Pacific Gas and Electric Company®

PG&E Topock
Compressor Station
Needles, California

Revised Groundwater Corrective Measures Implementation/Remedial Design Work Plan for SWMU 1/AOC 1 and AOC 10

November 2011

CH2MHILL®

ES121009054220BAO

Topock Project Executive Abstract

Document Title: Revised Groundwater Corrective Measure Implementation/Remedial Design (CMI/RD) Work Plan for SWMU 1/AOC 1 and AOC 10, PG&E Topock Compressor Station, Needles, California Submitting Agency: DTSC, DOI Final Document? ☒ Yes ☐ No	Date of Document: 11/2/2011 Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E
Priority Status: ☐ HIGH ☐ MED ☒ LOW Is this time critical? ☐ Yes ☒ No Type of Document: ☐ Draft ☒ Report ☐ Letter ☐ Memo ☐ Other / Explain:	Action Required: ☒ Information Only ☐ Review & Comment Return to: N/A By Date: As specified by DTSC and DOI ☐ Other / Explain:
What does this information pertain to? ☐ Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA) ☐ RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment) ☐ Corrective Measures Study (CMS)/Feasibility Study (FS) ☒ Corrective Measures Implementation (CMI)/Remedial Action ☐ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR) ☐ Interim Measures ☐ Other / Explain:	Is this a Regulatory Requirement? ☒ Yes ☐ No If no, why is the document needed?
What is the consequence of NOT doing this item? What is the consequence of DOING this item? Report is required to be in compliance with the 1996 Corrective Action Consent Agreement and DTSC's direction letter dated January 31, 2011	Other Justification/s: ☐ Permit ☐ Other / Explain:

Brief Summary of attached document:

This Revised Corrective Measures Implementation/Remedial Design (CMI/RD) Work Plan presents the framework and schedule for implementation of the selected groundwater remedy for chromium in groundwater at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station (the Compressor Station), Needles, California. The existing chromium contamination in groundwater near the Compressor Station is largely attributable to the historical wastewater discharge from compressor station operations to Bat Cave Wash, designated as Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1, and within the East Ravine, designated as AOC 10. Other cleanup actions that may be required due to other historical operations at the Compressor Station are not within the scope of this document and will be addressed in subsequent documents as appropriate.

This CMI/RD Work Plan presents the framework for implementation of the groundwater remedy and is intended to satisfy both RCRA Corrective Action and CERCLA requirements. After the CMI/RD Work Plan is approved by DTSC and DOI, the remedy design will commence. Construction and start-up of the remedy will occur following completion of the remedy design. Operation and maintenance of the groundwater remedy will continue until the Remedial Action Objectives (RAOs) are achieved. Following attainment of the RAOs, closure and post-closure activities will take place.

Written by: Pacific Gas and Electric Company

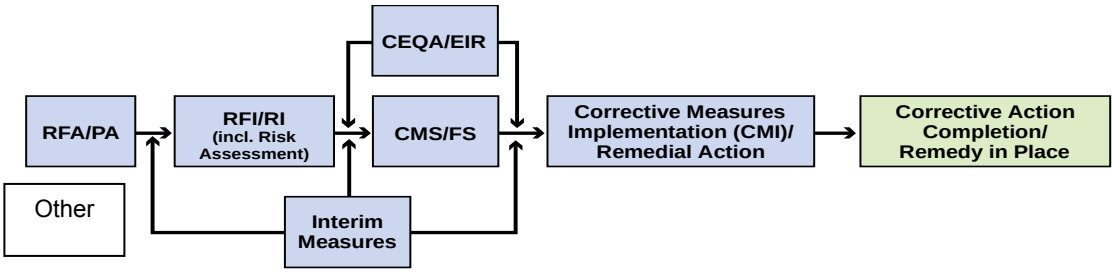
Recommendations:
CMI/RD Work Plan provided is intended to be a final document.

How is this information related to the Final Remedy or Regulatory Requirements:
This Work Plan presents the framework and schedule for implementation of the groundwater remedy selected by DTSC and DOI to address chromium contamination in groundwater at SWMU 1/AOC 1 and AOC 10.

Other requirements of this information?
None.

Related Reports and Documents:

Click any boxes in the Regulatory Road Map (below) to be linked to the Documents Library on the DTSC Topock Web Site (www.dtsc-topock.com).



Legend
RFA/PA – RCRA Facility Assessment/Preliminary Assessment
RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)
CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study

Version 9

Pacific Gas and Electric Company

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November 2, 2011

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Subject: Revised Groundwater Corrective Measure Implementation/Remedial Design Work Plan for SWMU 1/AOC 1 and AOC 10, PG&E Topock Compressor Station, Needles, California *(Document ID: PGE20111104A)*

Dear Mr. Yue and Ms. Innis:

In compliance with the 1996 Corrective Action Consent Agreement between the California Department of Toxic Substances Control (DTSC) and Pacific Gas and Electric Company (PG&E) and DTSC's directive letter "*Corrective Measure Decision for the Groundwater Operable Unit at SWMU1/AOC1 and AOC10, PG&E Topock Compressor Station, Needles, California*" dated January 31, 2011, this letter transmits the *Revised Groundwater Corrective Measure Implementation/Remedial Design Work Plan for SWMU 1/AOC 1 and AOC 10 at PG&E Topock Compressor Station, Needles, California* (CMI/RD Work Plan). This revised Work Plan incorporates the changes in the red-line strikeout revision of the draft Work Plan (dated September 19, 2011) and the additional final edits requested by DTSC and DOI. PG&E understands that DTSC and DOI have no further comments on this Work Plan, and are looking forward to receiving approval from DOI on this document.

Please contact me at (805) 234-2257 if you have any questions or comments regarding this Work Plan.

Sincerely,

Yvonne Meeks
Topock Project Manager

cc: Karen Baker/DTSC

Revised

Groundwater Corrective Measures Implementation/ Remedial Design Work Plan for SWMU 1/AOC 1 and AOC 10

PG&E Topock Compressor Station Needles, California

Prepared for

Pacific Gas and Electric Company

November 2011

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Certification

Revised Groundwater Corrective Measures Implementation/
Remedial Design Work Plan for
SWMU 1/AOC 1 and AOC 10
PG&E Topock Compressor Station
Needles, California

Prepared for
California Department of Toxic Substances Control and
United States Department of the Interior

On behalf of
Pacific Gas and Electric Company

November 2011

This report was prepared under supervision of a California Professional Engineer.

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Acronyms and Abbreviations

µg/L	micrograms per liter
ACHP	Advisory Council on Historic Preservation
ADEQ	Arizona Department of Environmental Quality
AOC	Area of Concern
APE	Area of Potential Effects
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BLM	United States Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe Railroad
BOR	United States Bureau of Reclamation
CACA	Corrective Action Consent Agreement
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHPMP	Cultural Historic Property Management Plan
CIMP	Cultural Impact Mitigation Program
CMI	Corrective Measures Implementation
CMP	Compliance Monitoring Program
CMS/FS	corrective measures study/feasibility study
COC	constituent of concern
COPC	constituent of potential concern
Cr(III)	trivalent chromium
Cr(T)	total chromium

Cr(VI)	hexavalent chromium
CRHR	California Register of Historical Resources
CRMP	Cultural Resources Management Plan
CTF	Clearinghouse Task Force
CUPA	Certified Unified Program Agencies
DOI	United States Department of Interior
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
E&E	Ecology and Environment, Inc.
EIR	environmental impact report
ft/ft	feet per foot
gpm	gallons per minute
GWRA	groundwater human health and ecological risk assessment
HMBP	Hazardous Material Business Plan
HNWR	Havasu National Wildlife Refuge
HSP	Health and Safety Plan
HSU	hydrostratigraphic unit
I&C	instrumentation and controls
I-40	Interstate 40
IM	Interim Measure
IRZ	In-situ Reactive Zone
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
MMRP	Mitigation Monitoring and Reporting Program
MNA	monitored natural attenuation
NHPA	National Historic Preservation Act
NTH	National Trails Highway
O&M	operation and maintenance
PA	Programmatic Agreement
PAH	polycyclic aromatic hydrocarbon

PBA	Programmatic Biological Agreement
PG&E	Pacific Gas and Electric Company
PMP	Performance Monitoring Program
PP	Proposed Plan
ppb	parts per billion
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RFA	RCRA Facility Assessment
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RO	reverse osmosis
ROD	Record of Decision
ROW	right-of-way
SHPO	State Historic Preservation Officer
SOB	Statement of Basis
SOP	standard operating procedure
SWFL	southwestern willow flycatcher
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan
TCS	Topock Compressor Station
TDS	total dissolved solids
TLP	Topock Leadership Partnership
TMR	telescopic mesh refinement
TOC	total organic carbon
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

UTL	upper tolerance limit
Water Board	California Regional Water Quality Control Board
WBS	work breakdown structure
WDR	Waste Discharge Requirement

1.0 Introduction

This Corrective Measures Implementation/Remedial Design (CMI/RD) Work Plan presents the framework and schedule for implementation of the selected groundwater remedy for chromium in groundwater at the Pacific Gas and Electric Company (PG&E) Topock Compressor Station (the Compressor Station) in San Bernardino County, California. The existing chromium contamination in groundwater near the Compressor Station is largely attributable to the historical wastewater discharge from Compressor Station operations to Bat Cave Wash, designated as Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1, and within the East Ravine, designated as AOC 10. Other cleanup actions that may be required due to other historical operations at the Compressor Station are not within the scope of this document and will be addressed in subsequent documents as appropriate.

PG&E is implementing the groundwater remedy at the Compressor Station in conformance with the requirements of the Resource Conservation and Recovery Act (RCRA) Corrective Action and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) is the state lead agency overseeing corrective actions at the Compressor Station in accordance with the RCRA Corrective Action. In February 1996, PG&E and DTSC entered into a Corrective Action Consent Agreement (CACA) pursuant to Section 25187 of the California Health and Safety Code (DTSC, 1996). The United States Department of the Interior (DOI) is the lead federal agency overseeing response actions on or emanating from land under its jurisdiction, custody, or control near the Compressor Station pursuant to CERCLA. In July 2005, PG&E and the federal agencies entered into an Administrative Consent Agreement (DOI, 2005).

In a coordinated effort, DOI and the DTSC selected the groundwater remedy to address chromium in groundwater at SWMU 1/AOC 1 and AOC 10. The DOI decision is presented in the Record of Decision (ROD) (DOI, 2010a), and the DTSC decision is presented in a decision package that includes the certification of the Final Environmental Impact Report (EIR), the Final Statement of Basis (SOB), the Statement of Decision, and the Resolution of Approval (DTSC, 2011a).

The action being taken by PG&E to address chromium in groundwater near the Compressor Station is referred to in this work plan as the "remedy," which is intended to be equivalent to the RCRA Corrective Action and CERCLA terminology of "corrective measure," "corrective action," remedial action" or "response action." Furthermore, the action is more specifically defined as the "groundwater remedy" to distinguish it from other future actions that may be selected for the soil media at the Compressor Station.

This work plan describes the framework for activities to be conducted through design, construction, startup, operation, maintenance, decommissioning, restoration, and long-term monitoring following completion of the active treatment. The following subsections provide project background information, describe the selected remedy and the remedial action objectives (RAOs), and outline the content and organization of this work plan.

A draft work plan was submitted on May 2, 2011, for review and comment. In mid June 2011, comments on the draft work plan were transmitted to PG&E; comments were received from DTSC, DOI, Arizona Department of Environmental Quality (ADEQ), Metropolitan Water District, Fort Mojave Indian Tribe, and Hualapai Indian Tribe. Responses to comments and comment resolution occurred between mid June and the end of August, 2011. Responses to comments are included in Appendix A.

1.1 Project Background

The Compressor Station is located adjacent to the Colorado River in eastern San Bernardino County, California, approximately 12 miles southeast of Needles, California, south of Interstate 40 (I-40), in the north end of the Chemehuevi Mountains (Figure 1-1) (all figures are located at the end of this document).

The Topock site and adjacent lands are contained within a larger geographic area that is considered sacred by the Fort Mojave Indian Tribe and by other Native American tribes. The Tribes believe that the environmental, cultural, and spiritual resources may not be physically perceptible. DTSC has concluded within the January 2011 certified EIR that the project site "appears to qualify as a historic resource under California Environmental Quality Act (CEQA) as an area that is significant in the social and cultural annals of California," and the Bureau of Land Management also has determined that a traditional cultural property or property of traditional religious and cultural significance that is eligible for listing on the National Register of Historic Places exists in the area of the Topock project.

In recognition of this, all activities are planned in such a way as to minimize impact to this area. The work will be conducted in a manner which recognizes and respects these resources and the spiritual values of the area. Practices which will be implemented with this objective in mind include: minimizing additional disturbance to the area by installing facilities in previously disturbed areas where possible; minimizing the size of drilling pads and staging areas; use of all terrain drilling and sampling equipment in areas not served by existing roadways; constructing nested wells with multiple well screens at different depths in a single boring where possible rather than drilling individual borings for each well depth' minimizing the amount of equipment and duration that equipment is present on site; and providing training to all site employees to ensure that they are aware of and respectful of the spiritual value of this area that is considered sacred by certain Tribes.

Exhibit 1-1 below illustrates the site cleanup process and the various project phases for the groundwater remedy. Investigative and remedial activities at the Compressor Station began in the 1980s with the identification of SWMUs through a RCRA Facility Assessment (RFA). To date, major portions of the site RCRA Facility Investigation/Remedial Investigation (RFI/RI) have been completed for groundwater, an Interim Measure (IM) is being implemented to stabilize chromium plume migration towards the river, and a corrective measures study/feasibility study (CMS/FS) for SWMU 1/AOC 1 and AOC 10 has been completed. The status and findings of these activities may be reviewed at the DTSC Topock web site: http://www.dtsc-topock.com.

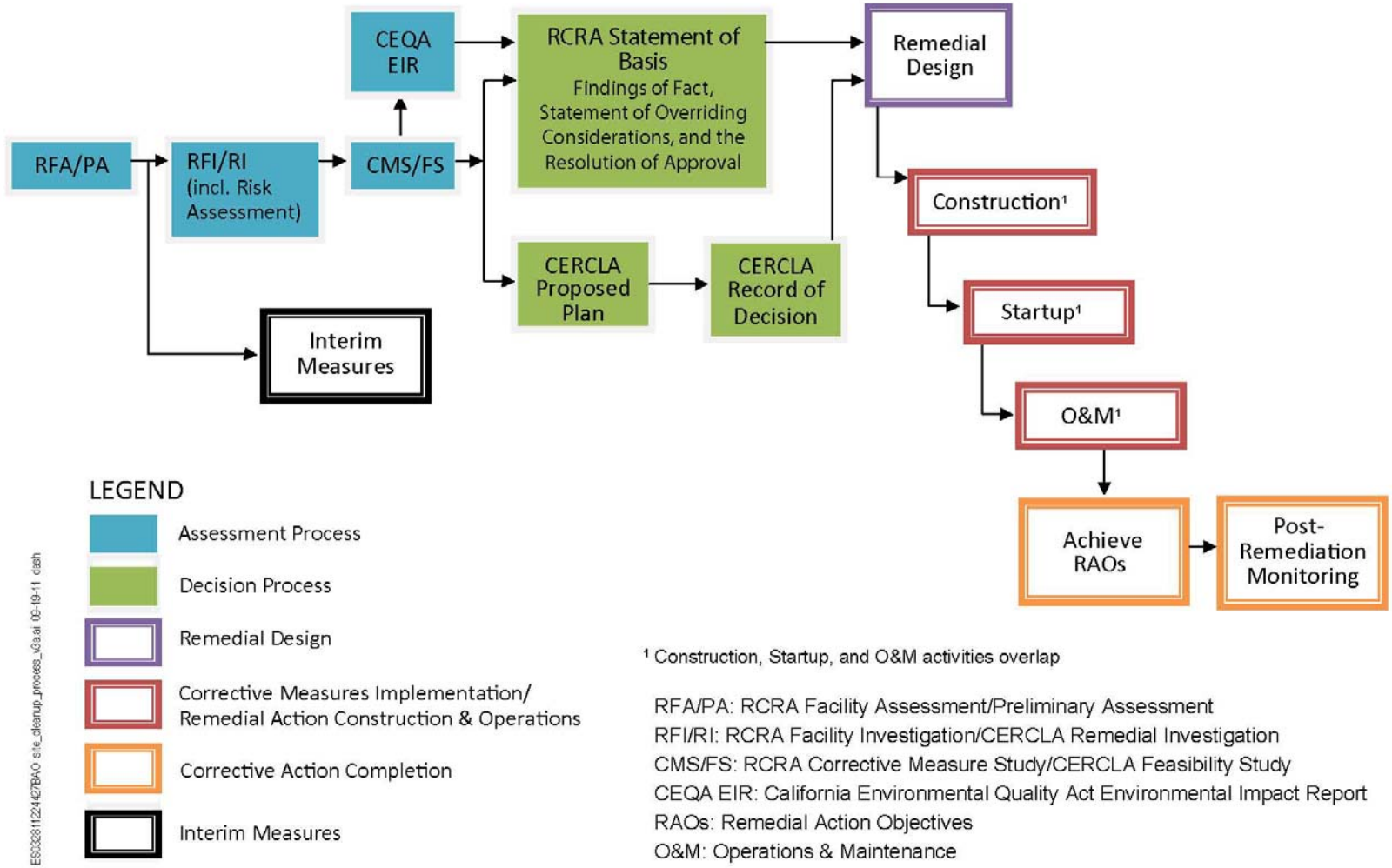
Key technical documents and other project background information for the various phases of the site cleanup process of the groundwater remedy are described below. Extensive information about the site background, environmental characteristics, and facility infrastructure and performance are provided in the referenced documents. These documents can be accessed and reviewed at http://www.dtsc-topock.com. Relevant information from each of these documents will be used during implementation of the groundwater remedy.

RFI/RI Volume 1—Volume 1 of the RFI/RI Report (CH2M HILL, 2007c) compiled and evaluated information on the Compressor Station operations and history, and included identification and descriptions of the SWMUs, AOCs, and other undesignated areas. Volume 1 of the RFI/RI Report was completed in 2007 and approved later that year by both DTSC and DOI; it identified SWMU 1/AOC 1 (Bat Cave Wash) and AOC 10 (East Ravine) associated with past discharge of wastewater from the Compressor Station. Volume I represented the completion of the RFA/CERCLA Preliminary Assessment project phase.

RFI/RI Volume 2—Volume 2 of the RFI/RI Report (CH2M HILL, 2009a and 2009b) contained information on the hydrogeologic characterization and results of groundwater, surface water, pore water, and river sediment investigations to evaluate and characterize the nature and extent of groundwater contamination resulting from past discharge of wastewater from the Compressor Station. The Volume 2 Report and its addendum were completed in February and June 2009, respectively, and were approved by both DTSC and DOI later in the same year.

Groundwater Risk Assessment (GWRA)—In November 2009, PG&E completed a groundwater risk assessment that evaluated potential risks to human health and ecological receptors associated with groundwater affected by past discharge of wastewater from the Compressor Station (ARCADIS, 2009). The GWRA provided information to assist risk management decision-making about the constituents of concern (COCs) in groundwater and risk-based concentrations of those constituents. Both DTSC and DOI approved the GWRA in December 2009.

Corrective Measure Study/Feasibility Study—A CMS/FS for SWMU 1/AOC 1 and AOC 10 was completed in 2009 (CH2M HILL, 2009c). The CMS/FS identified the RAOs for the groundwater remedial action, identified nine remedial alternatives to address the RAOs, and evaluated each of the alternatives against RCRA Corrective Action and CERCLA-defined criteria. As part of the CMS/FS, the DOI identified the Applicable or Relevant and Appropriate Requirements (ARARs) for the action. Based on the evaluation of the alternatives against the criteria, Alternative E, "In-situ Treatment with Fresh Water Flushing," was recommended as the alternative that provided the best balance of advantages and tradeoffs for the remedial action. Both DTSC and DOI approved the CMS/FS in December 2009.



¹ Construction, Startup, and O&M activities overlap

RFA/PA: RCRA Facility Assessment/Preliminary Assessment
RFI/RI: RCRA Facility Investigation/CERCLA Remedial Investigation
CMS/FS: RCRA Corrective Measure Study/CERCLA Feasibility Study
CEQA EIR: California Environmental Quality Act Environmental Impact Report
RAOs: Remedial Action Objectives
O&M: Operations & Maintenance

EXHIBIT 1-1
Site Cleanup Process

Remedy Decision—The decision process steps identified on Exhibit 1-1 include the, the RCRA SOB, the Findings of Fact, the Statement of Overriding Considerations and Resolution of Approval, the CERCLA Proposed Plan (PP), and the CERCLA ROD. The CEQA EIR was completed in January 2011 (AECOM, 2011); it described the existing conditions in the project area, analyzed the potential environmental impacts associated with project implementation, and identified mitigation measures to reduce the level of significance of impacts, where feasible. The SOB, which described the rationale for the State's preferred alternative, was published by the DTSC in June 2010, and finalized as part of the Staff Report supporting the Resolution of Approval that was signed in January 2011 (DTSC, 2011a). The DOI published the PP on June 4, 2010, which presented the DOI's recommendation for the preferred alternative (DOI, 2010b). In January 2011, DOI issued the ROD for the site, which selected the groundwater remedy (DOI, 2010a).

Interim Measure—PG&E has been implementing an IM at the site since March 2004. The purpose of the IM has been to stabilize the groundwater contamination during the time period in which the groundwater site characterization, risk assessment, and alternative definition and evaluation steps are completed. The current IM consists of pumping from extraction wells on the Colorado River floodplain, and management of extracted groundwater via treatment in an aboveground treatment plant and onsite injection. Treatment consists of a continuous, multi-step process that involves reduction of hexavalent chromium (Cr[VI]) to trivalent chromium (Cr[III]), precipitation and removal of precipitate solids by clarification and microfiltration, and lowering of naturally occurring total dissolved solids (TDS) using reverse osmosis. Treated groundwater is transported via an aboveground pipeline to an injection well field located approximately 2,000 feet west of the treatment plant and injected into the alluvial aquifer. The IM will be terminated upon the determination by the agencies that it is no longer required.

This CMI/RD Work Plan is intended to satisfy both RCRA Corrective Action and CERCLA requirements (refer to Exhibit 1-1). Construction and start-up of the remedy will occur following completion of the remedy design. Operation and maintenance (O&M) of the groundwater remedy will continue until the RAOs are achieved. Following attainment of the RAOs, long-term monitoring and remedy decommissioning and restoration activities will take place. Each of these phases, including the types of activities and required submittals, is discussed in more detail in Chapter 4 of this work plan.

1.2 Selected Groundwater Remedy and Requirements for Implementation

The selected groundwater remedy, as well as key regulatory conditions, goals and requirements for implementation, are described below.

1.2.1 Selected Groundwater Remedy

The selected remedy for chromium in groundwater at SWMU 1/AOC 1 and AOC 10 near the Compressor Station is "Alternative E—In-situ Treatment with Fresh Water Flushing." The groundwater remedy includes:

- Construction of an In-situ Reactive Zone (IRZ) along National Trails Highway (NTH) using a line of wells that may be used as both injection and extraction wells to circulate

groundwater and distribute an organic carbon source to promote bacteriological reduction of the Cr(VI) to Cr(III).

- Flushing accomplished through a combination of fresh water injection and injection of carbon-amended water in wells upgradient of the plume.
- Extraction wells near the Colorado River to provide hydraulic capture of the plume, accelerate cleanup of the floodplain, and enhance the flow of contaminated groundwater through the IRZ line.
- Bedrock extraction wells in the eastern (downgradient) end of the East Ravine to provide hydraulic capture of contaminated groundwater in bedrock. Extracted water will be treated and managed using the same active treatment system that will be used to treat and manage contaminated groundwater extracted from the alluvial aquifer.
- Institutional controls to restrict surface land uses and prevent the use of groundwater.
- Monitored natural attenuation (MNA) as a long-term component to address residual chromium that may remain in recalcitrant portions of the aquifer after enhanced in-situ treatment and optimized system performance.

As discussed previously, this action will henceforth be referred to as the groundwater remedy, intended to be equivalent to other RCRA Corrective Action and CERCLA terminology of "corrective measure," "corrective action," remedial action," or "response action." The terminology "Alternative E" or "selected remedy" will no longer be used in this document. Additional details of the groundwater remedy are provided in Chapter 2 of this work plan.

Implementation of the groundwater remedy is anticipated to require several decades, the actual time required for implementation depending on a number of factors. The level of project definition will increase during the remedial design phase and will continue to increase during the construction and operation and maintenance phases. This concept of increasing project certainties as the project progresses through implementation phases after remedy selection is illustrated in Exhibit 1-2. The definition of the groundwater remedy presented in Chapter 2 is conceptual (comparable to the level of project definition in the CMS/FS Report). The level of project definition will be further refined in the remedial design documents, and then refined still further during operation and system optimization.

1.2.2 Remedial Action Objectives

The objectives of the groundwater remedy, or RAOs, are defined based on the conclusions of the GWRA and ARARs identification. The RAOs for the groundwater remedy are to:

1. Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 micrograms per liter (µg/L).
2. Prevent or minimize migration of total chromium (Cr[T]) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]).

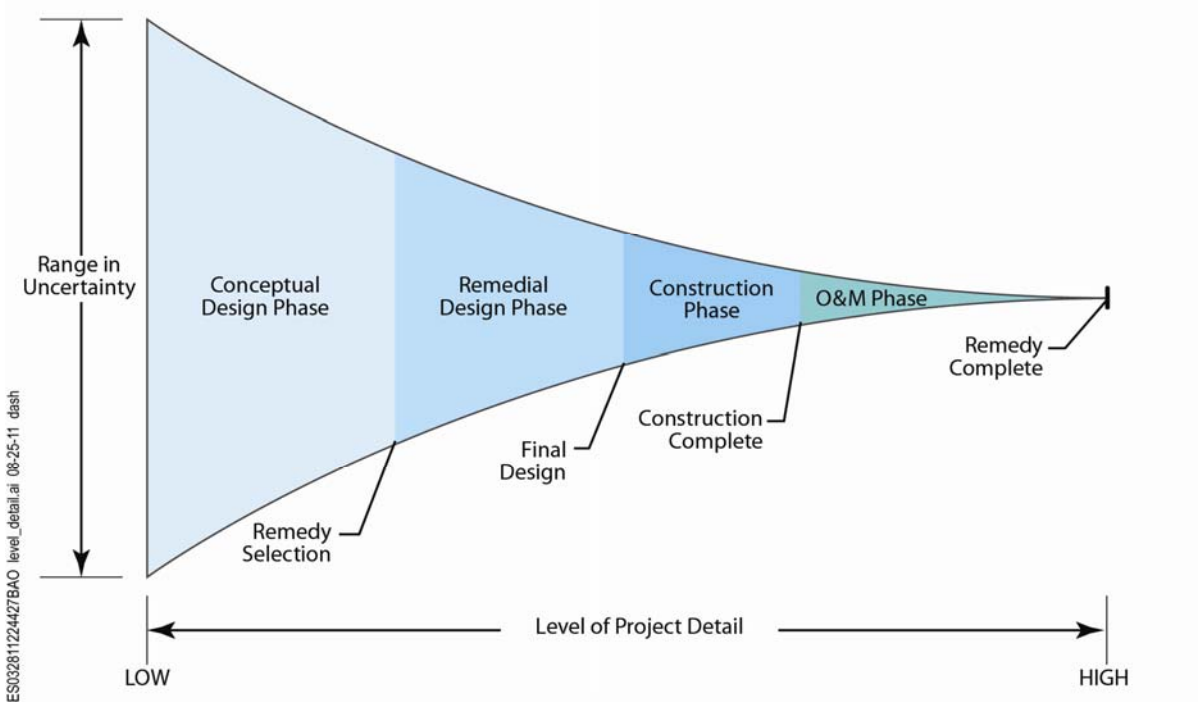


EXHIBIT 1-2
Level of Project Detail Over Time

3. Reduce the mass of Cr(T) and Cr(VI) in groundwater at the site to achieve compliance with ARARs in groundwater. This RAO will be achieved through the cleanup goal of the regional background concentration of 32 µg/L of Cr(VI).
4. Ensure that the geographic location of the target remediation area does not permanently expand following completion of the remedial action.

1.2.3 ARARs

CERCLA remedial actions are required to comply with the substantive requirements of identified ARARs. The DOI identified the ARARs for the groundwater remedy, documented in the ROD (DOI, 2010a). The ARARs include chemical-specific, location-specific, and action-specific ARARs of federal, California, and Arizona laws and regulations. As the RAOs were developed based on the identified chemical-specific ARARs, attaining the RAOs will therefore result in compliance with the chemical-specific ARARs. Until the RAOs are attained, institutional controls to prohibit development of drinking water supply wells within the plume will be maintained. Plans and procedures to comply with the identified location- and action-specific ARARs during construction, operation, maintenance, decommissioning, restoration, and long-term monitoring after the completion of the active treatment will be developed, as discussed in Chapter 4.

In conformance with one of the identified location-specific ARARs, the National Historic Preservation Act (NHPA), the U.S. Bureau of Land Management (BLM), Arizona State Historic Preservation Officer (SHPO), California SHPO, and the Advisory Council on Historic Preservation have completed a Programmatic Agreement (PA) (BLM, 2010) that includes policies and procedures to help guide BLM's planning and decision-making as it affects cultural and historic properties specific to the remedial investigations and groundwater and soil removal and response actions. The Area of Potential Effect (APE) as defined by the PA is shown on Figure 1-2.

1.2.4 CEQA Mitigation Measures

In conformance with CEQA, DTSC prepared an EIR to evaluate the potential environmental effects of actions associated with cleanup of groundwater contamination at the Compressor Station and to identify mitigation measures to reduce the level of significance of impacts, where feasible (AECOM, 2011). The project area as defined by the EIR for evaluation of impacts and assessment of remedy implementation is shown on Figure 1-2. The project area as defined by the EIR is encompassed within the APE specified in the PA. The EIR concluded that implementation of the groundwater remedy would generate significant adverse environmental impacts, and for most potential impacts, the EIR prescribes mitigation capable of reducing these impacts to less-than-significant levels. The EIR included a Mitigation Monitoring and Reporting Program (MMRP) for the groundwater remedy. The mitigation measures were identified for impacts associated with various resources, including aesthetics, air, cultural, biological, geology and soils, hazardous materials, hydrology and water quality, noise, and water supply resources (AECOM, 2011). Plans and procedures to comply with the identified CEQA mitigation measures during construction, operation, monitoring, decommissioning, and post-remediation phases of the groundwater remedy will be developed, as discussed in Chapter 4.

1.3 Organization and Content of Work Plan

This work plan presents the framework and schedule for implementation of the groundwater remedy at the Compressor Station. The content of this work plan is guided by the requirements of the RCRA CACA (DTSC, 1996) and CERCLA (40 CFR 300), as well as USEPA guidance for remedial design and remedial action (USEPA, 1995a; 1995b).

Exhibit 1-3 illustrates the specific requirements for this CMI/RD Work Plan as outlined in the CACA and identifies where in this document each of the CACA work plan requirements are included.

EXHIBIT 1-3
CACA Requirements for this CMI/RD Work Plan
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

CMI/RD Work Plan Requirements from the CACA (DTSC, 1996)	Chapter of this CMI/RD Work Plan Where Requirement is Met
Introduction/Purpose	Chapter 1
Media Cleanup Standards	Chapter 1
Conceptual Model of Contaminant Migration	Chapter 3
Description of Corrective Measures	Chapter 2
Data Sufficiency	Chapter 3
Project Management	Chapter 7
Project Schedule	Chapter 4
Design Criteria	Preliminary design criteria for freshwater supply is provided in Chapter 2, Draft design criteria for the remaining systems will be provided the Basis of Design Report (part of the 30% design)*
Design Basis	Preliminary design basis for freshwater supply is provided in Chapter 2. Draft design basis for the remaining system will be provided in the Basis of Design Report (part of the 30% design)*
Conceptual Process/Schematic Diagrams	Chapter 2
Site Plan Showing Preliminary Plant Layout and/or Treatment Area	Chapter 2
Tables listing number and type of major components with approximate dimensions	A draft will be provided in the Basis of Design report (part of the 30% design submittals)
Tables giving preliminary mass balances	A draft will be provided in the Basis of Design report (part of the 30% design submittals)
Site safety and security provisions	A draft will be provided in the intermediate (60%) design submittal after PG&E's proposed remedial facilities locations (to be presented in the 30% design) are reviewed and confirmed
Waste management practices	Will be provided in future submittals (O&M Plan, Construction-related Plans)
Required permits	Will be provided in future submittals (O&M Plan, Construction/Remedial Action Work Plan)
Long-lead procurement considerations	A draft will be provided in the Basis of Design report (part of the 30% design submittals)
Appendices including design data, equations, sample calculations, laboratory or field test results	A draft will be provided in the Basis of Design report (part of the 30% design submittals)

Source:
California Department of Toxic Substances Control (DTSC). 1996. *Corrective Action Consent Agreement (Revised), Pacific Gas and Electric Company's Topock Compressor Station, Needles, California.* EPA ID No. CAT080011729. February 2.

* In response to DTSC and DOI comments on the Draft Work Plan, supplemental information is provided in Section 2 on the status of PG&E's evaluation of options for power supply, freshwater supply, freshwater conveyance, and locations of major equipment, preferred options, and additional work to be done before the evaluation is complete, A separate technical memorandum was prepared to provide supplemental information on the management of remedy wastewater.

This CMI/RD Work Plan is organized into the following chapters:

- Chapter 1 provides project background information; introduces the groundwater remedy, as well as key regulatory conditions, goals and requirements for implementation; and provides the organization and content of the work plan.
- Chapter 2 describes the main elements of the remedial action including a description of the main system components and other features, and also includes a discussion of the Corrective Measure/Remedial Action Monitoring Program.
- Chapter 3 provides a summary of existing site conditions and drivers for collection of additional site characteristic information during design, construction, and operation of the groundwater remedy.
- Chapter 4 provides a schedule for the implementation of the groundwater remedy and a list and schedule dates of future submittals required by the regulatory process, including the protocol for review of these documents.
- Chapter 5 describes the existing IM components and discusses considerations for transitioning from the IM to the groundwater remedy, including a potential decision process for the transition.
- Chapter 6 identifies short-term design activities for the groundwater remedy, including a data collection plan for 2011 and groundwater modeling activities.
- Chapter 7 summarizes project organization and management approach for the groundwater remedy.
- Chapter 8 provides reference information for the works cited in this report.
- Appendix A contains the Response to Comments on the Draft CMI/RD Work Plan.
- Appendix B contains an example of the Rainbow Schedule.

2.0 Groundwater Remedy Components

The groundwater remedy consists of five main components (see Exhibit 2-1). This section describes each of the components and presents a framework for their design and implementation. The design basis and criteria will be provided in future design packages.

This section also describes the supporting facilities and infrastructures for the five main remedy components, to ensure their proper operation. In addition, this section presents the framework for the Corrective Measure/Remedial Action Monitoring Program that will be implemented to evaluate the performance of the groundwater remedy to attain the RAOs and to comply with ARARs. The future design packages will contain detailed information of the selected remedy designed to achieve the RAOs while meeting the substantive requirements of the identified ARARs and complying with the EIR MMRP and landowner and leaseholder requirements. The selected remedy described in the agencies' decision documents and the RAOs provide the foundational inputs to the project design basis. The identified ARARs, the EIR MMRP, and landowner/ leaseholder requirements provide the boundary within which the design will be developed and subsequent phases of the project will be implemented.

Central to the design process is the groundwater modeling effort, which will be used to refine/optimize the key remedy features: from a macro scale, the groundwater flow model will be updated to define the well locations and pumping/ injection rates/capture zones, and from a finer scale, the new solute fate and transport model will be used to design the IRZ (see Section 6.2 for more details about the modeling effort). In addition, key supplies (e.g., freshwater supply, power supply, etc.) will be evaluated; one or more preferred option(s) will be carried forward in the design. Key assumptions will also be confirmed during the design, such as the ability of the arched bridge to carry freshwater supply pipe. Supporting facilities needed to ensure proper operation of the remedy will be further developed and designed, e.g., management of remedy wastewater, site security, etc. (see Section 2.2 for further details). Additional data collected during the design (see Section 3.1.2) will be incorporated into the design process. Additional engineering options may surface during the design; if deemed viable and appropriate, PG&E will include them in the design submittals for agencies and stakeholders' review.

With the above, basic project information will be determined or calculated so as to prepare the project design basis. The project design basis will be described in the Basis of Design Report included in the preliminary/ intermediate/final design submittals (see Table 4-5). The Basis of Design Report will include updated site data, design basis (e.g., source of freshwater, well extraction/injection rates, well spacing, carbon substrate, carbon dosing, redundancy, level of automation, etc.), assumptions, uncertainties, governing codes/standards (including compliance with EIR MMRP and substantive requirements associated with ARARs), tools used to guide design (e.g., aerial map of disturbed areas, map of mature plant species, topographic survey, utility locations , etc.), updated cost estimates and schedule. Plans and specifications will be included in the design submittals as described in Table 4-5.

It is anticipated that as the design progresses, the design basis and assumptions will be refined and the level of uncertainties will decrease. For example, assumptions about access for piping or facilities, substantive requirements associated with injecting of remedy wastewater into the ground or discharging remedy wastewater (e.g., to the Topock Compressor Station [TCS] evaporation ponds or future infiltration gallery), the ability of a given remediation well to accomplish its objective (e.g., achieve desired flow rates).Design assumptions will be or are being evaluated presently and will be included in the design submittals. In the event that design assumptions cannot be resolved by the time of the intermediate design stage, PG&E will propose to either carry options in the final design submittal, or to plan for potential re-design in the final design submittal.

2.1 Description of Groundwater Remedy Main Components

The following section describes the main components of the groundwater remedy, including the in-situ reduction, fresh water injection, and groundwater extraction systems. Figures 2-1a and 2-1b show the conceptual remedy site plan. Figure 2-2 shows an overall conceptual process flow schematic diagram for the remedy.

Implementation of the groundwater remedy is anticipated to require several decades, the actual time required for implementation depending on a number of factors. The level of project definition will increase during the remedial design phase and will continue to increase during the construction and operation and maintenance phases. Numbers and locations of remedy facilities and operational elements are largely assumptions at this point. It is fully expected that changes to the numbers, locations, methods, and configuration of remedy components will change as the remedy moves through the design, construction, and operational phases. Changes will be made during design, construction, and operation to optimize the remedy to enhance performance to attain the RAOs, provide for adjustments due to field conditions, and comply with location- and action-specific ARARs, EIR mitigation measures, and landowner and leaseholder requirements.

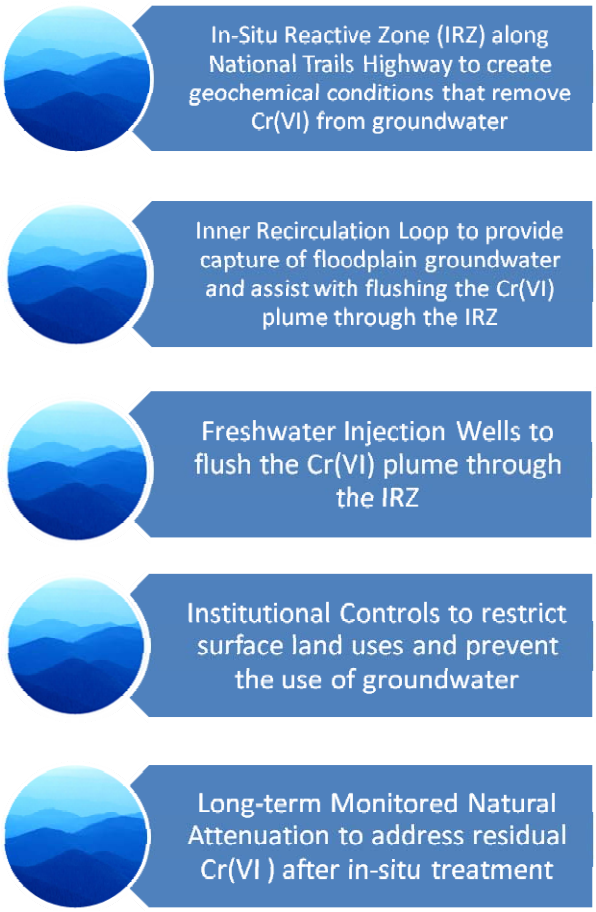


EXHIBIT 2-1
Main Remedy Components

2.1.1 In-situ Reactive Zone (IRZ)

The IRZ consists of a line of wells installed along National Trails Highway (NTH) that will be used to create and maintain a permeable barrier in the aquifer where Cr(VI) will be removed from groundwater by conversion to insoluble Cr(III). The IRZ will be established by injecting water containing a degradable source of organic carbon (e.g., ethanol, sodium lactate, or other food-grade carbon compounds) through a line of wells to create a continuous zone of reduced geochemical conditions along NTH. The IRZ wells will operate as either injection or extraction wells to circulate groundwater and distribute the organic carbon source throughout the target treatment zone.

Effective distribution of organic carbon (as measured by total organic carbon [TOC]) is one of the key design criteria for the establishment of the IRZ. Effective distribution of TOC is a function of the following aspects:

- Site geology (including lithology, hydraulic characteristics, structure, and geochemical make-up)
- Groundwater injection volumes and rates
- TOC concentrations
- Groundwater chemistry
- Groundwater flow patterns in the vicinity of the injection well

These aspects will control the radius of influence of an individual IRZ injection well and the resultant number of wells and their relative spacing required to achieve the treatment objectives. Individual IRZ well design is based on the lateral and vertical extents of the contaminant plume. The thickness of the aquifer in the area of the plume ranges from less than 50 feet near the bedrock interface to over 150 feet near NTH (CH2M HILL, 2009c). To adequately distribute TOC through a 100-ft vertical "slice" of the plume requires multiple wells positioned in a nest. Alternatively, an individual well can contain two to three discrete screened intervals separated by blank sections. In either case, injected groundwater may be delivered in alternating depth sequences, or potentially in more than one interval simultaneously.

Solute transport modeling will support the design of the IRZ. The model will establish the number of IRZ wells, the spacing between those wells, injection flow rates, carbon dose rates, as well as the location and flow rates of extraction wells within the line of IRZ wells. The modeling will also be used to identify the well locations to monitor remedial performance. The plan for developing the model and modeling efforts is discussed in Section 6.2.

Another important consideration in the IRZ design involves the fate and transport of secondary treatment byproducts (e.g., iron, arsenic, and manganese). Byproduct formation, along with the microbial growth associated with the in-situ process, can negatively influence the performance of the extraction wells and injection wells. Solute transport and geochemical modeling will be used to develop strategies for minimizing generation and migration of byproducts.

IRZ System Footprint

The IRZ line will be located along a portion of NTH, covering a distance approximately 3,000 feet in length. Wells will be installed on one or both sides of the road (possibly extending into the floodplain or areas adjacent to natural gas pipeline corridors northeast of the Topock Compressor Station). Wells and appurtenant infrastructure (e.g., foundations, concrete aprons/skirts, piping, electrical ducts/conduits, etc.) will be installed, to the extent practicable, in areas that have previously been disturbed. Piping will convey groundwater from extraction wells to carbon amendment facilities and back to injection wells. Piping and conduits to provide instrumentation and controls (I&C) and electrical power to the extraction and injection well pumps will be located along NTH. Piping and conduit will be placed into excavated trenches that are backfilled, or will be routed above ground. Spare pipes and conduits may be placed in trenches to minimize the need for excavation in the future.

The IRZ will employ above grade structures with foundations to house major equipment items such as pumps, storage tanks, valves and instrumentation, control panels, and electrical switchgear. In addition, the above grade structures will include a bulk carbon storage tank (or multiple tanks). Tanker truck loading and unloading pads with concrete spill containment will also be constructed. These structures could be located at the MW-20 Bench as this area is easily accessible and is next to the IRZ, minimizing the required distance for piping to and from the extraction and injection wells and operational logistics. In addition, a secondary structure may be installed to the north of the MW-20 Bench to house electrical power and I&C circuits for the northernmost IRZ wells. In response to DTSC's comment on the Draft CMI/RD Work Plan, Exhibit 2-2 is a photograph of the Hinkley Central Area IRZ carbon amendment storage, amendment, and control facilities is shown below.

Remediation system buildings and substrate tank matching desert landscape.

Recirculation well field – wells are below grade within vaults.

EXHIBIT 2-2
Hinkley Central Area IRZ Storage, Amendment, and Control Facilities

SUPPLEMENTAL INFORMATION

In response to DTSC's and DOI's comments on the Draft CMI/RD Work Plan, the following supplemental information is provided to discuss selection criteria for candidate locations for major equipment, identification of candidate locations, current status of analysis of options including the preferred options, and the additional work needed to verify the viability of the preferred option.

Since the submittal of the Draft CMI/RD Work Plan on May 2, 2011, PG&E has continued to evaluate potential candidate locations for major equipment. For this evaluation, the major equipment includes the IRZ system (carbon tanks, process tanks, storage containers, etc.), remedy wastewater treatment system, electrical room, and other support facilities (operations room, onsite laboratory, storage, etc.). The following criteria were used to identify candidate locations:

- *Previously disturbed areas*
- *Avoid cultural, archaeological, and historical resources*
- *Areas of adequate space*
- *Proximity to existing asphalt access roads, Compressor Station, electrical and other utility services, remedy components (for service), and reuse/disposal options for remedy wastewater*
- *Limited interference with existing infrastructure*
- *Limited interference with compressor station operations during construction*

The identified candidate locations are the MW-20 bench, the bench near the Transwestern Meter Station, and select areas on the Compressor Station parcel (the bone yard area to the south/southwest, the lower yard area to the west/southwest, the maintenance shop area to the southeast). The MW-20 bench is located on land owned by the Bureau of Reclamation and managed by the Bureau of Land Management. The bench near the Transwestern Meter Station and select areas with the Compressor Station are located on PG&E-owned land.

Considering operability, maintainability, security, and impacts during construction, PG&E's current preferred locations for the major equipment is as follows:

- *IRZ system – MW-20 bench to serve the IRZ wells along National Trails Highway and carbon amendment wells in the upland; and the bench near the Transwestern Meter Station to serve the carbon amendment wells in the Compressor Station.*
- *Remedy wastewater treatment system, electrical room, and other support facilities – A combination of the bone yard area, the lower yard area, and the maintenance shop area on the Compressor Station parcel.*

Additional work is needed to verify the viability of the preferred locations, e.g., obtain approval from Compressor Station staff for use of various Compressor Station locations for remedy facilities, and confirm with the PG&E emission reduction design team the availability of the same areas. Details will be provided in the design submittals. Anticipated approvals from the agencies for the use of the MW-20 Bench for remedy facilities will be included in the future Construction/Remedial Action Work Plan.

IRZ System Details

A conceptual IRZ process flow schematic is illustrated in Figures 2-2 and 2-3. The number of wells, spacing, materials of construction, and design details will be provided in the upcoming design submittals. Well depth will be determined primarily by the depth to bedrock. It is anticipated that the well depths will vary from up to 300 feet below ground surface (bgs) at the north end of the IRZ line (along NTH) to less than 100 feet bgs at the south end. The IRZ wells can be designed with one to three discrete screen intervals targeting specific zones of the water-bearing unit for treatment by the IRZ. The length of each well screen may range from 5 to 50 feet, as a function of the geology and target zone thickness. Specific site geology and groundwater modeling will be used to determine actual well design specifications. The groundwater flow and solute transport models will be utilized to evaluate the optimum discrete screen zones by first determining the chromium plume distribution throughout the model. With the plume initialized in the appropriate model layers, IRZ wells will be distributed horizontally and vertically to target the impacted groundwater. The well spacing, rates, duration, and carbon concentrations will then be optimized to intercept the impacted groundwater to reduce the potential of chromium impacted groundwater flowing to the east of NTH. The model will act as a tool to evaluate potential remedial scenarios and can then be further refined as additional hydrogeologic and water quality data is collected during implementation of the well design. Details of the fate and transport modeling approach will be provided in the preliminary (30%) design submittal for review and comment. The IRZ wells may contain some or all of the following down-hole components:

- Pneumatic packers (location dependent)
- Injection piping
- Valves
- Control and monitoring instrumentation
- Equipment to facilitate batch addition of well maintenance compounds at the well head which may include acids, oxidizing agents, biocides, and chelating agents (additional information regarding potential reagents that may be used during well maintenance activities is presented in Section 2.1.2).
- Backflush pump (submersible pump or ejector pump) to facilitate removal of excess biomass, aquifer solids, and/or mineral precipitates and extend the duration of the injection well operation between redevelopment
- Extraction pumps and associated equipment installed in select IRZ wells

Each wellhead will be contained in a vault which is mainly below grade, but may have a portion which is above grade at some locations. The vault will house wellhead piping, fittings, and valves (e.g., control valves, isolation valves, air release valves, vacuum relief valves, etc.). The vaults may also contain I&C devices, including pressure switches, level switches, flow meters and transmitters, level transmitters (for down-hole pressure transducers), and other related devices and support infrastructure. Each well may be connected to a carbon-amended groundwater conveyance header, a spare header, backflush piping, and/or a backflush return header. IRZ wells configured as extraction wells will be connected to a groundwater conveyance header. Each of these headers will run the entire

length of the IRZ and will be routed to the IRZ carbon amendment and well maintenance facilities likely located at the MW-20 Bench.

IRZ Carbon Amendment

As indicated above, a series of groundwater pipes will convey groundwater from the extraction well networks to the IRZ carbon amendment system, likely to be located on the MW-20 Bench. Carbon substrate (e.g., ethanol, sodium lactate, or other food-grade carbon source) will be dosed into the extracted groundwater, combined into amended groundwater pipes, and conveyed to the IRZ wells and the carbon amendment injection wells.

Buildings may be used to house the primary carbon dosing, metering, and control equipment; including valves, flow meters, pumps, and ancillary equipment. Carbon substrate dosing pumps will be monitored with metering instruments and controlled to provide target TOC concentrations to the groundwater stream. Pulsing carbon injections, rather than continuous injections, may be employed to distribute the carbon amendment throughout the treatment zone and mitigate excessive localized bio-fouling of the injection well screens. Building design details will be provided in the future design submittals.

The carbon substrate will be maintained onsite in properly sized, secured, and protected storage tanks. A secure and contained loading area will be designed to accommodate transfer of substrate from transportation containers (e.g., semi-trailer tankers) to the storage tanks. Design details of storage tanks and off-loading pads will be provided in the future design submittals.

