility constraints in AOC 19. As can be seen in the photos, the footprint of 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. All of the proposed sampling locations within the AOC 19 boundary are suitable for XRF screening, and only hand sampling is feasible within the boundaries of this unit. Proposed sampling locations AOC19-5, AOC19-8, and AOC19-9 are outside of the AOC boundary within paved or gravel areas that are likely accessible by hydrovac. The accessibility assessment for each proposed sampling location can be found in Table B16-6. 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. Sample locations and depths identified for AOC 19 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of Appendix B.

5.3 AOC 19 Proposed Sampling

Table B16-6 summarizes the proposed AOC 19 sample locations, depths, description/ rationale for each location (that is, 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 were defined in collaboration with the California Environmental Protection Agency, Department of Toxic Substances Control and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

Samples are proposed to be collected at six locations (AOC19-5 through AOC19-10). Sample locations AOC19-5, AOC19-8, and AOC19-9 are designated deeper sample locations, and samples are proposed to be collected at the surface (0 to 0.5 or 1 foot bgs), and from the three typical subsurface intervals (2 to 3 feet bgs, 5 to 6 feet bgs, and 9 to 10 feet bgs). The remaining sample locations in this unit will initially be sampled at the surface and shallow subsurface intervals in accordance with the phased sampling protocol. In addition, one XRF soil sample location (XRF-34) has been added to assist with the nature and extent evaluation. The XRF results from these locations will be discussed during the data calls described in Section 4.0 of Appendix B to decide if soil samples should be collected from these locations for offsite laboratory analysis. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B16-4. Where the area of sampling is covered with asphalt, the surface sampling interval will begin at the bottom of the asphalt or gravel subbase 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 in Table B16-6; 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 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 US EPA Method 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

Applied P & CH Laboratory. 1994. *APCL Analytical Report – Soil and Concrete from Topock Compressor Station. July18.*

ARCADIS. 2009. *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil.* July 1.

Betz, Inc. 1978. *Service Review, Topock CA*. Sampled April 19.

__________. 1987. *Topock Cooling Water Analyses Report*. March 12.

__________. 1989. *Topock Cooling Water Analyses Report*. March 21.

__________. 1990. *Topock Cooling Water Analyses Report*. September 26.

__________. 1991. *Topock Cooling Water Analyses Report.* January 30.

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.

Pacific Gas and Electric Company (PG&E). 1954. Engineering Drawing 481878, Revision 7:*Fdn. For Jacket Cooler, Aux. Cooler & Hot Well, Topock Compressor Station*. February 2.

__________.1960. Letter from R. S. Nadors/PG&E to K.B. Anderson/PG&E. "Topock Hot Well." February 23.

__________.1967. Engineering Drawing 484387, Revision 2: *Foundation Plan and Piping Supports, 1967 Construction, Topock Compressor Station*. Drawing Number. May 2.

__________. 1994. Memorandum from PG&E/Technical and Ecological Services to PG&E/Gas Engineering and Environmental Services. "Topock Concrete Removal." October 14.

__________. 2006. Letter from Rich McCurdy/PG&E to Norman Shopay/DTSC. "Preliminary Results of Investigation of Stained Concrete Pad Located at the Jacket Cooling Water Units, January, 2006, PG&E's Topock Compressor Station, Needles, California." February 28.

Russell, Curt. 2006. Personal Communication in "Final Field Notes Memorandum, May 8 to 9, 2006." May.

Trident Environmental and Engineering. Undated. Letter from Michael Heckathorn/Trident to Dave Zeigen (company unknown).

Tables

TABLE B16-1
Conceptual Site Model, AOC 19 – Former Cooling Liquid Mixing Area and Former Hotwell
Soil Investigation Part B 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 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 and General Chemistry
Area of Concern 19 – Former Cooling Liquid Mixing Area and Former Hotwell Investigation Program
Soil Investigation Part B 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**
RWQCB Environ. 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[5] (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-OS1	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-OS2	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-OS3	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-OS4	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 and Former Hotwell Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
			Commercial Screening Level 1	99,000	4,100,000	33,000,000	17,000,000	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
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acenaphthene**	**Acena phthylene**	**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**	**Phen anthrene**	**Pyrene**	**B(a)P Equivalent**
Category1																						
AOC19-OS1	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-OS2	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-OS3	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-OS4	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

Sample Results: Soluble Threshold Limit Concentrations

Area of Concern 19 – Former Cooling Liquid Mixing Area and Former Hotwell Investigation Program

Soil Investigation Part B Work Plan

Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/L)	
Soluble Threshold Limit Concentration (STLC)[1]:				**5**	**5**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Chromium Hexavalent**	**Chromium**
Category2					
SS#1	01/30/06	0	N	0.48	11
SS#2	01/30/06	0	N	4.5	30
SS#3	01/30/06	0	N	1.9	19
SS#4	01/30/06	0	N	3.7	17
SS#5	01/30/06	0	N	0.38	13
SS#6	01/30/06	0	N	3.7	34
SS#7	01/30/06	4	N	1.3	34

Notes:

-- = not analyzed

1 Code of Regulations, Title 22, Chapter 11, Article 3

mg/L = milligrams per liter

N = Primary Sample

Results greater than or equal to the Soluble Threshold Limit Concentration are circled.