SUPPLEMENTAL INFORMATION

In response to DTSC's and DOI's comments on the Draft CMI/RD Work Plan, the preliminary evaluation criteria and design criteria for substrate selection presented in the Final Corrective Measures / Feasibility Study Report for Chromium in Groundwater, Appendix G - In Situ Reactive Zone Treatment Design Elements, are summarized herein. There is a wide spectrum of organic carbon substrates available for IRZ applications, including fermentable soluble substrates such as molasses, lactate, and whey; alcohols such as ethanol and methanol; semi-soluble substrates such as emulsified vegetable oil; and solids such as chitin and bark mulch. The following is a summary of the evaluation criteria for the carbon substrates considered for use in the IRZ components of the Final Groundwater Remedy:

- *Biodegradation half-life*
- *Biodegradation pathway/intermediates*
- *Relative strength and persistence of reducing equivalents*
- *Biomass characteristics imparted by metabolizing the carbon substrate*
- *Mobility in geologic formation*

The intent of the IRZ design is to engineer sufficient flexibility to facilitate the use carbon substrates identified above (if needed) during the operational phase of the remedy. The dosing system components will be designed to allow for operations with the variety of substrates, with selected pumps, instruments, etc., compatible with the handling of each of the above substrates. The design criteria include the following:

- *Physical/chemical characteristics of reagent:*
  - *Shelf life*
  - *Viscosity*

- *Flammability/combustibility*
- *Materials compatibility*
- *Special handling requirements*
- *Health and safety*

- *Substantive Requirements of Permits California Fire Code*
  - *National Electric Code*
  - *Air Permitting Requirements*
  - *Alcohol & Tobacco Tax and Trade Bureau Permit*
  - *Certified Unified Program Agencies (CUPA) Permit / Hazardous Materials Business Plan*

The tools that will be used for evaluating carbon substrates include the following:

- *Groundwater Modeling*
  - *Hydraulic Model: Evaluates the hydraulic characteristics of the site that will be used to predict the mobility of the carbon substrate.*
  - *Fate/Transport Model: Evaluates the fate and transport of chromium and the carbon substrate to determine the IRZ footprint using biodegradation half-life and reducing equivalents data.*
  - *Geochemical Model: Evaluates the release and stabilization of byproducts (iron, arsenic, and manganese) using thermodynamic and kinetic data for the metals and associated ligands.*
- *Uplands In Situ Pilot Test results*
- *Floodplains In Situ Pilot Test results*
- *PG&E Hinkley Compressor Station IRZ performance*

Based on the preliminary evaluation, the carbon substrates that will be carried forward into remedy design include ethanol (used in the Uplands In Situ Pilot Test), sodium lactate (used in the Floodplains In Situ Pilot Test), emulsified vegetable oil, and liquid whey. Each of these carbon substrates were evaluated in the EIR. The selection of the appropriate substrate will depend on the balance between the mode of delivery, the substrate properties, and the rate of carbon utilization. It is anticipated that for most of the final remedy operational period, substrates that are soluble with fast biodegradation half lives (e.g., 5 to 20 days), like lactate and ethanol, will be used to facilitate rapid distribution and establishment of reducing conditions across the IRZ. Whey could be used if infrequent dosing of carbon substrate (e.g., biodegradation half live of greater than 25 days) is needed (whey is not an ideal carbon substrate for continuous usage because it is perishable, has a limited shelf life, and will develop septic odors relatively quickly). Emulsified vegetable oil may be used during future operational stages of the remedy if a low dosage, slow release reservoir of carbon would be advantageous. More comprehensive engineering criteria will be presented in the Basis of Design report (part of the 30% design submittal), including chemical reaction equations for each substrate, the mass balance calculations for relevant process lines, the conceptual process flow diagram, and the piping and instrumentation diagram.

Well Maintenance

Groundwater injection is expected to be nearly continuous initially; however, injection flow rates may decline as wells clog, increasing injection levels, and reducing the available head

for injection. To maintain the performance of the injection wells, the IRZ will be equipped with facilities to provide routine and preventive in-well maintenance, including back-flushing pumps, and chemical addition access piping. The design may incorporate either a submersible pump or a jet ejector pump to facilitate well maintenance activities. Additional conveyance pipes will be included to route the water generated during the maintenance cycle to the MW-20 Bench and/or a separate treatment facility for treatment and removal of solids (see Section 2.2.3).

Buildings may be used to house the well maintenance equipment, including the back-flush recirculation system and a clean-in-place system for the IRZ carbon-amended groundwater pipe (using spare pipes to create a recirculation loop). These buildings may be placed on the MW-20 Bench near the carbon amendment facilities or at another site. Maintenance system equipment and sizing will be determined during the design process.

IRZ Operation

Injection and extraction rates at each well will vary depending on the aquifer characteristics, biomass, geochemistry, and other factors, but will typically be less than 50 gallons per minute (gpm) per well. Injection at specific wells may be adjusted or discontinued to optimize the IRZ system's operation. Injection and extraction to specific target screen intervals may also be discontinued to optimize the IRZ system's operation. Similarly, the pumping rates from each extraction well will be controllable in order to optimize IRZ system operation. As previously indicated, the number, specifications, and locations of the extraction and injection wells in the IRZ will be determined during the design.

O&M activities for the IRZ line include, but are not limited to, pulsing with carbon amendment, refining the injection and extraction well recirculation system, collecting and analyzing groundwater samples, inspecting equipment, and periodically maintaining or replacing wells when necessary.

2.1.2 Inner Recirculation Loop

The Inner Recirculation Loop system is composed of extraction wells along the bank of the Colorado River (the River Bank extraction wells), extraction wells in the East Ravine area, extraction wells to the northeast of the Compressor Station, and injection wells in the Upland Area. The objective of the riverbank extraction wells is to capture impacted groundwater. Because the solute transport model indicates the NTH IRZ effectively remediates groundwater hexavalent chromium concentrations, complete capture of the initial plume footprint is not the primary objective. However, according to ARCADIS the draft pathline analysis (Figure 2-4) indicates the groundwater in the vicinity of MW-26 and MW-51 is still effectively captured by the simulated riverbank extraction wells.

An operational goal of the inner recirculation loop will be to control movement of the chromium plume through the IRZ and as a result avoid temporary expansion of the plume boundary. Outside the perimeter of the plume, water quality monitoring will be implemented to ensure that the target remediation area is not expanding and that in-situ byproducts are being adequately controlled. Extraction downgradient of the IRZ line will serve the purpose of capturing Cr(VI) that was already downgradient of the IRZ line prior to IRZ operation. It will also help draw the chromium plume through the IRZ and draw carbon-amended water from the IRZ line into the floodplain to expand the extent of

treatment in the floodplain. Additionally, these extraction wells will provide secondary protection for the Colorado River by controlling the migration of byproducts generated by the IRZ.

River Bank Extraction Wells

The River Bank extraction well network is expected to consist of five or more groundwater extraction wells. Well design details, including materials of construction, will be provided in the upcoming engineering design submittals. Site geology and groundwater modeling will be used to determine actual well design specifications and groundwater yields. Each extraction well may contain some or all of the following down-hole components:

- Electric submersible pump
- Pump discharge piping (e.g., drop tube)
- Valve/fittings to facilitate batch addition of well maintenance reagents at the well head
- Control and monitoring instrumentation

Each wellhead will be contained in a vault which is mainly below grade, but may have a portion which is above grade at some locations. The vault will house wellhead equipment and instruments. Each well will be connected to a groundwater conveyance header that will be routed to the IRZ carbon amendment system, likely located at the MW-20 Bench. A preliminary listing of potential well maintenance reagents was provided in the Final CMS/FS Report for Chromium in Groundwater, Appendix G - In Situ Reactive Zone Treatment Design Elements. The listing of reagents was developed from commonly applied chemical agents approved for drinking water supply well maintenance. The potential well maintenance reagents include acids (some with dispersants) to dissolve mineral deposits and break up biofilms (muriatic acid, phosphoric acid, glycolic acid, etc.); oxidizing agents to disinfect and degrade microbial biofilms (hydrogen peroxide, chlorine); biocides to inhibit microbial growth (Tolcide®); and chelating agents to aid acid and disinfectant penetration, remove mineral deposits, and break down and disperse biofilms (e.g. citric acid). More comprehensive well maintenance details will be provided in the O&M Plan.

Extraction Wells to the Northeast of the Compressor Station

In the area northeast of the Topock Compressor Station the alluvial aquifer extends southward following a depression in the bedrock. This area northeast of the Compressor Station will have approximately four groundwater extraction wells. Well design details, including materials of construction, will be provided in the upcoming design submittals. Site geology and groundwater modeling will be used to specify actual well designs, construction, locations, and estimated groundwater yields. Each extraction well may contain some or all of the following down-hole components:

- Electric submersible pump
- Pump discharge piping (e.g., drop tube)
- Valve/fittings to facilitate batch addition of well maintenance reagents at the well head
- Control and monitoring instrumentation

Each wellhead will be contained in a vault which is mainly below grade, but may have a portion which is above grade at some locations. The vault will house wellhead piping, fittings, valves, flow meters and transmitters, and pressure transducers/level transmitters.

Each well will be connected to a groundwater conveyance header that will be routed to the IRZ carbon amendment system, likely located at the MW-20 Bench.

East Ravine Extraction Wells

As described in the ROD, remediation of the East Ravine groundwater could take one or more of three forms: (1) groundwater extraction, to be reinjected upgradient for in situ treatment in the alluvial aquifer, (2) in situ treatment within the East Ravine bedrock groundwater, or (3) fresh water flushing of east ravine groundwater. Options (2) and (3) would require that there be sufficient fracture interconnection and effective permeability within the East Ravine bedrock zone so that carbon amendment injection and/or flushing would be effective and sustainable. The second phase of East Ravine groundwater investigation is ongoing, and an assessment of groundwater conditions and hydraulic properties will be made at the conclusion of the investigations. Sustainable purge rates of the wells drilled in the first phase were too low for injection to be a viable option, so the discussion below assumes, for the time being, that extraction is the only viable option in this area. Further evaluation of these options will be provided in the next stage of design.

The East Ravine extraction well network is expected to consist of a series of groundwater extraction wells installed in bedrock along the lower (eastern) end of the East Ravine. Site geology and groundwater modeling, coupled with the East Ravine groundwater investigation effort, will be used to determine actual well design specifications and groundwater yields. Each extraction well may contain some or all of the following down-hole components:

- Electric submersible pump
- Pump discharge piping (e.g., drop tube)
- Valve/fittings to facilitate batch addition of well maintenance reagents at the well head
- Control and monitoring instrumentation

Each wellhead will be contained in a vault which is mainly below grade, but may have a portion which is above grade at some locations. The vault will house wellhead piping, fittings, valves, flow meters and transmitters, and pressure transducers/level transmitters. Each well will be connected to a groundwater conveyance header that will be connected to the Embayment extraction well network header.

Carbon-Amended Injection Wells

The Inner Recirculation Loop injection well network is anticipated to consist of four or more wells installed near the western margin of the plume north of I-40. Well design details, including materials of construction, will be provided in the future design packages. Wells may be designed with multiple discrete screened intervals to target specific zones of the water-bearing unit. Site geology and groundwater modeling will be used to determine actual well design specifications. The injection wells may contain some or all of the following down-hole components:

- Pneumatic packer
- Injection piping
- Valves
- Control and monitoring instrumentation

- Valve/ fittings to facilitate batch addition of well maintenance reagent at the well head
- Backflush pump (submersible pump or ejector pump)
- Extraction pumps and associated equipment may be installed in select Inner Loop wells

Each wellhead will be contained in a vault which is mainly below grade, but may have a portion which is above grade at some locations. The vault will house wellhead piping, fittings, and valves. The vaults may also contain I&C devices to optimize well operations. Submersible pumps intended for backflushing may require modification involving removal of their check valves. The modification allows flow back into the well upon turning the pump off, creating a surging action beneficial for well development. Each well will be connected to more than one carbon-amended groundwater conveyance headers. Each of the headers will run the entire length of the Inner Loop and will be routed to the IRZ carbon amendment system, likely located at the MW-20 Bench. The purpose of the spare header is to provide redundancy and flexibility of operation. In addition, the spare header can be employed to facilitate well or pipe cleaning of biological and/or mineral fouling within the primary carbon-amended groundwater header. As described previously, to the extent practicable, this infrastructure will be routed through areas that have been previously disturbed.

O&M activities associated with the Inner Recirculation Loop system include management and adjustment of injection and extraction system flow rates, periodic well maintenance, groundwater sample collection and analysis, management of carbon amendment systems, equipment inspections, and periodic replacement of wells and other structures as needed.

Inner Recirculation Loop Footprint

The locations of the carbon-amended injection wells and River Bank extraction wells are shown in Figure 2-1a. The River Bank extraction wells will be located along the bank of the Colorado River. Carbon-amended groundwater would be injected into a series of wells located west of Bat Cave Wash and north of the Burlington Northern Santa Fe (BNSF) railroad tracks, covering a distance approximately 1,300 feet in length. These injection wells will be located along existing roads and utility corridors, minimizing the disturbance associated with remedial activities.

Recirculation System Details

A conceptual process flow schematic is illustrated in Figure 2-2. Well construction details will be similar to the injection and extraction wells used in the IRZ system, with multiple screens and the potential to target specific vertical intervals for injection and extraction. Well vaults and controls may be similar to those described previously for the IRZ line wells. Groundwater recovered from the River Bank extraction well network will be dosed with carbon at the IRZ carbon amendment system (as described above).

2.1.3 Fresh Water Injection System

Fresh water will be extracted from offsite production well (s) and then injected at several locations beyond the western and northern periphery of the groundwater plume. The primary purpose of the fresh water injection is to assist with flushing the chromium plume through the NTH IRZ and to constrain westward spread of carbon-amended water and in-situ byproducts from the Inner Recirculation Loop. As previously stated, an operational goal of the freshwater injection system will be to flush the chromium plume through the IRZ

and as a result avoid temporary expansion of the plume boundary. Outside the perimeter of the plume, water quality monitoring will be implemented to ensure that the target remediation area is not expanding and that in-situ byproducts are being adequately controlled.

The fresh water injection system is anticipated to consist of fresh water production well(s), injection wells (four shown in the CMS/FS [CH2M HILL, 2009c]) and piping connecting the production well area to the injection wells. The anticipated capacity of the fresh water injection system is at least 500 gpm. The actual volume of injection water required to accelerate plume movement may be larger or smaller than the currently estimated total of 500 gpm. Groundwater modeling will be used to support the design of the fresh water injection system. The model will verify the number and location of the injection wells, as well as the extraction and injection flow rates. The plan for modeling efforts is discussed in Section 6.2. It is important to note that as the remedy implementation progress, certain components of the fresh water injection system (e.g., sources of fresh water, number and location of injection wells) may need to be adjusted with changing conditions.

Fresh Water Production Well(s)

The CMS/FS considered multiple potential sources of fresh water (production wells in Arizona, production wells in California, and the Colorado River), and multiple conceptual locations were considered for the potential production wells. For the purpose of the forthcoming remedial design, it is proposed that the source of fresh water will be from production well(s) in Arizona. Alternative well locations will be evaluated during the design.

In compliance with EIR mitigation measure CUL-1a-9, in order to minimize environmental impacts and disturbances, priority will be given to previously disturbed areas and to reuse of existing physical improvements when locating new infrastructure including production well(s). To that end, if the use of already existing production well(s) with suitable characteristics (in terms of quality and quantity and infrastructure) is proposed outside of the project area or the APE, an analysis will first be conducted to assess the environmental impacts associated with using the existing wells and whether they would be adequately addressed by the existing EIR mitigation measures, including mitigation measure CUL-1a-9. Additional analyses may be required depending on the results of the first analysis, and before any decision is made on the use of existing production wells outside of the project area or the APE.

SUPPLEMENTAL INFORMATION

In response to DTSC's and DOI's comments on the Draft CMI/RD Work Plan, the following supplemental information is provided to present the current evaluation of sources and selection of preferred option for freshwater supply, as well as additional work to be conducted.

Since the submittal of the Draft CMI/RD Work Plan on May 2, 2011, PG&E has conducted further evaluation of freshwater supply options for the remedy (production wells in Arizona, production wells in California, and the Colorado River). All of these options were evaluated in the EIR. The evaluation criteria include the following:

1) *Influence of drawdown from freshwater pumping on remedy performance,*
2) *Quantity and quality of water available,*

3) Need for treatment of water prior to injection, and
4) Disturbance associated with construction.

From a hydraulic perspective, preliminary model simulations showed that pumping from a hypothetical production well near Moabi Regional Park could create adverse northerly gradients resulting in non-containment of carbon-amended injection water. On the other hand, pumping in Arizona provides easterly gradients which are beneficial to maintaining capture of both carbon-amended injection and floodplain groundwater.

From a water quantity perspective, there is uncertainty whether the aquifer near Moabi Regional Park could yield sufficient quantity of fresh water for the remedy. Existing data indicate that the current supply wells for the Compressor Station (Topock-2 and -3, located in Arizona) cannot deliver sufficient volumes of freshwater for the remedy, as currently constructed. Existing data from the Havasu National Wildlife Refuge (HNWR) well, an irrigation well located on the Refuge in Arizona, showed a production rate that is more than adequate for the remedy (estimated design flowrate of 500 gpm, to be confirmed by the modeling). Available data on the construction of the HNWR well is presented below:

- *Date Installed – 11/24/2010*
- *Boring Depth – 160 feet*
- *Well Depth – 160 feet*
- *Well Screen/Perforated Length – 65 feet*
- *Well Screen/Perforated Interval – 92-157 feet*
- *Static Depth to Water – 5.2 feet*
- *Well Diameter – 10 inches*
- *Depth to Bedrock – Unknown*
- *Unit Monitored – Fluvial*
- *Well Log Available – Yes*
- *Driller's Log Available – No*

Since the HNWR well is located just outside of the project area, it is envisioned that, if needed, a similar water supply well could be located just inside the project area to produce the quantity of water needed for the remedy,

Exhibit 2-3 presents the available water quality data from the HNWR well (see below). From a water quality and need for treatment prior to injection perspective, the water quality is suitable for the remedy, with levels of trace metals that are below the Topock background levels (see Exhibit 2-3). Additional water quality data will be collected to support design. Geochemical model simulations were conducted to evaluate the effects on the receiving aquifer from a hypothetical injection of HNWR water. Results showed no reduction in the receiving aquifer porosity during injection of this water. Additional water quality data will be collected from the HNWR well and geochemical modeling will be performed to verify the effects from injecting HNWR water in California and to confirm that no pre-injection treatment of this water is anticipated from a water quality perspective. Water from the Colorado River will likely require filtration and disinfection prior to injection into the aquifer. This would require filters and chemical feed equipment that would increase the footprint of the remedy.

From a disturbance associated with construction perspective, the use of existing infrastructure such as the existing HNWR well is preferred over constructing new wells (CUL-1a-9). Construction of a water intake structure will require significant increase in footprint for the intake structure and mitigation measures to protect biological resources.

In summary, the preferred freshwater supply option is production well(s) in Arizona. To minimize disturbance associated with construction, the use of the existing HNWR well is preferred over drilling a new production well. PG&E is currently working with the United States Fish & Wildlife Service (USFWS) and DOI on the potential use of the HNWR well for the remedy. Details will be provided in the forthcoming design submittals.

Fresh Water Injection Well(s)

There are four conceptual injection well locations as shown on Figure 2-1a. If the injection rates and aquifer properties at any of these locations prove to be different than anticipated, it is possible that more than one injection well may be installed at a single location or additional injection well may be needed at different locations. Each injection well will be similar except for capacity, piping size, and location. Each injection well will consist of a well casing containing a drop pipe, aboveground or submersible pump, backflush discharge pipe, and associated sounding tubes or bubbler lines for measuring water levels. The top of the well casing and associated valves and piping may be contained in a vault which is mainly below grade, but may have a portion which is above grade at some locations. Alternatively, the wells may be completed entirely above ground located inside a structure or fence. A local control panel shaded by a sunscreen will be located nearby.

Fresh Water Injection System Routing

Figures 2-1a and 2-1b present the conceptual routing of the fresh water injection system. Assuming that the fresh water supply is obtained from a well or wells in Arizona, fresh water piping from the production well and instrumentation conduits may follow the alignment of the existing source water piping for the Compressor Station, running parallel to the BNSF railroad track, then crossing underneath the railroad track and under I-40. The pipeline would continue onto the existing arched pipeline bridge (co-owned by El Paso Natural Gas and PG&E) to cross the river. During the design, an evaluation will be conducted to verify/ confirm the feasibility of the river crossing on the arched bridge. A backup option is to install the fresh water pipe under the Colorado River, along the alignment of the existing natural gas pipeline (owned by Transwestern Pipeline) between the railroad bridge and I-40, or to utilize other existing bridges.

EXHIBIT 2-3
Observed Water Quality Data from HNWR Irrigation Well

HNWR-1 Well Results

Sample Date	11/10/10 (sampled by PG&E)							
Field Parameters	**Units**	**Result**	**General Chemistry Parameters**	**Units**	**Result**	**Trace Metals**	**Units**	**Result**
Dissolved Oxygen	mg/L	5.33	Total Alkalinity	mg/L $CaCO_3$	100	Aluminum	µg/L	<50
Oxidation-Reduction Potential	mV	159	Boron	mg/L	0.38	Antimony	µg/L	<10
			Calcium	mg/L	23	Arsenic	µg/L	15
pH	pH units	7.84	Iron	mg/L	<0.02	Barium	µg/L	130
Salinity	Percent	0.42	Fluoride	mg/L	3.8	Beryllium	µg/L	<1
Specific Conductance	µS/cm	870	Potassium	mg/L	5.1	Cadmium	µg/L	<3
Temperature	Deg C	35.9	Magnesium	mg/L	4	Chromium (Meth. 6010B)	µg/L	18
Turbidity	NTU	5.1	Manganese	mg/L	<0.01	Chromium (Meth. 6020A)	µg/L	19.2
			Sodium	mg/L	130	Cobalt	µg/L	<3
Stable Isotopes	Units	Result	Ammonia-N	mg/L	<0.1	Copper	µg/L	<5
$\delta^{18}O$	Per mil	-10.3	Nitrate-N	mg/L	2.5	Hexavalent Chromium	µg/L	17.5
$\delta^{2}H$	Per mil	-75.3	Sulfate	mg/L	47	Lead	µg/L	<10
			Dissolved Silica	mg/L	28.6	Mercury	µg/L	<0.2
			Total Dissolved Solids	mg/L	490 J	Molybdenum	µg/L	11
			Total Kjeldahl Nitrogen	mg/L	<0.4	Nickel	µg/L	<5
			Total Organic Carbon	mg/L	<1	Selenium	µg/L	0.73
						Silver	µg/L	<3
						Thallium	µg/L	<0.5
						Vanadium	µg/L	20
						Zinc	µg/L	<10

After crossing the Colorado River into California, the water pipeline may follow PG&E's natural gas pipeline right-of-way (ROW) along a portion of old Route 66 and PG&E's pipeline ROW road to the existing water tank area of the Compressor Station. Midway along this route, it is likely that the water pipeline would branch to the north to connect to the piping corridor located within NTH and the Topock Compressor Station access road to allow the fresh water system to form a loop. This northern branch would head north on NTH and continue up to the intersection with the IM No. 3 access road, after crossing under I-40 and the BNSF railroad tracks. The line would branch north to serve the northernmost injection well. The main trunk of this northern branch would continue west on the IM No. 3 access road to serve the westernmost well located near the IM No. 3 injection wells. Along this route, another branch will go to the south and west to an injection well located within the I-40 median. Two potential routes have been identified to reach the I-40 median well: both will require directional boring. This branch would also continue south through Bat Cave Wash to connect to the southernmost injection well. The final leg of this loop is a pipeline segment that goes up the existing Bat Cave Wash access road into the Compressor Station. The pipeline would follow the western Compressor Station fence line and then proceed to the east to the water tank area.

Along the pipe route, booster stations may be required to meet the operational requirements. The need for and locations of the booster stations will be evaluated during the design.

SUPPLEMENTAL INFORMATION

In response to DTSC's and DOI's comments on the Draft CMI/RD Work Plan, the following supplemental information is provided to discuss the current status of the evaluation of freshwater conveyance options, the current preferred option(s), and the additional work to be done.

Since the submittal of the Draft CMI/RD Work Plan on May 2, 2011, PG&E has continued its evaluation of the freshwater conveyance options. Of specific notes are the following:

- *Crossing the Colorado River – At this point, the use of the arched pipeline bridge for crossing the river is feasible and is PG&E's preferred option. PG&E will continue to work with El Paso Natural Gas (co-owner of the bridge) on the feasibility study. As requested by DOI, the feasibility study report for crossing the river will be included in the preliminary (30%) design submittal.*
- *Freshwater pipe to serve the injection well located in the median of I-40 – PG&E has initiated discussion with Caltrans on options to serve this well, which include directional drill from Bat Cave Wash, drill from north of the railroad tracks, and use of existing or new culverts extending from Bat Cave Wash to the I-40 median. PG&E's preferred option is to use the existing culverts. PG&E is also studying alternatives, if these approaches are not deemed to be feasible by Caltrans.*

Additional details will be provided in the preliminary (30%) design submittal.

Fresh Water Injection System Operation

The fresh water injection system is intended to operate with occasional downtime for maintenance and rehabilitation. The production well or wells is anticipated to operate to supply the necessary injection capacity, with the possibility of connecting to the existing fresh water storage tanks above the Compressor Station. The production well pump could

operate less than full time as long as it has sufficient capacity to deliver the needed amount of fresh water during intermittent operation. The production well pump would turn on when the tanks drop to a pre-set level. This level would be above the level required for minimum emergency storage or other Compressor Station requirements. The well(s) would continue pumping until the tanks reached a pre-set level that would correspond to a full tank, just slightly below the emergency tank overflow level. The well(s) will need to be taken out of service for rehabilitation periodically.

Fresh water would flow into the injection wells through a flow control valve, which would maintain a pre-set water level measured in the aquifer. Flow rate, pressure and water level in the well would be monitored locally and transmitted back to the control building. The injection wells would be back-flushed frequently (potentially up to four times per month) to clear well screens and restore permeability. Periodically, the injection wells may go through more extensive cleaning. Valves will be closed to enable the back-flushing to occur without interrupting injection to the other wells. The back-flushed water will be conveyed from the injection wells to a central system by a separate pipeline. Piping design will focus on independent maintenance at each well, covering routine actions like back-flushing, periodic chemical addition and agitation, or more prolonged invasive rehabilitation techniques. Using this approach, other system wells can remain in service during maintenance activities involving individual wells or groups of wells.

Valves will be installed at key locations in the pipe so that pipeline maintenance on the main trunk loop can be conducted while the system remains in service. Pipeline maintenance on some pipe segments may preclude service to just one well during maintenance activities.

The well network will be monitored remotely at one or more control facilities as well as having instruments with local readouts. Potential location for such control facility or facilities include the MW-20 Bench (co-locate with the IRZ control system), the Compressor Station, or a location near the Transwestern Metering Station *(see Section 2.2.1 for supplemental information on preferred major equipment locations)*. Pressure, well level, pump status, and flow data from production and injection wells would be transmitted back to the control facility. Alarms would be triggered by a loss of pressure (potential main break or control valve failure) or a pump failure. In compliance with the EIR mitigation measures, alarms will not be routed through PG&E's existing Compressor Station alarm system.

The water quality of the production well(s) in Arizona may require pH adjustment to prevent potential scaling on injection wells. In that case, a water conditioning facility may be required. However, after the submittal of the Draft CMI/RD Work Plan in May 2011, simulations with the PHAST geochemical model, developed by the U.S. Geological Survey (USGS) (Parkhurst, et al., 2010) showed no reduction in aquifer porosity during injection of HNWR water (presumed representative of water quality in Arizona), and as a result no pre-injection treatment or conditioning of this water is anticipated from the porosity reduction perspective.

Additional water quality data will be collected from the HNWR well and geochemical modeling will be performed to verify the effects from injecting HNWR water in California and to confirm that no pre-injection treatment of this water is anticipated from a water quality perspective. If such a facility is determined to be needed details will be provided in future design submittals.

Well Maintenance, Rehabilitation, and Replacement

Over time, well maintenance will be required to prevent progressive loss in specific injectivity and specific capacity. Routine back-flushing will be the primary method of maintaining well performance, but it is anticipated that more extensive redevelopment may be required periodically. Progressive clogging could be related to air entrainment, suspended solids, bacterial growth, or geochemical reactions. In addition to these specific clogging mechanisms, all injection wells remain susceptible to clogging by suspended solids accumulation. Thus, invasive rehabilitation methods will focus on the specific sources of well clogging, along with suspended solids.

Typically rehabilitation consists of superchlorination; acid treatment; swabbing and air lifting; and development pumping. Rehabilitation programs vary and will be tailored to the given well conditions. Some well rehabilitation methods potentially involve the addition of chemicals to a well. Chemicals that are added will be pumped back up to the surface if necessary, followed by treatment and proper management of the removed wastewater. The management of this wastewater stream is discussed in Section 2.2.3.

Older wells may require decommissioning or replacement. Wells will be decommissioned in accordance with the California Department of Water Resources standards or other methods approved by agencies based on ongoing discussion with stakeholders. Different well designs may require different approaches to decommissioning. Wells must be properly decommissioned to ensure the protection of groundwater quality by preventing the borehole from being a conduit for (a) the infiltration of surface water to the aquifer or (b) the migration of contaminated groundwater to uncontaminated portions of the aquifer. In addition, wells must be properly decommissioned to eliminate a possible physical hazard to humans and animals.

Wells may also be damaged and become inoperable due to a number of reasons including vehicular collisions, vandalism, loss of equipment down the well, as well as during flooding or storm events. Wellheads in flood-prone areas will be designed to minimize the possibility of damage due to flooding. Care will be taken to ensure that any damaged wells are properly rehabilitated or replaced in a timely manner to ensure continued operation of the remedy, ensure protection of the groundwater quality, and eliminate hazards to humans and animals.

2.1.4 Institutional Controls (ICs)

Institutional controls are legal and administrative mechanisms used to limit activities on specified property that could interfere with the remedy or the protection of human health and the environment. The ROD stated that the ICs adopted by the selected groundwater remedy for the Topock site are specified in the *BLM Lake Havasu Field Office Resource Management Plan* issued in May 2007 (BLM, 2007) and in the *1994 Lower Colorado River National Wildlife Refuges Comprehensive Management Plan* (USFWS and U.S. Bureau of Reclamation [BOR], 1994). These plans restrict surface uses and use of the groundwater. In addition, land use covenants or deed restrictions to prevent groundwater use within the plume until cleanup goals are attained are common ICs that could also be used for the Topock site. Similar ICs or their equivalents could effectively manage risk of exposure by restricting direct human contact with the groundwater plume. However, a restriction on groundwater use alone would not meet long-term cleanup goals. Therefore, an IC is

considered a component of the remedial action for risk management in addition to the remedial technologies that comprise the project. It is anticipated that if ICs are implemented in a specific area, most of these controls would remain in place for the duration of the remedy; that is, until the RAOs are achieved.

Where available, the ICs or their equivalents could provide control by: (1) preventing the use of contaminated groundwater within the plume; (2) prohibiting the installation of new large-capacity water supply wells within a specified area; (3) restricting the development/use of the land such that the planned (i.e., build in 2013-2014) remedial structures (wells, pipelines, tanks, etc.) are protected and that PG&E can access, operate and maintain them; and (4) restricting the use/development of the land such that future (i.e., to be built beyond 2014) remedial structures can be built and that PG&E will be allowed to access, operate and maintain them.

Key parameters needed to set up ICs include definition of the area over which the ICs should be applied (e.g., area within which offsite pumping could be a concern), location of remedial facilities, and implementation timing. Once updated, the groundwater flow model will be used to help determine the area within which off-site pumping could influence the remedy hydraulics. This area is important as it will assist in defining the area over which the ICs should be applied. The location of the remedial facilities will be determined through the design process. The implementation timing will be refined with each design (updated schedule will be submitted to the agencies per the CACA and Model CD).

Different landowners and operators may have different processes for establishing an IC or its equivalent, based on whether they are a landowner or leaseholder, whether they are a private party or a government agency, etc. Parties near the site with non-federal lands, for which an IC or its equivalent may need to be established (if available) could include:

- County Agencies,
- Transportation Agencies,
- Utility Companies, and
- Owners of private parcels.

Once the area over which ICs should be applied and the location of remedial facilities are identified, the process of establishing ICs or their equivalents, if available, will commence.

The target timeframe for having in place the ICs or their equivalents (where available) is prior to remedy construction.

2.1.5 Monitored Natural Attenuation (MNA)

MNA is included as a long-term component of the groundwater remedy. MNA could be utilized for remediation of specific area during the O&M phase after sufficient data are available to evaluate the effectiveness of the in-situ treatment and hydraulic containment components of the remedy. Remediation by MNA as a sole component may be appropriate after optimization attempts have been implemented (including installation of additional remedial wells) and when the natural reductive capacity has been demonstrated through monitoring to be effective at the area in question.

At the Topock site, attenuation occurs naturally in most of the fluvial sediments in the floodplain near the Colorado River, where reducing materials in the aquifer chemically and

biochemically convert Cr(VI) to low-solubility Cr(III) that precipitates out of solution and binds to the aquifer formation. Reducing conditions have been documented in shallow to mid-depth fluvial wells and sediments near and underlying the river. South of the railroad tracks, these reducing conditions are also encountered in deep wells near and beneath the river. The observed natural reducing conditions are characterized by the presence of organic carbon, dissolved iron, dissolved manganese, and ammonia in groundwater samples. The available data indicate that the shallow and medium fluvial sediments adjacent to and beneath the river have sufficient reducing capacity to reduce at least a significant portion of the Cr(VI) plume (CH2M HILL, 2008c; 2009e). The presence of this reducing zone adds an extra layer of protection for the river during the active operation of the remedy, as well as afterwards, in addition to the protections afforded by the final remedy. Reducing conditions have not been found consistently in bedrock of the East Ravine area, however reducing conditions were found in fluvial sediments beneath the Colorado River upstream, downstream, and adjacent to the mouth of the East Ravine.

2.2 Description of Groundwater Remedy Supporting Features

This section describes additional features of the groundwater remedy that are not aimed specifically at attaining RAOs, but that represent features within the footprint and are needed to ensure proper operation. Further details will be provided in future design packages or documents.

2.2.1 Security and Site Access

In general, the security for remedial facilities located inside the Compressor Station will be provided for by the Compressor Station security system. Remedial facilities located outside of the Compressor Station will be equipped with security features/systems that are consistent with PG&E's current security standards. Such features, as determined necessary and in compliance with project and landowners' requirements, could include, but are not limited to, fencing to protect the equipment and provide safety for personnel and the public; locks to prevent unauthorized access; security devices and instrumentation; security communication systems; alarms to notify PG&E's security operations; and security cameras. As required by the EIR mitigation measure CUL-1a-3b, a Site Security Plan will be developed as part of the final design with the goal to provide increased observation and reporting of potential intrusions into the project area that may impact significant cultural resources during construction and operation of the final remedy.

To protect the health and safety of personnel, the public, and animals in the surrounding environment, and to ensure non-interference with remedy operations, engineering controls will be used to restrict access to remedial facilities located outside of the Compressor Station. Access to remedial facilities located inside the Compressor Station will be in accordance with established protocols for the facility. Besides consideration for health and safety and remedy operations, another aspect of access is related to preserving Tribal members' access to, and use of, the project area for religious, spiritual, or other cultural purposes. To address this aspect of access, an Access Plan will be developed in the future in coordination with the federal agencies with land management responsibilities in the project area, as required by EIR mitigation measure CUL-1a-2.

In addition, as required by EIR mitigation measures CUL-1a-3c and 3d, an informational kiosk will be installed within Park Moabi that will inform visitors of work activities being done at the project site and specify which parts of the project will be off limits to off-road vehicle usage due to health and safety concerns, and for protection of cultural and biological resources. Signage could also be posted to indicate those parts of the project area that are off limits to off-road vehicle usage to reduce potential damage to environmental resources.

2.2.2 Utilities and Support Facilities

The groundwater remedy will include utility and support facilities necessary to make the remedy effective and safe. Utilities include primarily electrical power, communications systems, I&C systems, and fresh water. For this project, it is anticipated that the City of Needles electric system will supply primary electrical service, and this will be taken from the existing electrical power system, if possible. As the design develops, the required service load will be better defined. Emergency backup generation will be provided to supply power in the event of a service outage. The backup generation may be provided by a stand-alone generator or by tying into the Compressor Station electric system, if excess power is available for this purpose.

Support facilities may include operator's facilities, equipment and materials storage, equipment maintenance and testing areas, office space, bathrooms, waste or refuse containers, and an onsite laboratory.

SUPPLEMENTAL INFORMATION

In response to DTSC's and DOI's comments on the Draft CMI/RD Work Plan, the following supplemental information is provided to discuss the current status of the evaluation of power supply options, the current preferred option(s), and the additional work to be done.

Since the submittal of the Draft CMI/RD Work Plan on May 2, 2011, PG&E has developed information to determine that the electrical load for the remedy is well within the parameters evaluated in the EIR. New or larger power lines will not be needed for the City of Needles Electric Department system to service the remedy. PG&E has and will continue to evaluate several power supply options, including the City of Needles Electric Department, the Compressor Station, solar panels, and/or dedicated diesel or natural gas fired generators. All of these options were evaluated in the EIR. With current electrical loads, the City of Needles Electric Department power is at capacity during some portions of the year. Under current operating conditions, the Compressor Station has excess capacity during most times of the year; going forward, it is anticipated that there would be additional excess capacity after the planned emission reduction project is complete (the project involves replacing existing compressors and generators with more efficient and lower emission units - construction is planned to occur between 2013 and 2014). A dedicated diesel or natural gas fired generator will be used as a source of backup power if the primary source cannot meet demand. Solar panels will also be used where appropriate.

The current preferred option is to use the Compressor Station power as primary and dedicated generator power/solar panels as backup. The reason is the Compressor Station power is more reliable than the City of Needles Electric Department power. Additional work will be conducted to verify the Compressor Station excess capacity and to coordinate with the emission reduction project design team on the preliminary (30%) design.

At this early stage, the electrical distribution system is envisioned to consist of an array of underground power cables, with several transformers installed at locations near the remedy facilities such as wells and the IRZ systems. Power cables will be placed in conduits that will be installed with the pipeline alignment. This approach to power distribution is designed to minimize the size of power cable and conduits. Details will be provided in future design submittals.

2.2.3 Management of Remedy Wastewater

The groundwater remedy includes wells that will require maintenance such as back-flushing and rehabilitation. Such maintenance activities will create a wastewater stream that must be managed. Other types of wastewater (smaller volume) will also need to be managed, such as monitoring well sampling purge water, equipment decontamination wastewater, and rainfall that collects in secondary containment. Collectively, these types of wastewater are called remedy wastewater.

It is estimated that 3 to 16 million gallons per year of remedy wastewater will be generated. Well back-flushing is projected to be the largest source of wastewater, followed by well rehabilitation, monitoring well sampling, rainfall, and other sources. The management methods for the remedy wastewater considered in the EIR include onsite management and offsite disposal. Additional information regarding onsite management options is presented below:

- **Transport of Wastewater –** use a combination of trucking and piping. The preferred option is to transport by piping from wells requiring frequent maintenance (injection and IRZ wells) and by trucks from wells that require less frequent maintenance (extraction and monitoring wells) or wells for which transport by pipeline would be problematic. It is envisioned that all piping for remedy wastewater will be laid in parallel, or in a common trench, to the extent practicable, with other piping and conduits.

- **Treatment of Wastewater -** store and treat the wastewater (using fixed and/or mobile units) prior to disposal/reuse. Mobile treatment equipment may be used during well maintenance periodically for filtration, but not for full treatment. The primary reason is that the amount of equipment required for full treatment would exceed the available space in the areas where wells are likely to be installed. Furthermore, using mobile equipment for full treatment could increase the potential for leaks and spills. A fixed treatment system could be in a building shared with other functions required by the remedy, such as onsite laboratory, remedy control center, fresh water conditioning/ treatment, and/or carbon-amendment controls. The treatment of remedy wastewater could involve removal of particulate material, solids dewatering, filtration, and neutralization. Some remedy wastewater could also contain dissolved constituents, such as chromium, iron, manganese, arsenic, and organic carbon. It is not anticipated that these will require removal as disposal/reuse options exist that can receive such water – including water from the carbon-amended injection wells in the plume and the existing Compressor Station evaporation ponds. Current waste discharge requirements (WDRs) for the Compressor Station ponds (Board Order No. R7-2004-0080) do not include discharge of remedy wastewater discussed in this section. The allowed discharges are cooling tower blow-down, and wastewater generated from intermittent operational

activities such as degreasing of equipment and compressor engine parts, and draining of cooling systems. Therefore, the WDRs (or its substantive requirements) will need to be amended in order for the ponds to accept the remedy wastewater. The fixed treatment system could operate in a continuous or batch mode – this will be determined during detailed design. A conceptual process flow schematic for the remedy wastewater treatment system is shown in Figure 2-5.

- **Disposal/Reuse of Treated Wastewater.** Multiple potential disposal or reuse options are considered so as to provide operational flexibility and avoid hampering operation of the remedy. These options will be further developed during the design process and include:

  1. Reuse by blending with fresh water and use in Compressor Station cooling towers. The cooling towers use fresh water to cool the compressed natural gas. The water is re-circulated in the tower and the volume is reduced through evaporation. Make-up water is added so the cooling demand is met. Water is blown down or discharged from the system to control concentration of salts or other impurities in the circulating water. The blowdown discharges to the existing evaporation ponds through an existing pipeline. This reuse option will require a pipeline to supply treated remedy wastewater to the cooling tower. Treated wastewater with low dissolved and suspended solids concentrations is likely to be desired to prevent scaling or plugging. In addition, as the circulating water is currently treated to prevent fouling and corrosion in the cooling towers, this reuse option will be evaluated/designed to ensure a similar level of protectiveness. The cooling tower water usage between January 2009 and March 2011 ranged from 11 to 110 gpm (using monthly water volumes converted to instantaneous rates).

  2. Discharge to the Compressor Station evaporation ponds, especially for wastewater that contains high TDS or has a high well-plugging potential. The Compressor Station's lined evaporation ponds receive cooling tower blowdown water and evaporate it as part of normal Compressor Station operations. Solids are removed from the ponds periodically. For this option, a pipe supplying treated remedy wastewater would be connected to the cooling tower blowdown discharge system and would be pumped to the ponds through the existing pipeline. The ponds operate under WDRs issued by the California Regional Water Quality Control Board (Water Board). Excess capacity of the ponds will be evaluated during the design.

  3. Discharge to Moabi Regional Park wastewater ponds. The Moabi Regional Park sewage treatment system ponds receive the wastewater from the Moabi Regional Park facilities and Pirate's Cove resort. Four ponds have been constructed, although only one pond appears to be in service at any one time, suggesting that there is significant excess capacity in this system. In this option, treated wastewater would be pumped in a pipeline running along NTH to an outfall directly at the ponds or be connected to another portion of the sewage treatment system. PG&E has not yet evaluated the regulatory or permit requirements of the Moabi Regional Park sewage treatment system, nor is it known at this time if San Bernardino County would accept the wastewater.

  4. Reuse by blending with carbon-amended water and injection into amended water injection wells. The carbon-amended injection wells could take remedy wastewater

with minimal treatment except for solids removal. This may benefit the remedy in further accelerating the plume movement toward the IRZ line on NTH. However, it is not known how much excess capacity the wells could take without affecting the plume movement. The groundwater modeling being performed will be used as a tool to understand the relative difference in the allowable fresh water and carbon-amended injection rates so that flow ranges can be defined for effective operation. For this option, a pipeline would be constructed to convey treated remedy wastewater to the carbon-amended injection wells.

5. Discharge to an infiltration gallery built in Bat Cave Wash near the Compressor Station. An injection gallery in Bat Cave Wash is another potential method to dispose of treated water. This also has the advantage of accelerating the plume movement toward the IRZ line along NTH. The groundwater modeling being performed will be used to verify the maximum flow to avoid unwanted effects on the plume. In addition, the evaluation of this option will be coordinated with the soil characterization and regulatory process (RFI/RI, CMS/FS) for SWMU1 and AOC1.

6. Transportation to an off-site disposal facility.

These six options will be further evaluated and additional details on the remedy wastewater management system will be included in the design. The design may include one or more the options listed above.

2.3 Corrective Measure/Remedial Action Monitoring Program

This section provides a discussion of the preliminary framework of the monitoring program for the groundwater remedy. Many of the details of this monitoring program, such as the monitoring well network (i.e., the location, the number, and the design of monitoring wells), will be determined during the design and included in future design submittals and the O&M Plan. In addition, at DTSC and DOI direction, constituents of potential concern (COPCs), including selenium, molybdenum, and nitrate will be monitored as part of the site monitoring program throughout the remediation process. As stated in the CMS/FS, it is expected that concentrations of COPCs will change during the course of remediation from the concentrations present today, and that the concentrations and distribution of the COPCs will be re-evaluated following attainment of the RAOs for Cr(VI) and prior to removing the ICs.

In general, the monitoring program is anticipated to include the following concepts:

- Data will be collected from various media, including groundwater, surface water, and process samples,
- Monitoring wells incorporated into the monitoring program will be a combination of existing monitoring wells and new monitoring wells, and
- The monitoring program will be re-evaluated throughout implementation of the remedy and adjusted as necessary to evaluate expected changes in site conditions.

2.3.1 Monitoring Goals and Objectives

During the RFI/RI stage of the project, groundwater monitoring has been conducted primarily for site characterization to define the nature and extent of contaminants in groundwater. In addition, existing monitoring programs are conducted to evaluate the performance of the IM. With the completion of the RFI/RI and the IM phases of the project, the objectives of the existing monitoring programs at the site will be complete. When the groundwater remedy is implemented, the current groundwater monitoring programs will be replaced by a new Corrective Measure/Remedial Action Monitoring Program with the focus of evaluating the performance of the remedy to attain the RAOs and to comply with ARARs.

Compliance Monitoring During Remedy Implementation

The RAOs for the groundwater remedy, as stated in Section 1.2.2, are:

1. Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 µg/L.
2. Prevent or minimize migration of Cr(T) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]).
3. Reduce the mass of Cr(T) and Cr(VI) in groundwater at the site to achieve compliance with ARARs in groundwater. This RAO will be achieved through cleanup goal of regional background of 32 µg/L of Cr(VI).
4. Ensure that the geographic location of the target remediation area does not permanently expand following completion of the remedial action.

Compliance monitoring will focus on confirming that the groundwater remedy is achieving these RAOs. The first RAO, relating to prevention of ingestion of contaminated groundwater, will be met primarily through ICs. Compliance monitoring will primarily be designed to ensure that the groundwater remedy is meeting RAOs 2, 3, and 4, relating to controlling migration and reducing mass to an adequate degree. Compliance monitoring will involve water quality monitoring. While RFI/RI characterization at the site has been focused on both Cr(T) and Cr(VI), future monitoring during the remediation will be focused on Cr(VI). Cr(T) will be periodically monitored to verify that Cr(VI) is an accurate indicator of Cr(T) and to compare to the maximum contaminant level (MCL) for Cr(T). Additional monitoring during remedy implementation, including analysis of in-situ byproducts and COPCs (selenium, molybdenum, and nitrate) is discussed in Sections 3.1.2 and 3.1.4.

Outside the perimeter of the plume, water quality monitoring will be implemented to ensure that the target remediation area is not expanding and that in-situ byproducts are being adequately controlled. Water quality monitoring in groundwater outside the plume will focus on analysis for Cr(VI), as well as in-situ byproducts (arsenic and manganese). In addition, select wells will be monitored for constituents that could be indicative of plume water or injected water movement, such as TOC and injection tracers. Concentrations in groundwater outside the plume will be evaluated against background concentrations (32 parts per billion [ppb] for Cr[VI] and 24 ppb for arsenic; as requested by DOI, preliminary action levels for manganese will be identified in the Construction/Remedial

Action Work Plan). Elevated concentrations at established compliance wells will result in contingency activities, such as system modifications. River monitoring will also be conducted to ensure that concentrations remain below numeric surface water quality criteria and is consistent with river baseline levels for Cr(T) and Cr(VI). Both chromium and potential byproducts (arsenic and manganese) will be monitored in the river. The surface water quality criteria for Cr(VI) is 11 µg/L and for arsenic is 150 µg/L (Source: Table 2 of the ROD, ARAR #3, Federal Water Pollution Control Act. 33 USC 1251-1387, 40CFR 131.38). There are no surface water quality criteria for Cr(T) and manganese. Concentrations attributable to contributions from the Topock site (comparison of upgradient surface water results to downgradient surface water results) will result in contingency activities, such as system modifications. Most compliance monitoring would likely occur in wells around the perimeter of the plume, particularly along the western and northern margins where the fresh water injection wells are located. Over the expected decades-long O&M period, it is expected that the plume will change in size and shape, and therefore the compliance monitoring program surrounding the plume will be modified accordingly.

Inside the perimeter of the plume, monitoring will be performed to assess the success of the remedy in attaining the RAOs and to update the shape and location of the target remediation area over the O&M period. Inside the plume, the monitoring program is focused on measuring progress towards attainment of RAOs, and therefore will primarily be measuring changes in Cr(VI) concentrations. Because an IC will be in place during the O&M period to prohibit ingestion of groundwater and therefore control risks, it is expected that compliance monitoring inside the perimeter of the plume will be less frequent than monitoring outside the perimeter of the plume, likely on an annual or bi-annual basis. Unlike the areas outside the plume, increases in concentrations inside the plume will not result in contingency activities because of the ICs. However, persistent increases in concentrations along the edge of the plume may result in contingency activities such as more frequent monitoring, adjustment of system hydraulics, etc. The ICs within the area of the plume boundary will remain in place until concentrations in groundwater are shown to have attained the RAOs.

Process Control Monitoring During Remedy Implementation

Process control monitoring is conducted to ensure that the groundwater remedy is functioning as designed. In the vicinity of the IRZ and the carbon-amended injection wells, the geochemistry of the aquifer will be altered to create the reducing conditions that will remove the Cr(VI) from groundwater. The process control monitoring will focus on issues such as ensuring that carbon dosing is sufficient to establish and maintain an effective IRZ, that the production and attenuation of in-situ by-products is occurring as anticipated, and that Cr(VI) is being removed to the extent necessary to meet RAOs.

Much of the process control monitoring for the in-situ remediation systems will involve sampling from wells associated with the IRZ and the carbon-amended water injection wells. Samples would be collected from nearby monitoring wells and possibly from IRZ and carbon-amended water injection wells. In above-ground support systems, process control monitoring mostly involves sampling from pipes and tanks. Tanks, pipes, and pumps are needed to mix the carbon amendment into the water being pumped from the River Bank extraction wells. It is anticipated that some process control sampling would be conducted in the mixing facility to monitor for changes in the quality of the influent water and ensure

proper carbon dosing. Other process control monitoring will be performed for influent and/or effluent from a conditioning/treatment facility for fresh water (if any), and influent/effluent from a system to manage wastewater produced by maintenance activities associated with the remedy such as injection well maintenance.

Constituents for process control monitoring will vary depending on design criteria, and results will be evaluated to assess the need for any type of system modifications or adjustments. Frequency of process control monitoring will depend on the system being evaluated; it is expected that more frequent monitoring will be needed during start-up of systems, and frequency of process control monitoring will be reduced or eliminated when the systems are optimized and steady-state conditions result.

Process control monitoring is often implemented using less rigorous analytical methods than compliance monitoring. For example, at the current IM No. 3 treatment plant, process control samples are analyzed in an onsite laboratory. This laboratory provides data of sufficient quality to make the day-to-day decisions needed for process control, but it is not state certified, so most of the data are not useful for compliance purposes. It is anticipated that non-certified lab analysis will also be a component of process control monitoring during the groundwater remedy.

In addition, water level monitoring will also be conducted to confirm adequate gradient control. Although gradient control is not an RAO in itself, maintaining groundwater gradients in certain areas, such as the fresh water injection barrier and the East Ravine extraction wells, will be necessary in order to prevent spreading of the plume and to ultimately achieve RAOs for groundwater quality.

2.3.2 Constituents to be Monitored and Monitoring Frequency

Table 2-1 presents preliminary information about the constituents that would be monitored and the monitoring frequency for different types of monitoring purposes (all tables are presented at the end of this report). Additional details of the monitoring program will be provided in future design submittals and the O&M Plan.

2.3.3 Evolution of Monitoring Programs Over Time

As the groundwater remedy implementation progresses, the chromium plume will diminish and change shape. This will typically result in changes in the monitoring program. Wells that were formerly within the plume boundary may become perimeter wells. Former perimeter wells may be far from the plume and therefore no longer be needed as part of the regular monitoring network. Once the floodplain is clean, it may be possible to turn off the pumping wells near the river and the carbon-amended injection wells. Changes such as this would result in changes in the monitoring program. Eventually, it will be determined that the active part of the remedial action is no longer needed. This may come about when RAOs have been met, or it may be determined that monitored natural attenuation is an appropriate alternative for a small remaining portion of the plume. At this time, the monitoring program would be reconfigured to focus on the areas where the plume remained and the natural attenuation processes that would eventually lead to reaching RAOs.

3.0 Baseline Site Conditions and Plan for Additional Data Collection

This section provides information about site characteristics, sources of information, and additional data and information that may be collected to update and refine the site understanding during groundwater remedy implementation. The additional information will be collected for various reasons such as to further document baseline conditions prior to remedy implementation, provide information as needed for design and construction planning, especially in the East Ravine area, and provide information to evaluate remedy performance during future operational and decommissioning phases. Additional data collection discussed in this section will be described in more detail in Section 4 and Section 6. Section 4 describes documents to be developed with additional details on the plan and schedule for collection and reporting of additional site condition information. Section 6 discusses plans for short-term data collection activities.

3.1 Hydrogeology and Plume Dimensions

Site hydrogeologic characterization and chromium distribution are discussed below, as well as objectives for collection of supplemental information to refine or update this information during the groundwater remedy design, construction, operation, and post-remediation phases.

3.1.1 Site Characteristics

The geologic and hydrogeologic conditions at the site have been characterized through data collected over an approximately 14-year period since the initiation of RFI activities in 1997. The geologic and hydrogeologic conditions of the site described below are discussed in greater detail in the RFI/RI Volume 2 Report (CH2M HILL, 2009a), the Volume 2 Addendum (CH2M HILL, 2009b), the Summary of Findings Associated with the East Ravine Groundwater Investigation included in Appendix A of the CMS/FS (CH2M HILL, 2009c), and ongoing monitoring reports. The following sections summarize information from these reports.

Hydrogeologic Setting

The Topock site is situated in a basin-and-range geologic environment in the Mohave Valley. The Colorado River is the main source of water to this groundwater basin, but at the southern end where the site is located, groundwater is fed by a modest amount of local recharge from mountain runoff. The most prominent geologic structural feature in the study area is a Miocene-age, low-angle normal fault (referred to as a detachment fault) that forms the northern boundary of the Chemehuevi Mountains (Figure 3-1) found to the southeast of the study area. The surface expression of the Chemehuevi detachment fault is evident as a pronounced northeast-southwest lineament that can be traced along the northern boundary of the Chemehuevi Mountains, terminating at the abrupt bend in the Colorado River east of the Compressor Station (Figure 3-1).

The site is located at the southern (downstream) end of the Mohave Valley groundwater basin. On a regional scale, groundwater in the northern and central area of the valley is recharged primarily by the Colorado River, while groundwater discharges back to the river in the southern area, above where the alluvial aquifer thins near the entrance to Topock Gorge. The groundwater directly beneath the Topock site is derived mostly from the relatively small recharge from the nearby mountains. Under natural conditions, groundwater flows from west/southwest to east/northeast across the site. The Colorado River, Topock Marsh, floodplain and other surface features at the Topock site are shown on an aerial photograph on Figure 3-1. This figure also shows the locations of the PG&E Topock Compressor Station, the current IM groundwater extraction area (MW-20 bench and adjacent floodplain), and the IM No. 3 groundwater treatment facility and associated injection area. Subsurface features including stratigraphy, aquifer dynamics, and river-floodplain communication are presented in a block diagram depicting the central portion of the study area on Figure 3-2.

The Colorado River flows along the eastern and northern boundary of the site and is very dynamic, fluctuating seasonally and daily largely due to upstream flow regulation of water releases primarily at Davis Dam, approximately 33 miles upstream. River levels at the site fluctuate by 2 to 3 feet per day, and flows vary anywhere from 4,000 to 25,000 cubic feet per second (cfs) according to the dam releases, producing a sinusoidal hydrograph each day. Locally, a floodplain borders both sides of the Colorado River, though the river no longer experiences regular spring floods due to flow regulation from upstream dams.

Hydrogeologic Properties

Groundwater occurs in the Tertiary and younger alluvial fan and fluvial deposits. The unconsolidated alluvial and fluvial deposits are underlain by the Miocene Conglomerate and pre-Tertiary metamorphic and igneous bedrock. The bedrock typically has lower permeability; therefore groundwater movement occurs primarily in the overlying unconsolidated deposits. There is no evidence to indicate any sizable potential for development of ground water in the bedrock, although locally, small yields may be developed from fractures (Metzger and Loeltz, 1973).

The alluvial aquifer consists of (1) alluvial sands and gravels shed from local mountain chains that ring the valley, and (2) fluvial material deposited by the Colorado River over time. Groundwater occurs under unconfined to semi-confined conditions within the alluvial fan and fluvial sediments beneath most of the site. The alluvial sediments consist primarily of clayey/silty sand and clayey gravel deposits interfingered with more permeable sand and gravel deposits. The alluvial deposits exhibit considerable variability in hydraulic conductivity between fine- and coarse-grained sequences. The fluvial sediments similarly consist of interbedded sand, sandy gravel, and silt/clay.

The water table in the alluvial aquifer is nearly flat and typically equilibrates to an elevation within 2 to 3 feet of the river level. On the basis of the variable topography, the depth to groundwater ranges from as shallow as 5 feet below ground surface (bgs) in floodplain wells next to the river to approximately 170 feet bgs at the upland alluvial terrace areas. The saturated thickness of the alluvial aquifer is about 100 feet in the floodplain and thins to the south, pinching out along the Miocene Conglomerate and bedrock outcrops. In the western

and northern portions of the site, where the depth to bedrock increases, the saturated alluvial aquifer is over 200 feet thick (see Figure 3-3).

Hydrogeologic features of the site are summarized below:

- Under ambient conditions in the vicinity of the site, the river recharges groundwater during the higher-flow stages in the spring and summer months, and groundwater discharges to the river during the months of lower river stages in fall and winter. Since 2004, the IM groundwater extraction and treatment system has maintained a consistent, year-round landward gradient in the area where the plume is present in the floodplain.
- Under natural conditions, groundwater flows from west-southwest to east-northeast across the site. Localized areas of northward flow likely occur along the mountain front to the south of the Compressor Station. Gradients are very small due to the limited recharge, with a typical value of 0.0005 foot/foot in the alluvial area. Under average conditions, groundwater velocity in the alluvial aquifer ranges from about 25 to 46 feet/year, according to numerical model estimates. Gradients are upward between bedrock and the overlying alluvial aquifer and typically, but not universally, upward within the alluvial aquifer.
- Investigation and monitoring in the East Ravine area (see Figure 3-1) shows that the groundwater in fractured bedrock is in hydraulic communication with the alluvial aquifer and equilibrates to an approximate elevation similar to the water table in the alluvial aquifer. Compared to the alluvial aquifer, the fractured rock permeabilities are very low, based on well tests in this area.

Chromium Plume Dimensions, December 2010

From the former percolation area in Bat Cave Wash, the wastewater infiltrated into the coarse sand and gravel of the wash bed and infiltrated approximately 75 feet downward through the unsaturated zone to reach groundwater (Figure 3-2). The chromium plume extends from the former percolation bed in Bat Cave Wash approximately 3,000 feet north/northeast to the Colorado River floodplain, along the general direction of groundwater flow. Chromium is present at all depth intervals of the alluvial portion of the aquifer but is generally not present in shallow and middle-depth fluvial wells near the Colorado River where natural reducing conditions predominate and geochemically remove the chromium from groundwater. Elevated concentrations of chromium are also present in wells completed within the shallow portion of the bedrock formations in the East Ravine to the southeast of the Compressor Station.

The chromium plume is defined as that part of the aquifer where Cr(VI) concentrations exceed natural background levels. The calculated statistical upper tolerance limit (UTL) of natural background levels for Cr(VI) in alluvial groundwater, obtained from sampling monitoring and water supply wells surrounding the Topock site, is 31.8 µg/L (CH2M HILL, 2008a), which has been rounded to 32 µg/L for discussion of the extent of impacted groundwater below. The majority of the plume is located in the alluvial aquifer.

Figures 3-4a, 3-4b, and 3-4c illustrate the extent of Cr(VI) contamination in the alluvial aquifer and bedrock formations based on groundwater sample results for 125 wells sampled

during the fourth quarter of 2010. The fourth quarter 2010 sampling event is the largest event conducted on an annual frequency.

In each of the alluvial aquifer depth monitoring zones,[1] the location of Cr(VI) concentrations for groundwater greater than or equal to 32 µg/L follows Bat Cave Wash northward approximately 3,000 feet from the Compressor Station. For the shallow and mid-depth zones, the 32 µg/L concentration limit extends west of Bat Cave Wash and into the western portion of the floodplain. In the deep zone of the alluvial aquifer, the 32 µg/L concentration limit extends further west of Bat Cave Wash and further eastward into the floodplain in the area between monitoring wells MW-27 and MW-28. Since startup of the IM groundwater extraction in 2004, concentration trends in floodplain wells have been generally stable or decreasing (CH2M HILL, 2011a).

During the 2009 East Ravine Groundwater Investigation, Cr(VI) was also found within the Miocene conglomerate and pre-Tertiary metadiorite bedrock formations east and southeast of the Topock Compressor Station. Additional investigations are being conducted in 2011 to determine the extent of Cr(VI) in bedrock. Due to the low porosity of the bedrock formations, the mass of Cr(VI) in bedrock represents a very small fraction of the total plume mass.

Based on current site characterization data, the existing dimensions of the plume exceeding natural alluvial background levels underlie an area that is approximately 175 acres, including alluvium and bedrock. The depth to groundwater in the area of the plume ranges from approximately 28 to over 135 feet bgs, and the thickness of the aquifer in the area of the plume ranges from less than 50 feet near the bedrock interface to over 150 feet near National Trails Highway. The volume of contaminated groundwater in the alluvial aquifer is currently estimated to be approximately 1.50 billion gallons (approximately 4,600 acre-feet).This estimate was calculated by interpolating the Cr(VI) concentration contours over the model grid, integrating the concentration intervals over the depth of each zone (shallow, middle, and deep), and applying a total porosity of 35 percent for the alluvial/fluvial portion of the plume (from measurements of site materials presented in Ecology and Environment, Inc. [E&E], 2004). Although the effective porosity of the bedrock formations is uncertain, it will be low compared to that of the alluvial/fluvial aquifer; therefore, the volume of the plume within the East Ravine bedrock formations is believed to represent less than 1 percent of the total plume and is not included in this volume estimate.

3.1.2 Additional Data During Groundwater Remedy Design

Characterization of the alluvial aquifer is generally considered sufficient for remedy design; however, the bedrock aquifer is not as well characterized as the alluvial aquifer, so additional groundwater monitoring and investigation of the bedrock is being conducted in 2011. The current groundwater monitoring program will continue through the remedy design phase and until the Corrective Measure/Remedial Action Monitoring Program begins. Data for the monitoring programs listed below will be used to update the baseline December 2010 chromium plume maps presented in Figures 3-4a through c, and to establish baseline levels of in-situ byproducts (arsenic and manganese) and COPCs (selenium, nitrate, and molybdenum) prior to remedy implementation.

[1] The depth zones are primarily defined based on the relative depth and position of screen intervals within the Alluvial Aquifer; however, there are no aquitards separating the zones.

DTSC and DOI concluded during review and finalization of the Groundwater Risk Assessment for SWMU 1/AOC 1 that although the noncancer hazards associated with selenium, molybdenum, and nitrate are much lower than those associated with Cr(VI), the noncancer hazard index exceeds the threshold of 1.0 in one or more wells for these three constituents using conservative exposure assumptions. Therefore, DTSC and DOI directed that molybdenum, selenium, and nitrate be monitored in the groundwater monitoring program (DTSC 2009b, DOI 2009).

The results of the investigation in the bedrock formations of the East Ravine will be used during the remedial design for chromium present in bedrock formations in this area. Data for the investigation beneath the Topock Compressor Station will be incorporated into remedy design for source area remediation. These programs are summarized in the following subsections.

Current Groundwater, Surface Water, Compliance and Performance Monitoring Programs

The current groundwater and surface water monitoring programs will continue through the remedy design phase and/or until the Corrective Measure/ Remedial Action Monitoring Program for the groundwater remedy is initiated. The current groundwater and surface water monitoring programs are defined in the Fourth Quarter 2010 and Annual IM Performance Monitoring and Site-Wide Groundwater and Surface Monitoring Report (CH2M HILL, 2011a) and the Second Half 2010 Semiannual Groundwater Monitoring Report for the Compliance Monitoring Program (CH2M HILL, 2011b).

The current groundwater and surface water monitoring programs are used to evaluate changes to site conditions as defined in the RFI/RI, and to evaluate performance of the Interim Measure. Data collected in the current groundwater and surface water monitoring programs which may be used in remedy design include:

- Water level data collection with pressure transducers for gradient analysis.
- Surface and groundwater sample collection for Cr(T) and Cr(VI).
- Groundwater sample collection for general water quality (alkalinity, TDS, sulfate, and chloride); stable isotopes of oxygen; in-situ byproducts (arsenic and manganese); and selenium, molybdenum and nitrate, which were identified as COPCs during the RFI/RI investigation.

Data for the monitoring programs listed above will be used to update the baseline December 2010 chromium plume maps presented in Figures 3-4a through c, and to establish baseline levels of in-situ byproducts (arsenic and manganese), and COPCs (selenium, nitrate, and molybdenum) prior to remedy implementation.

Current East Ravine and Topock Compressor Station Groundwater Investigation

A Work Plan Addendum describing the planned additional investigation activities and estimated timeline to collect information to enhance the understanding of groundwater contamination in the East Ravine bedrock area and to evaluate the nature and extent of potential groundwater contamination beneath the Topock Compressor Station was submitted to DTSC and DOI on December 31, 2010 (CH2M HILL, 2010a). East Ravine investigation activities in 2011 will include well construction, hydraulic testing, and soil and groundwater sample collection and analysis. Data collected during the East Ravine

investigation in 2011 will be used to update the hydrogeologic site characteristics and plume dimensions described in Section 3.1.1 and will be incorporated into the groundwater remedy design, as appropriate.

3.1.3 Additional Data During Groundwater Remedy Construction

During the initial construction of the groundwater remedy, wells will be installed in areas where they are needed including areas where there are currently few or no existing wells. The hydrogeologic characterization and plume dimensions described in Section 3.1.1 are based on the data set as of December 2010; installation of wells in areas of the site where there are few or no existing wells, such as to the north and west of the interpreted plume boundary, will be used to confirm and/or update the hydrogeologic site characterization following their construction. Information to be collected from these wells will include geologic logging, depth to groundwater, analytical constituent concentrations, and possibly aquifer properties. Geophysical logging may also be collected from the wells. Depending on actual measured results from wells installed during construction, modifications may be made to groundwater remedy component design to maximize the remedy effectiveness.

3.1.4 Additional Data During Groundwater Remedy Operation and Decommissioning

Following groundwater remedy construction and start-up, additional site characterization information will be collected on an ongoing basis through the operation and maintenance phase, and during post-remediation monitoring. The plume dimensions described in Section 3.1.1 are expected to change and diminish during the operation of the groundwater remedy, and data will be collected to evaluate trends and monitor plume characteristics over time. Additional data during the operation phase will be obtained through the following:

- Implementation of the Corrective Measure/Remedial Action Monitoring Program. Data collected from monitoring wells for RAO attainment during operation will be for Cr(VI) concentrations. In addition, measurements of groundwater quality for in-situ treatment byproducts, general water quality parameters, and hydraulic measurements will be collected in select areas of the site. DTSC and DOI have also directed that nitrate, molybdenum, and selenium concentrations in groundwater be monitored periodically throughout the remediation process. The Corrective Measure/Remedial Action Monitoring Program will be reviewed on a periodic basis (e.g., annually) and modified over the anticipated decades-long operation and maintenance period as appropriate.

- Installation of additional groundwater monitoring wells and remediation wells during operations, decommissioning, and post-remediation phases of the groundwater remedy. Additional site characterization information from wells installed during operation, decommissioning, and post-remediation phases will include geologic logging, depth to groundwater, analytical constituent concentrations, and possibly geophysical logging and aquifer properties. The additional characterization information to be collected from these wells will be used to confirm and/or update site characterization information to evaluate performance of the groundwater remedy to attain RAOs, and optimize system performance.

Following attainment of RAOs, system operations will cease and a long-term monitoring program will be implemented. Additional characterization information to be collected during the post-remediation long term monitoring will focus on groundwater quality through sampling of monitoring wells.

3.2 Other Existing Site Conditions Affecting Design, Construction, Operation

Existing site conditions anticipated to affect design, construction, and operation of the groundwater remedy are discussed below, as well as objectives for collection of supplemental information to refine or update the site condition information in the short term or long term. Additional data needs may be identified during the design and during the step of securing access and approvals; for example, site-specific geotechnical data may be required for securing encroachment permits. Section 4 describes documents to be developed with additional details on the plan and schedule for collection and reporting of additional site condition information. Section 6 discusses plans for short-term data collection activities.

3.2.1 Land Ownership, Disturbance, and Development

Land in most areas where groundwater remedial facilities will be constructed is not owned or leased by PG&E, and there are existing land uses and infrastructure in the project area that will be important factors influencing the design, construction, operation and decommissioning of the groundwater remedy. The groundwater remedy will be developed in coordination with landowners and to minimize effects on existing structures such as roads, pipelines, and rail lines. PG&E will focus construction in previously disturbed areas, so further definition of those areas will occur early in the design phase. In addition, the groundwater remedy will use power, water, and other infrastructure that will be coordinated with existing development in the area.

Existing Information

Figure 3-5 presents property ownership information in the project area. As shown, land overlying and near the plume is owned and/or managed by a number of government and private entities including PG&E, BOR (managed by BLM), USFWS (managing the HNWR), San Bernardino County, BNSF Railroad, Fort Mojave Indian Tribe, and the Southern California Metropolitan Water District. In addition, several other entities have easements and/or rights-of-way including the California Department of Transportation, Southern California Gas Company, Transwestern Pipeline Company, Mojave Pipeline Company, PG&E, City of Needles Electric, Southwest Gas Corporation, and Frontier Communications. Landowners/leaseholders in Arizona where pipelines for fresh water may be located include BOR, USFWS (HNWR), El Paso National Gas Company, BNSF Railroad, Arizona Department of Transportation, Mohave County, and private property owners. Ownership of land beneath the Colorado River includes the California State Lands Commission and the Arizona State Lands Department.

Sources of information on site development, disturbance, and existing above-ground infrastructure include aerial photographic surveys, Compressor Station information, and visual surveys of above-ground infrastructure. Existing infrastructure at the site includes the

Topock Compressor Station and its associated ponds; Interstate 40; the BNSF Railroad; subsurface utilities including six natural gas transmission pipelines and potable water pipelines; overhead electric lines; railroad, pipeline and freeway bridges over the Colorado River; the Moabi Regional Park and its associated ponds; PG&E's remedial infrastructure including IM facilities and monitoring facilities; NTH, Route 66, and other county roads and various unnamed access roads; the Topock Marina; and other nearby houses, mobile homes, and commercial structures.

Additional Land Ownership, Disturbance and Development Information During Design

Additional information will be collected during groundwater remedy design to refine existing information. Activities during design include preparation of a disturbance map, conduct of aerial photographic surveys, and preparation of an inventory of existing infrastructure.

Land owners and leaseholders will have to grant permission to access their property for construction and operation of groundwater remedy facilities or equipment. Each entity will establish its own process, whether it be an encroachment permit, easement, right-of-way, or other type of access. PG&E will contact affected entities to establish the requirements and complete the appropriate process. Depending on the specific requirements of the agreements, there may be the need for additional information such as title searches or property boundary surveying and staking.

In conformance with EIR mitigation measure CUL-1a-9, an aerial map of disturbed areas will be prepared to guide project design; this map will also document pre-construction baseline site conditions. The map will be prepared using aerial photographs supplemented by visual surveys to identify areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years.

It is anticipated that groundwater remedy infrastructure, primarily pipeline corridors, will cross existing natural gas pipelines, I-40 and other existing roads, and the railroad line, among others. To more precisely define existing infrastructure, and to define pre-construction site conditions, an aerial photographic survey of the site will also be performed during the design phase. Additionally, the identification of underground utilities will be performed during design. Information on the aerial survey and underground utilities locating work is included in Section 6. The underground utilities locating work will involve non-intrusive methods using geophysical instruments such as magnetometers or ground-penetrating radar.

In addition to identifying ownership, location, and depth of existing infrastructure, additional information will be collected about its usability relative to the infrastructure for the groundwater remedy. This information will be gathered through meetings, document review, and site visits. It will include information about the existing Compressor Station fresh water supply system, cooling water system, evaporation ponds, electrical power supply, and existing utilities or infrastructure, including those owned by other entities. Existing infrastructure that could interact with the groundwater remedy construction or operation will

be investigated to an extent such that it can be incorporated into the design. Examples of the existing infrastructure evaluation are as follows:

- PG&E will evaluate the ability (structural and physical space capacity) of the arched pipeline bridge to accommodate a pipe to bring fresh water from water supply well(s) in Arizona. If the bridge does not have sufficient capacity, then an alternate route crossing the Colorado River would be designed. This decision could potentially trigger additional data needs to support design.
- The groundwater remedy will require electrical power during construction and operation. The amount necessary for construction will be calculated as part of the design. Then, an appropriate source for electrical power will be selected and the supplier contacted to enable a power service to be established. For this project, it is anticipated that the City of Needles electric system will supply primary electrical service, and this will be taken from the existing electrical power system, if possible. As the design develops, the required service load will be better defined. Emergency backup generation will be provided to supply power in the event of a service outage. The backup generation may be provided by a stand-alone generator or by tying into the Compressor Station electric system, if excess power is available for this use.
- Water will be required during groundwater remedy construction for activities such as dust suppression. This water will be supplied by the Compressor Station fresh water storage tanks, and details regarding connection to these tanks will be explored during the design.
- Wastewater will be generated by the groundwater remedy, such as by maintenance of various types of wells. Additional information will be gathered during the design phase on capacities of various disposal/reuse options for treated wastewater, such as capacity of existing evaporation ponds on an average basis and annual basis, to determine if the ponds have adequate capacity for some or all of the wastewater generated. Section 2.2.3 describes the options to be evaluated during the design.

3.2.2 Topography and Surface Geology

Surface conditions and topography have a significant effect on project implementation. For example, variation in surface elevations will require installing air release valves from pipes and may require grading for storm water drainage in select areas. Infrastructure locations may be adjusted to avoid steep areas.

Existing Information

Existing topography and surface geology information is contained in the RFI/RI Volume 2 report and its Addendum (CH2M HILL, 2009a and 2009b) and CMS/FS (CH2M HILL, 2009c) reports. Existing topography information is based on data and contours from topographic surveys of monitoring wells and select infrastructure and property boundaries within the site area, published data from the USGS, and aerial surveys. The generalized surface geologic map in the RFI/RI was compiled from literature sources including Metzger and Loetz (1973), John (1987), Howard et al. (1997), and PG&E historic reports.

The site is located in the southern portion of the Mohave Valley, north of the Chemehuevi Mountains, and south and west of the Colorado River floodplain. Overlying the plume,

topography ranges from approximately 455 feet above mean sea level at the Colorado River floodplain to approximately 600 to 650 feet above mean sea level at the Compressor Station.

The site consists of a series of terraces divided by dry desert washes. The terraces are considerably eroded with very steep slopes. The Compressor Station is located on a prominent alluvial terrace. Overlying the plume, the largest incised channel is Bat Cave Wash, a north-south dry wash that bisects the plume. Bat Cave Wash flows on the surface only intermittently (as an ephemeral stream) following intense rainfall events and extends to the Colorado River.

Additional Topographic Information During Design

For the purposes of the remedial design, 1-foot topographic contours are required. Data at this level of detail exist in some portions of the site; however, much of the existing topographic information is 5- or 10-foot contours.

Additional topographic survey data will be collected during the design phase in areas of the site anticipated for remedial facilities. The planned area for the topographic survey is presented in Chapter 6 (Figure 6-1). Topographic surveying will be accomplished by aerial photogrammetry supplemented by ground surveying. The ground surveying will be used to locate existing features such as roads and utilities, well heads, manholes, utility poles, valves, pipe inverts, drainage flowlines, drain inlets, edge of pavement, etc.

The survey will be incorporated into the drawings, so these details can be incorporated into design items such as pipe networks, utility connections, utility crossings, earthworks quantities, grading, and drainage. An additional outcome of the survey is an updated aerial photo that can also be used for the ongoing investigation, site reconnaissance, and reporting activities being conducted through the remedial design phase.

Additional information on surface geology is not expected to be required for remedial design. The primary remedial design interface with the surface geologic mapping is the intersection of proposed subsurface infrastructure (pipeline trenches) in areas of surface bedrock (Miocene Conglomerate or Pre-Tertiary). Construction of pipeline trenches through this material will require procedures to be documented in the Construction/Remedial Action Work Plan, or alternatively relocating pipeline corridors to avoid bedrock outcrops or construct the pipelines aboveground similar to existing gas and fresh water pipes.

3.2.3 Background Soil Concentrations

Background concentrations of inorganics and polycyclic aromatic hydrocarbons (PAHs) in soil near planned groundwater remedial infrastructure have been defined through the RFI/FI soil investigations, as well as other baseline studies. Background concentrations in soils established through these efforts will be considered baseline conditions for areas near groundwater remedy infrastructure at the time of construction.

Background concentrations of inorganics and PAHs in soil for geologic units near the Topock Compressor Station are defined in the Topock Revised Final Soil Background Investigation report (CH2M HILL, 2009d) and the Soil Investigation Part A Phase 1 Data Gaps Evaluation Report (CH2M HILL, 2010b). Baseline concentrations of metals in floodplain deposits are defined in the Baseline Soil Sampling report for the PE-1 Pipeline, IM No. 3 (CH2M HILL, 2008b). A total chromium value of 31 milligrams per kilogram

(mg/kg) in soil has been used for guiding remedial facility closure on the MW-20 bench (PG&E, 2005).

No additional investigations are planned to determine naturally-occurring background concentrations of metals and other inorganic compounds in soil in the immediate vicinity of groundwater remedy infrastructure (such as tanks or pipelines for contaminated groundwater or treatment chemicals) at the time of construction. Background concentrations of metals in soil near remedial infrastructure in Arizona have not been defined through site-specific studies, because groundwater remedial infrastructure in Arizona is anticipated to be limited to wells and pipelines for fresh water. As some infrastructure for the groundwater remedy will likely be located within or near soils investigation areas within the Topock Compressor Station, Bat Cave Wash, or the East Ravine, additional soil samples will be collected from those areas as part of the RFI/RI and, potentially, soil remediation activities. Future soil restoration in those areas associated with decommissioning of groundwater facilities (e.g., pipelines) would meet any future soil cleanup concentrations that may be established for those areas.

3.2.4 Soil Contamination Areas

PG&E is performing an RFI/RI for soil in areas near the Compressor Station. Investigations are being performed to collect data to meet defined data quality objectives to complete the soil RFI/RI, soil risk assessment, and soil CMS/FS. Groundwater remedy infrastructure, such as pipeline corridors, is likely to be constructed within or near soil investigation areas inside the fenceline of the Compressor Station, and within or near soil investigation areas outside the fenceline of the Compressor Station such as Bat Cave Wash, East Ravine, and in the vicinity of AOC 11 and AOC 12.

Existing Information

Existing information on soil investigation areas is contained in documents including the Draft RFI/RI Soil Investigation Work Plan Part A (CH2M HILL, 2006), Draft RFI/RI Soil Investigation Work Plan Part B (CH2M HILL, 2007a), Soil Investigation Part A Phase 1 Data Gaps Evaluation Report (CH2M HILL, 2010), and the Implementation Report for the Time-Critical Removal Action at AOC 4 (CH2M HILL, 2011d). Existing information includes sample locations, sample depths, and analytical concentrations of organic and inorganic constituents, as well as descriptions of previous soil removal activities.

Coordination of RFI/RI Soil Investigation with Remedy Design and Construction

Additional soil investigation is planned to supplement the existing information to complete the RFI/RI Volume 3. Additional soil investigation is planned at seven investigation areas outside the Compressor Station fenceline, and at twenty-five investigation areas inside the Compressor Station fenceline. The planned additional investigation activities primarily involve collection of soil samples for laboratory analysis of inorganic and organic constituents.

The additional soil investigations are independent of design activities for the groundwater remedy; however, as soil investigation data become available they will be used to guide and inform groundwater remedy design and construction in the vicinity of these areas. Where appropriate—considering timing, efficiency and protectiveness—construction of

groundwater remedy facilities will be coordinated with soil investigation and remediation activities. For example:

- Groundwater remedy infrastructure may be relocated to avoid the soil contaminated areas.
- Where groundwater remedy facilities will intersect with soil contamination areas, the Construction/Remedial Action Work Plan will describe appropriate procedures to address health and safety, soils management, erosion and dust control during groundwater remedy construction.
- Where appropriate, timing and scope of soil investigation activities will be coordinated to minimize interference with remedy implementation.
- Access restrictions established to protect groundwater remedy infrastructure will consider the need to access soil investigation areas for additional investigation or remediation.
- Removal actions for soil contamination, if any, may be combined with groundwater remedy construction to minimize multiple soil disturbances for both groundwater remedy construction and soil remediation.

3.2.5 Surface Water and Wetlands

Surface water and wetlands occur in areas near the groundwater remedy infrastructure and will affect design, construction, and implementation.

Existing Information

Existing information on surface water and wetlands has been obtained through various studies and surveys as documented in the RFI/RI Volume 2 Report (CH2M HILL, 2009a and 2009b), the Biological Resources Survey Report for the APE (CH2M HILL, 2005), the Reconnaissance Biological Resources Survey in Three Areas Outside of the APE (CH2M HILL, 2010c), and the Biological Survey in Three Areas Outside of the APE (CH2M HILL, 2010d).

The primary surface water feature is the Colorado River. The flow of the Colorado River is dynamic and fluctuates daily and seasonally as a result of BOR's power and water delivery schedule. The flow of the Colorado River at Topock is regulated by BOR, primarily by the controlled release of water from Davis Dam on Lake Mohave approximately 33 miles upstream. River levels at the site fluctuate by 2 to 3 feet per day, and flows vary anywhere from 4,000 to 25,000 cubic feet per second according to the dam releases. The Colorado River channel ranges from approximately 600 to 700 feet wide in the area upstream of the railroad bridge crossing at Topock. In 2005, the river depths ranged from 4 to 12 feet on two cross-river transects measured at and north of the I-40 bridge.

The Colorado River is a major source of water for irrigation, drinking, and other uses by humans and wildlife. The closest downstream supply intake is located approximately 21 river miles downstream of the railroad bridge over the Colorado River. The Colorado River also supports recreational uses of swimming, boating, and fishing, and serves as an aquatic habitat that supports various plant and wildlife species, including threatened or endangered species. Extensive monitoring of Colorado River surface water quality has been performed

in the vicinity of the site. Surface water samples collected within the river near the site, both before and after implementation of the IM, show concentrations less than the federal water quality criteria for Cr(VI) (CH2M HILL, 2009a); the Final Human and Ecological Risk Assessment of Groundwater Impacted by Activities at SWMU 1/ AOC 1 and SWMU 2 concluded that the potential transport of constituents in groundwater to the Colorado River represents an insignificant transport pathway (ARCADIS, 2009). Data for groundwater contamination associated with the East Ravine were not available at the time the risk assessment was completed. Therefore, the risk assessment did not specifically consider the potential transport to surface water for groundwater contamination subsequently detected within the bedrock in the East Ravine area. Routine surface water monitoring has continued since completion of the RFI/RI.

Bat Cave Wash is a north-south incised channel bisecting the plume that flows only infrequently (as an ephemeral stream) following intense rainfall events. The wash is dry throughout most of the year. Other surface water features near the site include the Park Moabi inlet/slough, the Topock Marsh, and several other dry wash drainages.

Groundwater remedy infrastructure is anticipated to be constructed near or intersecting with waters of the U.S. or identified wetlands at the pipeline crossing over the Colorado River, the pipelines in Bat Cave Wash, and the River Bank extraction wells.

Additional Information During Design, Construction, and Operation

Additional information will be collected during the design phase of the groundwater remedy to more specifically define the ordinary high water mark of the Colorado River and the location of jurisdictional waters and wetlands. Also, throughout the design, construction, and operation period, PG&E will continue to monitor surface water quality in the Colorado River.

A map of the ordinary high water mark along the bank of the Colorado River will be prepared during design to update the 2005 identification, and to the extent necessary, the 2010 identification. EIR mitigation measure AES-2 requires a minimum setback of 20 feet from the ordinary high water mark for construction of remedial facilities. The map of the ordinary high water mark will be used to guide the remedial design in these areas.

In addition, field verification of the jurisdictional waters and wetlands will be conducted by a qualified wetlands biologist during the design phase to update the 2005 identification and to the extent necessary, the 2010 identification of waters of United States in the areas where remedial facilities will be located. Verification of the jurisdictional waters and wetlands will be performed to guide remedial infrastructure design and construction to comply with EIR mitigation measure BIO-1 and the substantive requirements of the Clean Water Act that prohibit discharge of dredged or fill material in the defined waterways unless there is no practicable alternative that would have less adverse impact.

Additionally, PG&E will continue routine monitoring of surface water quality for chromium and potentially other analytical parameters in the Colorado River throughout the design, construction, and operation periods of the groundwater remedy.

3.2.6 Vegetation Conditions

Construction of groundwater remedy infrastructure may remove or displace vegetation in some areas. Certain EIR mitigation measures require preservation of mature and/or indigenous plants, and additional information is needed to identify these plants. In addition, following construction of wells in the floodplain, floodplain areas disturbed for construction will be revegetated, and additional information on existing floodplain vegetation will be used to guide the scope of the floodplain revegetation efforts.

Existing Information

Plant communities at the site have been identified through surveys as documented in the Biological Resources Survey Report for the APE (CH2M HILL, 2005), the Programmatic Biological Agreement (PBA) for Remedial and Investigative Actions at Topock (CH2M HILL, 2007b), the Reconnaissance Biological Resources Survey in Three Areas Outside of the APE (CH2M HILL, 2010c), and the Biological Survey in Three Areas Outside of the APE (CH2M, HILL, 2010d). Plant communities include creosote bush scrub in most upland terrestrial areas of the site, arrow weed and salt cedar in floodplain areas (both east and west) of the Colorado River, wetland areas within the Colorado River floodplain near the I-40 bridge and the Topock Marsh, and mesquite/palo verde in Bat Cave Wash and other washes.

Additional Information during Design

Additional vegetation community identification will be performed to guide design activities, in conformance with EIR mitigation measures.

EIR mitigation measure CUL-1a-5 requires that PG&E avoid, protect, and encourage the natural regeneration of identified indigenous plants of traditional cultural significance. To guide the design, construction and operation of the groundwater remedy, a qualified botanist will survey the areas where remedial facilities could be located to identify whether the identified plants may be present.

EIR mitigation measures AES-1a and AES-2b requires the protection of mature plant specimens in select locations (EIR Key Views 5 and 11) (AECOM, 2011) during construction, operation, and decommissioning of the groundwater remedy. To guide the design and construction, a qualified ecologist or biologist will identify and map existing mature plants in the areas where remedial facilities could be constructed in these EIR Key Views.

EIR mitigation measures AES 1b and AES-2c require the revegetation of disturbed areas within the riparian vegetation along the Colorado River, concurrent with construction. Additional information on existing floodplain vegetation will be collected during preparation of the revegetation plans to guide the scope of the floodplain revegetation efforts.

3.2.7 Listed and Protected Species

Federally-listed wildlife species have the potential to be located in the project area. These species include the desert tortoise (*Gopherus agassizii*) that may occur in creosote bush scrub habitat; the Yuma clapper rail (*Rallus longirostris yumanensis*) which may occur in marsh habitats along the Lower Colorado River; the southwestern willow flycatcher (SWFL) (*Empidonax traillii extimus*) that has been documented as nesting in tamarisk thickets near

watercourses, including the Colorado River; and fish species that may occur within the Colorado River near the site, including bonytail chub *(Gila elegans)*, Colorado pikeminnow *(Ptychocheilus lucius)*, and the razorback sucker *(Xyrauchen texanus)*. Designated critical habitat for the bonytail chub is the Colorado River and the 100-year floodplain.

Existing Information

Information on listed and protected species has been collected through literature searches and reconnaissance surveys; information is contained in the Biological Resources Survey Report for the APE (CH2M HILL, 2005), the PBA for Remedial and Investigative Actions (CH2M HILL, 2007b), the Reconnaissance Biological Resources Survey in Three Areas Outside of the APE (CH2M HILL, 2010c), and the Biological Survey in Three Areas Outside of the APE (CH2M, HILL, 2010d). In addition, PG&E has performed surveys for desert tortoise and flycatcher since 2005. Five years of annual protocol surveys for the desert tortoise completed between 2005 and 2009 resulted in an absence of tortoise sightings (PG&E, 2010); six years of annual protocol surveys for the SWFL have identified no nesting pairs and only occasional transient SWFL sightings (PG&E, 2010; Garcia and Associates, 2010).

Additional Information During Design

In compliance with the Endangered Species Act of 1973 (16 USC §§ 1531-1544; 50 CFR 402), Section 7 consultation with the USFWS will occur prior to the implementation of the groundwater remedy to ensure that remedial activities will not result in the take of, or adverse impacts to, threatened and endangered species or their habitats. The current PBA addresses activities up to the selection of the remedy and expires at the end of 2012. A new PBA will be prepared in coordination with BLM and USFWS to address remedy implementation as well as future RFI/RI and remedial activities that are anticipated to occur in the APE.

A biennial protocol survey for the SWFL will be conducted in 2012; survey information will be incorporated into the new PBA. At the request of the USFWS in September 2011, a survey for the Yuma clapper rail will be conducted on the California side of the Colorado River, in the potentially suitable rail habitat under the (below/near) the I-40 bridge. The survey is anticipated to occur in 2012, with the exact timing to be determined by qualified biologist.

Additional Information During Construction

Pre-construction surveys for listed and protected species will be conducted in order to comply with requirements of the Federal Endangered Species Act and the Migratory Bird Treaty Act, as well as EIR mitigation measures Bio-2a and Bio-2b. These surveys will determine if listed or protected species are present in the project area and whether additional protective measures (e.g., avoidance buffers) will be required during construction. For the Yuma clapper rail, the preconstruction surveys will specifically identify habitat within 300 feet of construction areas, in accordance with substantive policies of USFWS including those set out in USFWS protocols.

3.2.8 Cultural Resources

Cultural resources occur in areas near the groundwater remedy infrastructure and will affect design, construction, and implementation.

Existing Information

Cultural resources surveys of the project area are summarized in the reports *Archaeological and Historical Investigations, Third Addendum: Survey of the Original and Expanded APE for Topock Compressor Station Site Vicinity* (Applied Earthworks, 2007), *Archaeological and Historical Investigations for the PG&E Compressor Station, Addendum 8: Survey of Additional Areas Outside the Expanded Area of Potential Effects* (Applied Earthworks, 2010a), and *Archaeological and Historical Investigations for the PG&E Compressor Station, Addendum 9: Survey Within the Fence Line of the Topock Compressor Station* (Applied Earthworks, 2010b). National Register of Historic Places-eligible and listed sites within or immediately adjacent to the project area include CA-SBR-219: Topock Maze Loci A–C; CA-SBR-2910H: Historic Route 66 and portions of the National Old Trails Road; CA-SBR-6693H: Atlantic and Pacific Railroad Company rail line; and CA-SBR-1170: consisting of numerous lithic artifacts, stone tools, and features such as an aboriginal trail.

Additional Information During Design and Construction

Additional information will be collected during the design and construction phases of the groundwater remedy in accordance with EIR mitigation measures, including the following:

- The EIR mitigation measure CUL-3 requires that a paleontological investigation be conducted to refine the potential impacts on unique paleontological resources within the final design area.
- The EIR mitigation measure CUL-1b/c2 requires that a cultural resources study be conducted that may include a geoarchaeological investigation and/or non-destructive remote-sensing surveys of potentially disturbed areas to determine if a potential exists for buried historical and archaeological resources.
- The EIR mitigation measure CUL-1a-3a requires inspections of identified historical resources.

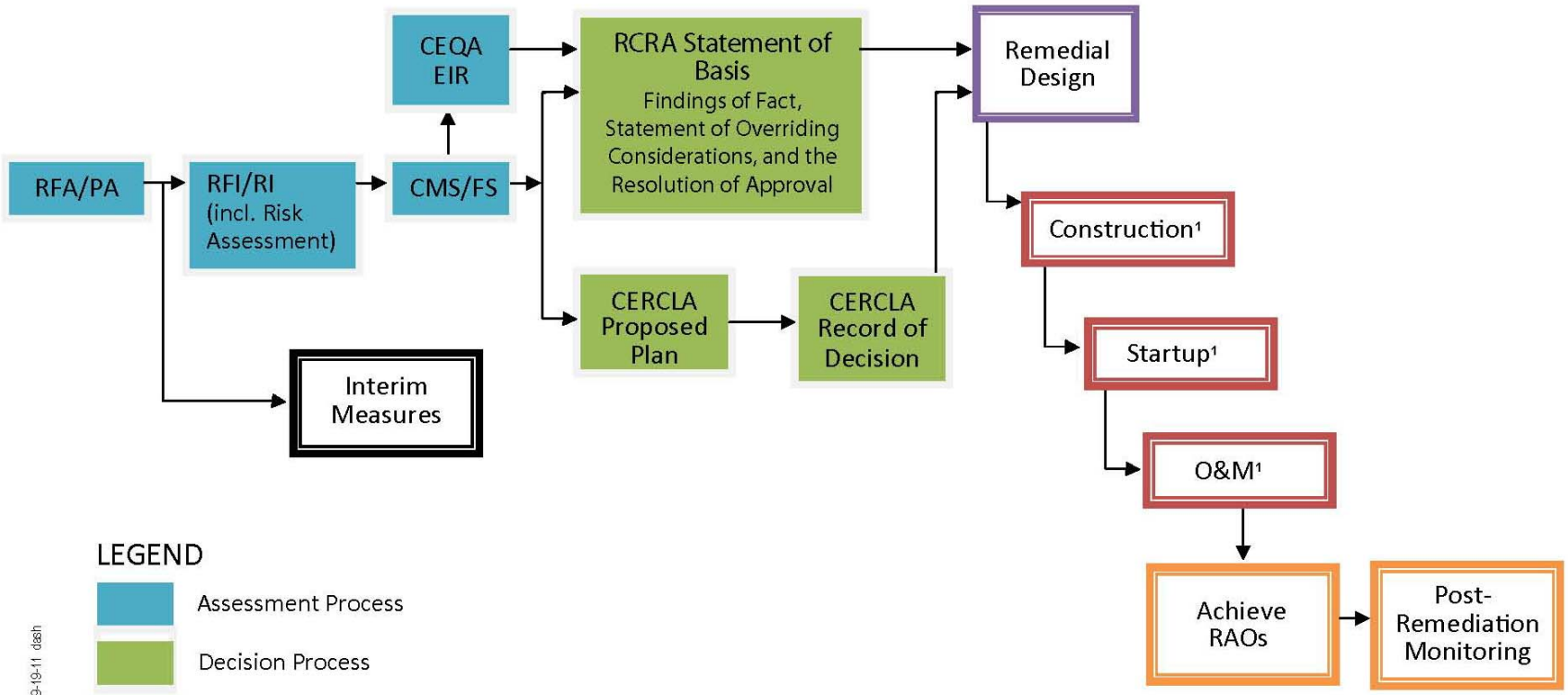
Information collected during these studies, investigations and inspections, in conjunction with existing information, will be used to guide design and construction of the groundwater remedy and will be incorporated into cultural resource documents discussed in Chapter 4. In addition, information may need to be collected to support or satisfy the PA reporting requirements. Also, depending on the design, additional supporting data may be needed.

4.0 Schedule and Future Documents

The implementation of the groundwater remedy consists of several phases, including design, construction, O&M, achievement of RAOs, post-remediation monitoring, and decommissioning of remedial facilities. Exhibit 4-1 illustrates the project implementation phases. Multiple activities and documents will occur during each phase of the project and any one phase may overlap with other phases of the project; for example, some parts of the remedy may be in start-up while other parts are under construction. Implementation of the groundwater remedy is anticipated to require several decades, the actual time required for implementation depending on a number of factors. Figure 4-1 shows the current implementation schedule for the initial design and construction phases of the groundwater remedy. Construction of the final groundwater remedy is currently scheduled to take place from January 2013 through June 2014. Initial start-up of the system is expected to occur in November 2013. At this early stage of project implementation, a timeline for the latter phases of the project is not meaningful. As work progresses, the implementation schedule will be updated, expanded, and incorporated into future submittals. Note that the 2009 CMS/FS stated that it may take approximately 29 years to flush five pore volumes, and the range of cleanup time is from 10 years (based on two pore volumes) to 110 years (based on 20 pore volumes). After the cleanup is complete, monitoring will continue for 10 years. Using this as a basis, the year when cleanup is achieved could range from 2024 to 2124. Monitoring after cleanup is complete would then extend another ten years beyond that date.

A number of different requirements (driven by the CACA, CERCLA, EIR mitigation measures, ARARs, and PG&E's Settlement Agreement with the Fort Mojave Indian Tribe [Settlement Agreement] [PG&E, 2006]) govern the implementation of this complex project, which mandates documents to be produced in various phases of implementation. Tables 4-1/4-1A and 4-2/4-2A summarize the documents and their contents, as required by the CACA and CERCLA, respectively. The EIR MMRP (Table 5-1 of the EIR) and the PA also both mandate various documents be prepared and implemented (see Table 4-3). In addition, once final, requirements from the pending Consent Decree between PG&E and DOI will be compared to those listed on Tables 4-2/4-2A (2009 CERCLA RD/RA Model Consent Decree), 4-3, and 4-5. If there are any differences, they will be evaluated for impact to the project as a whole.

Coordination between these requirements would be beneficial to ensure clarity, harmony, and unification in implementation, while fulfilling all requirements. There are overlaps between these requirements and discrepancies in the reporting timing. Opportunity exists for a document strategy that maximizes efficiency via combining and packaging information together where it makes sense to avoid duplication and/or to facilitate tracking of information and requirements by stakeholders, interested tribes, and regulatory agencies (e.g., package information so as to reduce the number of stand-alone supporting documents that would require separate tracking). The following sections present a proposed document "road map" to accomplish the above.



LEGEND

- Assessment Process
- Decision Process
- Remedial Design
- Corrective Measures Implementation/ Remedial Action Construction & Operations
- Corrective Action Completion
- Interim Measures

¹ Construction, Startup, and O&M activities overlap

RFA/PA: RCRA Facility Assessment/Preliminary Assessment
RFI/RI: RCRA Facility Investigation/CERCLA Remedial Investigation
CMS/FS: RCRA Corrective Measure Study/CERCLA Feasibility Study
CEQA EIR: California Environmental Quality Act Environmental Impact Report
RAOs: Remedial Action Objectives
O&M: Operations & Maintenance

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EXHIBIT 4-1
Site Cleanup Process

4.1 Overview of Document Road Map

Table 4-3 presents the overall road map of key documents to be produced in various implementation phases, from design through decommissioning (*note that at this early stage in the project, future documents that are related to approvals, access, substantive requirements that are normally contained in permits are not yet known with specificity)*.

Where documents are proposed to be combined or packaged together, a footnote is provided in Table 4-3 to indicate the original documents. The following guidelines were used in packaging information:

- When documents have a similar mission and have enough similarity in contents, and are on a similar timeline, they represent good candidates for a combined/unified document. Examples include: (1) the CACA-required Construction Work Plan and the CERCLA-required Remedial Action Work Plan, and (2) the EIR-required Plan for Decommissioning and Removal of IM No. 3 facility and Site Restoration and the PA-required Plan for Decommissioning, Removal, and Restoration of IM No. 3.
- When documents appear to have a similar mission and enough similarity in contents, but the timeline is uncertain, they represent good candidates for coordination. An example is the EIR-required Access Plan and the PA-required Tribal Access Plan. The schedule for the Access Plan will be available after coordination with BLM.
- To the extent practicable and sensible, supporting documents will be packaged with the documents that rely upon the supporting conclusions. For example, various EIR-required documents for design (e.g., aerial map of disturbance, map of mature plant species, etc.) will be packaged with the design submittals, where possible. Likewise, the EIR-required documents for construction will be packaged with the Construction/ Remedial Action Work Plan.
- Since the groundwater remedy is a CERCLA response action, activities conducted onsite are covered under the permit exemption codified in Section 121(e)(1) of CERCLA. While the permit exemption applies to the administrative or procedural elements (e.g., preparing and submitting permit applications), the substantive requirements of ARARs remain. Substantive information that might otherwise be included in a permit application to a state or local agency will instead be incorporated into design, construction, and operating plans submitted to DTSC and DOI. For example, best management practices (BMPs) for control of storm water pollutants during construction would be incorporated into the Construction/Remedial Action Work Plan submitted to DTSC and DOI in lieu of preparing a separate Construction Storm Water Pollution Prevention Plan (SWPPP) for compliance with the Clean Water Act and general permitting requirements of the State Water Resources Control Board.
- When there is a discrepancy in the reporting timing, an efficient path forward is proposed. For example, the EIR MMRP requires that the Security Plan, the Access Plan, the Communications Log, and the Workers Cultural Sensitivity Education Training be developed as part of this CMI/RD Work Plan. It was later clarified by the agency that the CMI/RD Work Plan will provide a framework and schedule for development of these future plans. A proposed path forward for each plan is described below.

A discussion of contents for select documents is provided in the sections below.

Due to the large number of requirements driven by the EIR MMRP, Table 4-4 was prepared to ensure completeness and fulfillment of all requirements. Table 4-4 maps each mitigation measure to a future document which is intended to satisfy the measure.

A similar mapping of the substantive requirements of the identified action and location specific ARARs to a future document was also conducted. Compliance with substantive requirements of the identified action- and location-specific ARARs will be assessed by first, identifying the trigger for compliance, e.g., underground injection activity, transfer and storage of hazardous wastes, RCRA-regulated facilities in 100-year floodplain, etc.; second, determine the steps for compliance, e.g., file the inventory of injection well, adhere to design requirements for containers, etc.; third, identify the parties responsible for compliance; and fourth, identify overlaps with EIR requirements. Table 4-4A presents an initial assessment of the identified ARARs. PG&E will provide information (a checklist if requested) to document implementation and completion of identified ARARs, as part of the Basis of Design Report (Table 4-5).