TABLE B16-5

Constituent Concentrations in Soil Compared to Screening Values

Area of Concern 19 – Former Cooling Liquid Mixing Area and Former Hotwell Investigation Program

Soil Investigation Part B 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	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)
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 B16-6
Proposed Sampling Plan, AOC 19 – Former Cooling Liquid Mixing Area and Former Hotwell
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet)	Description/Rationale	Analytes	Accessibility Assessment
AOC19-5	0-0.5,3, 6, and 10, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination at AOC 19	Title 22 metals, hexavalent chromium, and pH	Not suitable for XRF Likely accessible by hydrovac
AOC 19-6	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination at AOC 19	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF Suitable for hand sampling
AOC 19-7	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents 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.	Suitable for XRF Suitable for hand sampling
AOC 19-8	0-0.5, 3, 6, and 10, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination at AOC 19	Title 22 metals, hexavalent chromium, pH, and Target Analyte List/Target Compound List constituents, as requested by agencies	Suitable for XRF. Likely accessible by hydrovac
AOC 19-9	0-1[a], 3, 6, and 10, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination at AOC 19	Title 22 metals, hexavalent chromium, and pH	Not suitable for XRF Likely accessible by hydrovac
AOC 19-10	0-0.5 and 3, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination at AOC 19	Title 22 metals, hexavalent chromium, and pH	Suitable for XRF after concrete pad removal Suitable for hand sampling

Note:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

Ten percent of samples from the investigation will be analyzed for Target Analyte List/Target Compound List constituents.

Figures

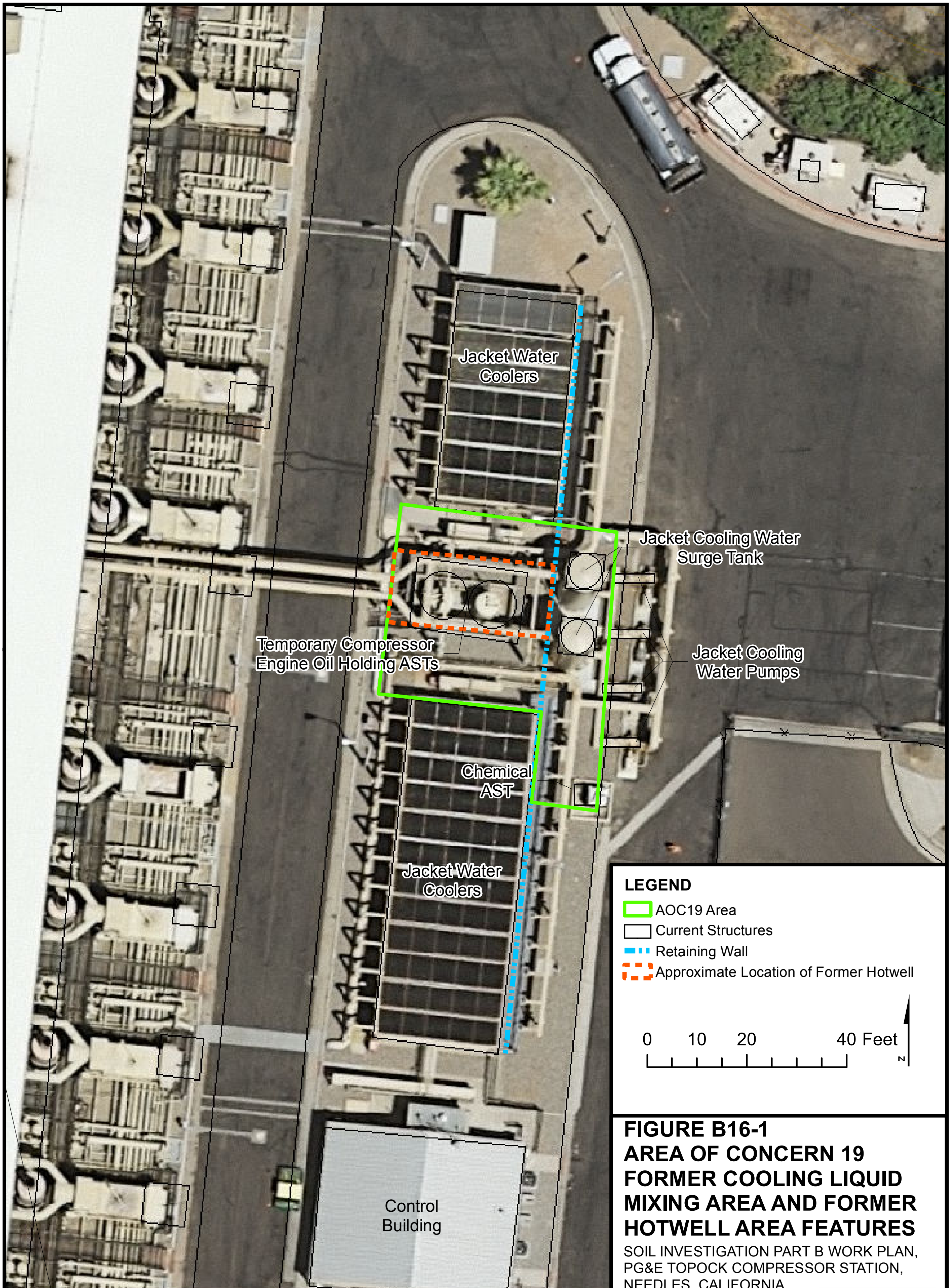

FIGURE B16-1
AREA OF CONCERN 19
FORMER COOLING LIQUID MIXING AREA AND FORMER HOTWELL AREA FEATURES

SOIL INVESTIGATION PART B WORK PLAN,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