4.2 Schedule of Key Documents During Design Phase

Table 4-3 lists the key documents to be produced during each phase of the project from design to decommissioning. Table 4-5 presents a more detailed view of the contents of selected key technical documents to be produced during the design phase, which includes:

- Design submittals (Preliminary, Intermediate, and Final)
- O&M Plan
- Construction/Remedial Action Work Plan

To make information/requirements tracking efficient, several supporting or EIR-required documents are planned to be either submitted concurrently with the key documents identified above or included in the key documents. The current schedule for these documents is shown in Figure 4-1. As work progresses from preliminary design to final design to construction, the level of remedy details increases and the level of uncertainty decreases. Below is a description of other required key documents.

4.2.1 Cultural and Historical Resources Related Documents

1. Cultural Impact Mitigation Program (CIMP)/Cultural Historic Properties Management Plan (CHPMP) — The EIR mitigation measure CUL-1a-8 requires that a CIMP be developed in coordination with Interested Tribes and the federal agencies with land management responsibilities in the project area (e.g., BLM and USFWS) in accordance with the PA. The CIMP will be submitted with the final design for DTSC's review and approval. The CIMP will include an appendix that contains the Plan for Decommissioning, Removal, and Restoration of the IM No. 3 Facility. The plan will address which parts of the IM No. 3 infrastructure will be re-used by the groundwater remedy as well as the decommissioning of the IM No. 3 treatment plant and other infrastructure. The IM No. 3 treatment plant and any other IM No. 3 infrastructure that is not incorporated into the remedial action are expected to be decommissioned following determination that the facilities are not needed to meet RAOs.

The BLM, in consultation with interested Tribes, the California and Arizona SHPOs, the Advisory Council on Historic Preservation and PG&E prepared and executed a PA to fulfill their Section 106 responsibilities for the ground water remediation Record of Decision. As a requirement of the PA, a Cultural Historic Properties Management Plan (CHPMP) is to be completed by January 2012. Requirements of the PA and the forthcoming CHPMP will be closely integrated with the requirements of the DTSC EIR. When possible, requirements of the PA/CHPMP and EIR will be coordinated so as to avoid conflict. Requirements from both the PA/CHPMP and EIR will be utilized when preparing all future work plans. Until the CHPMP is completed by the BLM, the existing 2007 Cultural Resources Management Plan (CRMP) will be followed.

2. Access Plan — As required by the EIR mitigation measure CUL-1a-2, the goal of the Access Plan is to preserve Tribal members' access to, and use of, the project area for religious, spiritual, or other cultural purposes. A similar Tribal Access Plan is required by the PA (Stipulation IC). BLM and PG&E are coordinating on the preparation of a combined plan that satisfies both requirements. A schedule will be established as part of the coordination. PG&E has been in contact with the BLM who has responsibility for preparing the Access Plan required by the PA. Given the majority of land within the area is Federal Land, PG&E is waiting for BLM to complete their Access Plan in order to avoid the potential for inconsistencies. PG&E will then prepare an Access Plan for the lands not under Federal management.

3. Aerial Map of Disturbed Areas — The EIR mitigation measure CUL-1a-9 requires that during selection of the design and specific locations for physical remediation facilities, PG&E will, in communication with the Interested Tribes (and subject to their review), and to the maximum extent feasible, as determined by DTSC, give: (1) priority to previously disturbed areas for the placement of new physical improvements; and (2) priority to re-use of existing physical improvements, such as (but not limited to) wells and pipelines, but not including IM No. 3 facilities. "Disturbed" areas in this context means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years. An aerial map of these disturbed areas will be prepared to guide project design.

4. EIR Mitigation Measures Compliance Report — Communications and outreach are key elements in all phases of project implementation. The EIR MMRP mandates various outreach efforts and periodic reporting of specific items (such as human-caused disturbance to project facilities and activities under the grant program). To make information and requirements tracking efficient, one quarterly report will be prepared to comply with all reporting requirements, including:

   - CUL-1a-8a (protocols for continued communication, quarterly and annual)
   - CUL-1a-2 (communication log)
   - CUL-1a-3b (report of human caused disturbance to project facilities)
   - CUL-1a-11 (annual report of activities under the grant program)

Exhibit 4-2 presents a report template. The report will be submitted to DTSC quarterly during design and construction, and annually during project operations. The report will also document the project's compliance with other EIR mitigation measures during the reporting period, such as issues, if any, and resolutions noted by the designated Disturbance Coordinators for noise and vibration (NOISE-1b and NOISE-2d).

5. Annual Cultural Resources Monitoring Report — The EIR mitigation measure CUL-1a-3a requires yearly inspections (or less frequently upon approval by DTSC) of identified historical resources, including inspections of the Topock Cultural Area, to determine if substantial adverse changes have occurred relative to the condition of the historical resources during the past year or prior to the implementation of the project. Per the EIR (Section 4.4.3.2), Section 15064.5(b) of the CEQA Guidelines clarifies the meaning of "substantial adverse change" by defining this phrase as the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings. Additionally, the significance of a historical resource or a unique archaeological resource would be "materially impaired" by the proposed project if it demolishes or materially alters in an adverse manner those physical characteristics of a resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources (CRHR), including those resources for which eligibility has been determined by the lead agency for the purposes of CEQA. Information from the inspections will be incorporated into the Annual Cultural Resources Monitoring Reports, required by the CRMP (until the CHPMP is in place).

6. Cultural Resources Study/Geoarchaeological Investigation Report — The EIR mitigation measure CUL-1b/c2 requires that a cultural resources study be conducted to assess the potential for the construction, operation, or decommissioning of specific proposed improvements to result in significant impacts on identified historically significant resources. This may include a geoarchaeological investigation and/or non-destructive remote-sensing surveys of potentially disturbed areas to determine if a potential exists for buried historical and archaeological resources. The study report will be submitted to DTSC for review and evaluation to determine if existing mitigation measures are appropriate.

7. Cultural Resources Treatment Plan (if needed) — In compliance with the EIR mitigation measure CUL-1b/c-3, if the cultural resources study determines that the construction of physical improvements would result in significant impacts on identified historically significant resources, and avoidance of the resource is not feasible, a treatment plan will be prepared, in communication with Interested Tribes, that identifies measures to reduce these impacts. PG&E will also coordinate with the Federal agencies and SHPO/Advisory Council on Historic Preservation (ACHP) in designing a treatment plan.

PG&E Topock Compressor Station Groundwater Remediation Project
EIR Mitigation Measures Compliance Report
[Indicate Reporting Period]

1. Introduction

In compliance with the EIR mitigation measures CUL-1a-8a (protocols for continued communication), CUL-1a-2 (communication logs), CUL-1a-3b (report of human caused disturbances), and CUL-1a-11 (annual report of activities under grant program), this quarterly report summarizes the outreach efforts/communications between PG&E and the Tribes during the design and construction of the groundwater remedy. This quarterly report also documents the project's compliance with other EIR mitigation measures during the reporting period, including issues and resolutions, if any, noted by the designated Disturbance Coordinators (Curt Russell and Chris Smith of PG&E) for noise and vibration.

2. Project Status/Outreach Activities between PG&E and Tribes

Provide a brief overview of key project milestones achieved and outreach activities conducted during the reporting period. To the extent practicable and available, discuss outreach activities/milestones anticipated for next reporting period.

Log of Outreach/Communication with Tribes				
ID	**Date/Time**	**Party Initiated Contact**	**Party Received Contact**	**Summary of Outreach/Communication**

3. Summary of Compliance with EIR Mitigation Measures

Provide a summary of compliance with EIR mitigation measures during the reporting period. Information may be presented in a table or a narrative as long as all the pertinent information is included.

4. Summary of Noise/Vibration Issues (if any) and Resolutions Noted by Disturbance Coordinators *(per EIR Mitigation Measure NOISE-1b and NOISE-2d)*

Information may be presented in a table or a narrative as long as all the pertinent information is included. If information is cumulative, a table format may be a better option.

Log of Noise/Vibration Issues (if any)					
ID	**Date/Time**	**Party Initiated Contact**	**Party Received Contact**	**Summary of Issues**	**Resolution**

5. Outstanding Items/Issues Identified as Needing Clarification - *If applicable, list items needing clarification or further discussion, e.g., seek clarification of application of an EIR mitigation measures.*

6. Project Photographs - *If applicable, insert photographs with captions that depict key activities/events during the reporting period.*

EXHIBIT 4-2
EIR Mitigation Measures Compliance Report Template

8. Paleontological Investigation Report — The EIR mitigation measure CUL-3 requires a paleontological investigation, including a survey of the project area by a qualified paleontologist, be conducted to refine the potential impacts on unique paleontological resources within the final design area and to determine whether preconstruction recovery of sensitive resources and/or construction monitoring would be warranted. A report will be submitted after the investigation.

9. Training/education manual for cultural resources, historical resources, and the identification of human remains — Cultural and historical resources sensitivity education has been a central part of the Topock remediation project to date. The existing education on cultural/historical resources sensitivity for Topock occurs via periodic training and project initiation meetings. Sensitivity training classes are conducted at least annually, and are attended by all workers available to participate. Sensitivity training/education is also provided at project initiation meetings, typically held at the site and prior to field work. The training is provided by the Site Operations Manager, the Project Archaeologist, and Interested Tribal members who attend the meetings. Many EIR mitigation measures associated with the groundwater remedy (e.g., CUL-1a-13, CUL-1b/c-4, CUL-4) are related to continued training of workers on cultural resources, historical resources, and the identification of human remains. To comply with the EIR requirement, a training/education manual will be prepared using existing and new material, as available.

4.2.2 Biological Resources Related Documents

1. Programmatic Biological Agreement Addendum — A new PBA will be prepared in consultation with USFWS, BLM, and DOI to include activities associated with implementation of the groundwater remedy, in conformance with the requirements of the federal Endangered Species Act, the Fish and Wildlife Coordination Act, and the Migratory Bird Treaty Act.

2. Avoidance and Minimization Plan for Special-Status Birds — The EIR mitigation measure BIO-2a requires that an avoidance and minimization plan for special-status bird species, as defined in Table 4.3-3 of the EIR and those species protected under the federal Migratory Bird Treaty Act, including the Yuma clapper rail, be developed and implemented in consultation with USFWS, and agreed upon by DTSC. Avoidance and impact minimization measures, such as prohibiting construction near or in sensitive bird habitat, limiting construction during breeding seasons, and requiring an onsite biological monitor, will be included in the design plan and implemented to the extent necessary to avoid significant impacts on sensitive bird species. The avoidance and minimization plan can be combined with the PBA Addendum for efficiency in scoping/planning of the document and agency consultation.

3. Map of Mature Plant Species/Survey of Indigenous Plants of Traditional Cultural Significance (listed in Appendix PLA of the EIR) — The EIR mitigation measures AES-1a and AES-2b require that plant specimens in select locations (EIR Key Views 5 and 11) (AECOM, 2011) determined to be mature and that must be retained, will be mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation. A map will be prepared and incorporated into the design. For

efficiency, field work may be coordinated between this mapping and the survey of indigenous plant species required by EIR mitigation measure CUL-1a in the project area.

4. Plant Transplantation/Monitoring Plan (if needed) — If an indigenous plant(s) of traditional cultural significance as listed in the EIR is identified within the project area, measures will be taken to avoid, protect, and encourage the natural regeneration of the identified plant(s) when developing the remediation design, final restoration plan, and IM No. 3 decommissioning plan as required by EIR mitigation measure CUL-1a. In the event that impacts on the identified plant(s) cannot be avoided and such plant(s) will be displaced, a plant transplantation/monitoring plan will be prepared by a qualified botanist.

5. Revegetation Plan — The EIR mitigation measures AES-1b and AES-2c require that plans and specifications for revegetation of disturbed areas within the riparian vegetation along the Colorado River be developed. The revegetation plan will include specification of maintenance and monitoring requirements, which will be implemented for a period of five years after project construction or after the vegetation has successfully established, as determined by the qualified plant ecologist or biologist.

6. Delineation of Waters and Wetlands Field Survey Addendum — In 2005, field surveys of surface waters and wetlands within and near the Topock site were conducted and documented (CH2M HILL, 2005). In 2010, surveys of three additional areas outside of the APE were conducted (CH2M HILL, 2010c and 2010d). In compliance with EIR mitigation measure BIO-1, a field verification of wetlands will be conducted and documented in an addendum to the 2005 survey and, to the extent necessary, the 2010 surveys.

7. Map of Ordinary High Water Mark — The EIR mitigation measure AES-2a requires that a minimum setback requirement of 20 feet from the water (ordinary high water mark) will be incorporated in the design, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the river bank. A map of the ordinary high water mark along the river bank will be prepared and incorporated into the design.

8. Habitat Restoration Plan for Sensitive Habitats and Special-Status Species— The EIR mitigation measures BIO-1 and BIO-2c require that a habitat restoration plan be prepared to address potential impacts on (a) sensitive habitats, and (b) special-status species during decommissioning activities. The plan will be prepared in consultation with CDFG, BLM, and USFWS, and will include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan, and an adaptive management plan.

9. Fish Rescue Plan/In-stream Habitat Typing Report — The fish rescue plan and the in-stream habitat typing report (mitigation measure BIO-3) will not be prepared at this time since for the near-term, the forthcoming design will focus on a fresh water source from Arizona (not water from the Colorado River).

10. Hydrologic Analysis — The EIR mitigation measure WATER-1 requires that computer simulations or other appropriate hydrologic analysis be used before the installation of any new fresh water extraction wells to demonstrate that production rates of existing nearby wells will not be substantially affected. A hydrologic analysis will be prepared for inclusion in the design submittals.

4.2.3 Other Key Documents During Design

1. Site Security Plan — The Site Security Plan will be prepared and submitted concurrently with or included in the future Construction/Remedial Action Work Plan. As required by the EIR mitigation measure CUL-1a-3b, the goal is to provide increased observation of potential intrusions into the project area during construction and operation of the final remedy that may impact significant cultural resources. The general framework for the Site Security Plan is as follows:

   - The security for remedial facilities located inside the Compressor Station will be provided for by the existing station security system.
   - Remedial facilities located outside of the Compressor Station will be equipped with security features/systems that are consistent with current PG&E security standards. Such features, as determined necessary and in compliance with project and landowners requirements, could include, but are not limited to, fencing to protect the equipment and provide safety for personnel and the public; locks to prevent authorized access; security devices and instrumentation; security communication systems; alarms to notify PG&E's security operations; and security cameras.

2. Grading and Erosion Control Plan — EIR mitigation measure GEO-1a-a requires that a grading and erosion control plan be prepared by a California Registered Civil Engineer for DTSC approval prior to implementation of any grading in areas of the site where there is a potential for substantial erosion or loss of topsoils. The plan will outline specific procedures for controlling erosion or loss of topsoil during construction, operation and maintenance, and decommissioning.

3. Storm Water Pollution Prevention Plan (SWPPP)/BMP plans and Monitoring & Reporting — EIR mitigation measure HYDRO-1 requires that a SWPPP and BMP plans/monitoring and reporting program be developed to control storm water runoff, erosion, and sediment during construction, consistent with the substantive requirements of the San Bernardino County Building and Land Use Services Department for erosion control.

4. Project-specific Hazardous Materials Business Plan (HMBP) — EIR mitigation measure HAZ-1a-c requires a project-specific HMBP, chemical standard operating procedure (SOP) protocols, and contingency plans. The project-specific HMBP will be prepared in accordance with substantive San Bernardino County requirements (www.sbcfire.org). Chemical standard operating procedures (SOPs) and contingency plans will be developed. The HMBP and SOPs will describe the procedures for properly storing and handling hazardous materials and hazardous wastes onsite, the required equipment and procedures for spill containment, required personal protective equipment, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle and equipment maintenance activities.

5. Fueling SOPs and Contingency Plans — EIR mitigation measure HAZ-1b-b requires that fueling SOP protocols and a contingency plan be developed for implementation at all fueling areas onsite. Existing protocols will be reviewed and updated as needed.

6. Health and Safety Plan/Soil Management Plan — The EIR mitigation measures HAZ-2 and HAZ-2f require that a health and safety plan and a soil management plan, respectively, be developed for DTSC approval in the event that evidence of contaminated soil is identified during ground disturbing activities (e.g., noxious odors, discolored soil). To comply with EIR mitigation measure HAZ-2c, Health and Safety Plans (or addendums or revisions, as appropriate) will be prepared for future ground-disturbing field activities. Examples include, but are not limited to, data collection to support design, construction, and O&M of the groundwater remedy.

4.3 Key Documents During the Construction Phase

Construction of the final groundwater remedy is expected to take place from January 2013 through June 2014. Initial start-up of the system is expected to occur in November 2013. After construction and operational tests are complete, a Corrective Measure/Remedial Action Construction Completion Report will be prepared and submitted to DTSC and DOI. The construction completion report documents how the completed project is consistent with the final design plans and specifications. The Corrective Measure/Remedial Action Construction Completion Report will include the following elements:

- Purpose
- Synopsis of the final groundwater remedy, design criteria, and certification that the final groundwater remedy was constructed in accordance with the final design plans and specifications
- Explanation and description of substantive modifications to the final design plans and specifications and why the modifications were necessary
- Results of any operational testing and/or monitoring which may indicate how initial operation of the final groundwater remedy compares to the design criteria
- Summary of significant activities that occurred during construction
- Summary of any inspection findings
- As-built drawings
- A schedule indicating when treatment systems will begin full scale operations

4.4 Key Documents During Operations

During remedy operations, performance monitoring reports will be submitted to DTSC and DOI at a frequency determined appropriate by the agencies. Report content will be presented in the O&M Plan.

The SOB (DTSC, 2011a) requires five-year remedy performance evaluation reports to evaluate the long-term effectiveness and reliability of the groundwater remedy. The ROD (DOI, 2010a) requires that a statutory review be conducted within five years after initiation of the remedial action and every five years thereafter until attainment of the RAOs to ensure that the remedy is, or will be, protective of human health and the environment. The contents

of the five-year reviews will generally follow the USEPA Comprehensive Five-Year Review Guidance (USEPA, 2001) and could include the following main elements:

- Site chronology, including a list of all important site events and relevant dates.
- Site background, including a general site description; former, current, and future land uses of the site and surrounding areas; history of contamination; initial response; and basis for taking remedial action.
- Remedial actions, including regulatory actions; RAOs; remedy description; remedy implementation; O&M requirements, operational summary, and operational costs of system; and O&M effectiveness.
- Progress since the last five-year review (if applicable), including protectiveness statements from last review; status of recommendations and follow-up actions from last review; results of implemented actions; and status of any prior actions.
- Five-year review process, including:
  - Administrative components
  - Outline of components and schedule for the five-year review
  - Community involvement
  - Document review
  - Data review
  - Site inspections
  - Interviews
- Technical assessment:
  - Question A: Is the remedy functioning as intended by the decision documents?
  - Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?
  - Question C: Has any other information come to light that could call into question the protectiveness of the remedy?
  - Technical assessment summary
- Issues
- Recommendations and follow-up actions
- Protectiveness statement
- Next review

Operation of the groundwater remedy is expected to require several decades, the actual time required for implementation depending on a number of factors. It is fully expected that changes to the remedial systems will be made during the operation phase to optimize the remedy, address maintenance issues, and respond to changes in site conditions. Based on the results of the 5-year reviews described above, there may be construction of new infrastructure, decommissioning of infrastructure determined unnecessary for future operations, and/or

partial shut-down of those portions of the plume that attain RAOs earlier or are appropriate for ceasing of active operations.

4.5 Key Documents Following Attainment of RAOs

Once cleanup goals and RAOs are achieved and/or the agency issues a decision that monitored natural attenuation is appropriate to address residual Cr(VI) in portions of the plume, a Corrective Measure/Remedial Action Completion Report will be prepared. The completion report will demonstrate how the criteria for the completion of the groundwater remedy have been satisfied and outline the criteria for when operations and maintenance may cease. The Corrective Measure/Remedial Action Completion Report will contain the following elements:

- Purpose
- Synopsis
- Corrective measure completion criteria, including a description of the process and criteria for determining when corrective measures, maintenance, and monitoring may cease.
- Demonstration that the completion criteria have been met, including results of testing and monitoring
- Summary of work accomplishments
- Summary of significant activities that occurred during operations
- Summary of inspection findings
- Summary of total O&M costs

A Decommissioning Plan will also be prepared for the agencies' review and approval following remedial action completion and/or determination that remedial infrastructure is no longer needed to support the active operation. The Decommissioning Plan will detail the decommissioning of the final groundwater remedy; removal of infrastructure, including monitoring wells and the treatment facilities; and site restoration activities. Depending on performance of the remedial systems, schedules for decommissioning may be phased, as some portions of the site may be appropriate for decommissioning while other portions of the site remain in active operation.

4.6 Key Documents During Post-Remediation

Following agencies' approval of the Corrective Measure/Remedial Action Completion Report, PG&E will perform post-remediation monitoring. Post-remediation monitoring reports will be prepared to document the continued effectiveness achieved by the remedy.

4.7 Key Documents During Decommissioning of Remedial Facilities

Following agencies' approval of the Decommissioning Plan, PG&E will perform the decommissioning of the remedial facilities and site restoration activities. A Completion Report will be prepared after the decommissioning for submittal to agencies.

4.8 Protocols for Review of Future Submittals of Cultural Resources and Design Documents

This section presents the protocols for review of future cultural resources and design documents:

- Review protocols for cultural resources-related documents throughout the design, construction, and operational phases (CUL-1a-8c)
  - PG&E proposes to follow the current document review protocol being implemented under the CRMP until the future CHPMP is in place. After the CHPMP becomes effective, PG&E proposes that the document review protocol under the CHPMP be followed.
- Review protocols for project design documents before the beginning of construction (CUL-1a-8d)
  - PG&E proposes to follow the current document review process presented in the Project Schedule (the Rainbow schedule). The process is as follows:
    1. The review period for the design submittals (including all documents submitted concurrently with the design submittals) is 30 calendar days. At the end of the review period, the reviewer will submit his or her comments to DTSC and/or DOI. For the final design submittals, there is a 55 calendar day Tribal consultation period.
    2. After review of comments received, DTSC and DOI will direct PG&E to address or incorporate a subset or all comments.
    3. After reviews of the agencies' direction and comments, if needed, PG&E will organize a comment resolution meeting to discuss and resolve comments needing resolution. Per past project experience, the comment resolution meetings are more efficient than the traditional comment response process.

5.0 IM Termination/Coordination with Groundwater Remedy Implementation

PG&E has been implementing an interim measure at the Topock site since March 2004. The purpose of the IM has been to stabilize the groundwater contamination during the time period in which the site characterization, risk assessment, and remedial alternative definition and evaluation steps are completed. This chapter describes the existing IM system and discusses the considerations for transitioning to the final groundwater remedial system and the potential decision process for transitioning between the IM and groundwater remedy. Decommissioning and restoration of the IM system is also discussed.

The IM has different goals and objectives from the groundwater remedy, as highlighted below:

Interim Measure Objectives	Groundwater Remedy Objectives
• Establish hydraulic control of the plume boundaries near the Colorado River to maintain a net landward groundwater gradient in a westward direction from the Colorado River.	• Prevent ingestion of groundwater as a potable water source having Cr(VI) in excess of the regional background concentration of 32 µg/L. • Prevent or minimize migration of Cr(T) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI]). • Reduce the mass of Cr(T) and Cr(VI) in groundwater at the site to achieve compliance with ARARs in groundwater. This RAO will be achieved through the cleanup goal of the regional background concentration of 32 µg/L Cr(VI). • Ensure that the geographic location of the target remediation area does not permanently expand following completion of the remedial action.

The goals of the IM are different from the RAOs because the RAOs were developed based on the conclusions of the RFI/RI, risk assessment, and ARARs identification, which were not complete at the time the IM objectives were defined in 2004. The IM has served the purpose of stabilizing the groundwater contamination during the time period in which the site characterization, risk assessment, and remedial alternative definition and evaluation steps have been completed. Based on the conclusions of the RI/RFI, risk assessment, and ARARs identification, the RAOs for the groundwater remedy focus on reducing the mass of Cr(VI), which was not a defined objective of the IM.

5.1 IM System Description

The IM consists of groundwater extraction for hydraulic control of the plume boundaries in the Colorado River floodplain and management of extracted groundwater. The existing components associated with the IM include the following:

- Groundwater extraction by extraction wells in the floodplain area of the site. There are four extraction wells (TW-2S, TW-2D, TW-3D, and PE-1).
- Transport of extracted groundwater to an aboveground treatment plant via underground pipelines.
- Treatment of groundwater in the aboveground treatment plant. The groundwater treatment system is a continuous, multi-step process that involves reduction of Cr(VI) to Cr(III); precipitation and removal of Cr(III) precipitate solids by clarification and microfiltration; and lowering the naturally-occurring TDS using reverse osmosis.
- Transport of treated groundwater to an injection well field via aboveground pipeline.
- Injection of treated groundwater into the alluvial aquifer. There are currently two injection wells (IW-02 and IW-03).
- Brine storage tanks and other facilities on the MW-20 bench, including truck access and loading areas, containment structures, parking areas, fencing, piping, pumps, motors, valves, electrical power and control panels, instrumentation, security system, lighting, and other ancillary equipment.
- Monitoring wells from which data are required, and identified well pairs to evaluate the performance of the IM.

Figure 5-1 illustrates the locations of existing (as-built) infrastructure associated with the IM in relation to the conceptual locations of new infrastructure associated with the groundwater remedy. Figure 5-2 provides additional detail on the locations of existing (as-built) infrastructure associated with the IM in the floodplain in relation to the conceptual locations of new groundwater remedy infrastructure. As illustrated, particularly in the floodplain, many of the features of the groundwater remedy, such as the line of extraction wells near the Colorado River and the line of IRZ wells along NTH, are located in the same general area as existing infrastructure for IM operation and performance measurement.

5.1.1 IM Extraction System

The groundwater gradient objectives of the IM are met through the operation of the IM extraction system, currently utilizing well TW-3D located on the MW-20 bench just adjacent to NTH, and well PE-1 located on the Colorado River floodplain. Based on DTSC directives, groundwater is extracted from PE-1 at its maximum sustainable rate (approximately 30 gpm) and groundwater is extracted from TW-3D at a rate (approximately 105 gpm) such that the combined rate from the two wells is 135 gpm— except during periods of scheduled and unscheduled maintenance.

The requirements for IM monitoring and reporting are outlined in various DTSC directives (DTSC, 2005; 2006; 2007; 2008a-b). Performance of the IM to meet the defined objectives is

assessed through collection and reporting of water levels (which are measured by recording instruments on a continuous basis) from specified monitoring wells, and reporting gradients between specified well pairs on an average monthly basis. The magnitude of the landward gradient is required to be at least 0.001 feet per foot (ft/ft) at each of these well pairs. The IM Performance Monitoring Program (PMP) has been a routine monitoring and reporting program since 2005; the recent PMP monitoring report is the *Fourth Quarter 2010 and Annual Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report* (CH2M HILL, 2011a). The PMP will be terminated upon the determination by the agencies that the IM is no longer required. The focus of the Corrective Measure/Remedial Action Monitoring Program associated with the groundwater remedy will be on monitoring and measuring the effectiveness of the remedy to attain the RAOs, rather than the objectives of the IM. If the IM PMP and the Corrective Measure/Remedial Action Monitoring Program are both in effect during a transition period, the Corrective Measure/Remedial Action Monitoring Program will efficiently plan for any overlap between the two monitoring programs.

5.1.2 Management of Extracted Groundwater

The existing IM treatment and injection systems have been established and approved as a means of effectively managing the water that is generated by the required extraction system, in compliance with waste management regulations. The treatment and injection systems are currently regulated by various approvals or permits issued by agencies including the DTSC, BLM, Water Board, San Bernardino County, and Mojave Desert Air Quality Management District.

In compliance with the Monitoring and Reporting Program under Order R7-2006-0060, PG&E currently collects influent, effluent, and other data from within the treatment plant, and the results of these analyses are reported quarterly to the Water Board, along with other required information and a summary of operations. The aquifer near the treated water injection wells is monitored via a Compliance Monitoring Program (CMP), consistent with the requirements of the Monitoring and Reporting Program under Order R7-2006-0060 and directions received from DTSC since 2005. The CMP has been a routine monitoring and reporting program since 2005; the recent CMP monitoring report is an appendix to the *Performance Assessment Report, Interim Measure No. 3 Injection Well Field* (CH2M HILL, 2011c). Similar to the PMP discussed above, the CMP will be terminated upon determination by the agencies that the IM is no longer required. In addition, the various regulatory approvals and permits for the treatment and injection system will be closed upon completion of the IM. If the IM CMP and the Corrective Measure/Remedial Action Monitoring Program are both in effect during a transition period, the Corrective Measure/Remedial Action Monitoring Program will efficiently plan for any overlap between the two monitoring programs.

5.2 Considerations for Transitioning from the IM to the Final Groundwater Remedy

The DTSC has established performance criteria for the operation of the IM. In addition to the gradient control metrics (maintaining a landward gradient away from the Colorado River), DTSC approval letters for the IM dictate that PG&E must maintain a target pumping rate of 135 gpm from two specific wells, TW-3D and PE-1 (Figure 5-2). These metrics are

consistent with the purpose of the IM, and the IM has been successful in achieving them. However, at some point during the construction and start-up of the groundwater remedy, it will no longer be possible to operate the IM in a manner that meets the current IM metrics. This section outlines example areas where the IM gradient control/pumping rate metrics or the operation of the IM wells or treatment plant may be incompatible with the construction and start-up of the groundwater remedy.

There are several ways in which the IM gradient control/pumping rate metrics or the operation of the IM wells or treatment plant may be incompatible with the construction and start-up of the groundwater remedy. Examples of those incompatibilities, which will be addressed during planning for the transition between the IM and groundwater remedy include:

1) During the startup of the groundwater remedy, it will be necessary to pump from the River Bank extraction wells to test the wells, the piping, and the control system. It will likely not be possible to continuously maintain the prescribed 0.001 ft/ft gradients in the three designated well pairs during the testing of the new River Bank extraction wells.

2) There will be significant quantities of water, along with carbon amendments, injected into wells along the NTH to construct the IRZ barrier. During this period of IRZ construction, which will likely extend over many months, it may not be possible to continuously maintain the required gradient control metrics in all of the IM well pairs. Injection or extraction in the IRZ recirculation wells may affect water levels in one or more of the designated gradient measurement well pairs.

3) The groundwater remedy facilitates mass removal of Cr(VI) from floodplain groundwater by injecting reductant along NTH and pumping from wells near the Colorado River. Once pumping from these River Bank extraction wells is fully implemented, gradients across the floodplain will no longer be landward. With the groundwater remedy in place, the IM gradient control metrics will no longer be appropriate.

4) Construction of the IRZ barrier requires relatively uniform distribution of carbon substrates across the entire length and thickness of the aquifer along NTH. The pumping from TW-3D, which is located within about 50 feet of the IRZ barrier, creates a cone of depression that extends along much of the length of the IRZ line. Near the ends of the IRZ line, the gradients associated with TW-3D pumping are parallel to the IRZ line, which could be beneficial for distributing the carbon along the line. However, near the middle of the IRZ line, pumping from TW-3D creates very strong gradients that are nearly perpendicular to the IRZ line. The pumping from TW-3D will make it very difficult, if not impossible, to achieve even distribution of carbon substrate between the IRZ wells in the center of the IRZ line.

5) Once carbon has been distributed along the IRZ, it will be necessary to allow some time for the microbes to digest the carbon and create the geochemical reducing conditions needed to remove the chromium. During this time, it is desirable to have a minimal flow of groundwater across the IRZ so that the carbon substrate remains in the target treatment zone rather than being pulled away downgradient. The period of time required for complete development of the IRZ following carbon injection may be weeks

to months. During this time, pumping from TW-3D would adversely affect the development of the IRZ by pulling un-amended water through the target treatment zone, particularly in the center portion of the IRZ line. This could result in incomplete distribution of carbon, and therefore only partial treatment, in the central portion of the IRZ, where some of the highest concentrations of Cr(VI) are found in groundwater.

6) If TW-3D remains pumping during the construction of the IRZ barrier, carbon compounds and in-situ byproducts (reduced species of iron, arsenic, and manganese) will eventually be drawn into the treatment plant. The IM treatment process is not designed to remove carbon compounds in the extracted water. Carbon compounds in the IM water could increase fouling of the IM extraction and injection wells, potentially reducing the effectiveness and capacity of the IM system and requiring increased maintenance. In addition, some carbon compounds can act as chelating agents and could decrease the effectiveness of the plant in removing chromium. Some of the in-situ byproducts would be removed by the treatment plant, but the plant was not designed to remove these metals and its treatment efficiency for arsenic and manganese in influent water has not been quantified. If the treatment plant is not able to adequately treat all the constituents in the influent water, concentrations in the treatment plant effluent may exceed effluent limits and/or the injection wells may be at risk of plugging. Therefore, in addition to the adverse hydraulic affects that pumping TW-3D would have on the ability to build the IRZ barrier, the construction of the IRZ barrier near TW-3D will have adverse effects on the operation of the IM treatment plant and injection wells. If PG&E is required to operate the treatment plant beyond a certain point during construction and startup of the groundwater remedy, and to meet the current discharge requirements in spite of the changing influent water chemistry, as described above, modifications to the treatment plant may be necessary and could require additional construction, and/or could require changes to approved authorizations of the treatment and injection system.

7) There may be portions of the IM infrastructure (wells, pipelines, etc.) that become incorporated into the groundwater remedy; for example, PE-1 may be incorporated into the line of River Bank extraction wells. If IM infrastructure is used as part of the groundwater remedy for a different purpose, it may reduce the amount of construction activities required, but would prevent simultaneous operation of that feature for both the IM and the groundwater remedy.

5.3 Decision Process for Transition to Groundwater Remedy Operation

A series of potential transition scenarios between the operation of the IM and the groundwater remedy is being developed as part of the remedial design process. An implementation plan for each scenario that defines the specific order and goal of each step, potential consequences of each, and critical milestones will be developed. Potential criteria for evaluating the transition scenarios will be developed and will take into account items such as the timely shutdown of the treatment plant, continued protection of the floodplain and river from contaminants, technical operational criteria, and general IM compliance issues and metrics. PG&E will consult with stakeholders regarding the best transition option that provides continued safeguards for the floodplain and Colorado River while ensuring the integrity of the construction and operation of the groundwater remedy.

5.4 Transition of Regulatory Requirements Between IM and Groundwater Remedy

Once an appropriate transition scenario is selected, a schedule for the transition between regulatory approvals and programs currently required for the IM to those required for the groundwater remedy will be defined. As the transition between IM and the groundwater remedy progresses, PG&E will likely request that some existing regulatory requirements (permits, action memorandum requirements, etc.) are updated, eliminated and/or replaced, as necessary, with those required for the groundwater remedy. Other IM monitoring programs (e.g., PMP, CMP) will be terminated when the agencies determine that the IM, and therefore the IM monitoring programs, is no longer required; similarly, existing contingency plans for the injection well field area, the floodplain area and the Colorado River initiated during the IM will be terminated and replaced by contingency plans appropriate for the groundwater remedy. Chapter 4 presents a list of future anticipated deliverables for the groundwater remedy.

5.5 IM Decommissioning and Restoration

The treatment plant and other IM infrastructure that are not incorporated into the groundwater remedy are expected to be decommissioned following determination by DOI and DTSC that the groundwater remedy is operating properly and successfully. In conformance with the Programmatic Agreement Stipulation V(E), EIR mitigation measure CUL-1a-8(f), and PG&E's Settlement Agreement (PG&E, 2006), a decommissioning plan will be prepared as described in Chapter 4 of this work plan. The decommissioning plan will form the basis for the closure cost estimate that is submitted to the Certified Unified Program Agency every year as part of the Conditional Authorization renewal.

5.5.1 IM No. 3 Treatment Plant Decommissioning

No aboveground component of the existing IM infrastructure that is located within the footprint of the existing treatment plant building will be re-used (in its current location) as part of the groundwater remedy. Decommissioning of the existing treatment plant building will include removing the exterior structure, interior treatment equipment, and associated tanks and facilities from the treatment plant building location. Related process piping, conduit, lights, electrical trays, concrete, road surfacing, and sunshade will be removed and either reused elsewhere as part of the groundwater remedy or transported to an appropriate disposal facility. Other components such as the control trailer, sunshade steel supports, tanks, pumps, polymer system, microfilter system, reverse osmosis system, mixers, control panels, switchgears, panels, and generators are expected to be removed and either sold for salvage value or stored at the Compressor Station as shelf spares.

The decommissioning of the treatment plant will likely generate liquid and solid waste that will be managed in compliance with RCRA. Waste streams will be identified and evaluated prior to decommissioning. This effort will involve reviewing equipment use and historical spills or leaks to identify potential waste disposal or salvage options. Soil sampling will be conducted beneath and around the IM No. 3 treatment plant. If foundation material beneath the treatment plant is to be removed, fill or other appropriate materials will likely be placed over the area after removal of the foundation. The fill will be graded and stabilized per the

erosion control plan. Sampling of the foundation to assess whether contamination is present would typically be by wipe or core sampling if determined to be necessary. If the concrete foundation and/or soil is found to be contaminated, it will be managed and disposed of in accordance with applicable regulations. Equipment within the treatment building such as process pipe and tanks will be decommissioned as appropriate, such as by power washing, and reused or disposed of. Wipe or chip sampling of the equipment will be conducted to verify the effectiveness of the washing. If the equipment cannot be adequately cleaned, it will be managed and disposed of in accordance with applicable regulations. Decontamination wash water will be treated onsite if not a hazardous waste, or disposed of offsite as appropriate. The volume of wash water to be disposed of depends on the volume of water generated and the availability of onsite use or disposal. Treatment can be accomplished with portable equipment (e.g., filters, pumps, tanks). If limited onsite use is available, offsite disposal or treatment options will need to be employed.

Solid waste generated will consist of incidental trash, such as pallets, empty drink and food containers, plastic sheeting, and other disposables associated with construction work. Incidental trash will typically be collected at the end of each shift and either hauled off at the end of the day or placed in dumpsters or roll-off bins that will be hauled offsite periodically by truck to an appropriate disposal or recycling facility. The amount of materials that may be generated during the treatment plant decommissioning is estimated to be up to 5,000 cubic yards of solid waste and up to 2,000,000 gallons of water.

Typical equipment that may be used for decommissioning of the treatment plant may include cranes, forklifts, standard and high reach demolition equipment, cutting equipment (e.g., torches, reciprocating saws), jackhammers, backhoes, graders, excavators, bulldozers, water trucks, and dump trucks.

5.5.2 Other IM Infrastructure Decommissioning

If not incorporated into the groundwater remedy, other IM infrastructure will be decommissioned following the determination that the facilities are not needed to meet the RAOs. The two IM injection wells (IW-02 and IW-03) and four extraction wells (PE-1, TW-2D, TW-2S, and TW-3D) will be decommissioned using procedures required by San Bernardino County and the California Department of Water Resources. Demolition of brine storage and loading facilities on the MW-20 bench will involve procedures similar to tank demolition at the treatment plant building. Pipelines will be decontaminated as appropriate. Aboveground piping from the treatment plant to the injection well field may be reused in place or would be removed and either reused elsewhere or disposed of offsite as scrap material. Subsurface pipelines from the extraction wells to the treatment plant will likely be abandoned in place following decontamination unless the regulatory agencies or landowner requires removal. Decontamination wash water will be treated onsite or disposed of offsite as appropriate. Electrical utilities will be disconnected from their service points and underground conduit left in place. Aboveground conduit will be removed with the piping. Electrical cables will be pulled from the underground and aboveground conduit and sold for salvage value. Existing pipeline and conduit vaults that have no continuing use by the groundwater remedy system will be removed and backfilled. Soil sampling will be performed in the vicinity of IM facilities during decommissioning as appropriate based on the potential for release of hazardous materials.

5.5.3 IM Restoration

Following decommissioning of IM infrastructure, the site of the existing treatment plant and related facilities will be restored to the conditions existing prior to the construction of the investigation and remediation related appurtenances and facilities, to the extent practicable and in conformance with Programmatic Agreement Stipulation I(D) and Stipulation III(B)(3)(c), and the Settlement Agreement (PG&E, 2006). Also, in conformance with Programmatic Agreement Stipulation V(E), EIR mitigation measure CUL-1a-8(f), and the Settlement Agreement, a plan for decommissioning, removal and restoration of the IM facility will be prepared as part of the design documents for the groundwater remedy, as described in Chapter 4.

6.0 Planned Short-Term Activities to Support Remedial Design

Short-term activities to support the remedial design and/or to comply with ARARs and mitigation measures are presented in this chapter. The level of planning presented in this work plan is conceptual and based on the currently anticipated information needs for completing the preliminary design submittals. It is anticipated that most of these activities will be conducted in 2011. As the design effort progresses from the preliminary design through intermediate and final design and the level of detail increases, new information/ data needs may be identified or other requirements triggered (for example, an Instream Habitat Typing survey is not currently planned because river intake structures are not being considered in the design at this time). If necessary, additional information/data needs will be filled through subsequent investigations or studies in accordance with separate supplemental work plans or reports (e.g., bench scale treatability studies).

The efforts to update and refine the groundwater flow model, and to use this to help develop a new in-situ model of the groundwater flow, geochemistry, and fate and transport, are discussed in Sections 6.2 and 6.3, respectively. These models are analytical design tools that will be used to determine critical design parameters such as well locations, pumping and injection rates, and hydraulic capture zones, and to assist with development of contingency plans. The groundwater flow model will be updated with data and information collected subsequent to the CMS/FS.

6.1 Plan for Data Collection in 2011/Early 2012

The following activities are ongoing or planned for 2011:

- East Ravine and Topock Compressor Station Groundwater Investigation
- Continuation of existing groundwater, surface water, compliance and performance monitoring programs
- Mapping of disturbed areas as defined in EIR mitigation measure CUL-1a-9
- Inventory of existing infrastructure (in areas relevant to the project)
- Pump tests
- Topographic survey (Figure 6-1 shows the planned survey areas)
- Underground utility identification
- Mapping of ordinary high water mark
- Field verification of jurisdictional waters and wetlands (with the project area)
- Mapping of mature plant species (in areas where new remedial facilities are likely to be located)

- Field survey of indigenous plant species (in areas where new remedial facilities are likely to be located)
- Survey of Yuma clapper rail on the California side of the Colorado River (near or below I-40 bridge)

Table 6-1 identifies the scope and schedule for each of the above activities.

6.2 Groundwater Flow Model Update

The model used in the CMS/FS was calibrated in 2009 prior to installation of a number of monitoring wells, both on the site and in Arizona. These monitoring wells have provided additional data on the lithology that is not yet incorporated in the model. In addition, there are hydraulic data from the installation and testing of a large capacity irrigation well on the Havasu National Wildlife Refuge across the river in Arizona from the Topock site. A river bathymetry survey has also been conducted since the groundwater model used in the CMS/FS was constructed. The model is being updated to incorporate these recent data, and to provide a more realistic representation of the hydraulic influence of Topock Marsh.

In addition, the model grid spacing will be refined to support more detailed simulations in the area where the final groundwater remedy is to be implemented and monitored. Although the model will be updated and refined, the original hydraulic parameters will be kept intact for the floodplain and other areas where sufficient data were available at the time of the original calibration. Parameters will only be changed in areas where little or no data were available previously (e.g., the Arizona side of the river).

Once updated, this groundwater flow model will be used to support remedial design on a macro scale level (i.e., well locations and pumping/injection rates/capture zones). Through a process of Telescopic Mesh Refinement (TMR), the aquifer properties and hydraulic fluxes will be exported from the flow model to provide the basis for a much finer-grid in-situ model. The in-situ model will be used to support design of IRZ reaction zones and evaluate options for in-situ byproduct management. The in-situ model task is described in Section 6.3.

The technical tasks associated with the groundwater flow modeling activities will include the following:

1. Produce Baseline Model for In-situ Design Tool: This task will employ the use of TMR to create an in-situ model grid based on the USGS MODFLOW modeling code. The in-situ model domain will constitute a portion of the flow model domain, focusing on the chromium plume and immediately surrounding area. In order to simulate smaller-scale processes, the in-situ model will have finer grid spacing and more vertical layers than the flow model.
2. Refine Model Grid: Finer grid spacing will be applied to the entire plume area to accommodate better simulation of final groundwater remedy detail. The finer grid will extend into the East Ravine and Compressor Station areas to incorporate data collected in more recent field programs. The number of model layers will remain the same as the previous version: five total layers. In most areas of the model, four of the layers will represent unconsolidated materials and the bottom layer will be assigned bedrock

properties. The exception will be the East Ravine area, where the saturated alluvium is very thin or not present. In these areas, bedrock properties will be assigned to multiple model layers.

3. Redefine Hydrostratigraphic Unit (HSU) Distribution and Bedrock Surface: The bedrock surface and HSU thicknesses will be updated on the basis of stratigraphy defined by well data collected since the original calibration. It is anticipated that additional stratigraphic data will become available during the ongoing East Ravine/Topock Compressor Station investigations, and adjustments to the model will be made as appropriate to accommodate these new data.

4. Redefine Topock Marsh Area: To better account for the influence of Topock Marsh on groundwater in Arizona, constant heads will be added to the model in the area of the Topock Marsh. Heads in these nodes will be assigned based on published average water levels maintained by USFWS. The assignment of marsh water elevations will be based on currently available information and no new data will be collected.

5. Incorporate Arizona Pumping: Extraction rates from wells in Arizona will be updated with any available data that can be obtained from public sources. In addition, the anticipated future pumping rates of the HNWR-1 well will be incorporated into the model.

6. Refine River Parameters: The river channel bottom will be refined using bathymetry survey data collected by the USGS in 2006. River depth estimates will be redefined and river bottom resistance will be recalculated to match the previous calibration.

7. Refine Aquifer Property Estimates: Transducers were installed in selected monitoring wells during a 24-hour pumping test at the HNWR-1 well. The data from these transducers will be used to refine model aquifer properties in Arizona. On the basis of previous USGS comments on the model, conductivity estimates in the area between the Old Evaporation Ponds and the IM No. 3 injection wells will be reexamined and adjusted where necessary. The aquifer properties in the floodplain area were previously calibrated based on pumping tests at TW-3D and PE-1. These properties will be maintained to preserve the original model calibration.

8. Refine Design of the Final Groundwater Remedy: Following the model update tasks identified above, the simulations conducted in the CMS/FS will be rerun as a check on the effects of the model revisions. As needed, the design of the final groundwater remedy will be adjusted, adding wells and adjusting extraction rates where necessary to optimize the performance and reliability of the groundwater remedy. The estimated time to cleanup will also be recalculated, based on the updated design and groundwater plume configuration.

6.3 In-situ Model Development

6.3.1 Groundwater Flow Evaluation

As described in Section 6.2, a TMR process will be used to export the aquifer properties and hydraulic fluxes from the groundwater flow model to provide the basis for a much finer-grid in-situ model. The in-situ model will be used to support design of IRZ reaction zones

and evaluate options for in-situ byproduct management. The in-situ model will have greater resolution in the area of the chromium plume while honoring the regional flow conditions established by the groundwater flow model. Additional vertical refinement will be added to the in-situ model to improve the resolution and understanding of local hydraulic flow patterns. Boundary conditions for the in-situ model will be based on the groundwater flow patterns computed using the groundwater flow model. The hydraulic flow patterns of the refined in-situ model will be compared to those of the groundwater flow model to ensure that the two models are hydraulically consistent before proceeding.

6.3.2 Geochemical Evaluation

Dissolved metals are temporarily liberated from soils as by-products of IRZ technology by redox-driven dissolution of minerals in a reducing environment. For full-scale implementation of the IRZ remedy, a numerical model (reaction, transport, and multi-component) will be used to evaluate transient water quality effects and the timeframe required to restore groundwater to background concentrations. The focus for this analysis will be within and downgradient of the IRZ. The input parameters will be developed from the in-situ pilot test data set collected in the floodplain.

The variables affecting by-product attenuation will be identified through numerical modeling to permit incorporating geochemical reactions into the groundwater transport analysis. The multi-component reactive transport model will use the PHREEQC model developed by the USGS (Parkhurst and Appelo, 1999). The geochemical model will be calibrated against the existing floodplain data set. It will be used to evaluate the floodplain treatment scenarios and will be adjusted as appropriate using up to five different input parameter sets. These parameters determined from the geochemical model will be used as input parameters for the fate and transport model.

6.3.3 Fate and Transport Evaluation

A fate and transport model will be developed to evaluate the potential migration of the chromium plume, injected carbon, and potential IRZ by-products under various in-situ remedial scenarios. The groundwater flow model will be used to establish the initial flow conditions for each potential remedial scenario. The solute transport of the chromium and injected carbon will be performed using the modular three-dimensional transport model referred to as MT3DMS. The MT3DMS code uses the flows computed by MODFLOW in its transport calculations. MT3DMS can be utilized to simultaneously simulate the degradation of injected carbon and precipitation of chromium.

Various in-situ remedial scenarios will be evaluated with the groundwater flow and solute transport model in order to minimize infrastructure, shorten period of active remediation, manage transient byproducts, utilize available disturbed areas, and comply with ARAR and MMRP. Key optimizations for the modeling will include well flow rates (NTH IRZ wells, riverbank wells, freshwater injection wells, recirculated riverbank water injection wells, extraction wells located northeast of the Compressor Station, and East Ravine extraction), well locations (both horizontally and vertically), IRZ well spacing, and locations of extraction and injection wells within the IRZ. With respect to remediation, optimizations will be made to TOC concentrations, timing of TOC addition, frequency of TOC injections, with overall objectives of maximizing chromium treatment, shorting the period of active remediation, while minimizing site impacts and byproduct generation. The results of these

various groundwater flow and solute transport modeling scenarios will be used as a tool to guide the engineering design task.

The model domain will then be prepared to evaluate IRZ by-product transport and attenuation downgradient from the IRZ under various injection and extraction scenarios for the full-scale system. The public domain code PHT3D is a multicomponent transport model for three-dimensional reactive transport in saturated porous media. PHT3D integrates MODFLOW, MT3DMS, and PHREEQC-2, enabling the assessment of flow, mass transport, and geochemical reactions (aqueous chemical speciation, distribution coefficients, kinetic rate parameters for reactions, and/or surface complexation reactions) at the site. This is a robust means to evaluate IRZ by-product transport. The model output will provide detailed information to guide the engineering design task while serving as a platform to evaluate the effects of design decisions on the by-product footprint. The model will be sufficiently detailed to enable incorporation of the current understanding of the floodplain aquifer as well as the variations in groundwater flow and geochemical reactions across the aquifer. This modeling will utilize the results of the work conducted under the geochemical modeling, both in terms of suitable input parameters as well as integration of the PHREEQC model into the flow model.

7.0 Project Organization and Management

As required by the CACA, this section describes the management approach for this project, including levels of authority and responsibility, lines of communication, and qualifications of key personnel. In addition, this section describes the general approach to health and safety, compliance, quality, and outreach throughout the design and implementation of the remedial action.

7.1 Project Commitment

PG&E is committed to implementing the design and remedial action in an effective manner that is safe, sustainable, and respectful to the sacredness and sensitivity of the cultural, historical, and biological resources at or near the Topock site, while complying fully with all regulatory mandates.

PG&E has chartered an implementation team (Section 7.2) with the accountability to ensure that the above commitment is fulfilled. General approaches to implementation in areas from health and safety, to compliance, to respect for sensitive cultural and biological resources are outlined in Section 7.3.

7.2 Project Organization

Figure 7-1 presents the overall PG&E Topock Groundwater Remedy Implementation Project Team organization chart. This project organization is intended to be a "living" element throughout the remedy implementation, meaning that it can be updated as new information becomes available as the design proceeds or as site circumstances change.