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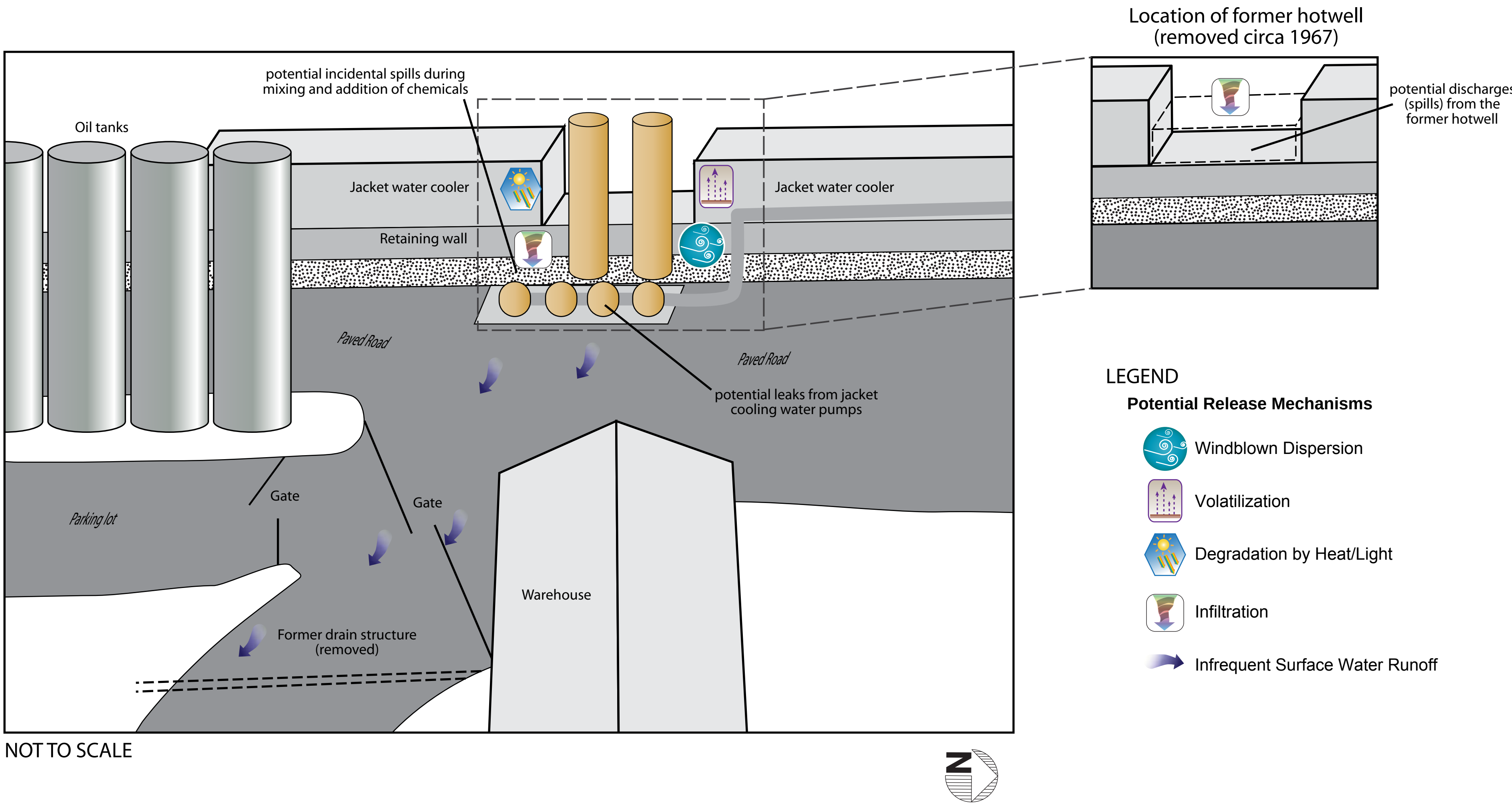
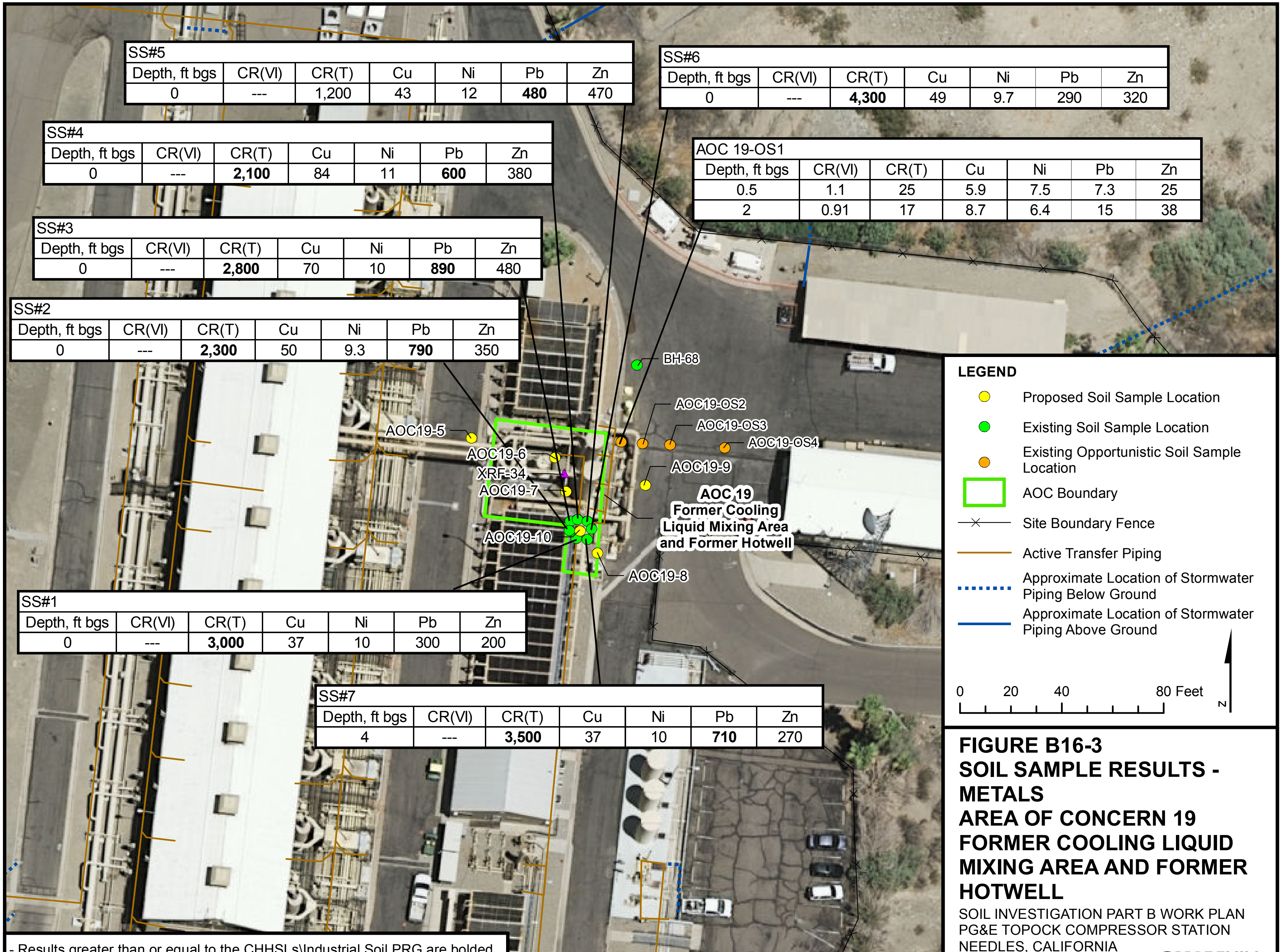