Exhibit 7-1 summarizes the qualifications and project roles of key personnel, their levels of authority and responsibility, and lines of communication.

The primary remedial design contractors (CH2M HILL and ARCADIS) report to Ms. Yvonne Meeks, the PG&E Project Manager, and are responsible for preparation of the design documents as required by the CACA and CERCLA, as well as the O&M Plan and the Construction/ Remedial Action Work Plan. Again, this is intended to be a living element of the remedy implementation that can be updated as project circumstances change. Note that in addition to CH2M HILL and ARCADIS, other qualified contractors may also be utilized to prepare select documents to comply with ARARs and mitigation measures (see Chapter 4 for a list of submittals and schedule).

At the time of this Work Plan, contractor(s) for the construction, the O&M of the groundwater remedy, and the preparation of required documents associated with these activities have not been identified.

EXHIBIT 7-1
Key Project Personnel, Qualifications, Levels of Authority and Responsibility, and Lines of Communication
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Key Personnel	Summary of Qualifications, Project Role and Lines of Communication
Jane Yura	**PG&E Vice President of Gas Transmission and Distribution** Ms. Yura is the executive sponsor of the project and represents PG&E at the executive level on the Topock Leadership Partnership (TLP). Ms. Yura has served in this role since 2011.
Tom Wilson	**PG&E Director of Environmental Remediation** Mr. Wilson is responsible for environmental remediation at PG&E, and has served in this role since 2005.
Sheryl Bilbrey	**PG&E Director of Chromium Remediation Program Office** Ms. Bilbrey reports to Mr. Wilson; she has the overall responsibility for the project direction and implementation, and represents PG&E at the executive level on the Clearinghouse Task Force (CTF).
Juan Jayo	**Legal** Mr. Jayo reports to Ms. Bilbrey; he has the overall responsibility for the legal aspects of the project. Mr. Jayo has served in this role since 2005.
Yvonne Meeks, P.G.	**PG&E Project Manager** Ms. Meeks reports to Ms. Bilbrey; she is responsible for the technical direction and the day-to-day execution of the project. Ms. Meeks has served in this role since 2004.
Bob Doss, P.E.	**PG&E Project Engineer** Mr. Doss reports to Mr. Wilson; he is responsible for assisting Ms. Meeks in the various aspects of execution of the project. Mr. Doss has served in this role since 2004
Curt Russell	**PG&E Topock Site Operations Manager** Mr. Russell reports to Ms. Meeks; he is responsible for all aspects of Topock site/local operations related to the project. Mr. Russell has served in this role since 2005. For the groundwater remedy implementation, Mr. Russell is also a designated disturbance coordinator for noise/vibration.
Glenn Caruso	**PG&E Project Archaeologist** Mr. Caruso reports to Mr. Russell; he is the project liaison for issues related to cultural resources and historic properties. Mr. Caruso has served in this role since 2004.
Melanie Day	**PG&E Project Biologist** Ms. Day reports to Mr. Russell; he is the project liaison for issues related to biological resources. Ms. Day has served in this role since 2011.
Chris Smith	**PG&E Site Compliance Management** Mr. Smith reports to Mr. Russell; he is responsible for the overall site compliance management activities. Mr. Smith has served in this role since 2005. For the groundwater remedy implementation, Mr. Smith is also a designated disturbance coordinator for noise/ vibration.
PG&E In-House Quality Assurance Team	**PG&E in-house subject matter experts** report to Ms. Meeks and will perform review/quality assurance of the remedial design documents prepared by the remedial design contractors. The engineering discipline reviewers will include, but not be limited to, structural, geotechnical, electrical, and instrumentation and controls.

7.3 General Implementation Approaches

7.3.1 Ensuring Protection of Human Health and the Environment

The PG&E Topock project team is committed to executing this project with zero safety incidents. Project protocols have been and will continue to be implemented and enforced to ensure safety for the project team members as well as site visitors, including Tribal Monitors, regulatory agencies, and interested stakeholders.

As the remedial design and the implementation of the remedial action progress, Health and Safety Plans (or addendums or revisions, as appropriate) will be prepared for future ground-disturbing field activities including, but not limited to, data collection to support design, construction, and O&M of the groundwater remedy. Each contractor performing field work will be responsible for preparing and complying with the standards and procedures in its project-specific health and safety plan. As required by the EIR mitigation measure HAZ-2c, project-specific health and safety plan(s) will be submitted to DTSC prior to beginning any ground disturbing activities. For protection of sensitive habitats and the environment, PG&E will implement protocols consistent with EIR mitigation measures and ARARs.

There are 154 mitigation measures from the EIR that address nine resource areas including aesthetic, biological, air quality, cultural, geology and soils, hazardous materials, hydrology and water quality, noise, and water supply. There are 59 action-specific and location-specific ARARs that address several resource areas including biological, air quality, cultural, hazardous materials, and waterways

7.3.2 Ensuring Respect of the Sacredness and Sensitivity of the Cultural, Historical, and Biological Resources

PG&E is committed to implementing the design and remedial action in a manner that is respectful of the sacredness and sensitivity of the resources at and near the project area. To that end, PG&E and its contractors will fully comply with the mitigation measures set forth to minimize impacts to the sensitive resources as well as protocols and/or provisions that are forthcoming in the future Cultural Impact Minimization Plan and the Cultural Historic Properties Management Plan. For example, the EIR mitigation measures mandate that PG&E conduct specific outreach activities with Tribes and nearby communities, and report back to DTSC (via quarterly or annual reports). PG&E has included a template of the compliance report in Chapter 4 of this Work Plan for review and comment (see Exhibit 4-2).

7.3.3 Ensuring Opportunities for Inputs

The processes for remedial design and remedial action have incorporated steps for inputs from Tribes and stakeholders (Consultative Work Group and Technical Work Group). For example, input will be solicited on every work plan and design submittal. Comments/ inputs received on these project documents will be reviewed by agencies, who will then direct PG&E to respond or incorporate the comments. As applicable, comment resolution meetings will be held to obtain clarification on the comments to ensure inputs are understood and accurately reflected.

In addition, both the state (DTSC) and federal (DOI) lead agencies have established programs related to Topock Community Outreach/Public Participation (DTSC, 2009; DOI, 2010c) to ensure that input from the community is reflected in remedial activities at Topock. PG&E will continue to provide support, as requested, by the agencies in their implementation of these programs.

7.3.4 Ensuring Compliance with ARARs, Mitigation Measures, and Other Agreements

The groundwater remedy is being implemented as required by RCRA Corrective Action and CERCLA. The groundwater remedy will be constructed, operated, monitored, and optimized to attain the RAOs. DTSC and DOI, as the lead agencies under the RCRA Corrective Action and CERCLA, have also identified additional requirements such as those contained in the CACA and the DTSC letter dated January 31, 2011 (DTSC, 2011b).

In addition to the requirements of the RCRA Corrective Action and CERCLA, implementation of the groundwater remedy will be guided by and held to standards required by the following main categories of requirements:

- ARARs specified in the Record of Decision (DOI, 2010a), including the Programmatic Agreement developed in compliance with the National Historic Preservation Act (BLM, 2010).
- CEQA mitigation measures defined by DTSC in the Final EIR (AECOM, 2011).
- Requirements of landowners and leaseholders of property and rights-of-way affected by groundwater remedy construction, operation and monitoring.

PG&E is committed to maintaining compliance with the identified requirements. Compliance will be demonstrated through submittal of information in design, operation, and decommissioning plans; through implementation of defined field procedures; and through monitoring of activities and reporting of collected information.

Since the groundwater remedy is a CERCLA response action, activities conducted onsite are covered under the permit exemption codified in Section 121(e)(1) of CERCLA. While the permit exception applies to the administrative or procedural elements (e.g., preparing the submitting permit applications), the substantive requirements of ARARs remain. As described in Chapter 4, substantive information that might otherwise be included in a permit application to a local or state agency will instead be incorporated into design, construction, and operating plans submitted to DTSC and DOI. Offsite activities, such as transportation and disposal of waste in a permitted offsite facility, will comply with both substantive and administrative requirements of ARARs.

Compliance with substantive requirements of the identified action- and location-specific ARARs will be assessed by first identifying the trigger for compliance, e.g., underground injection activity, transfer and storage of hazardous wastes, RCRA-regulated facilities located in a 100-year floodplain, etc.; second, by determining the steps for compliance, e.g., file the inventory of injection wells, adhere to design requirements for containers, etc.; third, by identifying the parties responsible for compliance; and fourth, by identifying overlaps with EIR requirements. Table 4-4A presents an initial assessment of the identified

ARARs. PG&E will provide information (a checklist if requested) to document implementation and completion of identified ARARs, as part of the Basis of Design Report (see Table 4-5).

As part of the Final EIR, DTSC adopted a mitigation monitoring and reporting program to ensure that mitigation measures identified in the EIR are implemented and that implementation is documented (AECOM, 2011). PG&E will provide information to DTSC to document implementation and completion of identified mitigation measures.

PG&E will work directly with surrounding landowners and leaseholders of property and rights-of-way affected by groundwater remedy construction, operation, and monitoring, and will comply with conditions of agreements with these entities.

7.3.5 Ensuring Quality

Each contractor is responsible for performing quality control (QC) of its contracted work to manage, control, and document compliance with the requirements for remedy implementation. PG&E in-house subject matter experts will perform quality assurance (QA) during project implementation to ensure that the remedial design and remedial action meet project requirements. Quality Assurance Project Plans (QAPPs) will be prepared and included in the Construction/Remedial Action Work Plan and O&M Plan. For the long-term O&M of the groundwater remedy, an addendum to the current Topock Project QAPP or a separate QAPP will be prepared for use during this period.

7.3.6 Incorporation of Sustainability

Consistent with its existing corporate environmental policy framework, the PG&E team will work to integrate sustainability principles into the design and implementation of remedial action. The objectives are to evaluate benefits and costs of various sustainable strategies on the project and to document the results associated with application of sustainability practices (e.g., the amount of greenhouse gas reduced through the use of renewable energy like solar panels or through the specification of sustainable building materials).

7.3.7 Continuous Optimization of Processes and Resources

Implementation of the project through efficient use of processes and resources will save time and enable actual cleanup activities to begin sooner. Examples of specific approaches and tools that will be considered and implemented, as applicable, include the following:

- Optimizing the remedial design/design review process – e.g., implementation of a facilitated comment resolution process such as has been used successfully on previous Topock reports (e.g., the CMS/FS), as opposed to the traditional comment-response process, will save time.
- Use of pre-qualified contractors, where appropriate – e.g., use of pre-qualified contractors who have prior experience working at Topock will save time on procurement and reduce time spent on the learning curve. The disadvantage of this approach is lack of competition.
- Consideration of detailed design specifications vs. performance-based specifications – e.g., the advantage of using detailed design specifications is that a construction firm without design capabilities can bid on the construction of the project, thereby expanding

competition. The disadvantage is that additional design effort and detail is required to prepare the specifications and drawings. The advantage of using performance-based specifications is the time savings at the front end for preparation of the specifications; however, additional time would most likely be required on construction procurement at the back end with this approach.

- Phasing of construction and component startup – e.g., it is not necessary to complete construction of all system components before start of cleanup. With careful planning, a phased approach to construction and system startup can save time and optimize the use of field resources.
- Project controls/scheduling during construction – PG&E will continue to use the Rainbow Schedule (in Microsoft Project) as the overall Topock project schedule that covers both soil and groundwater. A construction schedule (including work breakdown structure [WBS]) will be developed as part of the Construction/Remedial Action Work Plan; this schedule will be incorporated into the Rainbow Schedule to the extent needed for additional critical path analysis during construction. For reference, a version of the Rainbow Schedule is included in Appendix B.

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Tables

TABLE 2-1
Preliminary Framework for Corrective Measure/Remedial Action Monitoring Program
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Monitoring Program	Primary Locations	Monitoring Objectives	Primary Constituents[1,2]	Frequency	Notes
Compliance Monitoring *(Outside the Plume)*	Monitoring wells west and north of fresh water injection wells	Evaluate performance to attain RAOs	Cr(VI) Redox-sensitive species TOC[3] Injection tracers[3]	Monthly during initial phases of startup, reducing to quarterly or less frequent with time	
	Monitoring wells in East Ravine	Evaluate performance to attain RAOs	Cr(VI) TOC[3] Injection tracers[3]	Quarterly or less frequently	
	Samples from Colorado River	Evaluate performance to attain RAOs	Cr(VI), Arsenic, Manganese	Quarterly	
Compliance Monitoring *(Inside the Plume)*	Monitoring wells	Evaluate progress towards attainment of RAOs	Cr(VI)	Annual or less frequently	
Process Control Monitoring	Monitoring wells west and north of fresh water injection wells	Confirm gradient control	NA	Monthly during initial phases of startup, reducing to quarterly or less frequent with time	Water level monitoring will be implemented in some of these wells. After the remedy is proven to be operating properly, the need for confirmation of gradient control ceases and water level monitoring will be re-evaluated.
	Monitoring wells in East Ravine	Confirm gradient control	NA	Quarterly or less frequently	Water level monitoring will be implemented in some of the East Ravine wells. After the remedy is proven to be operating properly, the need for confirmation of gradient control ceases and water level monitoring will be re-evaluated.
	Monitoring wells in floodplain	Confirm that carbon dosage is adequate, that Cr(VI) treatment is occurring, and that by-product behavior is as expected Confirm gradient control	Cr(VI) Redox-sensitive species TOC TDS[3], Common ions[3] Alkalinity[3]	Quarterly or more frequently	Water level monitoring will be implemented in some floodplain wells. After the remedy is proven to be operating properly, the need for confirmation of gradient control ceases and water level monitoring will be re-evaluated.
	Monitoring wells near carbon-amended injection wells	Confirm that carbon dosage is adequate, that Cr(VI) treatment is occurring, and that by-product behavior is as expected	Cr(VI) Redox-sensitive species TOC	Quarterly or more frequently	
	Water from River Bank and East Ravine extraction wells	Confirm that water is suitable for injection	Cr(VI) Redox-sensitive species TOC, TDS, Common ions Alkalinity	Quarterly or more frequently	
	Fresh water source	Confirm that water is suitable for injection	General chemistry, Cr(VI), trace metals *(see new Exhibit 2-2, Observed Water Quality Data from HNWR Irrigation Well)*	To be determined	Constituents and frequency would be different depending on whether water is from wells in Arizona or from the Colorado river
	Process samples from carbon amendment mixing system	Confirm that carbon mixing system is properly functioning	TOC	Monthly during initial phases of startup, reducing to quarterly or less frequent with time	
	Monitoring wells between carbon-amended injection wells and the National Trails Highway IRZ	Monitor water quality upgradient of IRZ line and effects of carbon injection on water quality	Cr(VI) Redox-sensitive species TOC	Quarterly to semi-annual	Frequency variable based on location of monitoring well relative to carbon-amended water injection wells
	Process samples from remedy wastewater treatment system	Confirm quality of untreated and treated water	To be determined	To be determined	

TABLE 2-1
Preliminary Framework for Corrective Measure/Remedial Action Monitoring Program
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Monitoring Program	Primary Locations	Monitoring Objectives	Primary Constituents[1,2]	Frequency	Notes

Notes:
[1] Redox-sensitive species = dissolved iron, manganese, arsenic, nitrate, and sulfate.
Common ions = calcium, magnesium, sodium, potassium, chloride, carbonate, bicarbonate, sulfate, and phosphorus.

[2] At DTSC and DOI direction, COPCs (selenium, molybdenum, and nitrate) will be monitored as part of the site monitoring program throughout the remediation process. As stated in the CMS/FS, it is expected that concentrations of COPCs will change over the course of remediation from the concentrations present today, and that the concentrations and distribution of the COPCs will be re-evaluated following attainment of RAOs for Cr(VI) and prior to removing ICs.

[3] At select wells.

Cr(VI) = hexavalent chromium
IRZ = In-situ Reactive Zone
NA = not applicable
RAO = remedial action objective
TDS = total dissolved solids
TOC = total organic carbon

TABLE 4-1
Summary of 1996 CACA Requirements
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Corrective Measures Implementation (CMI) Work Plan *Describes the size, shape, form, and content of the corrective measure, key components or elements needed, procedures and schedule for implementation*	**Draft Plans and Specs** *Info based on CMI Work Plan but include additional design detail, and drawings/specs needed to implement the CMI*	**Final Plans and Specs** *Info sufficient to be included in a contract document and be advertised for bid*	**Construction Completion Report** *Describes how the completed project is consistent with the final design plans and specifications*	**Corrective Measure Completion Report** *Describes how the criteria for the completion of the final groundwater remedy have been fully satisfied and to justify why the final groundwater remedy and/or monitoring may cease*
• Introduction/Purpose • Media cleanup standards • Conceptual model of contaminant migration • Description of Corrective Measures • Data sufficiency • Project management • Project schedule • Design criteria • Design basis • Conceptual process/schematic diagrams • Site plan showing preliminary plant layout and/or treatment area • Tables listing number and type of major components with approximately dimensions • Tables giving preliminary mass balances • Site safety and security provisions • Waste management practices • Required permits • Long-lead procurement considerations • Appendices including design data, equations, sample calculations, laboratory or field test results **Requirements for submittal concurrent with the CMI Work Plan** • *Health and Safety Plan (Attachment 2)*[1]	• General site plans • Process flow diagrams • Mechanical/electrical/structural drawings • Piping and instrumentation diagrams • Excavation and earthwork drawings • Equipment list • Site preparation and field work standards • Preliminary specs for equipment and materials **Requirements for submittal concurrent with the Draft Plans and Specs** • Draft O&M Plan - Project management - System description - Personnel training - Startup procedures - O&M procedures - Equipment replacement schedule - Waste management practices - Sampling and monitoring - Corrective measure completion criteria - O&M contingency procedures - Data management and documentation requirements • Draft Construction Work Plan - Project management - Project schedule - Construction QA/QC program - Waste management procedures - Sampling and monitoring - Construction contingency procedures - Data management and documentation requirements - Cost estimates =	• General site plans • Process flow diagrams • Mechanical/electrical/structural drawings • Piping and instrumentation diagrams • Excavation and earthwork drawings • Equipment list • Site preparation and field work standards • Construction drawings • Installation drawings • Detailed specs for equipment and materials **Requirements for submittal concurrent with the Final Plans and Specs** • Final O&M Plan - Project management - System description - Personnel training - Startup procedures - O&M procedures - Equipment replacement schedule - Waste management practices - Sampling and monitoring - Corrective measure completion criteria - O&M contingency procedures - Data management and documentation requirements • Final Construction Work Plan - Project management - Project schedule - Construction QA/QC program - Waste management procedures - Sampling and monitoring - Construction contingency procedures - Data management and documentation requirements - Cost estimates	• Purpose • Synopsis of the final corrective measure, design criteria, and certification that the final corrective measure was constructed in accordance with the final design plans and specifications • Explanation and description of any modifications to the final design plans and specifications and why the modifications were necessary • Results of any operational testing and/or monitoring which may indicate how initial operation of the final groundwater remedy compares to the design criteria • Summary of significant activities that occurred during construction • Summary of any inspection findings • As-built drawings • A schedule indicating when treatment systems will begin full scale operations	• Purpose • Synopsis • Corrective measure completion criteria, including a description of the process and criteria for determining when corrective measures, maintenance, and monitoring may cease. • Demonstration that the completion criteria have been met including results of testing and monitoring • Summary of work accomplishments • Summary of significant activities that occurred during operations • Summary of inspection findings • Summary of total O&M costs

Note:
Source = Attachment 6 (Statement of Work for Corrective Measure Implementation) to the Corrective Action Consent Agreement, Pacific Gas and Electric Company's Topock Compressor Station, Needles, California (DTSC, 1996).
[1] Clarifications on the timing of the Health and Safety plan was obtained from DTSC -- Consistent with the EIR mitigation measure HAZ-2c, Health and Safety Plans (or addendums or revisions, as appropriate) will be prepared for future ground-disturbing field activities including, but not limited to, data collection to support design, construction, and O&M of the groundwater remedy.

TABLE 4-1A
Cross reference of 1996 CACA Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

CACA-required Documents	CACA Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule to Agencies
CMI Work Plan	• Introduction/Purpose • Media cleanup standards • Conceptual model of contaminant migration • Description of Corrective Measures • Data sufficiency • Project management • Project schedule • Conceptual process/schematic diagrams • Site plan showing preliminary plant layout and/or treatment area	This CMI/RD Work Plan	Draft – May 2011 Final – September 2011
	• Design criteria • Design basis • Tables listing number and type of major components with approximately dimensions • Tables giving preliminary mass balances • Required permits • Long-lead procurement considerations • Appendices including design data, equations, sample calculations, laboratory or field test results	Preliminary, Intermediate, and Final Design Submittals (see Table 4-5 for content)	Preliminary – November 2011 Intermediate – March 2012 Final – August 2012 Revised Final – November 2012
	• Waste management practices	O&M Plan, Construction/Remedial Action Work Plan (see Table 4-5 for content)	See O&M Plan, Construction Work Plan
	• Site safety and security provisions	Intermediate and Final Design Submittals (see Table 4-5 for content)	Intermediate – March 2012 Final – August 2012
Draft Plans and Specs	• General site plans • Process flow diagrams • Mechanical/electrical/structural drawings	Preliminary and Intermediate Design Submittals	Preliminary – November 2011 Intermediate – March 2012

TABLE 4-1A
Cross reference of 1996 CACA Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

CACA-required Documents	CACA Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule to Agencies
	• Piping and instrumentation diagrams • Excavation and earthwork drawings • Equipment list • Site preparation and field work standards		
	• Preliminary specs for equipment and materials	Preliminary Design – List of specs and a sample spec format Intermediate Design – Draft specifications	
Final Plans and Specs	• General site plans • Process flow diagrams • Mechanical/electrical/structural drawings • Piping and instrumentation diagrams • Excavation and earthwork drawings • Equipment list • Site preparation and field work standards • Construction drawings • Installation drawings • Detailed specs for equipment and materials	Final Design Submittals	Final – August 2012 Revised Final – November 2012
Operations and Maintenance Plan	• Project management • System description • Personnel training • Startup procedures • O&M procedures • Equipment replacement schedule • Waste management practices • Sampling and monitoring • Corrective measure completion criteria	Operations and Maintenance Plan	Draft – March 2012 Final – August 2012

TABLE 4-1A
Cross reference of 1996 CACA Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

CACA-required Documents	CACA Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule to Agencies
	• O&M contingency procedures • Data management and documentation requirements		
Construction Work Plan	• Project management • Construction QA/QC program • Waste management procedures • Sampling and monitoring • Construction contingency procedures • Data management and documentation requirements	Construction/Remedial Action Work Plan	Draft – August 2012 Final – November 2012
	• Project schedule • Cost estimates	Preliminary, Intermediate, Final Design Submittals , and Construction/Remedial Action Work Plan	See submittal schedule for corresponding plans
Health and Safety Plan	• See Attachment 2 of CACA	Health and Safety Plan for O&M Health and Safety Plan for Construction	See submittal schedules for O&M Plan and Construction/ Remedial Action Work Plan
Construction Completion Report	• Purpose • Synopsis of the final corrective measure, design criteria, and certification that the final corrective measure was constructed in accordance with the final design plans and specifications • Explanation and description of any modifications to the final design plans and specifications and why the modifications were necessary • Results of any operational testing and/or monitoring which may indicate how initial operation of the final groundwater remedy compares to the design criteria • Summary of significant activities that occurred during construction • Summary of any inspection findings • As-built drawings • A schedule indicating when treatment systems will begin full scale operations	Corrective Measure/Remedial Action Construction Completion Report	Submittal schedule will be established in the Construction/Remedial Action Work Plan

TABLE 4-1A
Cross reference of 1996 CACA Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

CACA-required Documents	CACA Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule to Agencies
Corrective Measure Completion Report	• Purpose • Synopsis • Corrective measure completion criteria, including a description of the process and criteria for determining when corrective measures, maintenance, and monitoring may cease. • Demonstration that the completion criteria have been met including results of testing and monitoring • Summary of work accomplishments • Summary of significant activities that occurred during operations • Summary of inspection findings • Summary of total O&M costs	Corrective Measure/Remedial Action Completion Report	Submittal schedule will be established in the Construction/Remedial Action Work Plan

TABLE 4-2
Summary of 2009 CERCLA Model Remedial Design/Remedial Action Consent Decree Requirements
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Remedial Design Work Plan *Describes the design of the remedy and achievement of the Performance Standards and other requirements set forth in the ROD and the Consent Decree. (Includes a Health and Safety Plan [HSP])*	**Preliminary Design (30%)** *Provides plans and specifications for construction of the remedial action (RA)*	**Intermediate Design (60%)** *Continuation and expansion of the preliminary design*	**Pre Final (90%) and Final Design (100%)** *Final plans and specifications for construction of the RA*
• Includes plans and schedules for implementation of all remedial design and pre-design tasks identified in the SOW, including but not limited to, plans and schedules for the completion of a list based on site-specific factors including: • Design sampling and analysis plan (including but not limited to, a RD QAPP) • Construction Quality Assurance Plan • Treatability study • Pre-design work plan • Preliminary design submission • Intermediate design submission • Pre-final/final design submission • Schedule for completion of the RAWP	• Design Criteria • Basis of Design (design assumptions, permit plans, prelim easements/access requirements, prelim process & instrumentation diagrams [P&IDs]) • Results of treatability studies • Results of additional field sampling and pre-design work • Project delivery strategy • Preliminary plans, drawings and sketches • Required specifications in outline form • Results of value engineering screen • Prelim construction schedule/cost estimates	• Basis of Design (design assumptions, permit plans, prelim easements/access requirements, P&IDs) • Drawings/specs (incl. O&M requirements) • RA schedule/cost estimates	• Final Basis of Design • Final plans and specifications • RA schedule • Refined cost estimates **Requirements for submittal concurrent with the Pre Final Design** • O&M Plan • Field Sampling Plan (directed at measuring progress towards meeting performance standards) • Contingency Plan • HSP • Construction Quality Assurance and Control (CQA/QC) plan - Construction quality assurance objectives, specific quality control requirements and performance standards to be followed during implementation of remedial actions - Identification of responsibilities and authorities of all organizations and key personnel involved in the design and construction of the site remediation - Description of the construction quality assurance personnel qualifications - Description of inspection activities, observation and tests to be conducted, schedules, and scope

Remedial Action Work Plan (RAWP) *Describes the plans and schedules for construction and implementation of the remedy set forth in the remedial design plans and specifications*	**Progress Reports** *Describes actions that have been taken toward achieving compliance with the Consent Decree*	**RA Construction Completion Report** *Describes how the criteria for the completion of the final groundwater remedy have been fully satisfied and to justify why the final groundwater remedy and/or monitoring may cease*	**Certification of Completion of RA** *Requests certification from Lead Federal Agency upon conclusion that the RA has been fully performed and the Performance Standards have been achieved.*
• Revised HSP • Schedule for completion of RA tasks • Method for selecting contractor • Schedule for submitting other RA-required plans • Groundwater monitoring plan • Method for implementing CQAPP/O&M Plan/Contingency Plan • Methods for satisfying permit requirements • Tentative formulation of the remedial action team • Contractor construction quality assurance plan • Decontamination procedures and disposal of materials • Requirements for project closeout	• Include a summary of all results of sampling and tests and all other data received or generated since the last progress report • Identify all plans, reports, and other deliverables required by the Consent Decree that were completed since the last progress report. • Describe all actions, including but not limited to, data collection and implementation of work plans, which are scheduled before the next progress report is due and provide other information related to the progress of construction, including, but not limited to critical path diagrams, Gantt charts, and Pert charts • Include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation, and a description of the efforts made to mitigate those delays. • Include any modifications to the work plans or other schedules that have been proposed or approved. • Describe all activities undertaken in support of the Community Relations Plan since the last progress report and upcoming activities.	• Purpose • Synopsis • Corrective measure completion criteria, including a description of the process and criteria for determining when corrective measures, maintenance, and monitoring may cease. • Demonstration that the completion criteria have been met including results of testing and monitoring • Summary of work accomplishments • Summary of significant activities that occurred during operations • Summary of inspection findings • Summary of total O&M costs **Requirements for submittal concurrent with the Construction Completion Report** • Post-Achievement O&M Plan: - Activities needed to maintain Performance Standards after they have been achieved.	• Documentation of pre- certification inspection and completion of all work. • Statement that the remedial action has been completed in full satisfaction of the requirements of the Consent Decree. • As built drawings

Note:
Source = Model RD/RA Consent Decree (October 2009) from USEPA's Remedial Action/Remedial Design web page: http://www.epa.gov/superfund/cleanup/rdra.htm

TABLE 4-2A
Cross reference of 2009 Model Consent Decree Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Model CD-required Documents	2009 Model Consent Decree Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule
Remedial Design Work Plan	• Plans and schedules for implementation of all remedial design and pre-design tasks identified in the SOW, including but not limited to, plans and schedules for the completion of a list based on site-specific factors including: • Design sampling and analysis plan (including but not limited to, a RD QAPP) • Treatability study • Pre-design work plan • Preliminary design submission • Intermediate design submission • Pre-final/final design submission • Schedule for completion of the RAWP	This CMI/RD Work Plan *(Note that treatability study and pre-design work plan are not anticipated for this project)*	Draft – May 2011 Final – September 2011
	• Construction Quality Assurance Plan	Construction/Remedial Action Work Plan (see Table 4-5 for content)	Draft – August 2012 Final – November 2012
Preliminary Design (30%)	• Design Criteria • Basis of Design (design assumptions, permit plans, prelim easements/access requirements, prelim process & instrumentation diagrams [P&IDs]) • Results of treatability studies • Results of additional field sampling and pre-design work • Project delivery strategy • Preliminary plans, drawings and sketches • Required specifications in outline form • Results of value engineering screen • Prelim construction schedule/cost estimates	Preliminary Design Submittals (see Table 4-5 for content) *(Again, note that treatability study is not anticipated for this project)* *(Again, preliminary specs include a list of specifications and a sample spec format.)*	November 2011
Intermediate Design (60%)	• Basis of Design (design assumptions, permit plans, prelim easements/access requirements, P&IDs) • Drawings/specs (incl. O&M requirements) • RA schedule/cost estimates	Intermediate Design Submittals (see Table 4-5 for content)	March 2012

TABLE 4-2A
Cross reference of 2009 Model Consent Decree Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Model CD-required Documents	2009 Model Consent Decree Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule
Pre-Final (90%) and Final Design (100%)	• Final Basis of Design • Final plans and specifications • RA schedule • Refined cost estimates	Final Design Submittals (see Table 4-5 for content)	Final – August 2012 Revised Final – November 2012
Operations and Maintenance Plan	• See 2009 Model CD	Operations and Maintenance Plan (see Table 4-5 for content)	Draft – March 2012 Final – August 2012
Field Sampling Plan	• See 2009 Model CD	Operations and Maintenance Plan, Construction/Remedial Action Work Plan	
Contingency Plan	• See 2009 Model CD	Operations and Maintenance Plan, Construction/Remedial Action Work Plan	See submittal schedule for corresponding plans
Health and Safety Plan	• See 2009 Model CD	Health and Safety Plan for O&M Health and Safety Plan for Construction	See submittal schedules for O&M Plan and Construction/ Remedial Action Work Plan
Construction Quality Assurance and Control (CQA/QC) Plan	• See 2009 Model CD	Construction/Remedial Action Work Plan	See submittal schedule for corresponding plan
Remedial Action Work Plan	• Revised HSP • Schedule for completion of RA tasks • Method for selecting contractor • Schedule for submitting other RA-required plans • Groundwater monitoring plan • Method for implementing CQAPP/O&M Plan/Contingency Plan • Methods for satisfying permit requirements • Tentative formulation of the remedial action team • Contractor construction quality assurance plan • Decontamination procedures and disposal of materials • Requirements for project closeout	Construction/Remedial Action Work Plan, Health and Safety Plan	Draft – August 2012 Final – November 2012

TABLE 4-2A
Cross reference of 2009 Model Consent Decree Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Model CD-required Documents	2009 Model Consent Decree Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule
Post-Achievement O&M Plan	• See 2009 Model CD	Post-remediation monitoring report	Submittal schedule to will be established in the Construction/RA Work Plan
Progress Reports	• Include a summary of all results of sampling and tests and all other data received or generated since the last progress report • Identify all plans, reports, and other deliverables required by the Consent Decree that were completed since the last progress report. • Describe all actions, including but not limited to, data collection and implementation of work plans, which are scheduled before the next progress report is due and provide other information related to the progress of construction, including, but not limited to critical path diagrams, Gantt charts, and Pert charts • Include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule for implementation, and a description of the efforts made to mitigate those delays. • Include any modifications to the work plans or other schedules that have been proposed or approved. • Describe all activities undertaken in support of the Community Relations Plan since the last progress report and upcoming activities.	Performance monitoring reports	Submittal schedule to will be established in the Construction/RA Work Plan

TABLE 4-2A
Cross reference of 2009 Model Consent Decree Requirements and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Model CD-required Documents	2009 Model Consent Decree Requirements	Which Future Documents will contain or satisfy this requirements	Target Submittal Schedule
RA Construction Completion Report	• Purpose • Synopsis • Corrective measure completion criteria, including a description of the process and criteria for determining when corrective measures, maintenance, and monitoring may cease. • Demonstration that the completion criteria have been met including results of testing and monitoring • Summary of work accomplishments • Summary of significant activities that occurred during operations • Summary of inspection findings • Summary of total O&M costs	Corrective Measure/Remedial Action Construction Completion Report Corrective Measure/Remedial Action Completion Report	Submittal schedule will be established in the Construction/RA Work Plan
Certification of Completion of RA	• Documentation of pre- certification inspection and completion of all work. • Statement that the remedial action has been completed in full satisfaction of the requirements of the Consent Decree. • As built drawings	Corrective Measure/Remedial Action Completion Report	Submittal schedule will be established in the Construction/RA Work Plan

TABLE 4-3
"Road Map" of Key Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Remedial Design	Pre-Construction	Construction	Operation	Achieve RAOs	Post-Remediation	Decommissioning of Remedial Facilities
Key Documents Required by Corrective Action Consent Agreement (CACA)/Record of Decision (ROD)/ 2009 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Model Consent Decree/Settlement Agreement [1]						
• Preliminary Design Submittals • Intermediate Design Submittals • Final Design Submittals (includes Cultural Impact Mitigation Plan [CIMP] [2] which contains the plan for decommissioning and removal of IM No. 3 facility and site restoration [3]) • Health and Safety Plan • O&M Plan • Construction/Remedial Action Work Plan [4] • Documents required to establish institutional control(s)	• Health and Safety Plan • Documents required for access (e.g., easements, rights-of-way [ROWs])/approvals)	• Corrective Measure/ Remedial Action Construction Completion Report • Documents required for access (e.g., easements, ROWs)/approvals	• Performance monitoring reports • Five-year review reports • Documents required by access agreements/ approvals	• Corrective Measure/ Remedial Action Completion Report • Plan for decommissioning of remedial facilities and restoration • Documents required by access agreements/ approvals	• Post-remediation monitoring reports • Post-remediation documents required by access agreements/ approvals	• Decommissioning Completion report
Key Documents Required by Environmental Impact Report (EIR) Mitigation Measures [5]						
• CIMP [2] (include plan for decommissioning and removal of IM No. 3 facility and site restoration [3], plant transplantation/ monitoring plan [if needed]) • Site Security Plan [6, 7] • Grading and Erosion Control Plan [6] • Storm Water Pollution Prevention Plan (SWPPP)/Best Management Practice (BMP) plans and Monitoring & Reporting [6] • Fueling SOPs and Contingency Plan for Onsite Fueling Areas [6] • Soil Management Plan [6] • Hazardous materials business plan • Access plan [7, 8] • Aerial map of disturbed areas • Map of existing mature plant species/indigenous plant species • Map of ordinary high water mark • Hydrologic analysis • Cultural resources study/Geoarchaeological investigation report • Cultural resources treatment plan (if needed) • Revegetation plans and specifications • Delineation of waters and wetlands field survey addendum • Avoidance and minimization plan for special-status birds [9] • Habitat restoration plans for sensitive habitats and special-status species • Quarterly EIR mitigation measures compliance reports • Annual cultural resources monitoring reports [10] • Training/education manual for cultural resources, historical resources, and the identification of human remains	• Paleontological investigation report [6] • Worker cultural sensitivity education program [7] • Training/education manual for cultural resources, historical resources, and the identification of human remains • Health and Safety Plan [6] • Quarterly EIR mitigation measures compliance reports • Annual cultural resources monitoring reports [10]	• Quarterly EIR mitigation measures compliance reports • Annual cultural resources monitoring reports [10]	• Annual EIR mitigation measures compliance reports • Annual cultural resources monitoring reports [10]	• Annual EIR mitigation measures compliance reports • Annual cultural resources monitoring reports [10]	• Annual EIR mitigation measures compliance reports • Annual cultural resources monitoring reports [10]	• Annual EIR mitigation measures compliance reports • Annual cultural resources monitoring reports [10]
Key Documents Required by Applicable or Relevant and Appropriate Requirements (ARARs)						
• Programmatic Biological Agreement (PBA) in conformance with the substantive requirements of the federal Endangered Species Act • Other documents with substantive information normally contained in permit applications (e.g., Report of Waste Discharge) or plans (e.g., SWPPP).	• Documents with substantive information normally contained in permit applications (e.g., Report of Waste Discharge) or plans (e.g., SWPPP)	• Documents with substantive information normally required by permits	• Documents with substantive information normally required by permits	• Documents with substantive information normally required by permits	• Documents with substantive information normally required by permits	• Documents with substantive information normally required by permits

TABLE 4-3
"Road Map" of Key Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Remedial Design	Pre-Construction	Construction	Operation	Achieve RAOs	Post-Remediation	Decommissioning of Remedial Facilities
Key Documents Required by Programmatic Agreement (PA)						
• Documents related to Ongoing Consultation [11] • Tribal Access Plan [8,11] • Cultural Historic Property Management Plan (CHPMP) (include Plan of Action for discoveries and Treatment Plan) [11] • Plan for decommissioning, removal, and restoration of IM No. 3 facility [3] • Brochure [7, 11] • Annual Report [11]	• Documents related to ongoing consultation [11] • Annual Report [11]	• Documents related to ongoing consultation [11] • Annual Report [11]	• Documents related to Ongoing Consultation [11] • Annual Report [11]	• Documents related to ongoing consultation [11] • Annual Report [11] • Closure plan for decommissioning of remedial facilities and restoration (prior to decommissioning of any remedial facility)	• Documents related to ongoing consultation [11] • Annual Report [11]	• Documents related to ongoing consultation [11] • Annual Report [11]

Notes:

1 At any phase of project implementation (after final design), agencies could determine that the Interim Measure (IM) is no longer required and that decommissioning of IM No. 3 facility can occur. After the decommissioning and site restoration is complete, a decommissioning completion report for the IM will be prepared and submitted for approval.

2 EIR Mitigation Monitoring and Program (MMRP) CUL-1a-8 requires that the CIMP be submitted as part of the final remedial design, and that the plan for decommissioning and removal of IM No. 3 facility, and site restoration be included as an appendix to the CIMP.

3 In conformance with the EIR MMRP CUL-1a-8f, Stipulation V(E) of the PA, and PG&E's Settlement Agreement with the Fort Mojave Indian Tribe, a plan for decommissioning, removal and restoration of IM No. 3 facility will be prepared.

4 Combined Construction Work Plan (CACA required) and Remedial Action Work Plan (CERCLA required).

5 Documents related to EIR mitigation measure BIO-3 (e.g., fish rescue plan, in-stream habitat typing survey report) will not be prepared at this time as the current design focuses on production well(s) in Arizona, and not river water, as a source for fresh water.

6 EIR-required construction related plans to be included as part of the Corrective Measure Construction/Remedial Action Work Plan, the Plan for decommissioning, removal, and restoration for IM No. 3 facility, and Closure Plan for decommissioning of remedial facilities and restoration.

7 There is a discrepancy in the reporting timing required by the EIR MMRP for the Communication Log with Tribes, Security Plan, Access Plan, and Worker Cultural Sensitivity Training. This Corrective Measures Implementation/Remedial Design Work Plan will provide the framework and schedule for development of these documents.

8 EIR-required Access Plan and PA-required Tribal Plan could be combined. Schedule for the Access Plan will be available after coordination with the U.S. Bureau of Land Management (BLM).

9 Could combine with Programmatic Biological Agreement.

10 EIR MMRP CUL-1a-3a requires yearly inspections (or less frequently upon approval by DTSC) of identified historical resources, including inspections of the Topock Cultural Area. Information obtained from the required inspections will be incorporated into the Annual Monitoring Reports required under the Cultural Resources Management Plan.

11 Documents to be prepared by BLM.

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
Aesthetics	AES-1a	**Impacts on Views from Topock Maze Locus B, a Scenic Vista (Key View 5)** The proposed project shall be designed and implemented to adhere to the design criteria presented below. Existing mature plant specimens shall be protected in place during construction, operation, and decommissioning phases consistent with CUL1a-5. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation.	During design and before construction	Map of mature plant species; design submittals
	AES-1b	Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed and shall be implemented consistent with CUL1a-5. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist.	During design and before construction	Revegetation Plan
	AES-1c	Plant material shall be consistent with surrounding native vegetation.	During design and before construction	Revegetation Plan
	AES-1d	The color of the wells, pipelines, reagent storage tanks, control structures, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity along the view corridor. Integral color concrete should be used in place of standard gray concrete.	During design and before construction	Design submittals
	AES-1e	The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the design objectives and criteria are being met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation.	During design and before construction	Revegetation Plan

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
	AES-2a	**Impacts on Views from Colorado River, a Scenic Resources Corridor (Key View 11)** The proposed project shall be designed and implemented to adhere to the design criteria presented below. A minimum setback requirement of 20 feet from the water (ordinary high water mark) shall be enforced, except with regard to any required river intake facilities, to prevent substantial vegetation removal along the riverbank.	During design and before construction	Map of ordinary high water mark; design submittals
	AES-2b	Existing mature plant specimens shall be protected in place during construction, operation, and decommissioning phases. The identification of plant specimens that are determined to be mature and retained shall occur as part of the design phase and mapped/identified by a qualified plant ecologist or biologist and integrated into the final design and project implementation consistent with CUL1a-5.	During design and before construction	Design submittals
	AES-2c	Revegetation of disturbed areas within the riparian vegetation along the Colorado River shall occur concurrently with construction operations. Plans and specifications for revegetation shall be developed by a qualified plant ecologist or biologist before any riparian vegetation is disturbed. The revegetation plan shall include specification of maintenance and monitoring requirements, which shall be implemented for a period of 5 years after project construction or after the vegetation has successfully established, as determined by a qualified plant ecologist or biologist.	During design and before construction	Revegetation Plan
	AES-2d	Plant material shall be consistent with surrounding native vegetation.	During design and before construction	Revegetation Plan
	AES-2e	The color of the wells, pipelines, and utilities shall consist of muted, earth-tone colors that are consistent with the surrounding natural color palette. Matte finishes shall be used to prevent reflectivity along the view corridor. Integral color concrete should be used in place of standard gray concrete.	During design and before construction	Design submittals
	AES-2f	The final revegetation plans and specifications shall be reviewed and approved by an architect, landscape architect, or allied design professional licensed in the State of California to ensure that the design objectives and criteria are being	During design and before construction	Revegetation Plan

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		met. Planting associated with biological mitigation may contribute to, but may not fully satisfy, visual mitigation.		
	AES-3	**Impacts on Visual Quality and Character along the Colorado River (Key View 11).** Mitigation Measure AES-1 shall be implemented. Implementation of Mitigation Measures AES-1 would reduce the overall change to the visual character of the view corridor along the Colorado River. Although the proposed project would still be visible, incorporating a facilities design that is aesthetically sensitive and preserving the vegetation would blend the proposed project into their visual setting within the floodplain and would reduce the overall contrast of the proposed project.	During design and before construction	Design submittals
Air Quality	AIR-1a	**Short-Term Construction-Related Emissions of Criteria Air Pollutants and Precursors** PG&E shall implement the fugitive dust control measures below for any construction and/or demolition activities: Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions during dust episodes. Use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient	During construction and demolition	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of Cultural Impact Mitigation Plan [CIMP]); Plan for Decommissioning of Remedial Facilities and Restoration
	AIR-1b	Cover loaded haul vehicles while operating on publicly maintained	During construction and demolition	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
				Remedial Facilities and Restoration
	AIR-1c	Stabilize (using soil binders or establish vegetative cover) graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such delay is caused by precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions	During construction and demolition	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	AIR-1d	Cleanup project-related track out or spills on publicly maintained paved surfaces within twenty-four hours	During construction and demolition	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	AIR-1e	Curtail nonessential earth-moving activity under high wind conditions (greater than 25 miles per hour) or develop a plan to control dust during high wind conditions. For purposes of this rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance	During construction and demolition	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
Biological Resources	BIO-1	**Potential Fill of Wetlands and Other Waters of the United States and Disturbance or Removal of Riparian Habitat.** Areas of sensitive habitat in the project area have been identified during project surveys. These areas include floodplain and riparian areas, wetlands, and waters of the United States. Habitats designated by DFG as sensitive, including desert washes and desert riparian, are also included. To the extent feasible, elements of the project shall be designed to avoid direct effects on these sensitive areas. During the design process and before ground disturbing activities within such areas (not including East Ravine), a qualified biologist shall coordinate with PG&E to ensure that the footprints of construction zones, drill pads, staging areas, and access routes are designed to avoid disturbance of sensitive habitats to the extent feasible. DTSC shall be responsible for enforcing compliance with design and all preconstruction measures. If during the design process it is shown that complete avoidance of habitats under USACE jurisdiction is not feasible, the Section 404 permitting process shall be completed, or the substantive equivalent per CERCLA Section 121(e)(1). In either event, the acreage of affected jurisdictional habitat shall be replaced and/or rehabilitated to ensure “no-net-loss.” Before any ground-disturbing project activities begin in areas that contain potentially jurisdictional wetlands, the wetland delineation findings shall be documented in a detailed report and submitted to USACE for verification as part of the formal Section 404 wetland delineation process and to DTSC. For all jurisdictional areas that cannot be avoided as described above, authorization for fill of wetlands and alteration of waters of the United States shall be secured from USACE through the Section 404 permitting process before project implementation. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods agreeable to USACE and consistent with applicable county and agency policies and codes. Minimization and compensation measures adopted through any applicable permitting processes shall be implemented.	During design and before construction (not including East Ravine under the December 2010 East Ravine Revised Addendum, Groundwater Investigation)	Delineation of Waters and Wetlands Field Survey Addendum; Habitat Restoration Plan

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		Alternately, if USACE declines to assert jurisdiction because it determines that CERCLA Section 121(e)(1) applies, the substantive equivalent of the Section 404 permitting process shall be complied with by ensuring that the acreage of jurisdictional wetland affected is be replaced on a “no-net-loss” basis in accordance with the substantive provisions of USACE regulations. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by feasible methods consistent with USACE methods, and consistent with the purpose and intent of applicable county and agency policies and codes. Minimization and compensation measures adopted through any applicable permitting processes shall be implemented. In any event, a report shall be submitted to DTSC to document compliance with these mandates. If during the design process it is shown that complete avoidance of habitats under DFG jurisdiction (such as changes to the natural flow and/or bed and bank of a waterway) is infeasible, a Section 1602 streambed alteration agreement shall be obtained from DFG and affected habitats shall be replaced and/or rehabilitated. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be replaced or rehabilitated on a no-net-loss basis in accordance with DFG regulations and, if applicable, as specified in the streambed alteration agreement, if needed. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to DFG and consistent with the purpose and intent of applicable county policies and codes, as well as those policies outlined under the respective federal agency guidance documents. Minimization and compensation measures adopted through the permitting process shall also be implemented. Restoration of any disturbed areas shall include measures to achieve “no-net-loss” of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a habitat restoration plan submitted to DFG, BLM, and USFWS that is agreeable to these agencies, or, alternately, through the implementation of a habitat restoration plan consistent with the substantive policies of DFG, BLM, and USFWS. The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for		

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan. Alternately, if DFG declines to assert jurisdiction because it determines that CERCLA Section 121(e)(1) applies, and during the design process it is shown that complete avoidance of habitats under DFG jurisdiction (such as changes to the natural flow and/or bed and bank of a waterway) is infeasible, the substantive mandates of a streambed alteration agreement shall be implemented, and affected habitats shall be replaced and/or rehabilitated. If complete avoidance of identified riparian habitat is not feasible, the acreage of riparian habitat that would be removed shall be replaced or rehabilitated on a "no-net-loss" basis in accordance with DFG regulations and, if applicable. Habitat restoration, rehabilitation, and/or replacement shall be at a location and by methods agreeable to DFG and consistent with the purpose and intent of applicable county policies and codes, as well as those policies outlined under the respective federal agency guidance documents. Minimization and compensation measures adopted through the permitting process shall also be implemented. Restoration of any disturbed areas shall include measures to achieve "no-net-loss" of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a habitat restoration plan developed consistent with the substantive policies of DFG, BLM and USFWS. The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan.		
	BIO-2a	**Disturbance of Special-Status Birds and Loss of Habitat.** To the extent feasible, the project implementation plans shall be designed to minimize removal of habitat for special-status birds. During the design process and before ground disturbing activities (except within the East Ravine as described in the Revised Addendum and unless otherwise required as noted below), a qualified biologist shall coordinate with PG&E to ensure that the footprints of project elements and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on habitat and nesting	Before and during construction	Avoidance and Minimization Plan; Construction/ Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for

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		habitat for other special-status species, to the extent feasible. DTSC will ensure compliance with all preconstruction and construction phase avoidance measures identified during this process and included in any design plans. Vegetation removal and other activities shall be timed to avoid the nesting season for special-status bird species that may be present. The nesting cycle for most birds in this region spans March 15 through September 30. ***Preconstruction Measures*** Preconstruction breeding season surveys shall be conducted during the general nesting period, which encompasses the period from March 15 through September 30, if the final design of the project (including East Ravine investigation Sites I, K and L) could result in disturbance or loss of active nests of special-status bird species. If vegetation removal or other disturbance related to project implementation is required during the nesting season, focused surveys for active nests of special-status birds shall be conducted before such activities begin. A qualified biologist shall conduct preconstruction surveys to identify active nests that could be affected. The appropriate area to be surveyed and the timing of the survey may vary depending on the activity and species that could be affected. For the Yuma clapper rail, the preconstruction surveys shall specifically identify habitat within 300 feet of construction areas, in accordance with substantive policies of USFWS including those set out in USFWS protocols. ***Construction Measures*** Before the initiation of project elements that could result in disturbance of active nests or nesting pairs of other special-status birds, a qualified biologist shall be consulted to identify appropriate measures to minimize adverse impacts during the construction phase of the project. If deemed appropriate for the final project design because of the potential for impacts, minimization measures will include focusing construction activities that must be conducted during the nesting season to less- sensitive periods in the nesting cycle, implementing buffers around active nests of special-status birds to the extent practical and feasible to limit visual and noise disturbance, conducting worker awareness training, and conducting biological monitoring (including noise monitoring to determine if		Decommissioning of Remedial Facilities and Restoration