FIGURE B16-2
Conceptual Site Model for AOC19
Former Cooling Liquid Mixing Area
and Former Hotwell
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California



SS#5

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	1,200	43	12	**480**	470

SS#6

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**4,300**	49	9.7	290	320

SS#4

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**2,100**	84	11	**600**	380

AOC 19-OS1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0.5	1.1	25	5.9	7.5	7.3	25
2	0.91	17	8.7	6.4	15	38

SS#3

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**2,800**	70	10	**890**	480

SS#2

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**2,300**	50	9.3	**790**	350

SS#1

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
0	---	**3,000**	37	10	300	200

SS#7

Depth, ft bgs	CR(VI)	CR(T)	Cu	Ni	Pb	Zn
4	---	**3,500**	37	10	**710**	270

- Results greater than or equal to the CHHSLs\Industrial Soil PRG are bolded.

FIGURE B16-3
SOIL SAMPLE RESULTS - METALS
AREA OF CONCERN 19
FORMER COOLING LIQUID MIXING AREA AND FORMER HOTWELL

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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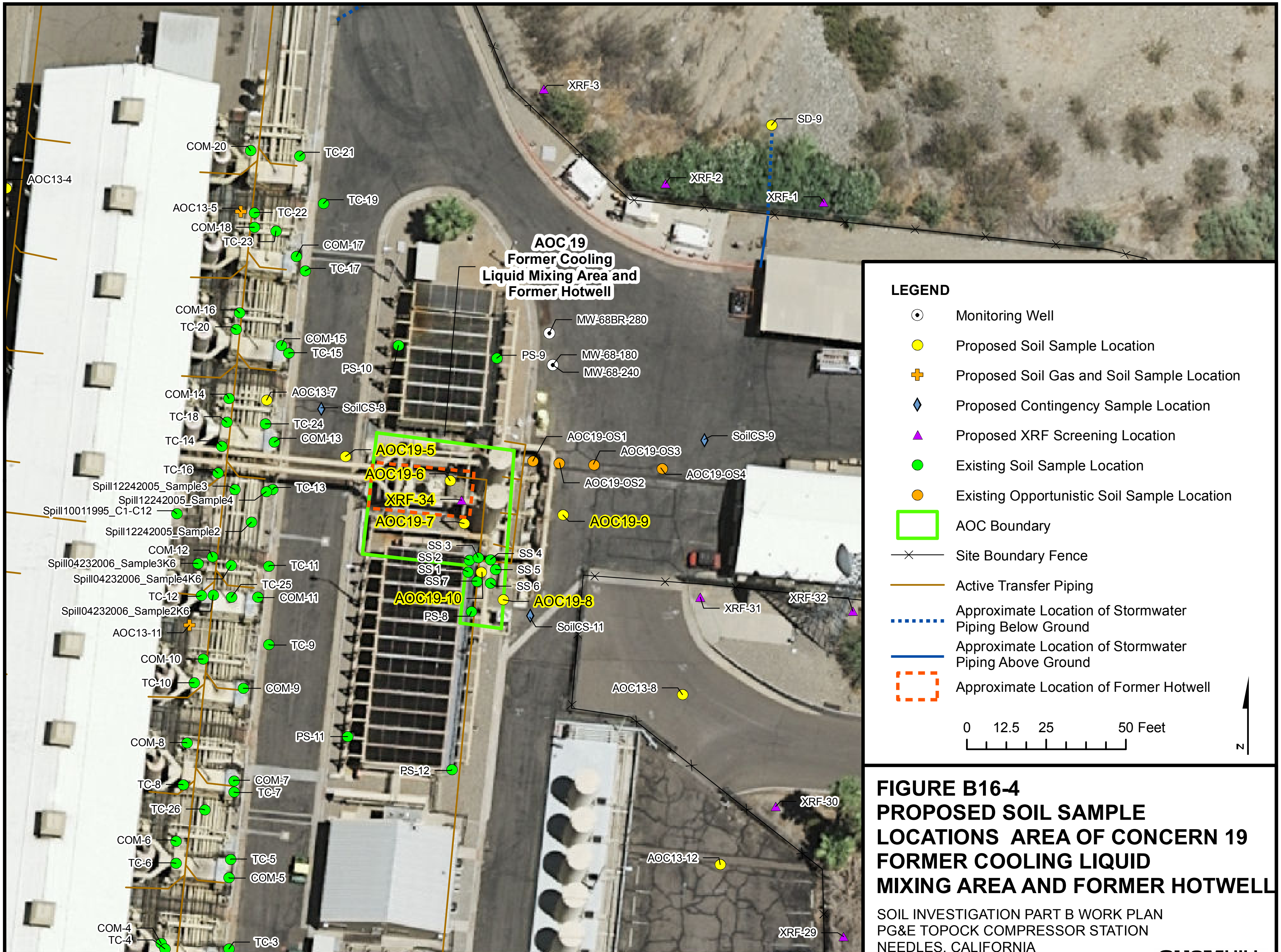