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		construction noise at the edge of suitable nesting habitat is elevated above 60 dBA $_{Leq}$ or ambient levels). An avoidance and minimization plan for special status bird species, as defined in Table 4.3-3 and those species protected under the federal Migratory Bird Treaty Act, including the Yuma clapper rail, shall be developed and implemented in consultation with USFWS, and agreed upon by DTSC. Avoidance and impact minimization measures, such as prohibiting construction near or in sensitive bird habitat, limiting construction during breeding seasons, and requiring an on-site biological monitor, shall be included in the design plan and implemented to the extent necessary to avoid significant impacts on sensitive bird species.		
	BIO-2b	**Disturbance of Desert Tortoise and Loss of Habitat.** ***Preconstruction Measures*** In areas where impacts to potential desert tortoise habitat are unavoidable, measures outlined in the Programmatic Biological Agreement (PBA) and in the USFWS letter concurring with the PBA, shall be implemented, as described below. To the extent feasible, project construction shall be designed to minimize removal of habitat for the desert tortoise. Before any ground-disturbing project activities begin, and except within the East Ravine for which potential effects to the tortoise have been considered per the PBA), a USFWS-authorized desert tortoise biologist shall identify potential desert tortoise habitat in areas that could be affected by the final project design. Through coordination with the authorized biologist, PG&E shall ensure that the footprints of project elements and construction zones, staging areas, and access routes are designed to avoid direct or indirect effects on potential desert tortoise habitat to the extent feasible. These measures include the presence of a USFWS-authorized desert tortoise biologist on-site who will examine work areas and vehicles for the presence of desert tortoises, and who will conduct preconstruction desert tortoise surveys in areas where unavoidable impacts to tortoise habitat would occur. If feasible, the preconstruction desert tortoise surveys would coincide with one of the two peak periods of desert tortoise activity (i.e., if feasible, the surveys should be conducted in either the period from April through May, or from September through October). The preconstruction surveys shall be in full accordance with the substantive requirements of USFWS protocols.	Before and during construction activities (except within the East Ravine for which potential effects to the tortoise have been considered per the Programmatic Biological Agreement (PBA) and those areas that are no longer considered suitable habitat for desert tortoise per previous biological surveys)	Construction/ Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration

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		Construction Measures Before the initiation of project elements that could result in disturbance of desert tortoises or desert tortoise habitat, a USFWS-authorized desert tortoise biologist shall be consulted to identify appropriate measures to minimize adverse impacts. Minimization measures are likely to include micro-siting structures, pipelines, and access roads in previously disturbed areas or in areas with sparse scrub vegetation, conducting worker awareness		
	BIO-2c	**Disturbance of Special-Status Species and Loss of Habitat Caused by Decommissioning.** To avoid impacts on special-status species that may occur within the project area as a result of decommissioning activities, an avoidance and minimization plan shall be developed and implemented through consultation with DFG, BLM, and USFWS. These measures shall be based on surveys conducted prior to decommissioning, and during the breeding season (as previously defined in this EIR for each species or suite of species). Restoration of any disturbed areas shall include measures to achieve no net loss of habitat functions and values existing before project implementation. These measures shall be achieved by developing and implementing a habitat restoration plan submitted to DFG, BLM, and USFWS that is agreeable to these agencies. The plan shall include a revegetation seed mix or plantings design, a site grading concept plan, success criteria for restoration, a monitoring plan for achieving no net loss of habitat values and functions, and an adaptive management plan.	During the design and planning of decommissioning activities and before decommissioning activities that have the potential to result in ground disturbance	Avoidance and Minimization Plan; Habitat Restoration Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	BIO-3a	**Potential Impacts to Aquatic Habitat Related to Turbidity, Erosion, Sedimentation, and Overall Water Quality during Construction of the Intake Structure.** Hydrology & Water Quality Mitigation Measure HYDRO-1 shall be implemented in order to reduce water quality impacts related to erosion and pollutant runoff through implementation of BMPs. In addition, installing the cofferdam and dewatering a portion of the proposed intake structure site during fish screen construction may result in fish stranding. PG&E and its contractor shall coordinate with a qualified fisheries biologist to develop and implement a fish	During construction activities	NA – design will focus on fresh water source from production well(s) in Arizona

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		rescue plan. The fish rescue effort would be implemented during the dewatering of the area behind the cofferdam and would involve capturing those fish and returning them to suitable habitat within the river. The fish rescue plan shall identify and describe the following items: collection permits needed, fish capture zones, staffing, staging areas, fish collection and transport methods, species prioritization, resource agency contacts, fish handling protocols, fish relocation zones, site layout and progression of dewatering and fish rescue, and records and data. To ensure compliance, a fisheries biologist shall be present on-site during initial pumping (dewatering) activities and to oversee the fish rescue operation.		
	BIO-3b	**Potential Loss or Degradation of Aquatic Habitat.** To restore, replace, or rehabilitate habitat impacted by the intake structure, PG&E shall implement the measures described below. Unless as provided below, PG&E shall confer with DFG regarding potential disturbance to fish habitat and shall obtain a streambed alteration agreement, pursuant to Section 1602 of the California Fish and Game Code, for construction work associated with intake structure construction; PG&E shall also confer with DFG pursuant to the CESA regarding potential impacts related to the loss of habitat or other operational impacts on state-listed fish species, respectively. PG&E shall comply with all requirements of the streambed alteration agreement and any CESA permits to protect fish or fish habitat or to restore, replace, or rehabilitate any important habitat on a “no-net-loss” basis. Alternatively, if DFG declines to assert jurisdiction because it determines that CERCLA Section 121(e)(1) applies, the project proponent shall consult with DFG regarding potential disturbance to fish habitat and shall meet the substantive policies of a streambed alteration agreement and of the CESA for construction work associated with intake structure construction and operations. PG&E shall comply with all substantive requirements of the streambed alteration agreement and CESA to protect fish and fish habitat or to restore, replace, or rehabilitate any important habitat on a “no-net-loss” basis and to operate the facility in accordance with CESA to ensure no net loss of habitat function.	Before operation of the intake structure	NA – design will focus on fresh water source from production well(s) in Arizona

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		Additionally, PG&E shall consult with USACE regarding the need to obtain permits under section 404 of the CWA and section 10 of the Rivers and Harbors Act. In conjunction with these permitting activities, the USACE must initiate consultation with USFWS under Section 7 of the Federal ESA regarding potential impacts of the proposed project on federally listed fish species due to the loss of habitat on federally listed fish species. PG&E shall implement any additional measures developed through the ESA Section 7 processes, or its equivalent, to ensure “no-netloss” of habitat function. Alternatively, if USACE and/or USFWS decline to assert jurisdiction because it determines that CERCLA Section 121(e)(1) applies, PG&E shall confer with USFWS regarding potential disturbance to federally listed fish species and federally listed fish species habitat and shall meet the substantive mandates under Section 7 of the Federal ESA regarding potential impacts to fish or to habitat of federally listed fish species. PG&E shall implement any additional measures developed through that processes, including compliance with the substantive requirements of all of what would be permit conditions if not exempt pursuant to CERCLA, and to ensure “no-net-loss” of habitat function. Because the type and extent of habitat potentially affected is unknown, PG&E shall have an instream habitat typing survey conducted in the area potentially affected by the intake construction. Further, cooperation with USFWS and other fisheries biologists shall determine suitable and acceptable location(s) for the intake structure(s) to avoid the spawning habitat of special-status fish species. PG&E shall avoid habitat modifications, especially to habitat that is preferred by native fishes for spawning or rearing including side channels, cobble or gravel bars, and shallow backwaters. If these habitat types cannot be avoided, any disturbed habitat will be restored or replaced to achieve “no-net-loss” of habitat types and values as described above.		
	BIO-3b		Before operation of the intake structure	NA – design will focus on fresh water source from production well(s) in Arizona

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	BIO-3c	**Potential Fish Entrainment and Impingement during Operation of the Intake Structure.** Both screened and unscreened diversions can entrain larval life stages of fish. For example, adverse effects to early life stages of fish could occur if diversions coincide with planktonic larval life stages that occur during summer months, a period of high entrainment vulnerability. Prior to operation of the intake structure, PG&E shall consult with USFWS and DFG to determine the most vulnerable time of the year for entrainment or impingement of razorback sucker and bonytail chub eggs or larvae. PG&E shall install a state-of-the-art positive-barrier fish screen that would minimize fish entrainment and impingement at the intake structure. The fish screen shall be designed in accordance with DFG and the National Marine Fisheries Service criteria, with specific consideration given to minimizing harm to fish eggs and other early life stages. To ensure that the fish screen operates as intended and reduce the risk of impacts, long-term monitoring of the operations and maintenance of the positive-barrier screen shall be conducted. Monitoring at the onset of diversions through the intake shall include approach velocity measurements immediately after the positive-barrier screen operations begin, with fine-tuning of velocity control baffles or other modifications as necessary, to achieve uniform velocities in conformance with the screen criteria established by regulatory agencies.	During design and operation of the intake structure	NA – design will focus on fresh water source from production well(s) in Arizona

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Cultural Resources	CUL-1a-1	**During Design, Construction, O&M, and Decommissioning Implement Measures to Avoid, Minimize, or Mitigate Impacts on Cultural Resources.** Establishment of a cultural impact mitigation program and a Corrective Measures Implementation Workplan (CMI Workplan), with specific activities stipulated for each phase of the project, will reduce the potential for impacts on historical resources within the project area, and will help preserve the values of and access to the Topock Cultural Area for local tribal users. As detailed below, measures will be implemented to avoid known resources, re-use existing disturbed areas to the extent feasible, allow for tribal input to the final design and maintain access for tribal users during design, construction, operation, and decommissioning activities, as appropriate. During construction, a Worker Education Program and regular archaeological and tribal monitoring will be implemented, and measures intended to reduce the potential for incursion by outside parties will be strengthened. This measure does not apply to the activities included as part of the East Ravine Revised Addendum, Groundwater Investigation (dated December 31, 2010). During development of the final design and the construction, operation, and decommissioning phases of the project, PG&E shall carry out and require all subcontractors to carry out all investigative, testing, and remediation activities, including all supporting operations and maintenance activities, in ways that avoid, minimize, and mitigate significant adverse effects to historically significant cultural and historic resources, consistent with the CEQA Guidelines, and including the Topock Cultural Area, to the maximum extent feasible as determined by DTSC. [1]"Interested Tribes" means, for purposes of this EIR and the mitigation measures contained herein, the six tribes that have substantially participated in the various administrative processes surrounding remediation of the site with DTSC, PG&E, and DOI, including throughout development of the final remedy. Interested tribes include the Chemehuevi Indian Tribe, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort Mojave Indian Tribe, Fort Yuma-Quechan Indian Tribe, and Hualapai Indian Tribe.	During the design, construction, O&M, and decommissioning phases	Training manual for cultural resources

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	CUL-1a-2	As part of the CMI Workplan, PG&E shall develop a written access plan to preserve tribal members' access to, and use of, the project area for religious, spiritual, or other cultural purposes. This plan will allow access to the extent PG&E has the authority to facilitate such access, and be consistent with existing laws, regulations, and agreements governing property within the project area. The access plan may place restrictions on access into certain areas, such as the Compressor Station and the existing evaporation ponds, subject to DTSC review with regard to health and safety concerns and to ensure noninterference with approved remediation activities. This access plan may be developed in coordination with the federal agencies with land management responsibilities in the project area (e.g., BLM and USFWS) in accordance with the related stipulation (General Principle I.C) contained in the Programmatic Agreement (Appendix PA). PG&E shall demonstrate a good faith effort to coordinate with Interested Tribes 1 by including communication logs as part of the CMI Workplan.	During the design, construction, O&M, and decommissioning phases	Access Plan; Communication Log with Tribes (part of the EIR mitigation measure compliance reports)
	CUL-1a-3a	PG&E shall enhance existing measures to prevent and reduce incursions from recreational and/or other outside users from affecting unique archeological and historically significant resources, including resources within the Topock Cultural Area, by: Retaining a Qualified Cultural Resource Consultant to implement the Mitigation Monitoring and Reporting Program (MMRP) and conducting yearly inspections (or less frequently upon approval by DTSC) of identified historical resources, including inspections of the Topock Cultural Area, to determine if substantial adverse changes have occurred relative to the condition of the historical resources during the past year or prior to the implementation of the proposed project. PG&E shall offer to retain a tribal monitor at historic rates of compensation or tribal representatives designated by the Tribal Council or chairperson, if so requested, to accompany the Qualified Cultural Resources Consultant during the inspections. The Qualified Cultural Resource Consultant shall be a person who is acceptable to DTSC and who is also a qualified archaeologist with a graduate degree in archaeology, anthropology or closely related field, plus at least 3 years of full-time professional experience in general	During the design, construction, O&M, and decommissioning phases	Annual cultural resources monitoring report

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		North American archaeological research and fieldwork, with expertise/experience in the Southwest preferred.		
	CUL-1a-3b	b. Developing a site security plan as part of the CMI Workplan. The site security plan shall include, but not be limited to, instructions for PG&E personnel to inspect the project site routinely during construction and report any human-caused disturbance to project facilities and the surrounding environment to DTSC and the appropriate landowner, such as BLM, USFWS, or FMIT, as appropriate, depending on the ownership of the property involved in the incursion. Notification shall be within a specified period, as established in the site security plan for the event, and shall also be summarized as part of the periodic implementation status report, as approved by DTSC for remedy implementation. This measure does not impose any obligation on PG&E to perform law-enforcement duties on federal or private lands, but is intended to provide increased observation of potential intrusions into the project area during construction and operation of the final remedy that may impact significant cultural resources. PG&E staff, or assigned agents, should be instructed to report any outside disturbance to the environment personally observed over the course of the working day. Information shall be reported within a specific period, as established in the site security plan, to DTSC and the appropriate landowners, such as BLM, USFWS, or FMIT, depending on the ownership of the property intruded upon. The site security plan may also include the use of PG&E security cameras at major ingress/egress gates into the project site. Finally, if requested by the FMIT the plan may include the use of private security personnel to patrol the FMIT-owned parcel within the project area to prevent outside incursions.	During the design, construction, O&M, and decommissioning phases	Site security plan; reporting of human-caused disturbances (part of the EIR mitigation measure compliance reports)
	CUL-1a-3c	c. Coordinating with BLM and San Bernardino County to facilitate an outreach effort to the staff at Moabi Regional Park, requesting that they communicate to visitors the parts of the project area that are off limits to off-road vehicle usage because of health and safety concerns, public lands management plans, or landowner requests. PG&E shall make a good faith effort to involve the surrounding tribes in this outreach effort, providing Interested Tribes with the opportunity to comment on outreach materials or provide a tribal cultural	During the design, construction, O&M, and decommissioning phases	Design submittals

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		resources specialist the opportunity to participate in the outreach activities. As part of this outreach effort, PG&E shall work with Park Moabi and offer to design, develop, and fund the installation of an informational kiosk within Park Moabi that informs visitors of the work being done at the project site. PG&E shall involve the tribes to the maximum extent feasible, as determined by DTSC, in the design and development of the informational kiosk.		
	CUL-1a-3d	d. Posting signage to indicate those parts of the project area that are off limits to off-road vehicle usage due to possible health and safety concerns and to reduce potential damage to environmental resources. If agreed to by land owners and/or local, state, or federal management entities within the project area, PG&E shall work with the relevant land owner or land management entity to develop, design, and fund the installation of easily visible and clear signage. This may include coordination with BLM to install signage noting the designation of the area as an Area of Critical Environmental Concern owing to its biological and cultural resources, while ensuring that signs are placed in a way that does not draw unwanted attention to specific resources.	During the design, construction, O&M, and decommissioning phases	Design submittals
	CUL-1a-4	PG&E shall work with representative members of the Interested Tribes to convene and retain a multidisciplinary panel of independent scientific and engineering experts as part of a Technical Review Committee (TRC). The TRC shall be made up of not more than five multidisciplinary experts who will be on call to review project-related documents, participate in project-related meetings, and advise interested tribal members on technical matters relating to the final design and remedy. The TRC shall include only persons with technical expertise, including but not limited to geology, hydrology, water quality, engineering, paleontology, toxicology, chemistry, biology, or botany. Before July 1, 2011, PG&E shall post an open grant or Request for Qualifications (RFQ) and retain members of the TRC at rates comparable to those paid historically to tribal experts by PG&E for the remediation project. TRC members shall be selected by majority vote of one representative from each participating Interested Tribe. PG&E shall provide Interested Tribes at least 30-days notice of the meeting to select TRC members and to review TRC candidate qualifications. For the purposes of contracting, the grant may be awarded to one tribal government to	During the design, construction, O&M, and decommissioning phases	EIR mitigation measures compliance reports (quarterly during design /construction, annual during project operation)

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		manage or, alternatively, PG&E may reimburse the tribe or TRC members directly. The entirety of the monies shall be used to fund the scientific and engineering team exclusively, and shall not be used to fund other tribal government expenses or used to support legal counsel. A stipulation of the open grant shall be that the scientific and engineering team shall provide all deliverables and results to all involved tribes, despite a possible contract agreement with only one tribe or with PG&E. Upon conclusion of the construction phase of the project, the necessity and dollar value of the TRC shall be assessed by PG&E and, with the approval of DTSC, shall either be extended, reduced, or terminated under the operations and maintenance phase.		
	CUL-1a-5	Should any indigenous plants of traditional cultural significance and listed in Appendix PLA of this FEIR be identified within the project area, PG&E shall avoid, protect, and encourage the natural regeneration of the identified plants when developing the remediation design, final restoration plan, and IM-3 decommission plan. In the event that impacts on the identified plants cannot be avoided and such plants will be displaced, PG&E shall retain a qualified botanist who shall prepare a plant transplantation/monitoring plan which can be included as part of the Cultural Impact Mitigation Program (CIMP) referenced in CUL-1a-8 either by (1) transplanting such indigenous plants to an on-site location, or (2) providing a 2:1 ratio replacement to another location decided upon between PG&E and members of the Interested Tribes. Plans to transplant or replace such plants shall be approved by DTSC. In coordination with the qualified botanist, PG&E shall monitor all replanted and replacement plants for at least 3 5 years, and shall ensure at least a 75 percent survivorship during that time. This mitigation measure is not meant to replace or subsume any actions required by state or federal entities with regard to the protection of species listed as rare, threatened, or endangered.	During the design, construction, O&M, and decommissioning phases	Survey of indigenous plant species; Plant transplantation/ monitoring plan (if needed) (part of CIMP)
	CUL-1a-6	All additional phone calls and alarms associated with remediation activities or facilities shall not be routed through PG&E's existing alarm system utilized at the compressor station. The notification system for remediation-related alerts and/or phone calls shall not introduce additional noise to the project area, to the maximum extent feasible, provided there is ongoing compliance with applicable safety regulations or standards of the Federal Energy Regulatory Commission,	During the design, construction, O&M, and decommissioning phases	Design submittals

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		Occupational Safety and Health Administration, and other agencies. (See Mitigation Measure NOISE-3 for additional mitigation related to the Topock Cultural Area).		
	CUL-1a-7	Nighttime construction-related activities shall be limited to work that cannot be disrupted or suspended until the following day, such as, but not limited to, well drilling and development or decommissioning activities. Lighting considerations, including the potential use of solar power for some lighting, shall be included as part of the remedial design plan to be developed with involvement of Interested Tribes and the U.S. Department of the Interior. To minimize construction and operations-related lighting impacts, the lighting in the remedial design plan shall include, at a minimum: (1) shrouding/shielding for portable lights needed during construction and operational activities; (2) installation of portable lights at the lowest allowable height and in the smallest number feasible to maintain adequate night lighting for safety; (3) shielding and orientation of lights such that off-site visibility of light sources, glare, and light from construction activities is minimized to the extent feasible. No additional permanent poles shall be installed for lighting. This mitigation measure is not meant to replace or subsume any actions required by the County or state or federal entities with regard to lighting required for minimum security and safety purposes.	During the design, construction, O&M, and decommissioning phases	Design submittals
	CUL-1a-8a	Prior to commencement of construction, PG&E shall submit as part of the final Remedial Design, a CIMP developed in coordination with Interested Tribes for DTSC's review and approval. The CIMP may be developed in coordination with the federal agencies with land management responsibilities in the project area (e.g., BLM and USFWS) in accordance with the Programmatic Agreement (Appendix PA). The CIMP shall include, at a minimum and to DTSC's satisfaction, the following: Protocols for continued communication. Consistent with past practice and the communication processes previously entered into by PG&E with Interested Tribes, the company shall continue to communicate with Interested Tribes during the design, construction, operation, and decommissioning of the project. Prior to	During the design, construction, O&M, and decommissioning phases	EIR mitigation measures compliance reports (quarterly during design /construction, annual during project operation)

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		implementation of construction, PG&E shall communicate with Interested Tribes that place cultural significance on the Topock Cultural Area. Outreach efforts between the Tribes and PG&E shall be communicated by PG&E to DTSC quarterly during the design and construction phase for review and input, and annually during project operations.		
	CUL-1a-8b	Protocols for the appropriate treatment of archaeological materials that may be disturbed or discovered during implementation of the final remedy, including protocols for the repatriation of significant items of cultural patrimony that may be recovered during the project, and protocols for the curation of cultural materials recovered during the project. Treatment of archaeological sites may include data recovery or capping. If data recovery is proposed, a Research Design following California Office of Historic Preservation guidelines or federal guidelines, as applicable, shall be prepared and reviewed and approved by DTSC.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8c	Protocols for the review of cultural resource-related documents throughout the design, construction, and operational phases.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8d	Protocols for the review of project design documents before the beginning of construction, including reviews of project design documents throughout the design process (e.g., Preliminary [approximately 30% completed], Intermediate [approximately 60% completed] and Pre-final design).	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8e	Protocols for the appropriate methods to be used to restore the environment to its preconstruction condition upon decommissioning of individual groundwater remedy facilities.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8f	A plan for the decommissioning and removal of the IM-3 Facility and proposed restoration of the site (to be an appendix to the CIMP).	During the design, construction, O&M, and decommissioning phases	Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (appendix to

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
				the CIMP)
	CUL-1a-8g	Protocols for the repatriation of clean soil cuttings generated during construction activities and during drilling associated with repair/replacement activities during operations and maintenance phases. The soil cuttings shall be managed in compliance with applicable laws and regulations on site.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8h	Protocols for the appropriate methods, consistent with Mitigation Measure NOISE-3, to reduce auditory impacts.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8i	Protocols for the appropriate methods, consistent with Mitigation Measures AES-1 and AES-2, to reduce visual intrusions.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8j	Protocols for tribal notification in advance of project-related activities that the Interested Tribes may feel have the potential to cause adverse impacts to sensitive cultural resources.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8k	Protocols to be followed by project personnel to accommodate, if feasible as determined by DTSC, key tribal ceremonies that involve the Topock Cultural Area.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8l	Provisions affording sufficient tribal monitors to observe ground-disturbing activities and/or other scientific surveying (e.g., biological surveys) that may occur in preparation for construction activities. Ground-disturbing activities include trenching, excavation, grading, well excavation/drilling, decommissioning of the IM-3 Facility and subsurface pipeline, or other construction-related activities.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8m	Provisions of reasonable compensation for tribal monitors consistent with historic rates.	During the design, construction, O&M, and decommissioning phases	CIMP

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
	CUL-1a-8n	Locations requiring specific protective devices, such as temporary fencing, flagging, or other type of demarcation during construction.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8o	Protocols for the reporting of discoveries of cultural importance consistent with existing statutes and regulations.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-8p	Protocols for the inspection of remediation facilities and/or staging areas throughout the construction phase.	During the design, construction, O&M, and decommissioning phases	CIMP
	CUL-1a-9	During selection of the design and specific locations for physical remediation facilities, PG&E shall, in communication with the Interested Tribes (and subject to their review), and to the maximum extent feasible, as determined by DTSC, give: (1) priority to previously disturbed areas for the placement of new physical improvements; and (2) priority to re-use of existing physical improvements, such as but not limited to wells and pipelines, but not including IM-3 facilities. "Disturbed" areas in this context means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years. PG&E shall produce an aerial map of these disturbed areas to guide project design, and PG&E shall make a good faith effort to provide tribes with an opportunity to review and comment on the information displayed on the map in determining "disturbed" areas.	During the design phase	Aerial map of disturbed areas
	CUL-1a-10	PG&E shall consider the location of Loci A, B, and C of the Topock Maze during the design and approval of the physical facilities necessary for the final remedy and is prohibited from creating any direct physical impact on the Topock Maze, as it is manifested archaeologically. Through the design, PG&E shall prevent all indirect (e.g. noise, aesthetics) impacts on the Topock Maze, to the maximum extent feasible as determined by DTSC.	During the design phase	Design submittals

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	CUL-1a-11	PG&E shall provide an open grant for two part-time cultural resource specialist/ project manager positions during the design and construction phases of the remediation project. The positions shall be filled by qualified members of an Interested Tribe as nominated by a majority vote of their Tribal Council(s) and appointed by DTSC's project manager if more than two members are nominated. The award of the grants is for continued involvement in review of project documents and participation in project-related meetings, including TRC meetings, at rates of historic compensation. Additionally, in light of FMIT's ownership of land in the project area and historical involvement in the environmental process, additional funding is guaranteed for one full-time FMIT position upon submission of an application by a qualified FMIT member who shall be appointed by the FMIT council, provided such funding is not duplicative of the services and funding provided by PG&E pursuant to the Settlement Agreement between PG&E and the FMIT in Fort Mojave Indian *Tribe v. Dept. of Toxic Substances Control, et al.*, Case No. 05CS00437 for a position with the FMIT's AhaMakav Culture Society. The payment of grant monies shall be timed to the awarded tribes' fiscal cycles so that the tribes are not forced to front funds for long periods of time. These positions shall act as cultural resources contacts and project managers for interactions between the tribes, PG&E, and DTSC to ensure coordination for review and comment of subsequent project and/or environmental documents related to the design and implementation of the groundwater remediation project to avoid, reduce, or otherwise mitigate impacts on historical resources, as defined by CEQA. This funding is separate from provisions for tribal monitor positions and shall not be used for routine tribal business or legal counsel. For review and approval, PG&E shall provide DTSC with the names of the selected grant recipients and an annual report that summarizes activities associated with the grant program. Upon the conclusion of the construction phase of the project, the necessity and dollar value of the grant program shall be assessed by PG&E and, with the approval of DTSC, shall either be extended or terminated under the operations and maintenance phase.	During the design and construction phases	Annual reporting of activities under grant program (part of the EIR mitigation measure compliance reports)
	CUL-1a-12	PG&E shall provide sufficient opportunity, as determined by DTSC, for Interested Tribes to provide a traditional healing/cleansing ceremony (or ceremonies) before and after ground disturbing construction activities occur.	During the construction phase	Construction/ Remedial Action Work Plan; Plan for Decommissioning and Removal of IM

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
				No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	CUL-1a-13	PG&E shall, in communication with Interested Tribes, develop as part of the CMI Workplan, a worker cultural sensitivity education program. The program shall be implemented before commencement of construction and throughout construction and operations as personnel are added. This program may include information provided directly by tribal entities either in written form or on video, in a manner consistent with Appendix C in the existing BLM Programmatic Agreement. The worker cultural sensitivity education program shall ensure that every person working on the project as an employee or contractor, before participating in design or outdoor activities at the project site, is informed regarding: • the cultural significance of the Topock Cultural Area, • appropriate behavior to use within the Topock Cultural Area, • activities that are to be avoided in the Topock Cultural Area, and • consequences in the event of noncompliance.	During the construction and operations/ maintenance phase	Worker Cultural Sensitivity Education Program
	CUL-1b and 1c	**During Design, Construction, O&M, and Decommissioning Consider the Location of Historical Resources and Implement Measures to Avoid Resources to the Extent Feasible** The following actions will reduce the potential for impacts on identified historically significant resources (other than the Topock Cultural Area, which is separately addressed in CUL-1a) within the project area. As detailed below, these actions include consideration of the location of historical resources, preparation of a cultural resources study, and preparation of a treatment plan. Monitoring of ground-disturbing activities during project construction will further protect historically significant resources. Protective actions are also described pertaining to the discovery of any previously unidentified potentially significant cultural resources.	During the design phase	Design submittals

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	CUL-1b/c-1	PG&E shall consider the locations of the identified historic resources described above (Table 4.4-3) during the design of the physical improvements necessary for the proposed project and avoid, minimize, or mitigate impacts on historical and archaeological resources to the maximum extent feasible, as determined by DTSC. The final design plans for the project will be submitted to DTSC for review and approval.	During the design phase	Design submittals
	CUL-1b/c-2	During preparation of the final design, and consistent with CUL-1 a-3, PG&E shall retain a Qualified Cultural Resources Consultant to prepare a cultural resources study that assesses the potential for the construction, operations, or decommissioning of specific proposed improvements to result in significant impacts on identified historically significant resources described in Impacts CUL-1b and CUL-1c. This may include a geoarchaeological investigation and/or non-destructive remote-sensing surveys of potentially disturbed areas to determine if a potential exists for buried historical and archaeological resources. “Significant impacts” as used here means the potential for construction to demolish or materially alter in an adverse manner those physical characteristics of a resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR. The study will be submitted to DTSC for review and evaluation to determine if existing mitigation measures are appropriate.	During the design phase	Cultural resources study/Geoarchaelogical investigation report
	CUL-1b/c-3	If the cultural resources study determines that the construction of physical improvements would result in significant impacts on identified historically significant resources described in Impacts CUL-1b and CUL-1c, and avoidance of the resource is not feasible, PG&E shall prepare a treatment plan that identifies measures to reduce these impacts (see above description of the CIMP) for DTSC’s review and approval. The treatment plan shall identify which criteria for listing on the CRHR contribute to the affected resource’s significance and which aspects of significance would be materially altered by construction, operations, or decommissioning and shall provide for reasonable efforts to be made to permit the resource to be preserved in place or left in an undisturbed state. Methods of accomplishing this may include capping or covering the resource with a layer of soil. To the extent that a resource cannot feasibly be preserved in place or left in an undisturbed state, excavation as mitigation shall	During the design phase	Cultural resources treatment plan (if needed)

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		be restricted to those parts of the resource that would be damaged or destroyed by the project. Excavation as mitigation shall not be required for a historically significant resource if the treatment plan determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource. The plan shall require communication with all Interested Tribes with regard to their perspectives and wishes for the treatment of the resources.		
	CUL-1b/c-4	Consistent with CUL-1a-3a above, PG&E shall retain a Qualified Cultural Resources Consultant to observe ground-disturbing activities and shall be required to request the participation of tribal monitors during those activities, including steps necessary during operations and decommissioning activities to ensure that historically significant resources are avoided to the maximum extent feasible, as determined by DTSC, during actual construction (see the description of the CMI Workplan, above). The Qualified Cultural Resources Consultant shall provide training to construction personnel on the locations of identified resources, values associated with the identified resources, responsibility for reporting suspected historic resources, and procedures for suspension of work in the immediate vicinity of the discovery, and shall use exclusionary fencing, flagging, or other appropriate physical barriers to mark the boundaries of identified resources. The Qualified Cultural Resources Consultant shall invite participation from Interested Tribal members to participate in the training. In the event that previously unidentified potentially significant cultural resources are discovered during ground-disturbing activities, the Qualified Cultural Resources Consultant shall have the authority to divert or temporarily halt ground-disturbing activities in the area of discovery to allow evaluation of the potentially significant cultural resources. If such discoveries occur on land managed by a federal agency, Stipulation IX (Discoveries) of the Programmatic Agreement shall apply and are deemed adequate by DTSC. If a discovery occurs on other lands within the project area, the Qualified Cultural Resources Consultant shall contact the PG&E and DTSC project managers at the time of discovery and, in consultation with DTSC and tribal monitors, shall evaluate the resource before construction activities will be allowed to resume in the affected area. For significant cultural resources, and before construction activities are	During the construction phase	Training material for historic resources

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		allowed to resume in the affected area, the resource(s) shall be recovered with coordination of the tribal monitors and DTSC. Recovery may include a Research Design and/or Data Recovery Program submitted to DTSC for review and approval. The Qualified Cultural Resources Consultant (and tribal monitors) shall determine the amount of material to be recovered for an adequate sample for analysis or data recovery. Any concerns or recommendations regarding the ground-disturbing activities or the handling of cultural resources shall be directed to the Qualified Cultural Resources Consultant or PG&E's site supervisor.		
	CUL-2	**During Project Design Consider the Location of Unique Archaeological Resources and Avoid Resources to the Maximum extent Feasible.** Cultural resources that qualify as unique archaeological sites in the project area would probably also meet one or more of the criteria for historical resources and would be subject to Mitigation Measures CUL-1b/c-2 and CUL-1b/c-3. The mitigation measures under this identified impact are the same as listed for Impact CUL-1b and CUL-1c. These mitigation measures would reduce the potential for impacts on unique archaeological resources.	Before completion of the final project design, during design of the proposed project and prior to ground-disturbing activities	Cultural resources study/Geoarchaelogical investigation report; cultural resources treatment plan (if needed)
	CUL-3	**Conduct Survey and Construction Monitoring.** A paleontological investigation, including a detailed survey of the project area by a qualified paleontologist, shall be conducted to refine the potential impacts on unique paleontological resources within the final design area and determine whether preconstruction recovery of sensitive resources and/or construction monitoring would be warranted. If construction monitoring is determined to be warranted, ground-altering activity would be monitored by a qualified paleontologist to assess, document, and recover unique fossils. Monitoring shall include the inspection of exposed surfaces and microscopic examination of matrix in potential fossil bearing formations. In the event microfossils are discovered, the monitor shall collect matrix for processing. In the event paleontological resources are encountered during earthmoving activities, recovered specimens shall be prepared by the paleontologist to a point of identification and permanent preservation. PG&E shall retain a Qualified	Before and during construction	Paleontological investigation report

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		Paleontologist to observe ground-disturbing activities where determined necessary based on the results of the paleontological investigation and shall be required to request the participation of tribal monitors during those activities, including steps necessary during operations and decommissioning activities to ensure that historically significant resources are avoided to the maximum extent feasible, as determined by DTSC, during actual construction (see above description of the CMI Workplan). Paleontological resources of scientific value shall be identified and curated into an established, accredited, professional museum repository in the region with permanent retrievable paleontological storage. This measure does not apply to the activities included as part of the East Ravine Revised Addendum, Groundwater Investigation.		
	CUL-4	**With Discovery of Human Remains or Burials Suspend Work, Protect Remains, and Comply with Local, State, and Federal Laws Regarding Discoveries During Ground-Disturbing Activities.** Ground-disturbing activities may disturb as-yet undiscovered human remains or Native American burials and associated grave goods. PG&E shall retain a Qualified Cultural Resource Consultant and request designated tribal monitor(s) to train construction personnel in the identification of human remains so that they may aid in the identification of such resources (see above description of the CIMP). A Qualified Cultural Resource Consultant and tribal monitor(s) shall be in place to adequately oversee all ground-disturbing activities. In the event human remains are uncovered over the course of project construction, operation and maintenance, and/or decommissioning activities, the following procedures shall be followed to ensure compliance with all applicable local, state, and federal laws.	In concert with ground-disturbing activities throughout the remediation process	Training material for the identification of human remains
	CUL-4f	The construction contractor shall immediately suspend work within the vicinity of the discovery and determine if the remains discovered are human or nonhuman. This determination shall be made by the Qualified Cultural Resources Consultant, a qualified archaeologist and/or physical anthropologist with expert skill in the identification of human osteological (bone) remains.	In concert with ground-disturbing activities throughout the remediation process	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of

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				CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	CUL-4g	The Qualified Cultural Resources Consultant (and tribal monitor), or construction contractor, shall protect discovered human remains and/or burial goods remaining in the ground from additional disturbance.	In concert with ground-disturbing activities throughout the remediation process	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	CUL-4h	The Qualified Cultural Resources Consultant, archaeologist, or construction site supervisor shall contact the San Bernardino County Coroner, and the PG&E and DTSC project managers immediately. In California, all subsequent action shall conform to the protocols established in the Health and Safety Code and regulations. In Arizona, the Qualified Cultural Resources Consultant or PG&E construction site supervisor will follow Arizona laws and the implementing regulations. Human remains found on federal land would require the notification of the BLM Havasu City field office and compliance with applicable federal laws and regulations, including the Native American Graves Protection and Repatriation Act if the remains are determined to be of Native American origin. The Qualified Cultural Resources Consultant shall coordinate the interaction between Interested Tribes, PG&E, the County, and DTSC to determine proper treatment and disposition of any remains.	In concert with ground-disturbing activities throughout the remediation process	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	CUL-4i	The San Bernardino County Coroner will determine if the remains are of recent origin and if an investigation of the cause of death is required (California Health and Safety Code Section 7050.5). If the coroner determines that the human remains are not Native American and not evidence of a crime, project personnel shall coordinate with the Qualified Cultural Resources Consultant (s) to develop an appropriate treatment plan. This may include contacting the next-of-kin to	In concert with ground-disturbing activities throughout the remediation process	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of

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		solicit input on subsequent disposition of the remains. If there is no next-of-kin, or recommendations by the next-of-kin are considered unacceptable by the landowner, the landowner will reinter the remains with appropriate dignity in a location outside the project area and where they would be unlikely to be disturbed in the future.		CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	CUL-4j	In the event that the San Bernardino County Coroner determines that the human remains are Native American and not evidence of a crime, project personnel shall contact the NAHC so that a most likely descendent (MLD) can be identified as required under California Public Resources Code Section 5097.98.	In concert with ground-disturbing activities throughout the remediation process	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	CUL-4k	The MLD (s) shall inspect the area in which the human remains were found and provide treatment recommendations to the landowner and PG&E site manager in accordance with the provisions of PRC Section 5097.98. The treatment may include reburial, scientific removal of the discovered human remains and relinquishment to the MLD(s), nondestructive analysis of human remains and/or other culturally appropriate treatment. If the MLD(s) so requests, the landowner would reinter the remains with the appropriate dignity in a location outside the area of disturbance in a location unlikely to be disturbed in the future.	In concert with ground-disturbing activities throughout the remediation process	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	CUL-4l	To the maximum extent feasible, Mitigation Measure CUL-4 shall be implemented in a manner that is consistent with mitigation required by local, state, and federal requirements.	In concert with ground-disturbing activities throughout the remediation process	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and

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				Restoration
Geology & Soils	GEO-1a-a	**Construction, Operation and Maintenance, and Decommissioning Impacts Related to Erosion of Soils.** a) A DTSC-approved grading and erosion control plan, prepared by a California Registered Civil Engineer, shall be completed prior to implementation of any grading in areas of the site where there is a potential for substantial erosion or loss of top soils. The plan shall outline specific procedures for controlling erosion or loss of topsoil during construction, operation and maintenance, and decommissioning.	Before any ground disturbing activities begin and during project-related ground disturbing activities, except activities included as part of the East Ravine Revised Addendum, Groundwater Investigation	Grading and Erosion Control Plan; Corrective Measure Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	GEO-1a-b	To ensure soils do not directly or indirectly discharge sediments into surface waters as a result of construction, operation and maintenance, or decommission activities, PG&E shall develop a SWPPP as discussed in mitigation measure HYDRO-1 of the “Hydrology and Water Quality” section of this EIR. The SWPPP shall identify best management practices (BMPs) that would be used to protect stormwater runoff and minimize erosion during construction. PG&E shall prepare plans to control erosion and sediment, prepare preliminary and final grading plans, and shall prepare plans to control urban runoff from the project site during construction, consistent with the substantive requirements of the San Bernardino County Building and Land Use Services Department for erosion control.	Before any ground disturbing activities begin and during project-related ground disturbing activities, except activities included as part of the East Ravine Revised Addendum, Groundwater Investigation	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	GEO-1a-c	During road preparation activities, loose sediment shall be uniformly compacted consistent with the substantive San Bernardino County Building and Land Use Services Department requirements to aid in reducing wind erosion. Ongoing road maintenance including visual inspection to identify areas of erosion and performing localized road repair and regrading, installation and maintenance of erosion control features such as berms, silt fences, or straw wattles, and grading for road smoothness shall be performed as needed to reduce potential for erosion.	Before any ground disturbing activities begin and during project-related ground disturbing activities, except activities included as part of the East Ravine Revised Addendum,	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities

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			Groundwater Investigation	and Restoration
	GEO-1a-d	Regarding the potential for contaminated soils to be eroded and contribute contamination into receiving waters, Mitigation Measures GEO-2 and HAZ-2 shall be implemented. Mitigation Measure GEO-2 provides the provisions for mitigating erosion through BMPs which shall be implemented. Mitigation Measure HAZ-2 provides the provisions for safe work practices and handling of contaminated soils as investigation derived wastes.	Before any ground disturbing activities begin and during project-related ground disturbing activities, except activities included as part of the East Ravine Revised Addendum, Groundwater Investigation	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	GEO-1b-a	**Construction, Operation and Maintenance, and Decommissioning Impacts Related to Differential Compaction of Soils.** BMPs shall be implemented during construction, operation and maintenance, and decommissioning activities to minimize impacts on the affected areas. Such BMPs could include, but would not be limited to, the following: uniform compaction of roadways created for accessing the project area as per San Bernardino County Building and Land Use Services Department requirements, returning areas adversely affected by differential compaction to preexisting conditions when these areas are no longer needed, and continuing maintenance of access roads, wellhead areas, and the treatment facility areas.	During the construction, operation and maintenance, and decommissioning activities	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	GEO-1b-b	Work area footprints shall be minimized to the greatest extent feasible to limit the areas exposed to differential compaction. Where possible, existing unpaved access roads and staging/working areas shall be reused and maintained for different stages of the construction. New graded areas for staging or for access roads shall be compacted to a uniform specification, typically on the order of 90 to 95% compaction and consistent with substantive San Bernardino County Building and Land Use Services Department requirements to reduce differential compaction and subsequent erosion of site soils.	During the construction, operation and maintenance, and decommissioning activities	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration

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	GEO-1b-c	After the completion of the operation and maintenance phase, the disturbed areas which result in increased potential for compaction shall be returned to their respective preexisting condition by regarding consistent with the preconstruction slopes as documented through surveys that may include topographic surveys or photo surveys. The areas will be returned to the surrounding natural surface topography and compacted consistent with unaltered areas near the access roads or staging areas in question. The habitat restoration plan outlined in mitigation measure BIO-1 shall include restoration of native vegetation or other erosion control measures where revegetation would be infeasible or inadequate, for purposes of soil stabilization and erosion control of the project area.	During the construction, operation and maintenance, and decommissioning activities	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
Hazardous Materials	HAZ-1a-a	**Spills or Releases of Contaminants during Operation and Maintenance Activities.** PG&E shall store, handle, and transport hazardous material in compliance with applicable local, state, and federal laws.	During operation and maintenance activities	O&M Plan
	HAZ-1a-b	All chemical storage and loading areas shall be equipped with proper containment and spill response equipment. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas; availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response.	During operation and maintenance activities	O&M Plan
	HAZ-1a-c	A project-specific HMBP, chemical standard operating procedure (SOP) protocols and contingency plans shall be developed to ensure that proper response procedures would be implemented in the event of spills or releases. Specifically, the HMBP and SOPs shall describe the procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required personal protective equipment, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. BMPs to be implemented may include, but are not limited to, use of secondary containment in mixing and storage areas; availability of spill kits and spill containment booms, and appropriate storage containers for containment of the materials generated during the spill response. The field	During operation and maintenance activities	Project-specific hazardous material business plan; O&M Plan

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		manager in charge of operations and maintenance activities shall be responsible for ensuring that these procedures are followed at all times.		
	HAZ-1b-a	**Spill or Release of Contaminants during Construction and Decommissioning Activities.** Fueling areas and maintenance areas would be supplied with proper secondary containment and spill response equipment.	During construction and decommissioning activities	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	HAZ-1b-b	PG&E shall develop fueling SOP protocols and a contingency plan that would be implemented at all fueling areas on-site. The SOPs shall describe the procedures for properly storing and handling fuel on-site, the required equipment and procedures for spill containment, required PPE, and the measures to be used to reduce the likelihood of releases or spills during fueling or vehicle maintenance activities. Potential measures include but are not limited to, fuel storage in bermed areas, performing vehicle maintenance in paved and bermed areas, and availability of spill kits for containment and cleanup of petroleum releases. The field manager in charge of construction and decommissioning activities shall be responsible for ensuring that these procedures are followed at all times.	During construction and decommissioning activities	Fueling SOPs and Contingency Plan for Onsite Fueling Areas; Corrective Measure Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	HAZ-1b-c	PG&E shall comply with local, state, and federal regulations related to the bulk storage and management of fuels.	During construction and decommissioning activities	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of

TABLE 4-4
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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
				Remedial Facilities and Restoration
	HAZ-2	**Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil.** Before initiating ground-disturbing operations, a health and safety plan shall be developed and implemented by qualified environmental professionals to ensure health and safety precautions are being met. It is not possible to prepare the health and safety plan at this stage of the planning process because final construction plans and other design documents have not been finalized in sufficient detail. However, at a minimum, the health and safety plan shall include procedures to mitigate potential hazards, and such procedures shall include the use of PPE, measures that provide protection from physical hazards, measures that provide protection from chemical hazards that may be present at the site, decontamination procedures, and worker and health and safety monitoring criteria to be implemented during construction. The worker health and safety plan shall include protective measures and PPE that are specific to the conditions of concern and meet the requirements of the U.S. Occupational Safety and Health Administration's (OSHA's) construction safety requirements and Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). In accordance with OSHA requirements, appropriate training and recordkeeping shall also be a part of the health and safety program. The worker health and safety plan shall be certified by a Certified Industrial Hygienist in accordance with OSHA regulations. The worker health and safety plan shall be explained to the construction workers and all workers shall be required to sign the plan, which will be kept on the construction site at all times. Worker safety training shall occur prior to initiation of ground disturbing activities. Training shall include the review of all health and safety measures and procedures. All workers and engineering inspectors at the site shall provide written acknowledgement that the soils management plan (discussed below), worker health and safety plan, and community health and safety plan were reviewed and training was received prior to commencement of construction activities.	Before commencement of any ground disturbing activities and during construction, operation and maintenance, and decommissioning activities that could have potential to disturb the ground surface	Health and Safety Plan

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	HAZ-2a	The following are specific elements and directives that shall be included in the health and safety plan and implemented by PG&E during construction, operation and maintenance, and decommissioning of this project: Vehicles traveling on unpaved roadways or surfaces would be directed to avoid traveling in areas where contaminated soils are known to be present; vehicle speeds shall be controlled (e.g., limited to 15 mph or slower) to limit generation of dust; measures, such as wetting of surfaces, will be employed to prevent dust generation by vehicular traffic or other dust-generating work activities.	Before commencement of any ground disturbing activities and during construction, operation and maintenance, and decommissioning activities that could have potential to disturb the ground surface	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	HAZ-2b	Pre-mobilization planning shall occur during which the likelihood of encountering contaminated soils shall be reviewed along with the HMBP, site-specific health and safety plan, and SOPs so that the procedures are followed and the contingencies for handling contaminated soils are in-place prior to implementing the field operations.	Before commencement of any ground disturbing activities and during construction, operation and maintenance, and decommissioning activities that could have potential to disturb the ground surface	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	HAZ-2c	Should evidence of contaminated soil be identified during ground disturbing activities (e.g., noxious odors, discolored soil), work in this area will immediately cease until soil samples can be collected and analyzed for the presence of contaminants by the site supervisor or the site safety officer. Contaminated soil shall be managed and disposed of in accordance with a project-specific health and safety plan and soil management plan. The health and safety plan and soil management plan shall be approved by DTSC before beginning any ground disturbing activities. While the project is exempt from the requirements of the San Bernardino County Division of Environmental Health, the health and safety plan and soil management plan shall be prepared in general accordance with the substantive requirements of this agency.	Before commencement of any ground disturbing activities and during construction, operation and maintenance, and decommissioning activities that could have potential to disturb the ground surface	Health and Safety Plan; Soil Management Plan
	HAZ-2d	In the event that drilling sites must be located within areas of suspected soil contamination, the appropriate PPE shall be worn by all personnel working in	Before commencement of any ground disturbing	Health and Safety Plan

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		these areas and methods specified in the health and safety plan used to control the generation of dust. When working in these areas, personnel shall be required to follow all guidance presented in the site-specific health and safety plan and soil management plan. The site-specific health and safety plan shall include provisions for site control such as, but not limited to, delineation of the exclusion, contaminant reduction and support zones for each work area, decontamination procedures, and procedures for the handling of contaminated soils and other investigation derived wastes. Soil that is excavated shall be loaded directly into containers such as roll-off bins; dust suppression methods shall be used prior to and during loading of soils into the bins. Suspected contaminated soils shall be segregated from suspected uncontaminated soils.	activities and during construction, operation and maintenance, and decommissioning activities that could have potential to disturb the ground surface	
	HAZ-2e	Personnel working at the site shall be trained in Hazardous Waste Operations.	Before commencement of any ground disturbing activities and during construction, operation and maintenance, and decommissioning activities that could have potential to disturb the ground surface	Health and Safety Plan
	HAZ-2f	All soil excavated and placed in roll-off bins or trucks for transportation off-site shall be covered with a tarp or rigid closure before transporting, and personnel working in the area shall be positioned upwind of the loading location.	Before commencement of any ground disturbing activities and during construction, operation and maintenance, and decommissioning activities that could have potential to disturb the ground surface	Soil Management Plan
Hydrology and Water Quality	HYDRO-1	**Exceedance of Water Quality Standards.** The project shall implement BMPs to meet the substantive criteria of NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities Order No. 2009-0009-DWQ NPDES No.	Before and during activities in the project area	O&M Plan; Storm Water Pollution Prevention Plan (SWPPP)/ Best Management Practices

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		CAS000002 (General Permit) (SWRCB 2009) as well as all other applicable federal, state, and local permit and regulatory requirements, even if a permit is not required pursuant to CERCLA, for purposes of ensuring the protection of receiving water quality. As such, a BMP plan shall be prepared and implemented for the project prior to construction and decommissioning phase activities. Impacts on water quality from pollutants, including soils from erosion, shall be controlled through use of the following types of BMPs, which shall be incorporated into the appropriate project-specific BMP plan. The General Permit requirements include specific BMPs as well as numeric effluent levels (NELs) and numeric action levels (NALs) to achieve the water quality standards (SWRCB 2009:3). Types of BMPs cited in the General Permit (SWRCB 2009:Attachment A:7) include: a) Scheduling of Activities; b) Prohibitions of Practices; c) Maintenance Procedures; d) Other Management Practices to Prevent or Reduce Discharge of Pollutants to Waters of the United States; e) Treatment Requirements; and f) Operating Procedures and Practice to Control Site Runoff, Spillage or Leaks, Sludge or Waste Disposal, or Drainage from Raw Materials Storage. Visual inspections and monitoring and sampling are required under the General Permit to evaluate the effectiveness of the BMPs and to determine whether modifying BMPs or implementing additional BMPs is required. The BMP designations cited below are based on those used by the *California Stormwater Quality Association Construction BMP Handbook* (California Stormwater Quality Association 2003) and are consistent with the types of BMPs referenced in the General Permit: g) Scheduling (SS-1): Proper scheduling assists in identifying ways to minimize disturbed areas, which allows for a reduction in the active project area requiring protection and also minimizes the length of time disturbed soils are exposed to erosive processes.		(BMP) Plan and Monitoring and Reporting

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		h) Preservation of Existing Vegetation (SS-2): Preserving existing vegetation to the maximum extent practicable facilitates protection of surfaces from erosion and can also help to control sediments. Sensitive areas should also be clearly identified and protected.		
		i) Hydraulic Mulch (S S-3), Straw Mulch (S S-6), and Wood Mulching (SS-		
		8): Using various mulches is a method for temporarily stabilizing soil and can be used on surfaces with little or no slope.		
		j) Geotextiles, Plastic Covers, and Erosion Control Blankets/Mats (S S-7):		
		These erosion control methods can be used on flat or, usually, sloped surfaces, channels, and stockpiles.		
		k) Stabilized Construction Entrance/Exit (TC-1): A graveled area or pad located at points where vehicles enter and leave a construction site can be built. This BMP provides a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.		
		l) Runoff Control Measures (SS-9, SS-10, and SC-10): These include graded surfaces to redirect sheet flow, diversion dikes or berms that force sheet flow around a protected area, and stormwater conveyances (swales, channels, gutters, drains, sewers) that intercept, collect, and redirect runoff. Diversions can be either temporary or permanent. Temporary diversions include excavation of a channel along with placement of the spoil in a dike on the downgradient side of the channel, and placement of gravel in a ridge below an excavated swale. Permanent diversions are used to divide a site into specific drainage areas, should be sized to capture and carry a specific magnitude of storm event, and should be constructed of more permanent materials. A water bar is a specific kind of runoff diversion that is constructed diagonally at intervals across a linear sloping surface such as a road or right-of-way that is subject to erosion. Water bars are meant to interrupt accumulation of erosive volumes of water through their periodic placement down the slope, and divert the resulting segments of flow into adjacent undisturbed areas for dissipation.		