FIGURE B16-4
PROPOSED SOIL SAMPLE LOCATIONS AREA OF CONCERN 19 FORMER COOLING LIQUID MIXING AREA AND FORMER HOTWELL

SOIL INVESTIGATION PART B WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Subappendix B17
AOC 20 – Industrial Floor Drains Investigation Program

Contents

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 biphenyl
PG&E	Pacific Gas and Electric Company
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
XRF	x-ray fluorescence

SUBAPPENDIX 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 (formerly 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 the current oily water treatment system; previously, these drains conveyed the flow to the former American Petroleum Institute oil/water separator (part of AOC 24, discussed in Appendix B21) and the old oily water treatment system (comprising Units 4.3, 4.4, and 4.5, discussed in Appendix B25). 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 oily water treatment system historically were made primarily of vitrified clay (Pacific Gas and Electric Company [PG&E], 1967). 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 (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 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 (Mittelhauser, 1990).

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 subappendix.) 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 and associated piping 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 considered to be only a minor migration pathway (where gravel cover is thin); however, soluble constituents located in surface soils may dissolve into rain water and be carried in surface water runoff.

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:

- Data Gap #1 – Lateral and vertical extents of contamination underneath the piping conveying discharge from the industrial floor drains

Data gaps for Decisions 2 through 5 are discussed in the main text of 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 in Section 3.3 of this subappendix.

3.2 AOC 20 Access Constraints

As discussed in Section 3.0 in the main text 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 Figure B-3, Topock Compressor Station Accessibility Map, in the main text of Appendix B. Access constraints for AOC 20 include numerous buildings and other utilities. Sampling may be feasible underneath aboveground portions of the system and adjacent to the piping in unpaved areas of the compressor station.

Four of the proposed sample locations at AOC 20 are located in unpaved areas and are suitable for x-ray fluorescence (XRF) screening; the remaining three locations (AOC20-1, AOC20 -2, and AOC20-7) are located in areas covered with paving or concrete. All seven locations are likely accessible by hydrovac. An accessibility assessment for each of the proposed sampling locations is provided in Table B17-2. Sample locations and depths identified for AOC 20 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of Appendix B.

3.3 AOC 20 Proposed Sampling

The initial step in the investigation of AOC 20 will be a video survey of the lines, if feasible. Most of the floor drain lines are 4 inches in diameter or smaller; therefore, standard sewer and drain video inspection methods and equipment will not work. PG&E will evaluate the feasibility of an experimental approach of using a draw wire and small video camera to inspect the floor drain lines. PG&E will test the approach on an inactive line prior to the implementation of the work plan. If this video survey methodology is deemed feasible, PG&E will attempt to implement the survey as part of the work plan and will present the results of the survey effort to the agencies during a data call. The methodology consists of the following steps:

1. Guide stiff fish tape (also known as draw wire or draw tape*)* through the line being investigated to an exit point.
2. Attach a rope to the end of the tape, and attach a downhole camera with built-in LED lights to the other.
3. Recoil the fishing tape and rope to pull the camera through the drain.

The portions of the line that can be surveyed will be determined by the length that the fish tape can successfully be used. If a video survey of the lines or some of the lines is not feasible or successful, PG&E will inform the agencies of which lines or segments could not be surveyed.

Table B17-2 summarizes the currently proposed AOC 20 sample locations, depths, description/rationale for each location (that is, the data gaps they would address), and analytes. Proposed sample locations are also shown in Figure B17-2. The proposed AOC 20 sample locations were defined in collaboration with DTSC and the United States

Department of the Interior and are pending the outcome of any video survey results. Locations will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B. Sample locations were selected to preferentially address areas in the vicinity of pipeline joints, as pipelines are most likely to leak at joints.

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 are proposed to be collected at seven locations: AOC 20-1 through AOC 20-7. Samples will initially be collected at the surface (0 to 1 foot below ground surface [bgs]) and from below the pipeline invert (approximately 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 subbase. In most cases, this first interval will be from 0.5 to 1 foot below the pavement. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B17-2. 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 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.

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.

__________. 2011. *Soil Part B Data Quality Objectives Technical Memorandum, PG&E Topock Compressor Station Needles, California*. February.

Kearny, A.T. 1987. *RCRA Facility Assessment, Pacific Gas and Electric Company, Topock Compressor Station, Needles, California.* August.

Mittelhauser Corporation. 1990. *Closure Activity Report, Oil Water Separator System*. July.

Pacific Gas and Electric Company (PG&E). 1967. *Sewers & Drains, Topock Compressor Station*. Drawing Number 481785 Revision 22. December 11.

__________.1988. Pacific Gas and Electric Company Drawing 387706 Revision 2: *Elementary-Mechanical Drain and Sewer Systems, Topock Compressor Station, Gas Operations*. June 16.

Tables

TABLE B17-1
Conceptual Site Model, AOC 20 – Industrial Floor Drains
Soil Investigation Part B 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 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 Drains
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 20-1	0-1[a]and below pipe invert (approximately 3), if feasible	Northwest of machine shop within the auxiliary building; to resolve Data Gap #1, lateral and vertical extents 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	No XRF refinement; location selected to assess specific pipeline Likely accessible by hydrovac
AOC 20-2	0-1[a] and below pipe invert (approximately 3), if feasible	Northeast of compressor building; to resolve Data Gap #1, lateral and vertical extents of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs	No XRF refinement; location selected to assess specific pipeline. Likely accessible by hydrovac
AOC 20-3	0-1[a] and below pipe invert (approximately 3), if feasible	Northwest of compressor building; to resolve Data Gap #1, lateral and vertical extents of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs	No XRF refinement; location selected to assess specific pipeline. Likely accessible by hydrovac
AOC 20-4	0-1[a] and below pipe invert (approximately 3), if feasible	Lower Yard, east of oil/water collection aboveground storage tank; to resolve Data Gap #1, lateral and vertical extents of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs	No XRF refinement; location selected to assess specific pipeline Likely accessible by hydrovac
AOC 20-5	0-1[a] and below pipe invert (approximately 3), if feasible	Lower Yard, east of former scrubber sump; to resolve Data Gap #1, lateral and vertical extents of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs	No XRF refinement; location selected to assess specific pipeline Likely accessible by hydrovac
AOC 20-6	0-1[a] and below pipe invert (approximately 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	No XRF refinement; location selected to assess specific pipeline Likely accessibly by hydrovac

TABLE B17-2
Proposed Sampling Plan, AOC 20 – Industrial Floor Drains
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC 20-7	0-1[a] and below pipe invert (approximately 3), if feasible	South of grit tank, in road; to resolve Data Gap #1, lateral and vertical extents of contamination underneath the piping conveying discharge from the industrial floor drains	Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, and PAHs	No XRF refinement; location selected to assess specific pipeline Likely accessibly by hydrovac

Notes:

[a] Surface soil sample intervals in paved areas are approximate. Surface soil samples will be collected beneath the asphalt/concrete and/or sub-gravel base.

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 foot bgs).

Figures

FIGURE B17-1
PROPOSED SOIL SAMPLE LOCATIONS
AREA OF CONCERN 20
INDUSTRIAL FLOOR DRAINS

SOIL INVESTIGATION PART B WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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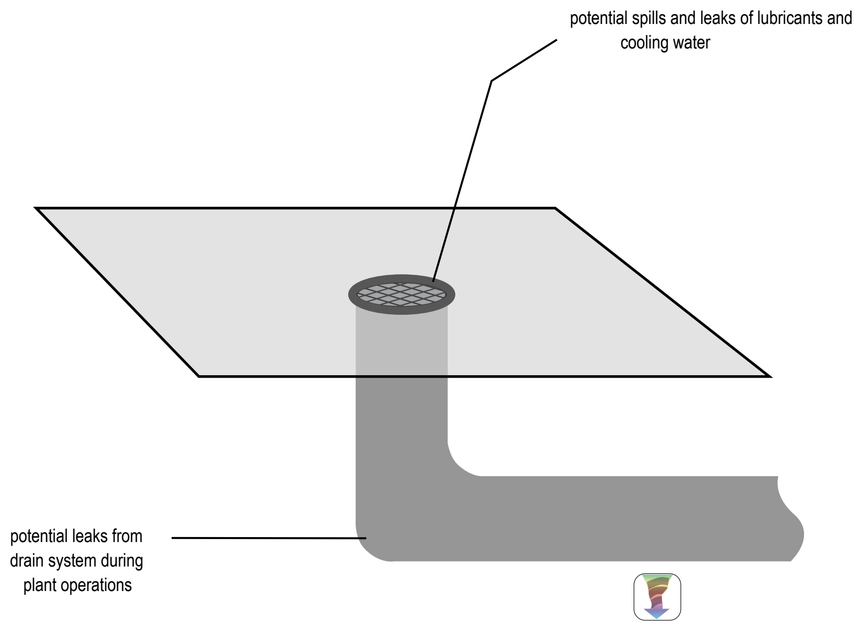


LEGEND

Potential Release Mechanisms

 Infiltration

FIGURE B17-2
Conceptual Site Model for AOC20
Industrial Floor Drains
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL.

Subappendix B18
AOC 21 –Round Depression Near Sludge Drying Bed Investigation Program

Contents

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
PG&E	Pacific Gas and Electric Company
SWMU	Solid Waste Management Unit

SUBAPPENDIX 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 bed (Solid Waste Management Unit [SWMU] 5) that is visible in the May 19, 1955 aerial photographs. A topographical map dated January 17, 1957 identifies this structure as a "water treatment sump" (Pacific Gas and Electric Company [PG&E],1957). AOC 21 was incorporated into this work plan at the request of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) based on a review of historical aerial photographs (DTSC, 2010). The structure appears to contain material of the same color as the material in the sludge drying beds and may have served a similar function as the sludge drying beds. During the 1950s and early 1960s, Sludge Drying Bed 1[1] (part of SWMU 5) was 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). 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, 2007), 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 each approximately 20 feet wide by 50 feet long; the round structure appears to have a diameter slightly greater than the width of Sludge Drying Bed 1 (the eastern bed).