TABLE 4-4
Correlation of EIR Mitigation Measures and Future Documents
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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		m) Silt Fence (SC-1): A temporary sediment barrier consisting of fabric is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.		
		n) Gravel Bag Berm (SC-6) and Sand/Gravel Bag Barrier (SC-8): A temporary sediment barrier consisting of gravel-filled fabric bags is designed to retain sediment from small disturbed areas by reducing the velocity of sheet flows.		
		o) Desilting Basin (SC-2) and Sediment Trap (SC-3): Constructing temporary detention structures facilitates the removal of sediment from waters. The devices provide time for sediment particles to settle out of the water before runoff is discharged.		
		Secondary concerns include potential pollutants from inappropriate material storage and handling procedures and nonstormwater discharges. These will be addressed through the following types of BMPs, which shall be incorporated into the stormwater BMP plan:		
		p) Material Delivery and Storage (WM-1): Provide covered storage for materials, especially toxic or hazardous materials, to prevent exposure to stormwater. Store and transfer toxic or hazardous materials on impervious surfaces that will provide secondary containment for spills. Park vehicles and equipment used for material delivery and storage, as well as contractor vehicles, in designated areas.		
		q) Spill Prevention and Control (WM-4): Ensure that spills and releases of materials are cleaned up immediately and thoroughly. Ensure that appropriate spill response equipment, preferably spill kits preloaded with absorbents in an overpack drum, is provided at convenient locations throughout the site. Spent absorbent material must be managed and disposed of in accordance with applicable regulations. In particular, absorbents used to clean up spills of hazardous materials or waste must be managed as hazardous waste unless characterized as nonhazardous.		
		r) Solid Waste Management (WM-5): Provide a sufficient number of conveniently located trash and scrap receptacles to promote proper disposal of solid wastes.		

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		Ensure that the receptacles are provided with lids or covers to prevent windblown litter.		
		s) Hazardous Waste Management (WM-6): Provide a sufficient number of proper receptacles to promote proper disposal of hazardous wastes.		
		t) Concrete Waste Management (WM-8): Dispose of excess concrete in specific concrete washout facilities.		
		u) Sanitary/Septic Waste Management (WM-9): Locate sanitary and septic		
		waste facilities away from drainage courses and traffic areas. Maintain the facilities regularly.		
		v) Vehicle and Equipment Cleaning (NS-8): Clean vehicles and equipment that regularly enter and leave the construction site.		
		w) Vehicle and Equipment Fueling (NS-9): Fuel vehicles and equipment off- site whenever possible. If off-site fueling is not practical, establish a designated on-site fueling area with proper containment and spill cleanup materials.		
		x) Vehicle and Equipment Maintenance (NS-10): Use off-site maintenance facilities whenever possible. Any on-site maintenance areas must be protected from stormwater runoff and on-site flooding.		
		In addition to BMPs implemented to avoid or reduce impacts from the construction and decommissioning phases, BMPs shall also be implemented to avoid or reduce impacts from the operations and maintenance phases. To address potential violation of water quality standards caused by insufficient treatment, system failure at concentrations in excess of water quality standards, proper design shall include contingency measures such as safeguards to shut down the extraction wells in case of pipeline failure or malfunction. In addition, operation of the proposed project will be governed by and follow an operations and maintenance plan.		
		PG&E will comply with all applicable water quality standards, the General Permit, and any SWRCB or RWQCB resolutions identified as ARAR, as well as a corrective action monitoring program. Under the corrective action monitoring program, data will be collected to measure performance of the remedy, compliance with standards, and progress of the remedial action as a part of the		

TABLE 4-4
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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		project description. In addition, the project will be operated to continually assess performance issues and to modify the type, method, and configuration of the treatment delivery systems to enhance performance of the remedy to attain the cleanup goals and to respond to site conditions and performance issues as described in the project description. A SWPPP will also be prepared for the proposed project, which will contain BMPs related to industrial activities (industrial SWPPP). The BMPs are designed to reduce pollutants in discharges that may affect receiving water quality during operations and maintenance of the proposed project. As noted above, BMP designations are based on those used by the *California Stormwater Quality Association Construction BMP Handbook* (California Stormwater Quality Association 2003) and those referenced in the General Permit The SWPPP will incorporate BMPs such as the following: y)Good Housekeeping: Maintain facility in a clean manner and train facility personnel to contribute to a safe, clean, and orderly environment by properly disposing of trash in designated containers, storing materials in appropriate locations, and keeping equipment clean and in good working condition. z)Preventative Maintenance: Prevent or minimize release of pollutants. Develop Standard Operating Procedures for operation and maintenance of facility components and train employees to follow the procedures. aa) Non-Stormwater Discharges (SC-10): Ensure that used oil, used antifreeze, and hazardous chemical recycling programs are being implemented. Conduct regular inspections of high priority areas. bb) Spill Prevention, Control, and Cleanup (SC-1 1): Store materials properly to prevent spills from entering the storm drain system or surface waters. Ensure that spill cleanup materials are located on-site and are easily accessible. Clean up leaks and spills immediately using proper absorbent materials. Absorbents used to clean up hazardous materials must be disposed of as hazardous waste. Educate employees about spill prevention and cleanup. cc) Vehicle and Equipment Fueling (SC-20): Maintain clean fuel-dispensing areas using dry cleanup methods, such as sweeping or using rags and absorbents for leaks and spills. Cover the fueling area to prevent contact with		

TABLE 4-4
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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		stormwater. Train personnel in pollution prevention, focusing on containment of spills and leaks.		
		dd) Outdoor Loading/Unloading (SC-30): Load and unload chemicals during dry weather, if possible, and load and unload in designated areas. Check equipment regularly for leaks.		
		ee) Outdoor Liquid Container Storage (SC-3 1): Cover the storage area with a roof and provide secondary containment. Inspect storage areas regularly for leaks or spills.		
		ff) Outdoor Equipment Operations (SC-32): Perform activities during dry weather, cover the work area with a roof, and use secondary containment. Train employees in proper techniques for spill containment and cleanup.		
		gg) Waste Handling and Disposal (SC-34): Cover storage containers with leak-proof lids, check for leaks weekly, and clean storage areas regularly. Ensure that wastes are disposed of properly.		
		hh) Tank Design System: Ensure that tank systems have sufficient strength to avoid collapse, rupture, or failure and that they are protected against physical damage and excessive stress. Provide adequate secondary containment.		
		In conformance with the substantive requirements of General Permit (Order No. 2009-0009-DWQ, a monitoring and reporting program will be implemented to assess the effectiveness of BMPs and to modify BMPs and revise the SWPPP, if necessary, to continue to reduce pollutants and impacts on receiving waters. The monitoring program shall include the following minimum elements as per the General Permit:		
		ii) quarterly, nonstormwater visual inspections,		
		jj) storm-related visual inspections within 2 business days of a qualifying rain event (producing precipitation of one-half inch or more of discharge),		
		kk) visual inspection after a storm event,		
		ll) monitoring of nonvisual pollutants based on the calculated risk level for the project, with Risk Level 2 and 3 requiring a minimum of three samples per day during qualifying rain events (SWRCB 2009:Tables 5 and 6, 22–27), and mm)		

TABLE 4-4
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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		monitoring and reporting for linear projects as per Attachment A of the General Permit Results of this monitoring shall be reported annually to DTSC and to the Storm Water Multi-Application Reporting and Tracking System (SMARTS). The annual report shall include a summary and evaluation of all sampling and analysis results, original laboratory reports, and chain of custody forms; a summary of all corrective actions taken during the compliance year; and identification of any compliance activities or corrective actions that were not implemented. NEL Violation Reports and/or NAL Violation Reports are required for Risk Level 3 and linear underground/overhead project (LUP) Type 3 Discharges. Should the project meet these criteria, the respective reports shall be submitted within 5 days of the end of the storm event, as per General Permit requirements, and provide the required information identified (SWRCB 2009:26–27 and Attachment A). The implementation of stormwater plans shall include an education component to train workers on water quality concerns and proper BMP implementation, maintenance, and repair, in addition to stormwater management program training on the construction BMP plan and industrial SWPPP.		
	HYDRO-2	**Exceedance of Water Quality Standards and/or Waste Discharge Requirements.** Implement Mitigation Measure HYDRO-1. Implementation of appropriate BMPs defined in Mitigation Measure HYDRO-1 would minimize impacts on water quality by controlling erosion and siltation. Consequently, any impacts associated with erosion and siltation resulting from alterations of drainage and hydrology and water quality during construction, operation and maintenance, and decommissioning.	During construction, operation and maintenance, and decommissioning	SWPPP/BMP Plan and Monitoring and Reporting
	HYDRO-3	**Exceedance of Water Quality Standards and/or Waste Discharge Requirements.** Implement Mitigation Measure HYDRO-1. Mitigation Measure HYDRO- 1 shall be implemented. Implementation of appropriate BMPs defined in Mitigation Measure HYDRO-1 would minimize impacts on water quality by controlling	During construction, operation and maintenance, and decommissioning	SWPPP/BMP Plan and Monitoring and Reporting

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
		potential pollutants, including sediment, and runoff discharges from the project area. Consequently, any impacts associated with pollutants resulting from alterations of drainage and water quality during construction, operation and maintenance, and decommissioning.		
Noise	NOISE-1a	**Short-Term Groundborne Noise and Vibration Levels Caused by Construction Activities near Sensitive Receptors.** Construct new wells a minimum of 45 feet from vibration-sensitive receptors. Avoid constructing wells within 30 feet of vibration- sensitive land uses located in California and 275 feet of vibration- sensitive land uses located in Arizona;	Upon commencement of construction activities being performed in proximity to vibration-sensitive receptors	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	NOISE-1b	A disturbance coordinator will be designated by the project applicant, which will post contact information in a conspicuous location near the entrance so that it is clearly visible to nearby receivers most likely to be disturbed. The coordinator will manage complaints resulting from the construction vibration. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by the project applicant to ensure compliance with applicable standards. The disturbance coordinator will contact nearby vibration-sensitive receptors, advising them of the construction schedule.	Upon commencement of construction activities being performed in proximity to vibration-sensitive receptors	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	NOISE-2a	**Project-Generated Construction-Related Noise Levels.** Construction equipment shall be properly maintained per manufacturer specifications and fitted with the best available noise suppression devices (e.g., mufflers, silencers, wraps). All impact tools shall be shrouded or shielded, and all intake and exhaust ports on power equipment shall be muffled or shielded.	Upon commencement of construction activities being performed in proximity to vibration-sensitive receptors	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
	NOISE-2b	Construction equipment shall not idle for extended periods of time	Upon commencement of construction activities being performed in proximity to vibration-sensitive receptors	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	NOISE-2c	(more than 15 minutes) when not being utilized during construction activities. Construction activities shall include the use of berms, stockpiles, dumpsters, and or bins to shield the nearest noise-sensitive receptor adjacent to construction activities to within acceptable nontransportation noise level standards. When construction activities are conducted within the distances outlined above (i.e., 1,850 feet and 5,830 feet from California receptors and 330 feet and 735 feet from Arizona receptors for daytime and nighttime noise, respectively) relative to noise-sensitive uses in the project area, noise measurements shall be conducted by a qualified acoustical consultant at the nearest noise-sensitive land use relative to the construction activities with a sound level meter that meets the standards of the American National Standards Institute (ANSI Section S14 1979, Type 1 of Type 2) to ensure that construction noise associated with the project component complies with applicable daytime and nighttime noise standards. If noise levels are still determined to exceed noise standards, temporary barriers shall be erected as close to the construction activities as feasible, breaking the line of sight between the source and receptor where noise levels exceed applicable standards. All acoustical barriers shall be constructed with material having a minimum surface weight of 2 pounds per square foot or greater and a demonstrated Sound Transmission Class (STC) rating of 25 or greater as defined by the American Society for Testing and Materials' Test Method E90. Placement, orientation, size, and density of acoustical barriers shall be specified by a qualified acoustical consultant.	Upon commencement of construction activities being performed in proximity to vibration-sensitive receptors	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
	NOISE-2d	A disturbance coordinator will be designated by the project applicant, which will post contact information in a conspicuous location near construction areas so that it is clearly visible to nearby receivers most likely to be disturbed. In addition, mailing of the same information will be sent to nearby receptors and all tribes. The coordinator will manage complaints resulting from the construction noise. Reoccurring disturbances will be evaluated by a qualified acoustical consultant retained by the project applicant to ensure compliance with applicable standards. The disturbance coordinator will contact nearby noise- sensitive receptors, advising them of the construction schedule.	Upon commencement of construction activities being performed in proximity to vibration-sensitive receptors	Corrective Measure Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	NOISE-3a	**Land Use Compatibility of Future Project Noise Levels with Places of Worship and the Topock Cultural Area.** Provided that the proposed project would be required to achieve the normally acceptable exterior noise level standard for places of worship, the following mitigation measure shall be incorporated in the project design: Implement all of the mitigation measures outlined for Impact NOISE- 1 and Impact NOISE-2;	Prior to the commencement of construction activities being performed and on at least an annual basis	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration
	NOISE-3b	Upon completion of detailed project design, the determination of remediation activities and the schedule established to achieve these activities shall be communicated to Native American tribes. PG&E shall maintain a liaison with requesting Tribes to alert them to project activities that would generate new noise in the Topock Cultural Area on at least an annual basis.	Prior to the commencement of construction activities being performed and on at least an annual basis	Construction/Remedial Action Work Plan; Plan for Decommissioning and Removal of IM No. 3 Facility and Site Restoration (part of CIMP); Plan for Decommissioning of Remedial Facilities and Restoration

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Resources	Mitigation Number	Mitigation Measure	Timing/Schedule	Which Future Document(s) Will Contain or Satisfy This Measure?
Water Supply	WATER-1	**Depletion of Groundwater.** To mitigate potentially significant effects on local groundwater levels associated with the freshwater extraction wells, in the event that freshwater is to be supplied from wells rather than from a surface intake, a hydrologic analysis shall be conducted during the design phase of the project to evaluate the proposed pumping rates for extraction, the potential cone of depression, and the extraction effect on any existing wells in proximity. Proximity shall be defined by the cone of depression boundary of any well to be used in the extraction process. Extraction well location and/or extraction rates shall be adjusted during project design based on this analysis to ensure that extraction does not substantially adversely affect the production rates of existing nearby wells (e.g., adversely affect well production such that existing land uses would not be supported). It shall be demonstrated using computer simulations or other appropriate hydrologic analysis that production rates of existing nearby wells will not be substantially affected before the installation of any new freshwater extraction wells.	During final project design and before final approval of the design of this project component	Hydrologic Analysis; Design submittals

TABLE 4-4A
Correlation of Identified Action-Specific and Location-Specific ARARs and Future Documents
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Item No.[1]	Category[1]	Citation[1,2]	Determination[1]	Description and Applicability[1]	Triggering Event	Compliance Responsibility	Which existing/future document(s) will document continued compliance with this ARAR?	Overlaps with EIR MMRP? (see Table 4-4 for Correlation of EIR MM and Future Documents)
Location-Specific ARARs								
5	Federal Location-Specific	Federal Land Policy and Management Act - (FLPMA); 43 USC § 1701, et seq.; 43 CFR 2800	ARAR Applicable	In managing public lands, BLM is directed to take any action necessary to prevent unnecessary or undue degradation of the lands. Actions taken on the public land (i.e. BLM-managed land) portions of the Topock site should provide the "optimal balance between authorized resource use and the protection and long-term sustainability of sensitive resources."	Activities on public lands	BLM	Design submittals, Construction/ Remedial Action Work Plan, O&M Plan, Progress Reports, Decommissioning Plan	To be determined by BLM
7	Federal Location-Specific	National Wildlife Refuge System Administration Act, as amended - 16 USC §§ 668dd-ee; 50 CFR Part 27	ARAR Applicable	This Act governs the use and management of National Wildlife Refuges. The Act requires that FWS evaluate ongoing and proposed activities and uses to ensure that such activities are appropriate and compatible with both the mission of the overall National Wildlife Refuge System, as well as the specific purposes for which the Havasu National Wildlife Refuge was established. The Topock site includes portions of the Havasu National Wildlife Refuge. Prior to selection of a remedial action by DOI/FWS, that remedial action must be found by the Refuge Manager to be both an appropriate use of the Refuge and compatible with the mission of the Refuge and the Refuge System as a whole. Any remedial action proposed to be implemented on the Refuge that was not selected by DOI/FWS would be subject to the formal appropriate use/compatibility determination process.	Activities on the Refuge	USFWS/DOI	Design submittals, Construction/ Remedial Action Work Plan, O&M Plan, Progress Reports, Decommissioning Plan	To Be Determined by USFWS/DOI
13	Federal Location-Specific	Fish and Wildlife Coordination Act - 16 USC §§ 661-667e;	ARAR Applicable	This Act requires that any federally-funded or authorized modification of a stream or other water body must provide adequate provisions for conservation, maintenance, and management of wildlife resources and their habitat. Necessary measures should be taken to mitigate, prevent, and compensate for project-related losses of wildlife resources. Any remedial action selected for the Topock site that includes any modification of a water body will be subject to these requirements.	Any modification of a water body	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	No
14	Federal Location-Specific	National Historic Preservation Act - 16 USC § 470, et seq.; 36 CFR 800.1, et seq.	ARAR Applicable	This statute and the implementing regulations direct federal agencies to consider the effects of their undertakings on historic properties included in or eligible for inclusion in the National Register of Historic Places and to consult with certain parties before moving forward with the undertaking. The agency must determine, based on consultation, if an undertaking's effects would be adverse and consider feasible and prudent alternatives that could avoid, mitigate, or minimize such adverse effects on a National Register or eligible property. The agency must then specify how adverse effects will be avoided	Remedial action selected for the Topock site qualifies as an undertaking under NHPA	BLM, Advisory Council on Historic Preservation, California and Arizona State Historic Preservation Offices, FWS and PG&E are parties to the PA	PA, CHPMP, Design Submittals, Construction/Remedial Action Work Plan, Plan for decommissioning, removal, and restoration of IM No. 3 facility, Decommissioning Plan for Remedy Facilities and Restoration, Documents related to ongoing consultation, Brochure, Annual Report, Tribal Access Plan	CUL-1a, CUL-1b, CUL-2

TABLE 4-4A
Correlation of Identified Action-Specific and Location-Specific ARARs and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Item No.[1]	Category[1]	Citation[1,2]	Determination[1]	Description and Applicability[1]	Triggering Event	Compliance Responsibility	Which existing/future document(s) will document continued compliance with this ARAR?	Overlaps with EIR MMRP? (see Table 4-4 for Correlation of EIR MM and Future Documents)
				or mitigated or acknowledge that such effects cannot be avoided or mitigated. The Topock site includes historic properties in or eligible for inclusion in the National Register and remedial action selected for the Topock site qualifies as an undertaking pursuant to the NHPA. Measures to avoid or mitigate adverse effects of any selected remedial action that are adopted by the agency through consultation must be implemented by the remedial action to comply with the NHPA.				
17	Federal Location-Specific	National Archaeological and Historic Preservation Act - 16 USC § 469, et seq.; 36 CFR 65	ARAR Applicable	This statute requires the evaluation and preservation of historical and archaeological data which might otherwise be irreparably lost or destroyed through any alteration of terrain as a result of federal construction projects or a federally-licensed activity. The Topock site includes historical and archaeological data. Any remedial action selected for the Topock site must include measures for the evaluation and preservation of historical and archaeological data that might be lost or destroyed as a result of the remedial action.	Alteration of terrain that threatens significant scientific, historical or archaeological data.	Federal Agencies, PG&E	PA, CHPMP, Design Submittals, Construction/Remedial Action Work Plan	CUL-1a, CUL-1b, CUL-2
18	Federal Location-Specific	Archaeological Resources Protection Act - 16 USC § 470aa-ii, et seq.; 43 CFR 7.1, et seq.	ARAR Applicable	This statute provides for the protection of archeological resources located on public and tribal lands. The Act establishes criteria which must be met for the land manager's approval of any excavation or removal of archaeological resources if a proposed activity involves soil disturbances. The Topock site includes archaeological resources on public land. Any remedial action selected for the Topock site must satisfy the criteria applicable to excavation or removal of archaeological resources that might be affected as a result of the remedial action.	Disturbance of archaeological and historical sites	Federal Agencies, PG&E	PA, CHPMP, Design Submittals, Construction/Remedial Action Work Plan	CUL-1b, CUL-2
19	Federal Location-Specific	Historic Sites Act - 16 USC 461-467	ARAR Applicable	Pursuant to this Act, federal agencies are to consider the existence and location of historic sites, buildings, and objects of national significance using information provided by the National Park Service to avoid undesirable impacts upon such landmarks. There are no designated historic landmarks within the APE, although 16 USC 461, through Public Law 106-45, provides for a cooperative program "for the preservation of the Route 66 corridor" through grants and other measures. Undesirable impacts on this site that might result from any remedial action selected for the Topock site will be evaluated and mitigated to the maximum extent practicable.	Existence of a designated historic landmark	Federal Agencies	Reevaluate in design documents if designated historic landmark exist	Potential overlap with CUL-1b
21	Federal Location-Specific	Native American Graves Protection and Repatriation Act (NAGPRA) - 25 USC § 3001, et seq.; 43 CFR 10.1, et seq.	ARAR Applicable	NAGPRA establishes requirements regulating the removal and trafficking of human remains and cultural items, including funerary and sacred objects. The Topock site may contain human remains. If	Federal Lands only - Discovery of human remains	PG&E	PA, CHPMP	Overlaps with CUL-3 (Conduct Survey and Construction Monitoring) and CUL-4

TABLE 4-4A
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Item No.[1]	Category[1]	Citation[1,2]	Determination[1]	Description and Applicability[1]	Triggering Event	Compliance Responsibility	Which existing/future document(s) will document continued compliance with this ARAR?	Overlaps with EIR MMRP? (see Table 4-4 for Correlation of EIR MM and Future Documents)
				remediation activities result in the discovery of Indian human remains or related objects, NAGPRA requirements must be met.				
22	Federal Location-Specific	American Indian Religious Freedom Act - 42 USC § 1996, et seq.	ARAR Relevant and Appropriate	The United States must "protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise [their] traditional religions..." Any remedial action selected for the Topock site must satisfy this requirement.	Remedy selection	Federal Agencies (BLM Lead), PG&E	Tribal Access Plan	Overlaps with CUL-1a-2 (Access Plan)
27	Federal Location-Specific	Resource Conservation and Recovery Act - 42 USC § 6901, et.seq.; 40 CFR 264.18	ARAR Applicable	These regulations promulgated under RCRA establish Seismic and Floodplain considerations which must be followed for treatment, storage, or disposal facilities constructed, operated, or maintained within certain distances of fault lines and floodplains. Portions of the Topock site are located on or near a 100-year floodplain.	Infrastructure in 100-year floodplain/ regulatory floodway	PG&E	Design submittals	Overlaps with BIO-1 (Potential Fill of Wetlands and Other Waters of the US and Disturbance or Removal of Riparian Habitat)
43	Arizona Location-Specific	Archeological Discoveries - A.R.S. § 41-841 through 847	ARAR	This Act prohibits any person from knowingly excavating on Arizona State or State agency owned land which is a historic or prehistoric ruin, burial ground, archaeological or paleontological site. These requirements will apply if the selected remedy involves excavation in Arizona.	Only if remedy in Arizona - Discovery of any archaeological, paleontological or historical site or object (including human remains) that is at least fifty years old	PG&E	PA, CHPMP, Construction/ Remedial Action Work Plan	Overlaps with CUL-2 (Location of Unique Archaeological Resources and Void Resources), CUL-3 (Conduct Survey and Construction Monitoring), and CUL-4
44	Arizona Location-Specific	Historic Preservation - A.R.S. § 41-865	ARAR	This Act restricts any person from disturbing human remains or funerary objects on lands other than lands[2] owned or controlled by the State. These requirements will apply if the selected remedy involves excavation in Arizona.	Only if remedy in Arizona on private lands - Discovery of human remains/funerary objects	PG&E	PA	Overlaps with CUL-3 (Conduct Survey and Construction Monitoring) and CUL-4
63	California Location-Specific	Seismic and Floodplain standards - Title 22, CCR, Div 4.5, Ch 14, Article 2, §66264.18	ARAR Relevant and Appropriate	These standards are relevant and appropriate for TSD facilities constructed, operated, or maintained within certain distances of fault lines, floodplains, or the maximum high tide.	Infrastructure in 100-year floodplain/regulatory floodway	PG&E	Design submittals, Construction/ Remedial Action Work Plan	Potential overlaps with BIO-1 (Potential Fill of Wetlands and Other Waters of the US and Disturbance or Removal of Riparian Habitat)
Action-Specific								
31	Federal Action-Specific	Federal Safe Drinking Water Act - 42 USC §300f, et seq. Part C – Protection of Underground Sources of Drinking Water; 40 CFR 144-148	ARAR Applicable	These Underground Injection Control Regulations assure that any underground injection performed on-site will not endanger drinking water sources. Substantive requirements include, but are not limited to, regulation of well construction and well operation. These requirements will be applicable if underground injection is proposed as a part of a site remedy.	Underground injection activities	PG&E	Filing of inventory of injection wells	No
32	Federal Action-Specific	Federal Water Pollution Control Act (Clean Water Act) - 33 USC § 1344 ; 40 CFR 230.10	ARAR Applicable	This section of the Clean Water Act prohibits certain activities with respect to on-site wetlands and waterways. No discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed activity which would have less	Activities that occur in the Colorado River or in jurisdictional waters of the United States that result in discharge of dredged or fill	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	Potential overlap with BIO-1 (Potential Fill of Wetlands and Other Waters of the US and Disturbance or Removal of Riparian Habitat)

TABLE 4-4A
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Item No.[1]	Category[1]	Citation[1,2]	Determination[1]	Description and Applicability[1]	Triggering Event	Compliance Responsibility	Which existing/future document(s) will document continued compliance with this ARAR?	Overlaps with EIR MMRP? (see Table 4-4 for Correlation of EIR MM and Future Documents)
				adverse impact to the aquatic ecosystem.	material			
33	Federal Action-Specific	Federal Water Pollution Control Act (Clean Water Act) - 33 USC § 1342; 40 CFR 122; 40 CFR 125	ARAR Applicable	These National Pollutant Discharge Elimination System (NPDES) requirements regulate discharges of pollutants from any point source into waters of the United States.	Point source discharges to waters of the US.	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	Potential overlap with HYDRO-1 (Exceedance of Water Quality Standards)
34	Federal Action-Specific	Federal Water Pollution Control Act (Clean Water Act) - 40 CFR 122.26	ARAR Applicable	These regulations define the necessary requirements with respect to the discharge of storm water under the NPDES program. These regulations will apply if proposed remedial actions result in storm water runoff which comes in contact with any construction activity from the site remediation.	Ground disturbance as a result of construction is > 1 acre	PG&E	SWPPP, BMP Plans and Monitoring & Reporting, Construction/Remedial Action Work Plan, Plan for Decommissioning and Removal of IM No. 3 and Site Restoration, Decommissioning Plan for Remedy Facilities and Restoration	Overlap with GEO-1a (Construction, O&M, and Decommissioning Impacts Related to Erosion of Soil); GEO-1b (Construction, O&M, and Decommissioning Impacts Related to Differential Compaction of Soil); HYDRO-1 (Exceedance of Water Quality Standards)
35	Federal Action-Specific	River and Harbor Act of 1899 - 33 USC §§ 401 and 403	ARAR Applicable	This Act prohibits the creation of any obstruction in navigable waters, in addition to banning activities such as depositing refuse, excavating, filling, or in any manner altering the course, condition, or capacity of navigable waters. These requirements will apply if proposed activities at the Topock site have the potential of affecting any navigable waters on the site.	Activities with the potential to affect any navigable waters on the site	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	No
38	Federal Action-Specific	Clean Air Act - USC §§ 7401, et seq. (National Emission Standards for Hazardous Air Pollutants (NESHAP)); 40 CFR 61; 40 CFR 63	ARAR Applicable	NESHAPs are regulations which establish emissions standards for certain hazardous air pollutants (HAPs) identified in the regulations. NESHAPs will apply if remediation activities on the site produce identified HAP emissions.	Activities produce identified HAP emissions	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	No
39	Federal Action-Specific	Religious Freedom Restoration Act - 42 USC § 2000bb	ARAR Applicable	Pursuant to this Act, the government shall not substantially burden a person's exercise of religion, unless the application of the burden is in furtherance of a compelling government interest, and it is the least restrictive means of furthering that interest. To constitute a "substantial burden" on the exercise of religion, a government action must (1) force individuals to choose between following the tenets of their religion and receiving a governmental benefit or (2) coerce individuals to act contrary to their religious beliefs by the threat of civil or criminal sanctions. If any remedial action selected imposes a substantial burden on a person's exercise of religion, it must be in furtherance of a compelling government interest and be the least restrictive means of achieving that interest.	Activities with the potential to impose a substantial burden on a person's exercise of religion	DOI/BLM	Design submittals, Construction/ Remedial Action Work Plan, O&M Plan, Progress Reports, Decommissioning Plan	To Be Determined by DOI/BLM
40	Federal Action-Specific	Endangered Species Act of 1973 - 16 USC §§ 1531-1544; 50 CFR 402	ARAR Applicable	The ESA makes it unlawful to remove or "take" threatened and endangered plants and animals and protects their habitats by prohibiting certain activities. Examples of such species in or around the Topock	Expiration of existing PBA (end of 2012) or construction of remedy, whichever is	DOI/FWS/PG&E	PBA, Construction/Remedial Action Work Plan, Plan for decommissioning, removal, and restoration of IM No. 3 facility,	Overlaps with BIO-2a (Disturbance of Special Status Birds and Loss of Habitat); BIO-2b (Disturbance of Desert

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				site may include, but are not limited to, southwestern willow flycatcher, Mojave Desert tortoise, Yuma clapper rail, Colorado pike minnow, razorback sucker, and bonytail chub. Any remedial action selected for the Topock site will not result in the take of, or adverse impacts to, threatened and endangered species or their habitats, as determined based on consultation with the Fish and Wildlife Service under section 7 of the ESA.	sooner		Decommissioning Plan for Remedy Facilities and Restoration	Tortoise and Loss of Habitat); BIO-2c (Disturbance of Special Status Species and Loss of Habitat Caused by Decommissioning)
41	Federal Action-Specific	Migratory Bird Treaty Act - 16 USC 703-712	ARAR Applicable	This Act makes it unlawful to "take, capture, kill," or otherwise impact a migratory bird or any nest or egg of a migratory bird. The Havasu National Wildlife Refuge, which is part of the Topock site, was created as a refuge and breeding ground for migratory birds and other wildlife, therefore, there is potential for contact with migratory birds during proposed remediation activities. Any remedial action selected for the Topock site will be designed and implemented so as to not take, capture, kill, or otherwise impact a migratory bird, nest, or egg.	Remedial action for Topock site	PG&E	Construction/Remedial Action Work Plan, Plan for decommissioning, removal, and restoration of IM No. 3 facility, Decommissioning Plan for Remedy Facilities and Restoration	Overlaps with BIO-2a (Disturbance of Special Status Birds and Loss of Habitat); BIO-2c (Disturbance of Special Status Species and Loss of Habitat Caused by Decommissioning)
74	California Action-Specific	Hazardous Waste Control Act (HWCA) - Standards applicable to generators of hazardous waste Title 22, CCR, Div 4.5, Ch 12, Article 1, §66262.11	ARAR Applicable	Owners or operators who generate waste shall determine whether waste is a hazardous waste. Applicable for any operation where waste is generated. The determination of whether wastes generated during remedial activities are hazardous shall be made when the wastes are generated.	Activity that generates waste that could potentially be hazardous	PG&E	O&M Plan, Construction/ Remedial Action Work Plan, Plan for Decommissioning and Removal of IM3 Facility and Site Restoration; Decommissioning Plan for Remedy Facilities and Restoration	No
75	California Action-Specific	Hazardous Waste Control Act (HWCA) - Title 22, CCR, Div 4.5, Ch 12, Article 1, §66262.12	ARAR Applicable	A generator shall not treat, store, dispose of, transport or offer for transportation, hazardous waste without having received an identification number. Substantive requirements will be applicable for any operation where waste is generated. The determination of whether wastes generated during remedial activities are hazardous shall be made when the wastes are generated.	Activity that generates waste that could potentially be hazardous	PG&E	EPA ID Number	No
76	California Action-Specific	Hazardous Waste Control Act (HWCA) - Standards for owners and operators of hazardous waste transfer and TSD facilities Title 22, CCR, Div 4.5, Ch 14, Article 2	ARAR Applicable	Establish requirements for a hazardous waste treatment facility to have a plan for waste analysis, develop a security system, conduct regular inspections, provide training to facility personnel, and use a quality assurance program during construction. The requirements may be applicable if CERCLA response action includes treatment, storage, or disposal as defined under RCRA, or may be relevant and appropriate if the requirements address problems or situations sufficiently similar to the specific circumstances at the site that their usage will be well suited.	Activity associated with construction and operation of a treatment facility or long term (longer than 90 days) storage of haz waste If waste is simply removed, stored in appropriate containers after characterization, and removed off-site within 90 days, PG&E will be required to follow the	PG&E	O&M Plan, Construction/ Remedial Action Work Plan, Plan for Decommissioning and Removal of IM3 Facility and Site Restoration; Decommissioning Plan for Remedy Facilities and Restoration	Overlaps with HAZ-1a (Spills or releases of contaminants during O&M activities); HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil); and CUL-1a-3b (Security Plan)

TABLE 4-4A
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					substantive requirements of a generator, including use of manifests, record keep, segregation of incompatibles, etc.			
77	California Action-Specific	Hazardous Waste Control Act (HWCA) - Standards applicable to generators of hazardous waste Title 22, CCR, Div 4.5, Ch 12, Article 2, §66262.20, §66262.22	ARAR Applicable	A generator of hazardous waste who transports or offers hazardous waste for transportation shall prepare a manifest. Substantive requirements will be applicable for any operation where waste is generated. The determination of whether wastes generated during remedial activities are hazardous shall be made when the wastes are generated.	Preparation of offsite shipment of hazardous waste	PG&E	O&M Plan, Construction/ Remedial Action Work Plan, Plan for Decommissioning and Removal of IM3 Facility and Site Restoration; Decommissioning Plan for Remedy Facilities and Restoration	Overlaps with HAZ-1a (Spills or releases of contaminants during O&M activities); HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
78	California Action-Specific	Hazardous Waste Control Act (HWCA) - Standards applicable to generators of hazardous waste Title 22, CCR, Div 4.5, Ch 12, Article 3, §66262.30, §66262.31, §66262.32, §66262.33	ARAR Applicable	Before transporting hazardous waste or offering hazardous waste for transportation off-site, the generator must do the following in accordance with DOT regulations: package the waste, label and mark each package of hazardous waste, and ensure that the transport vehicle is correctly placarded.	Preparation of offsite shipment of hazardous waste	PG&E	O&M Plan, Construction/ Remedial Action Work Plan, Plan for Decommissioning and Removal of IM3 Facility and Site Restoration; Decommissioning Plan for Remedy Facilities and Restoration	Overlaps with HAZ-1a (Spills or releases of contaminants during O&M activities); HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
79	California Action-Specific	Hazardous Waste Control Act (HWCA) - Standards applicable to generators of hazardous waste Title 22, CCR, Div 4.5, Ch 12, Article 3, §66262.34	ARAR Applicable	Requirements with respect to accumulation of waste on-site.	Accumulation of hazardous waste onsite	PG&E	O&M Plan, Construction/ Remedial Action Work Plan, Plan for Decommissioning and Removal of IM3 Facility and Site Restoration; Decommissioning Plan for Remedy Facilities and Restoration, Operations documents (e.g., manifests, inspection records)	Overlaps with HAZ-1a (Spills or releases of contaminants during O&M activities), HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
80	California Action-Specific	Hazardous Waste Control Act (HWCA) - Standards applicable to generators of hazardous waste Title 22, CCR, Div 4.5, Ch 12, Article 4, §66262.40, §66262.41	ARAR Applicable	Establishes requirements for record keeping of manifests, test results, waste analyses, and Biennial Reports. Any substantive requirements shall be attained.	Activity generating hazardous waste	PG&E	O&M Plan, Construction/ Remedial Action Work Plan, Plan for Decommissioning and Removal of IM3 Facility and Site Restoration; Decommissioning Plan for Remedy Facilities and Restoration, Operations documents (e.g., manifests, waste profiling records)	Overlaps with HAZ-1a (Spills or releases of contaminants during O&M activities), HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
81	California Action-Specific	Corrective Action - Title 22, CCR, Div 4.5, Ch 14, Article 6, §66264.100 (a) through (d), (f), (g)(1), and (h)	ARAR Relevant and Appropriate	The owner or operator is required to take corrective action under Title 22, CCR, §66264.91 to remediate releases from the regulated unit and to ensure that the regulated unit achieves compliance with the water quality protection standard. Substantive technical requirements are potentially relevant and appropriate for remedial action including groundwater monitoring.	Remedy implementation	PG&E	O&M Plan (sampling and monitoring plan, contingency plan), Progress Reports, Corrective Measure/Remedial Action Completion Report	No
82	California Action-Specific	Corrective Action for Waste Management Units - Title 22, CCR, Div 4.5, Ch 14, Article 6,	ARAR Relevant and Appropriate	The owner or operator is required to take corrective action to remediate releases from any solid or hazardous waste management unit at the facility to	Remedy implementation	PG&E	O&M Plan (sampling and monitoring plan, contingency plan), Progress Reports,	No

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		§66264.101		protect public health and the environment. Substantive technical requirements are potentially relevant and appropriate for remedial action including groundwater monitoring.			Corrective Measure/Remedial Action Completion Report	
83	California Action-Specific	Closure and post-closure care - Title 22, CCR, Div 4.5, Ch 14, Article 7, §66264.111, §66264.112, §66264.115 through 120	ARAR Applicable	Owners and operators shall close a facility and perform post-closure care when contaminated subsurface soil cannot be practically removed or decontaminated. Contaminated soil, residues, or groundwater from remedial action at a site will achieve clean closure; otherwise, post-closure care requirements will be relevant and appropriate.	Decommissioning	PG&E	Plan for Decommissioning and Removal of IM3 Facility and Site Restoration, Decommissioning Plan for Remedy Facility and Site Restoration.	No
84	California Action-Specific	Use and management of containers - Title 22, CCR, Div 4.5, Ch 14, Article 9	ARAR Applicable	Containers used for the transfer or storage of hazardous waste must be in good condition, compatible with the waste, kept closed except to add or remove materials and be inspected weekly. The area used to store the containers must provide adequate secondary containment and be designed with runoff controls. Also, appropriate closure of the containers must take place.	Design and management of hazardous waste containers	PG&E	Design Submittals; O&M Plan; Corrective Measure/Remedial Action Work Plan.	Overlaps with HAZ-1 (Spills or releases of contaminants during O&M activities), HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
85	California Action-Specific	Tank systems - Title 22, CCR, Div 4.5, Ch 14, Article 10	ARAR Applicable	The remedial activities may involve storage and/or treatment in tanks. These tanks are required to have secondary containment, be monitored and inspected, be provided with overfill and spill protection controls, and operated with adequate freeboard. Also, appropriate closure must take place.	During project design, operation and maintenance activities where tank systems are used to transfer, store or treat hazardous waste	PG&E	Design Submittals; O&M Plan; Corrective Measure/Remedial Action Work Plan.	Overlaps with HAZ-1 (Spills or releases of contaminants during O&M activities), HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
86	California Action-Specific	Waste piles - Title 22, CCR, Div 4.5, Ch 14, Article 12	ARAR Applicable	The waste piles should be placed upon a lined foundation or base with a leachate system, protected from precipitation and wind dispersal, designed to prevent run on and run off. Also, closure and post-closure care requirements. Remedial action may involve soil excavation and the compiling of soil in a temporary waste pile. This requirement is applicable if the excavated waste meets RCRA hazardous waste criteria.	Under broad application, a triggering event could be any temporary stockpiling of haz soil	PG&E	Soil Management Plan	Potential overlap with HAZ-2c (Soil Management Plan)
87	California Action-Specific	Landfills - Title 22, CCR, Div 4.5, Ch 14, Article 14	ARAR Relevant and Appropriate	The requirements for landfills include the design and operation, action leakage rate, monitoring and inspection, response actions, surveying and recordkeeping and closure and post-closure care.	Design, construct, O&M, and closure of landfills (66260.10 defines "Landfill" as a disposal facility or part of a facility where hazardous waste is placed in or on land and which is not a pile, a land treatment facility, a surface impoundment, an underground injection well, a salt dome formation, a salt bed formation, an underground mine, a cave, or	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	No

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					a corrective action management unit.)			
88	California Action-Specific	Miscellaneous Units - Title 22, CCR, Div 4.5, Ch 14, Article 16	ARAR Applicable	Applies to waste management unit not otherwise regulated under RCRA. It may include pumps, auxiliary equipment, air strippers, etc. The substantive requirements include design, construction, operation, maintenance and closure of the unit that will ensure protection of human health and the environment. The actions include general inspections for safety and operation efficiency, testing and maintenance of the equipment (including testing of warning systems). Applicable if pumps are used for extraction and treatment of leachate that meets RCRA hazardous waste criteria.	Design, construct, O&M, and closure of waste management units not otherwise regulated under RCRA	PG&E	Design Submittals; O&M Plan; Corrective Measure/Remedial Action Work Plan	Overlaps with HAZ-1 (Spills or releases of contaminants during O&M activities), HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
89	California Action-Specific	Land Disposal Restrictions (LDR) for RCRA wastes and non-RCRA wastes - Title 22, CCR, Div 4.5, Ch 18, Articles 1, 3, 4, 10, 11	ARAR Applicable	Movement of hazardous waste to new locations and placed in or on land will trigger LDR. General applicability, dilution prohibited, waste analysis and record keeping, and special rules apply for wastes that exhibit a characteristic waste. Best Demonstrated Available Technology (BDA) standards for each hazardous constituent in each listed waste, if residual is to be disposed. Utilize treatment standards table when necessary. Where applicable, hazardous waste generated from remedial activities must comply with LDR and meet the treatment standards or notify the disposal facility of the treatment standards before disposal at an appropriate offsite disposal facility.	Activity that generates hazardous waste	PG&E	O&M Plan, Construction/ Remedial Action Work Plan; Plan for Decommissioning and Removal of IM3 Facility and Site Restoration; Decommissioning Plan for Remedy Facilities and Restoration	Overlaps with HAZ-1 (Spills or releases of contaminants during O&M activities), HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
90	California Action-Specific	Hazardous Waste Control Act (HWCA) - Standards for owners and operators of hazardous waste transfer and TSD facilities, Title 22, CCR, Div 4.5, Ch 14, Articles 3 and 4	ARAR Applicable	Establish requirements for a facility to plan for emergency conditions. In addition, the design and operation of the facility must be done to prevent releases. Other requirements include testing and maintenance of equipment and incorporation of communication and alarm systems and contingency plan. The requirements may be applicable if CERCLA response action includes treatment, storage, or disposal as defined under RCRA, or may be relevant and appropriate if the requirements address problems or situations sufficiently similar to the specific circumstances at the site that their usage will be well suited.	Design, construction, operation and maintenance of the remedy	PG&E	Design submittals; Project-specific HMBP; O&M Plan; Construction/Remedial Action Work Plan	Overlaps with HAZ-1 (Spills or releases of contaminants during O&M activities), HAZ-2 (Reasonably Foreseeable Releases of Chemicals from Excavated or Disturbed Soil)
91	California Action-Specific	Hazardous Waste Control Act (HWCA) - Groundwater monitoring and response, Title 22, CCR, Div 4.5, Ch 14, Article 6, §66264.91 (a) and (c)	ARAR Relevant and Appropriate	Owners or operators of a RCRA surface impoundment, waste pile, land treatment unit, or landfill shall conduct a monitoring and response program for each regulated unit. Substantive technical requirements are potentially relevant and appropriate for remedial action including groundwater monitoring.	Design, construction, operation and maintenance of the remedy	PG&E	Design submittals, O&M Plan (sampling and monitoring plan, contingency plan); Construction/ Remedial Action Work Plan, Progress Reports	Overlaps with HYDRO-1 (Corrective Action Monitoring Program)
92	California	Hazardous Waste Control Act	ARAR Relevant	Requirements for monitoring groundwater, surface	Design, operation and	PG&E	Design submittals, O&M Plan	Overlaps with HYDRO-1

TABLE 4-4A
Correlation of Identified Action-Specific and Location-Specific ARARs and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Item No.[1]	Category[1]	Citation[1,2]	Determination[1]	Description and Applicability[1]	Triggering Event	Compliance Responsibility	Which existing/future document(s) will document continued compliance with this ARAR?	Overlaps with EIR MMRP? (see Table 4-4 for Correlation of EIR MM and Future Documents)
	Action-Specific	(HWCA) - Monitoring, Title 22, CCR, Div 4.5, Ch 14, Article 6, §66264.97 (b), (c), (d) and (e)(1) through (e)(5)	and Appropriate	water, and vadose zone. Substantive technical requirements are potentially relevant and appropriate for remedial action including groundwater monitoring.	maintenance of the remedy		(sampling and monitoring plan, contingency plan); Progress Reports	(Corrective Action Monitoring Program)
93	California Action-Specific	Hazardous Waste Control Act (HWCA) - Detection Monitoring Title 22, CCR, Div 4.5, Ch 14, Article 6, §66264.98	ARAR Relevant and Appropriate	Requires the owner or operator of a regulated unit to develop a detection monitoring program that will provide reliable indication of a release. Substantive technical requirements are potentially relevant and appropriate for remedial action including groundwater monitoring.	Design, operation and maintenance of the remedy	PG&E	Design submittals, O&M Plan (sampling and monitoring plan, contingency plan); Progress Reports	Overlaps with HYDRO-1 (Corrective Action Monitoring Program)
94	California Action-Specific	Hazardous Waste Control Act (HWCA) - Evaluation Monitoring, Title 22, CCR, Div 4.5, Ch 14, Article 6, §66264.99	ARAR Relevant and Appropriate	Requires the owner or operator of a regulated unit to develop an evaluation monitoring program that can be used to assess the nature and extent of a release from the unit. Substantive technical requirements are potentially relevant and appropriate for remedial action including groundwater monitoring.	Design, operation and maintenance of the remedy	PG&E	Design submittals, O&M Plan (sampling and monitoring plan, contingency plan); Progress Reports	Overlaps with HYDRO-1 (Corrective Action Monitoring Program)
95	California Action-Specific	Discharges of Waste to Land - Title 23 CCR, Div 3, Ch 15	ARAR Relevant and Appropriate	The regulations in this chapter pertain to water quality aspects of hazardous waste discharge to land, establishing waste and site classifications and waste management requirements for waste treatment, storage, or disposal in landfills, surface impoundments, waste piles, and land treatment facilities. Requirements in this chapter are minimum standards for proper management of each waste category. Pursuant to Section 2511 (Exemptions), because this remediation constitutes actions taken by public agencies to cleanup unauthorized releases of waste, these regulations will only apply if the proposed remedial activities include (1) removal of waste from the immediate place of release, or (2) keeping some contamination in place.	Activities involve (1) removal of waste from the immediate place of release, or (2) keeping some contamination in place.	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	No
96	California Action-Specific	Consolidated Regulations for Storage, Treatment, Processing, or Disposal of Solid Waste - Title 27 CCR, Div 2, Subdivision 1	ARAR Relevant and Appropriate	The regulations in this subdivision (promulgated by the State Water Resources Control Board (SWRCB)) pertain to water quality aspects of discharges of solid waste to land for treatment, storage, or disposal. Pursuant to Section 20090 (Exemptions), because this remediation constitutes actions taken by public agencies to cleanup unauthorized releases of waste, these regulations will only apply if the proposed remedial activities include (1) removal of waste from the immediate place of release, or (2) keeping some contamination in place.	Activities involve (1) removal of waste from the immediate place of release, or (2) keeping some contamination in place.	PG&E	N/A. No further action required unless design change triggers; reconfirm in design submittals.	No
97	California Action-Specific	Requirements for land-use covenants - Cal. Code Regs. Title 22, § 67391.1	ARAR Applicable	This regulation requires appropriate restrictions on use of property in the event that a proposed remedial alternative results in hazardous materials remaining at the property at levels which are not suitable for unrestricted use of the land. This is an ARAR with	A decision document finding that hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the	DTSC	A land use covenant imposing appropriate limitations on land use shall be executed and recorded when hazardous materials, hazardous wastes or	No

TABLE 4-4A
Correlation of Identified Action-Specific and Location-Specific ARARs and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Item No.[1]	Category[1]	Citation[1,2]	Determination[1]	Description and Applicability[1]	Triggering Event	Compliance Responsibility	Which existing/future document(s) will document continued compliance with this ARAR?	Overlaps with EIR MMRP? (see Table 4-4 for Correlation of EIR MM and Future Documents)
				respect to PG&E-owned land at the Topock site.	property at levels which are not suitable for unrestricted use of the land.		constituents, or hazardous substances will remain at the property at levels which are not suitable for unrestricted use of the land. The land use restrictions must be clearly stated in any response action decision document approved by DTSC. The following information must be specified: (1) the limitations or controls that will be incorporated into an appropriate land use covenant and (2) a description of the implementation and enforcement provisions, including but not limited to frequency of inspections and reporting requirements, necessary to ensure the integrity and long-term protectiveness of the land use covenant.	
98	California Action-Specific	California Water Code - Section 1380[c], California Well Standards, Bulletin 74-90 (Supplement to Bulletin 74-81)	ARAR Applicable	These standards for water, cathodic, and monitoring wells will be applicable if the remediation requires use of such wells.	Design, construction, decommission of groundwater wells	PG&E	Design submittals, Construction/ Remedial Action Work Plan, Plan for Decommissioning of IM No. 3 Facility and Site Restoration, Decommissioning Plan for Remedy Facility and Site Restoration.	No
99	California Action-Specific	State Water Resources Control Board Resolution No. 88-63 Adoption of Policy Entitled "Sources of Drinking Water"	ARAR Applicable	With certain exceptions, all surface and ground waters of the State of California are to be considered suitable, or potentially suitable, for municipal or domestic water supply. The Regional Water Quality Control Board and State Water Resources Board have designated the beneficial use of the ground and surface waters in the Topock Site area as "municipal and domestic water supply." This designation is set forth in the Basin Plan.	Remedy implementation	PG&E	O&M Plan (sampling and monitoring plan, contingency plan), Progress Reports, Corrective Measure/Remedial Action Completion Report	Overlaps with HYDRO-1 (Corrective Action Monitoring Program)
100	California Action-Specific	Water Quality Control Plan; Colorado River Basin-Region 7, June 2006 (Basin Plan)	ARAR Applicable	This Basin Plan designates the Colorado River and the Colorado Hydrologic unit as having the beneficial use of "MUN" (or, municipal or domestic water supply). The Basin Plan also prescribes General Surface Water Objectives and Ground Water Objectives, in addition to Specific Surface Water Objectives for the Colorado River, which include a flow-weighted average annual numeric criterion for salinity for the portion of the Colorado River on the Topock Site of 723 mg/L. This TDS value must not be exceeded in any remedial alternative being	Remedy implementation	PG&E	O&M Plan (sampling and monitoring plan, contingency plan), Progress Reports, Corrective Measure/Remedial Action Completion Report	Overlaps with HYDRO-1 (Corrective Action Monitoring Program)

TABLE 4-4A
Correlation of Identified Action-Specific and Location-Specific ARARs and Future Documents
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Item No.[1]	Category[1]	Citation[1,2]	Determination[1]	Description and Applicability[1]	Triggering Event	Compliance Responsibility	Which existing/future document(s) will document continued compliance with this ARAR?	Overlaps with EIR MMRP? (see Table 4-4 for Correlation of EIR MM and Future Documents)
				considered				
101	California Action-Specific	State Water Resources Control Board Resolution No. 68-16 ("Antidegradation Policy") - Statement of Policy with respect to Maintaining High Quality of Waters in California	ARAR Applicable	Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.	Remedy implementation	PG&E	O&M Plan (sampling and monitoring plan, contingency plan), Progress Reports, Corrective Measure/Remedial Action Completion Report	Overlaps with HYDRO-1 (Corrective Action Monitoring Program)
102	California Action-Specific	State Water Resources Control Board Resolution No. 92-49 -- Policies and Procedures for investigation and Cleanup and Abatement of Discharges under Water Code Section 13304	ARAR Relevant and Appropriate	Section III.A of this Resolution states that the Regional Water Board shall" "concur with any investigative and abatement proposal which the discharger demonstrates and the Regional Water Board finds to have a substantial likelihood to achieve compliance within a reasonable time frame…"	Remedy implementation	PG&E	Corrective Measure/Remedial Action Completion Report	Overlaps with HYDRO-1 (Corrective Action Monitoring Program)

Notes:
[1] Source: Table 2 of the Groundwater Record of Decision, Pacific Gas and Electric Company Topock Compressor Station, Needles, San Bernardino County, California, December 2010.
[2] As corrected by the Department of the Interior.
N/A = Not Applicable.