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 (for a more detailed discussion of the Permutit water softening system see Appendix B2 [SWMU 5] and Subappendix B20 [AOC 23]). 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 subappendix.) 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

[1] Sludge Drying Bed 2 was installed ca. 1967.

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 because there is some white coloration present between AOC 21 and the Sludge Drying Bed 1 in the 1995 aerial photograph. 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. Nearby samples were collected at SWMU 5, discussed in Appendix B2, and Units 4.3 through 4.5, discussed in Appendix B25.

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 extents 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 (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 in Section 3.3.

3.2 AOC 21 Access Constraints

As discussed in Section 3.0 and Figure B-3 in Appendix B, there are substantial access constraints within the compressor station. AOC 21 is located in Area 4, near the intersection with Areas 3 and 5. The proposed AOC 21 sample location is likely to be accessible by hydrovac. The accessibility assessment for the proposed AOC 21 sample is detailed in Table B18-2. 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 60 in Appendix B26 shows the accessibility constraints in AOC 21. Sample locations and depths identified for AOC 21 reflect the identified access constraints and the phased sampling approach described in Section 4.0 of Appendix B.

3.3 AOC 21 Proposed Sampling

Table B18-2 describes the proposed AOC 21 sample location, depths, and description/rationale for the location (that is, the data gaps it would address), and analytes. The proposed sample location is also shown in Figure B18-2. The proposed AOC 21 sample location was defined in collaboration with DTSC and the United States Department of the Interior and will be optimized and sampled in accordance with the phased sampling approach outlined in Section 4.0 of Appendix B.

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 volatile organic compounds, semivolatile organic compounds, PAHs, total petroleum hydrocarbons, polychlorinated biphenyls, Title 22 metals, hexavalent chromium, calcium, sodium, and pH. Samples are proposed to be collected at one location: AOC 21-1. The sample location will be sampled at the surface (0.0 to 0.5 foot bgs), from 2 to 3 feet bgs, and 5 to 6 feet bgs. Proposed samples for nearby AOCs will also be used to characterize soil for this unit, as shown on Figure B18-2. Per United States Department of the Interior requirements, 10 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, the sample will also be analyzed for soil characteristics, including grain size, washes (P200 sieve), Atterberg limits, and gradation. 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. 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.

Pacific Gas and Electric Company (PG&E). 1957. “Topography Colorado River Crossing to Topock Compressor Station.” Drawing Number 580855, Revision 4. January 17.

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– Former Round Depression near Sludge Drying Bed
Soil Investigation Part B 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 data will be reviewed in the data gaps assessment to evaluate potential fate impacts or current localized impacts to groundwater from soil.

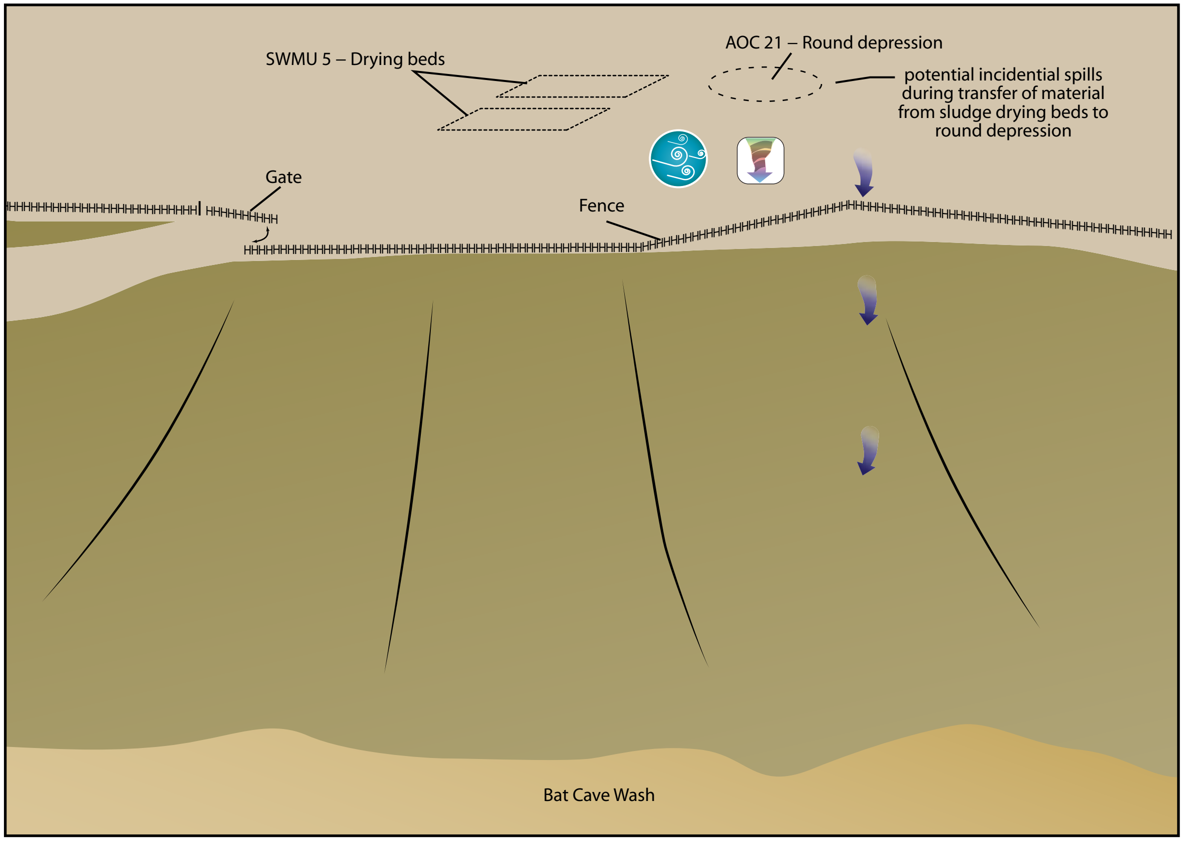
TABLE B18-2
Proposed Sampling Plan, AOC 21 – Former Round Depression near Sludge Drying Bed
Soil Investigation Part B Work Plan,
PG&E Topock Compressor Station, Needles, California

Location	Depths (feet bgs)	Description/Rationale	Analytes	Accessibility Assessment
AOC21-1	0-0.5, 3 and 6, if feasible	To resolve Data Gap #1, lateral and vertical extents of contamination underneath and immediately adjacent to the round structure	Volatile organic compounds, semivolatile organic compounds, PAHs, total petroleum hydrocarbons, polychlorinated biphenyls, 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	Suitable for x-ray fluorescence Likely accessibly by hydrovac

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

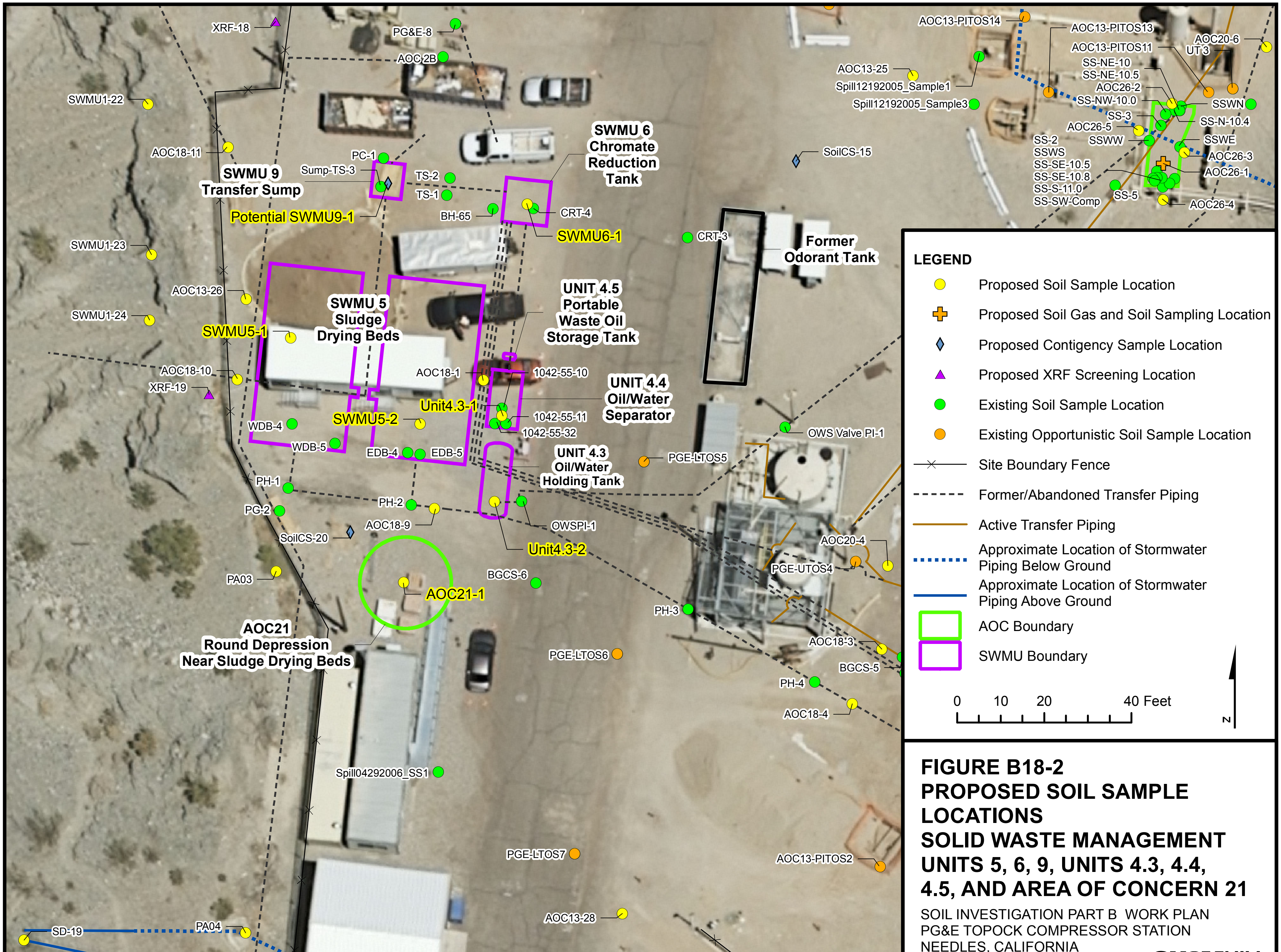
Windblown Dispersion

Infiltration

Infrequent Surface Water Runoff

FIGURE B18-1
Conceptual Site Model for AOC21
Former Round Structure
Soil Investigation Part B Work Plan
PG&E Topock Compressor Station
Needles, California

CH2MHILL.



LEGEND

- Proposed Soil Sample Location
- Proposed Soil Gas and Soil Sampling Location
- Proposed Contigency Sample Location
- Proposed XRF Screening Location
- Existing Soil Sample Location
- Existing Opportunistic Soil Sample Location
- Site Boundary Fence
- Former/Abandoned Transfer Piping
- Active Transfer Piping
- Approximate Location of Stormwater Piping Below Ground
- Approximate Location of Stormwater Piping Above Ground
- AOC Boundary
- SWMU Boundary

0 10 20 40 Feet

N

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 WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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