TABLE 4-5
Packaging and Content of Selected Key Technical Documents During Design
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

A. Submittals Required by 1996 CACA/2009 Model CD/Settlement Agreement (see Figure 4-1 and Tables 4-1a/4-2a for submittal schedule)

Preliminary Design Package (For Review/Comment Only)	Intermediate Design Package (For Review/Comment Only)	Final Design Package (For DTSC/DOI Approval)
• **Prelim Basis of Design Report** - Design assumptions, calculations - Design criteria - O&M provisions - Additional design data mapped, surveyed, or collected post Corrective Measures Study/Feasibility Study (CMS/FS) - Equipment list - Long-lead procurement considerations - Updated schedule and cost estimates • **Prelim Plans** - Site plans - Engineering/architectural drawings - Process flow diagrams (PFDs) - Process and instrumentation diagrams (P&IDs) • **Prelim Specifications** - List of specifications/Format of specifications	• **Intermediate Basis of Design Report** - Design assumptions, calculations - Design criteria - Additional design data mapped, surveyed, or collected post CMS/FS - Equipment list - Long-lead procurement considerations - Updated schedule and cost estimates • **Intermediate Plans** - Site plans - Engineering/architectural drawings - Excavation/earthwork drawings - PFDs - P&IDs • **Intermediate Specifications** - Draft specifications	• **Final Basis of Design Report** - Design assumptions, calculations - Design criteria - Additional design data mapped, surveyed, or collected post CMS/FS - Equipment list - Long-lead procurement considerations - Updated schedule and cost estimates • **Final Plans** - Site plans - Engineering/architectural drawings - Excavation/earthwork drawings - Construction/installation drawings - PFDs - P&IDs • **Final Specifications** - Detailed specifications
	Draft O&M Plan **(For Review/Comment Only – To be submitted concurrent with Intermediate Design Package)**	**Final O&M Plan** **(For DTSC/DOI Approval – To be submitted concurrent with Final Design Package)**
	• Project management and organization • Communication procedures and protocols • System description • Personnel training • Start-up procedures • O&M procedures - description of tasks for operation and maintenance, description of prescribed treatment or operation conditions, O&M schedule • Equipment replacement schedule • Waste management practices, including types of wastes to be generated and how each type of waste will be managed • Sampling and monitoring plan during system operation (including data quality objectives, Quality Assurance Project Plan) • O&M Quality Assurance Project Plan (QAPP) • Corrective measure completion criteria • O&M contingency plans to address potential failure modes, e.g., - Related to attainment of RAOs and ARARs compliance - Related to system breakdowns and operational problems - Related to major operational problems and is not performing to design specifications - Related to unforeseen events that prevent the operation of the groundwater remedy (e.g., acts of God like earthquakes, flooding, fires) • Data management and documentation requirements, including a description of how analytical data and results will be evaluated, documented, and managed • Details for the collection/maintenance of information	• Project management and organization • Communication procedures and protocols • System description • Personnel training • Start-up procedures • O&M procedures - description of tasks for operation and maintenance, including well rehabilitation methods and chemicals use, description of prescribed treatment or operation conditions, O&M schedule • Equipment replacement schedule • Waste management practices, including types of wastes to be generated and how each type of waste will be managed • Sampling and monitoring plan during system operation (including data quality objectives, Quality Assurance Project Plan) • O&M Quality Assurance Project Plan (QAPP) • Corrective measure completion criteria • O&M contingency plans to address potential failure modes, e.g., - Related to attainment of RAOs and ARARs compliance - Related to system breakdowns and operational problems - Related to major operational problems and is not performing to design specifications - Related to unforeseen events that prevent the operation of the groundwater remedy (e.g., acts of God like earthquakes, flooding, fires) • Data management and documentation requirements, including a description of how analytical data and results will be evaluated, documented, and managed

TABLE 4-5
Packaging and Content of Selected Key Technical Documents During Design
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

	• Summary of access, approvals, and substantive requirements of ARARs associated with permits (e.g., Report of Waste Discharge)	• Details for the collection/maintenance of information • Summary of access, approvals, and substantive requirements of ARARs associated with permits (e.g., Report of Waste Discharge)
		Draft/Final Construction/Remedial Action Work Plan **(For DTSC/DOI Approval – To be submitted concurrent with Final Design Package)**
		• Project management and organization (including method for selecting contractor) • Communication procedures and protocols • Project schedule, including timing of key elements for bidding purposes, timing of the initiation and completion of all major tasks, and when the construction completion report will be submitted • Construction QAPP which is intended to ensure that the groundwater remedy will meet all design criteria, plans, and specifications • Waste management procedures, including addressing how wastes generated during construction will be managed • Site preparation and field work standards(including decontamination procedures) • Sampling and monitoring plan during construction • Construction contingency plans to address potential failure modes, e.g., - Related to changes to the design and/or specifications due to issues that may arise during construction - Related to unforeseen events that prevent the construction of the groundwater remedy (e.g., acts of God like earthquakes, flooding, fires) • Data management and documentation requirements, including a description of how analytical data and results will be evaluated, documented, and managed • Details for the collection/maintenance of information • Summary of access, approvals, and substantive requirements of ARARs associated with construction
		Health and Safety Plan for O&M (**For DTSC Concurrence/DOI Review)** – To be submitted concurrent with Final Design Package) Health and Safety Plan for Construction (**For DTSC Concurrence/DOI Review)** – To be submitted concurrent with Final Design Package) Documents required to establish institutional control(s)[1]
B. Submittals to meet substantive requirements of ARARs (not otherwise included in the above documents) (see Figure 4-1a and Tables 4-1a/4-2a for submittal schedule)		
Key ARARs Compliance Submittals Concurrent with Preliminary Design Package	**Key ARARs Compliance Submittals Concurrent with Intermediate Design Package**	**Key ARARs Compliance Submittals Concurrent with Final Design Package/ Final Construction/Remedial Action Work Plan**
	• Other documents with substantive information normally contained in permit applications (as identified and developed during the design) Submittals where there are potential overlaps between substantive requirements of ARARs and EIR requirements: • Delineation of waters and wetlands field survey addendum (ARAR #27, 32, 63)	• Tribal Access Plan (PA) (BLM Lead) • Plan for decommissioning and removal of IM No. 3 facility and site restoration (ARAR #14) • Storm Water Pollution Prevention Plan (SWPPP)/BMP plans and Monitoring & Reporting (ARAR #34) • Injection well inventory (ARAR #31) • Other documents with substantive information normally contained in permit applications (as identified and developed during the design) Submittals where there are potential overlaps between substantive requirements of ARARs and EIR requirements:

TABLE 4-5
Packaging and Content of Selected Key Technical Documents During Design
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

		• Health and Safety Plan for Construction (ARAR #76) • Health and Safety Plan for O&M (ARAR #76) • Grading and Erosion Control Plan (ARAR #34) • Soil Management Plan (ARAR #86) • Site Security Plan (ARAR #76, 90) • Project-specific hazardous materials business plan (ARAR #90) • Programmatic Biological Agreement (ARAR #40) • Avoidance and minimization plan for special status birds (ARAR #40, 41) • Habitat restoration plan for sensitive habitats (ARAR #27, 32, 63) • Habitat restoration plan for special-status species (ARAR #27, 32, 40, 41, 63)
C. Submittals to meet EIR MMRP requirements (see Figure 4-1a and Tables 4-1a/4-2a for submittal schedule)		
EIR Compliance Submittals Concurrent with Preliminary Design	**EIR Compliance Submittals Concurrent with Intermediate Design Package/ Draft O&M Plan**	**EIR Compliance Submittals Concurrent with Final Design Package/Final O&M Plan/Final Construction/Remedial Action Work Plan**
• Aerial map of disturbed areas (CUL-1a-9) • Map of mature plant species (AES-1a/AES-2) • Map of ordinary high water mark (AES-2a)	• Map of indigenous species listed in Appendix PLA of the EIR (CUL-1a-5) • Delineation of waters and wetlands field survey addendum (BIO-1) **(for USACE Verification)** • Hydrologic analysis (WATER-1)	• Health and Safety Plan for Construction (HAZ-2) **(for DTSC Concurrence)** • Health and Safety Plan for O&M (HAZ-2) **(for DTSC Concurrence)** • Grading and Erosion Control Plan (GEO-1a-a) **(for DTSC Approval)** • Soil Management Plan (HAZ-2c) **(for DTSC Approval)** • Site Security Plan (CUL-1a-3b) • Access Plan (CUL-1a-2) • Storm Water Pollution Prevention Plan (SWPPP)/BMP plans and Monitoring & Reporting (HYDRO-1) • Fueling SOPs and Contingency Plan for Onsite Fueling Areas (HAZ-1b-b) • Project-specific hazardous materials business plan (HAZ-1a-c) • Paleontological investigation report (CUL-3) • Avoidance and minimization plan for special status birds (BIO-2a) **(Agreed upon by DTSC)** • Habitat restoration plan for sensitive habitats (BIO-1) **(Agreeable to USACE, DFG, BLM, USFWS)** • Habitat restoration plan for special-status species (BIO-2c) **(Agreeable to DFG, BLM, USFWS)** • Revegetation plan (AES-1b/1c/1e, AES-2c/d/f) • Cultural resources study/Geoarchaeological investigation report (CUL-1b/c-2, CUL-2) **(for DTSC review/evaluation)** • Cultural resources treatment plan (if needed) (CUL-2) (**for DTSC Approval)** • CIMP (include plan for decommissioning and removal of IM No. 3 facility and site restoration, plant transplantation/ monitoring plan (if needed)) (CUL-1a-8) (**for DTSC Approval)**

[1]The target timing for institutional controls (ICs) or their equivalent, where available, is prior to remedy construction.

TABLE 6-1
Design Support/Data Collection Activities in 2011/Spring 2012
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Activity	Scope	Expected Schedule	Anticipated Level of Stakeholders and Agencies Involvement
Groundwater Flow Model Update/In-Situ Model Development	As described in Sections 6.2 and 6.3	Model Development -- Ongoing through August 2011 Modeling to Support Design – throughout the design process	As requested/directed (e.g., TWG)
East Ravine and Topock Compressor Station Groundwater Investigation	Conduct additional groundwater characterization to evaluate data gaps in the East Ravine area and to collect groundwater data from under the Compressor Station, where minimal characterization data have been collected to date.	Ongoing through September 2011 (pending decisions on contingency boreholes and sites)	Stakeholders and agencies participation via screen calls
Mapping of Disturbed Areas (as defined in EIR mitigation measure CUL-1a-9)	The project area will be mapped to identify the disturbed areas. “Disturbed” areas in this context means those areas outside of documented archaeological site boundaries that have experienced ground disturbance in the last 50 years. A set of aerial maps showing these disturbed areas will be prepared to guide project design.	Ongoing through Summer of 2011 (target completion September)	Outreach with Tribes to obtain inputs and comments on the map Provide agencies with courtesy copies of map. Map of disturbed areas will be submitted concurrent with the preliminary design.
Mapping of Ordinary High Water Mark (along the river bank)	A map of the ordinary high water mark along the river bank will be prepared and incorporated into the design.	Completed	
Topographic Survey (in areas where new remedial facilities could be located)	Topographic surveying will be accomplished by aerial photogrammetry supplemented by ground surveying. Figure 6-1 shows the planned survey areas. The topographic survey will be completed prior to the preliminary design.	Completed	Coordinated with the Refuge for placement of aerial targets on HNWR

TABLE 6-1
Design Support/Data Collection Activities in 2011/Spring 2012
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Activity	Scope	Expected Schedule	Anticipated Level of Stakeholders and Agencies Involvement
Mapping of Mature Plant Species (in areas where new remedial facilities could be located)	A qualified plant ecologist or biologist will identify and map existing mature plants to be considered in the design.	Completed	Coordinated with the Refuge and property owners. Invited Interested Tribes to participate. Representatives from FMIT, Hualapai, and CRIT participated in the survey.
Pump Tests	Perform pumping tests on select monitoring, extraction, or supply wells and use transducers or tracers to monitor response in pumping well and observation wells.	Target Late 2011 (if needed)	If a pump test is determined to be needed, PG&E will first discuss the data needs and rationale with the agencies
Field Survey of Indigenous Plant Species (in areas where new remedial facilities could be located)	A qualified botanist will survey the areas where new remedial facilities could be located for indigenous plant species identified in Appendix PLA of the EIR.	Target Late 2011/Spring 2012	Coordinate with the Refuge and property owners, as appropriate
Field Verification of Jurisdictional Waters and Wetlands (within the project area)	A qualified wetlands biologist will conduct field verification of potential wetland areas located within the project area. An addendum to the 2005 report (CH2M HILL, 2005) and to the extent necessary, the 2010 surveys (CH2M HILL, 2010c and 2010d), will be prepared for submittal to the U.S. Army Corps of Engineers (USACE) and California Department of Toxic Substances Control (DTSC).	Target Spring 2012	Coordinate with the Refuge and property owners, as appropriate
Survey for Yuma clapper rail	At the request of the USFWS in September 2011, a survey for the Yuma clapper rail will be conducted on the California side of the Colorado River, in potentially suited nesting habitat under (below/near) the I-40 bridge.	Target Spring 2012	Coordinate with the Refuge and USFWS

TABLE 6-1
Design Support/Data Collection Activities in 2011/Spring 2012
Corrective Measures Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Activity	Scope	Expected Schedule	Anticipated Level of Stakeholders and Agencies Involvement
Inventory of Existing Infrastructure (in areas relevant to the project) and Usability Evaluation	Obtain detailed information on many aspects of the Compressor Station facilities and nearby site features. This information will be gathered through meetings, document review and site visits. It will include information about the existing fresh water supply system, cooling water system, evaporation ponds, electrical power supply, and existing utilities or infrastructure, including those owned by other entities. Any feature that could interact with the groundwater remedy construction or operation will be investigated to an extent such that it can be incorporated into the design. Before the preliminary design begins, PG&E will evaluate the ability (structural and physical space capacity) of the arched pipeline bridge to accommodate a pipe bringing the fresh water source from a water supply well in Arizona. If the bridge does not have sufficient capacity, then an alternate route crossing the Colorado River would be designed. This decision would potentially trigger additional design data needs.	Target Fall 2011	Coordinate with the Refuge and property owners, as appropriate Results of the feasibility of using the arched bridge will be included in the preliminary design submittal (basis of design).
Underground Utility Identification and Location (in areas along project utility corridors)	Underground utility location will be accomplished by non-intrusive geophysical surveying methods.	Target Fall 2011	Coordinate with the Refuge and property owners, as appropriate

[1] It is anticipated that additional survey(s) may be needed for seasonal plant species.

Figures

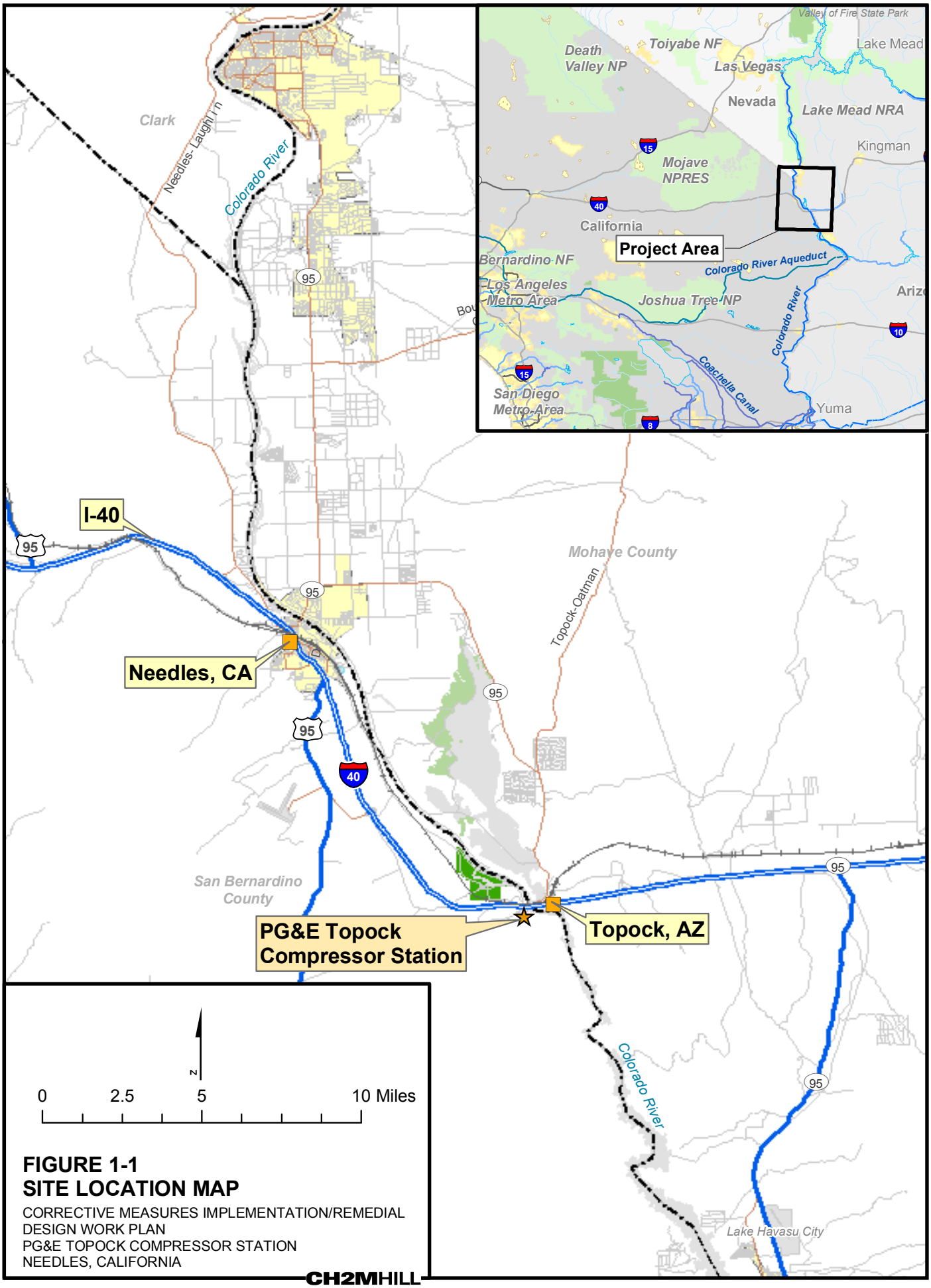

FIGURE 1-1
SITE LOCATION MAP

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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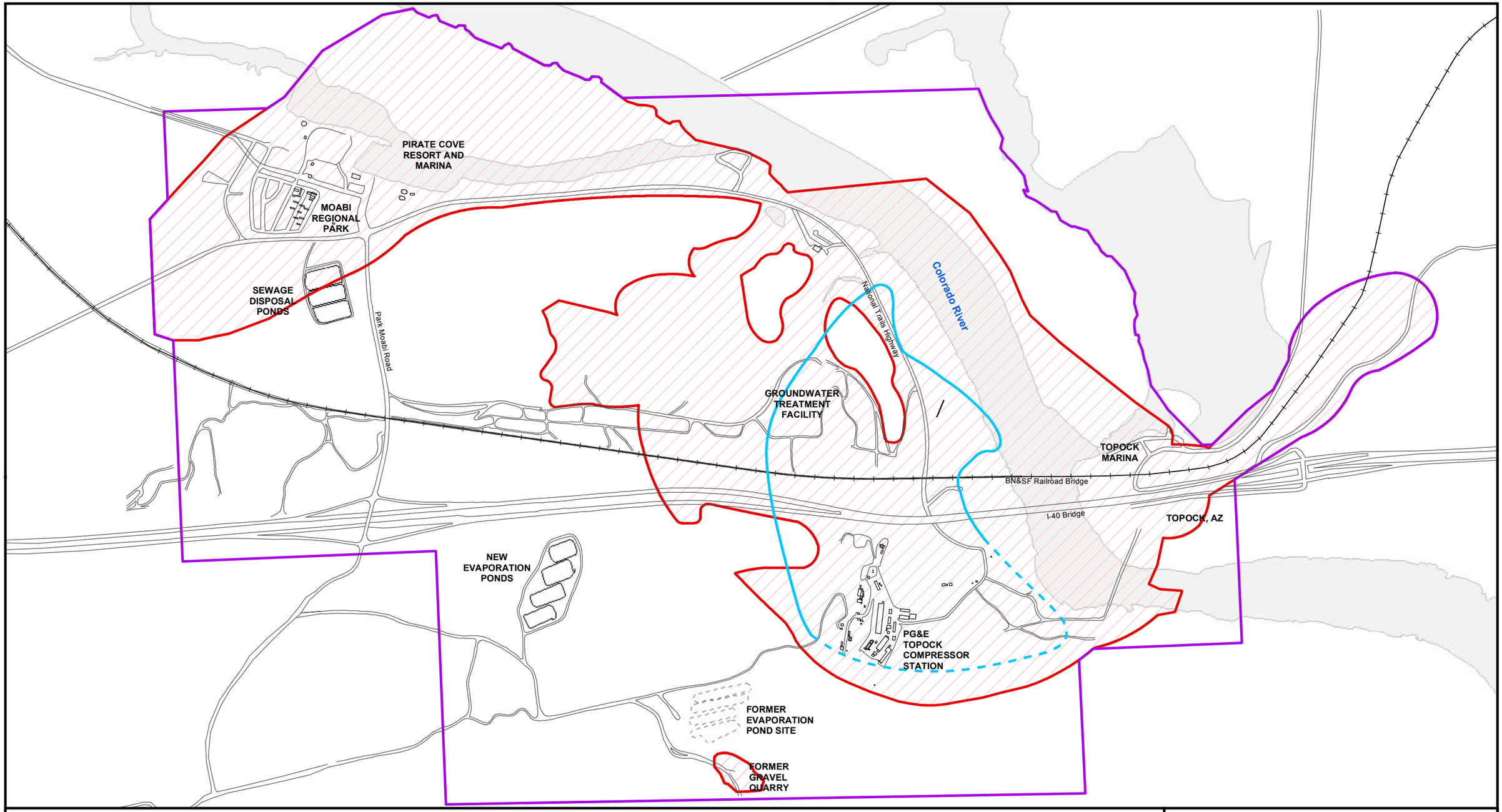

LEGEND

Area of Potential Effects (APE)

EIR Project Area

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth in groundwater based on fourth quarter 2010 sampling events. Dashed where based on limited data.The outline of Cr(VI) depicted as greater than 32 µg/L under the Colorado River is 80 feet below the bottom elevation of the Colorado River.

Note:
The locations of pipelines and existing infrastructure are approximate. The figure is not intended to be a comprehensive depiction of all existing infrastructure in the APE.

N

0 400 800 1,600 Feet

FIGURE 1-2
GROUNDWATER REMEDY PROJECT AREA

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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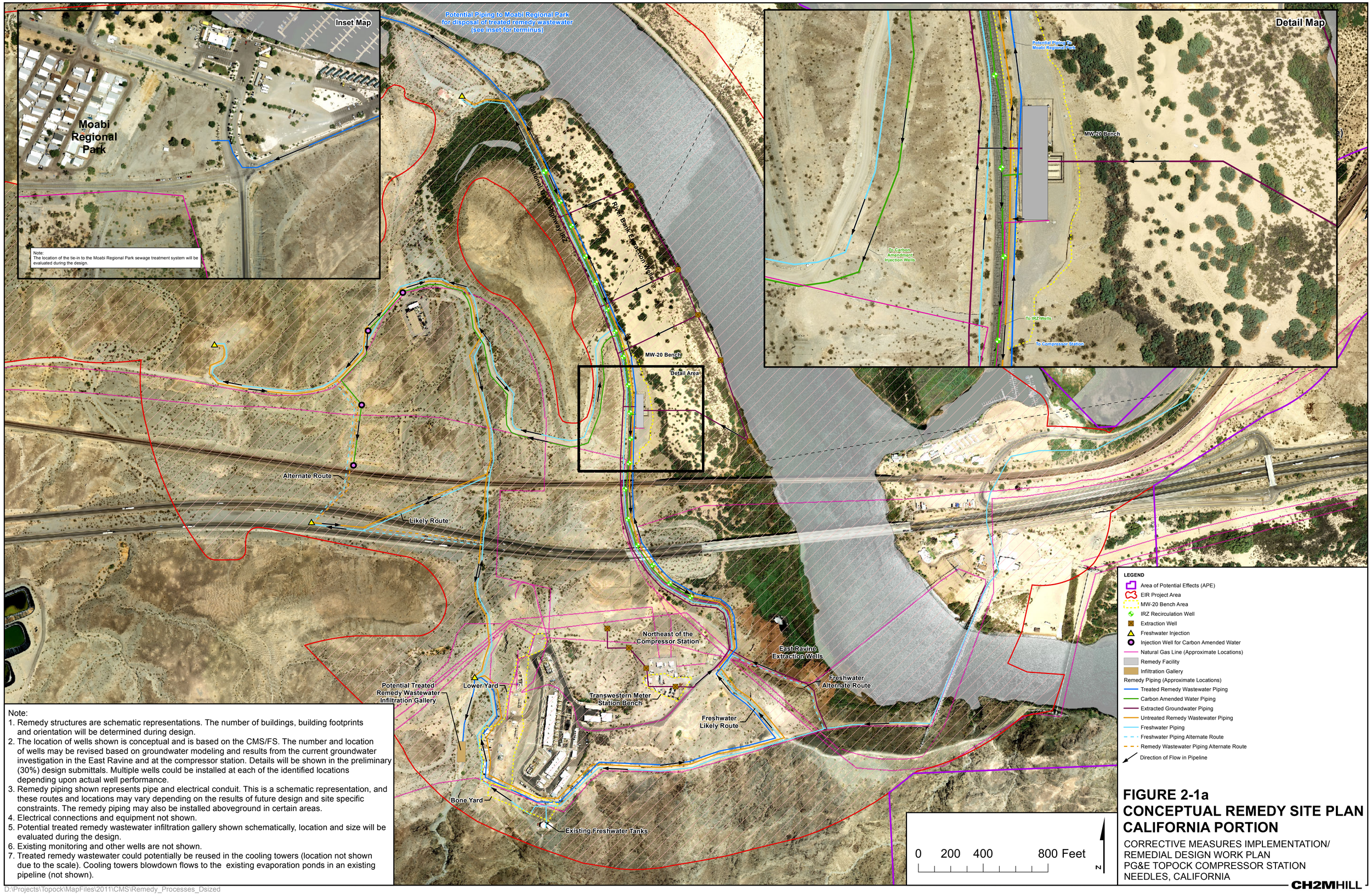

Note:
1. Remedy structures are schematic representations. The number of buildings, building footprints and orientation will be determined during design.
2. The location of wells shown is conceptual and is based on the CMS/FS. The number and location of wells may be revised based on groundwater modeling and results from the current groundwater investigation in the East Ravine and at the compressor station. Details will be shown in the preliminary (30%) design submittals. Multiple wells could be installed at each of the identified locations depending upon actual well performance.
3. Remedy piping shown represents pipe and electrical conduit. This is a schematic representation, and these routes and locations may vary depending on the results of future design and site specific constraints. The remedy piping may also be installed aboveground in certain areas.
4. Electrical connections and equipment not shown.
5. Potential treated remedy wastewater infiltration gallery shown schematically, location and size will be evaluated during the design.
6. Existing monitoring and other wells are not shown.
7. Treated remedy wastewater could potentially be reused in the cooling towers (location not shown due to the scale). Cooling towers blowdown flows to the existing evaporation ponds in an existing pipeline (not shown).

FIGURE 2-1a
CONCEPTUAL REMEDY SITE PLAN
CALIFORNIA PORTION

CORRECTIVE MEASURES IMPLEMENTATION/
REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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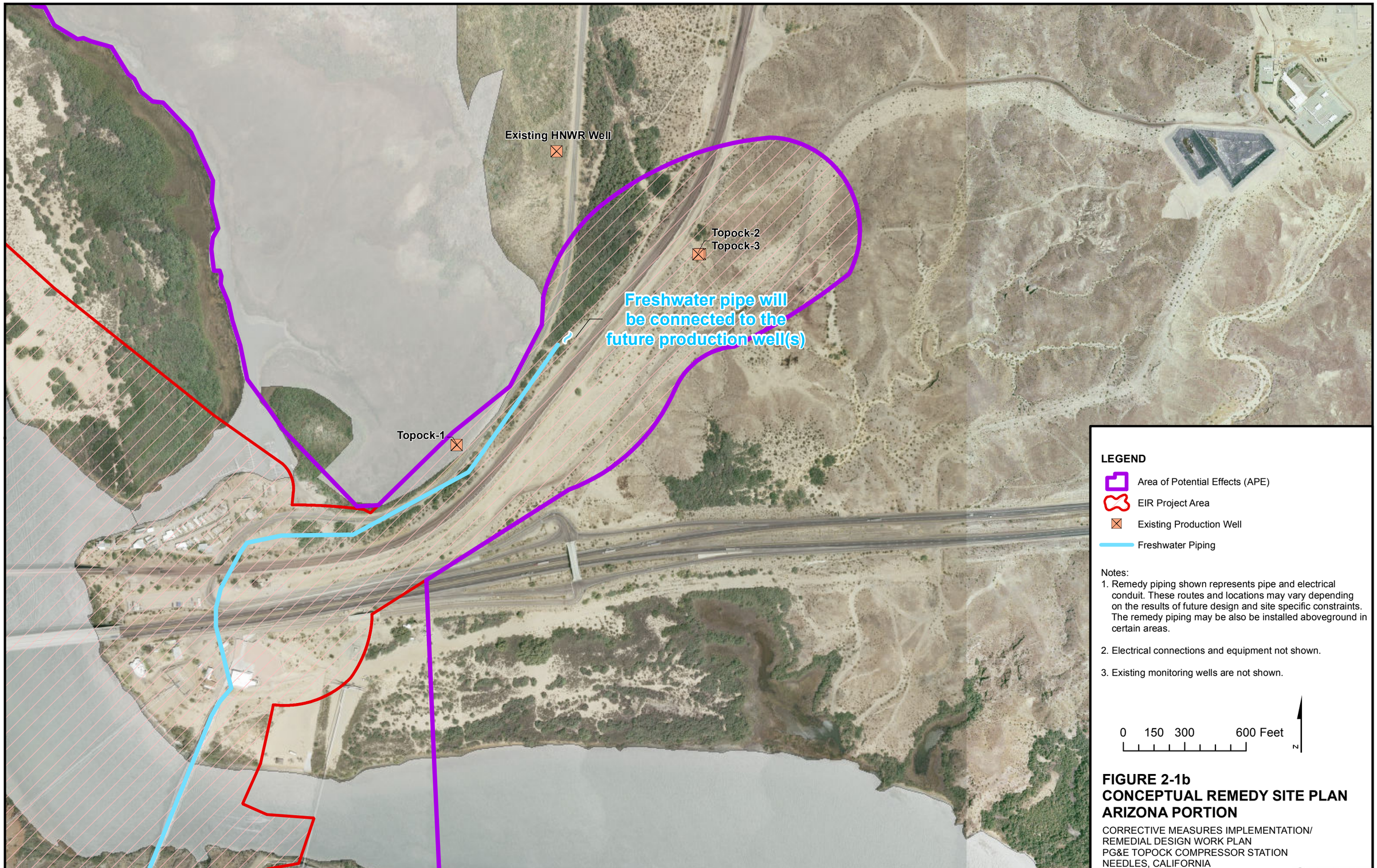

FIGURE 2-1b
CONCEPTUAL REMEDY SITE PLAN
ARIZONA PORTION

CORRECTIVE MEASURES IMPLEMENTATION/
REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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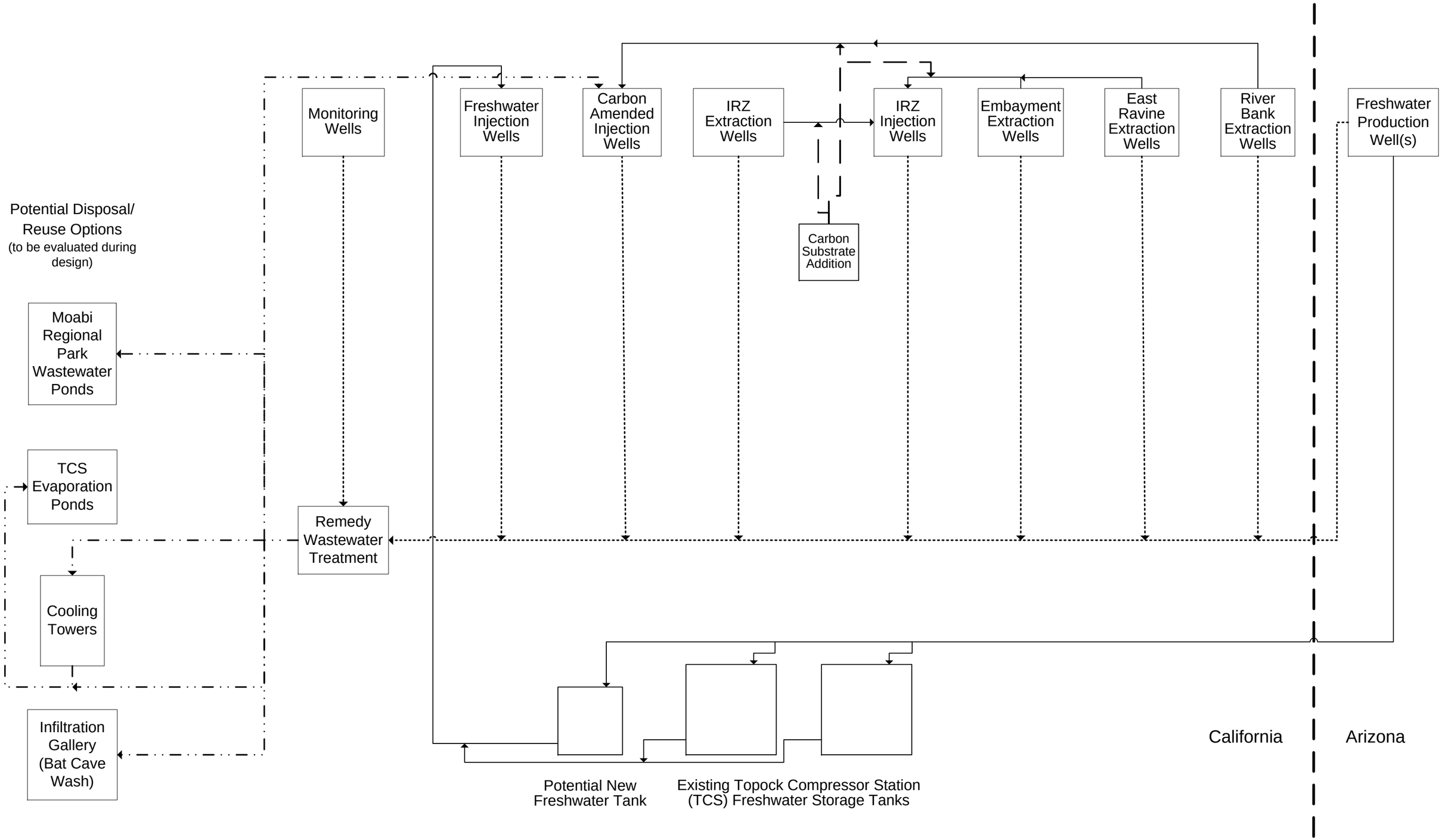
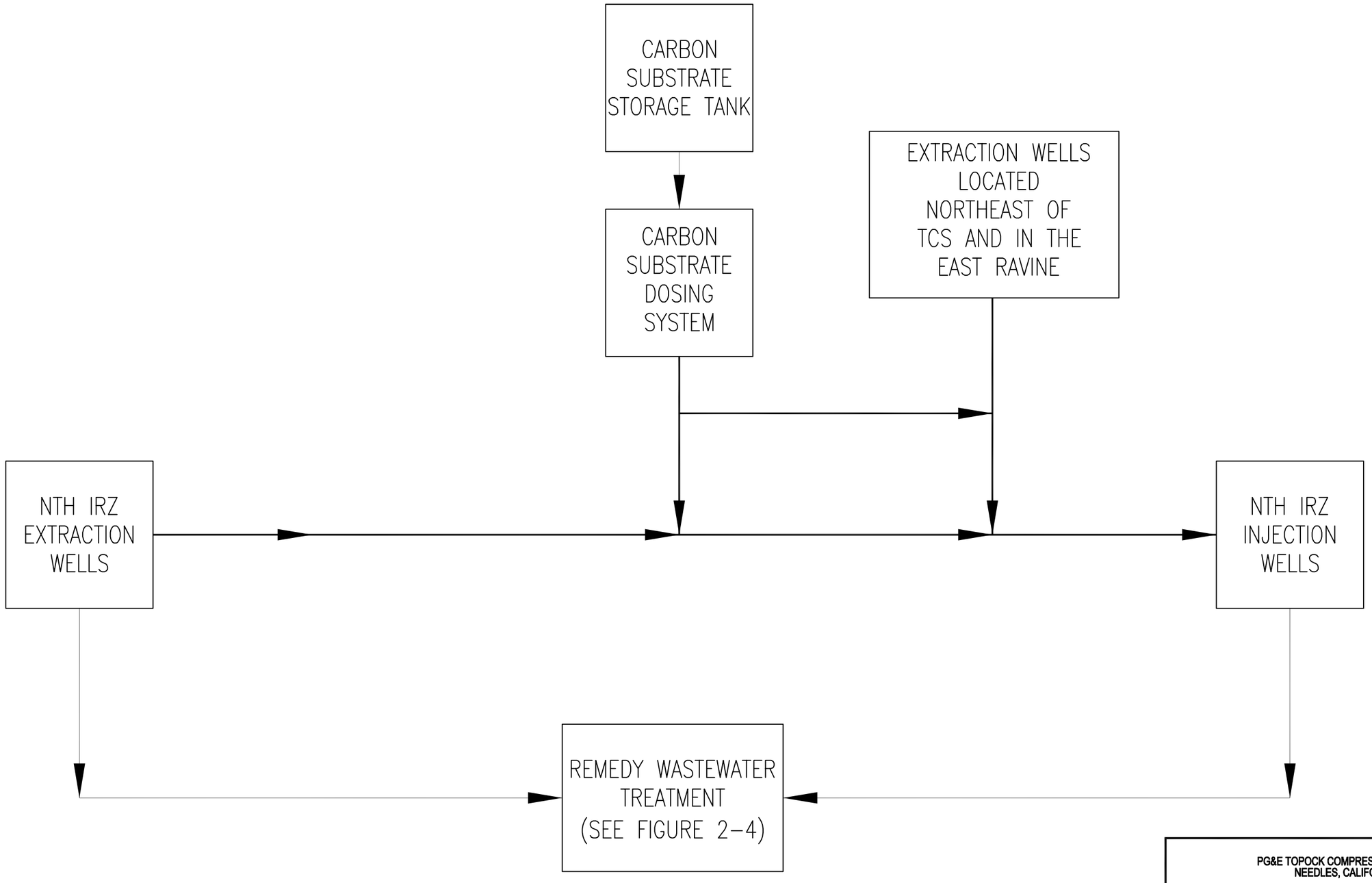


LEGEND
Extracted Groundwater:
Carbon Substrate:
Untreated Remedy Wastewater:
Treated Remedy Wastewater:

NOTES
1. Remedy wastewater is defined as wastewater generated from well maintenance activities (e.g., backflushing, rehabilitation) and other remedy-related activities (e.g., purge water from sampling of monitoring wells, equipment decontamination, rainfall that collects in secondary containment).
2. Depending upon the water quality of the Arizona production well(s), water conditioning may be required to meet operational needs of the remedy and the Compressor Station. The exact components will be determined during design. It is not shown on this conceptual diagram.

FIGURE 2-2
CONCEPTUAL REMEDY PROCESS SCHEMATIC DIAGRAM
CORRECTIVE MEASURES IMPLEMENTATION / REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL



NOTES:
1. NTH – National Trails Highway
2. IRZ – In-situ Reactive Zone
3. Remedy wastewater is defined as wastewater generated from well maintenance activities (e.g., backflushing, rehabilitation) and other remedy-related activities (e.g., purge water from sampling of monitoring wells, equipment decontamination, rainfall that collects in secondary containment).

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CONCEPTUAL IRZ DESIGN CONFIGURATION

ARCADIS

FIGURE
2-3

CITY:MILWAUKEE DIV/GROUP:ENV DB:(Regd) LD:J.BAXTER PIC:L.COPE PM:L.KELLOGG TM:J.FORBORT LYR:(On)(Xrf)=*OFF=*REF*
G:\Project\PGE\R0000888\TOPOCK\ADDICMI Workplan - Final Remedy\Design Plan\Workplan PFD.dwg LAYOUT: 2-3 SAVED: 9/9/2011 10:17 AM ACADVER: 18.0S (LMS TECH) PAGESETUP: 11X17 PDF PLOTSTYLETABLE: BLACKGRAY-THIN.CTB PLOTTED: 9/9/2011 10:17 AM BY: BAXTER, JONATHAN
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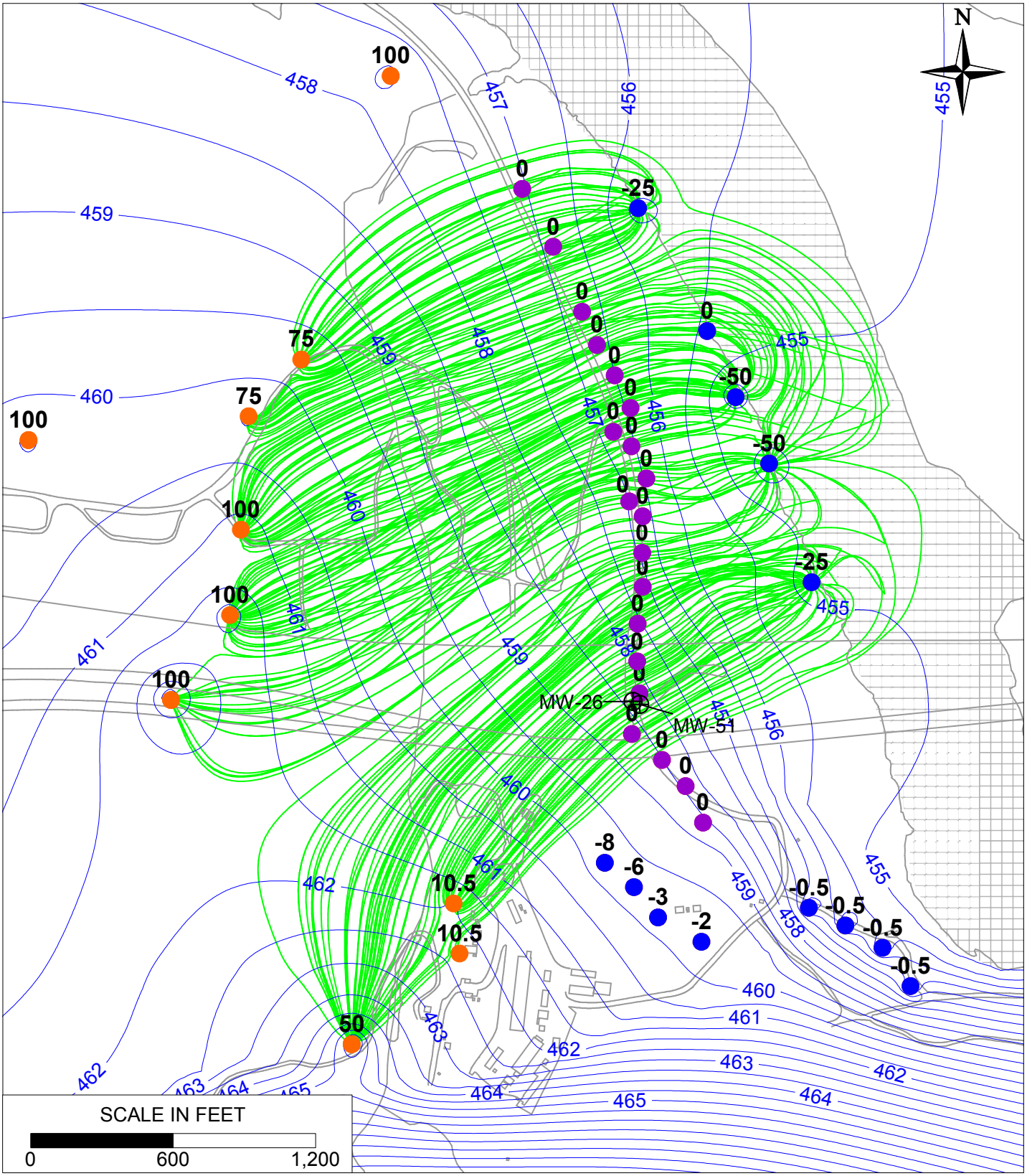


LEGEND

- IRZ WELLS
- UPGRADIENT INJECTION WELLS
- EXTRACTION WELLS
- Simulated Pathlines Captured by Riverbank Extraction Wells
- MONITORING WELLS

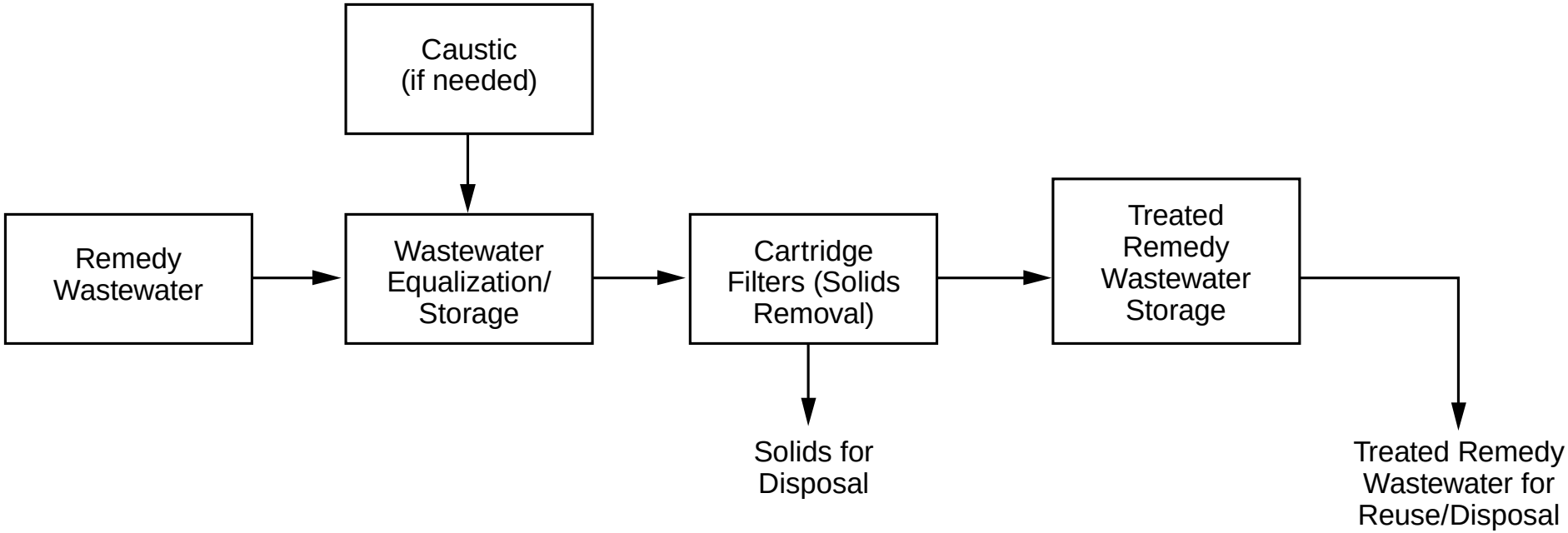
*Rates posted in gpm
negative rates = extraction
positive rates = injection

PGE&E TOPOCK FACILITY
NEEDLES, CALIFORNIA
WORK PLAN

DRAFT SIMULATED CAPTURE OF RIVERBANK EXTRACTION WELLS

ARCADIS

FIGURE
2-4



NOTES:
1. Remedy wastewater is defined as wastewater generated from well maintenance activities (e.g., backflushing, rehabilitation) and other remedy-related activities (e.g., purge water from sampling of monitoring wells, equipment decontamination, rainfall that collects in secondary containment).
2. The schematic diagram shown assumes that solids removal is the primary unit process with neutralization required to make the process more effective and adjust the treated wastewater to suit the reuse/disposal option requirements. Additional processes may be added during the design process or operations to treat dissolved constituents.

FIGURE 2-5
CONCEPTUAL REMEDY WASTEWATER TREATMENT SCHEMATIC DIAGRAM
CORRECTIVE MEASURES IMPLEMENTATION / REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL.

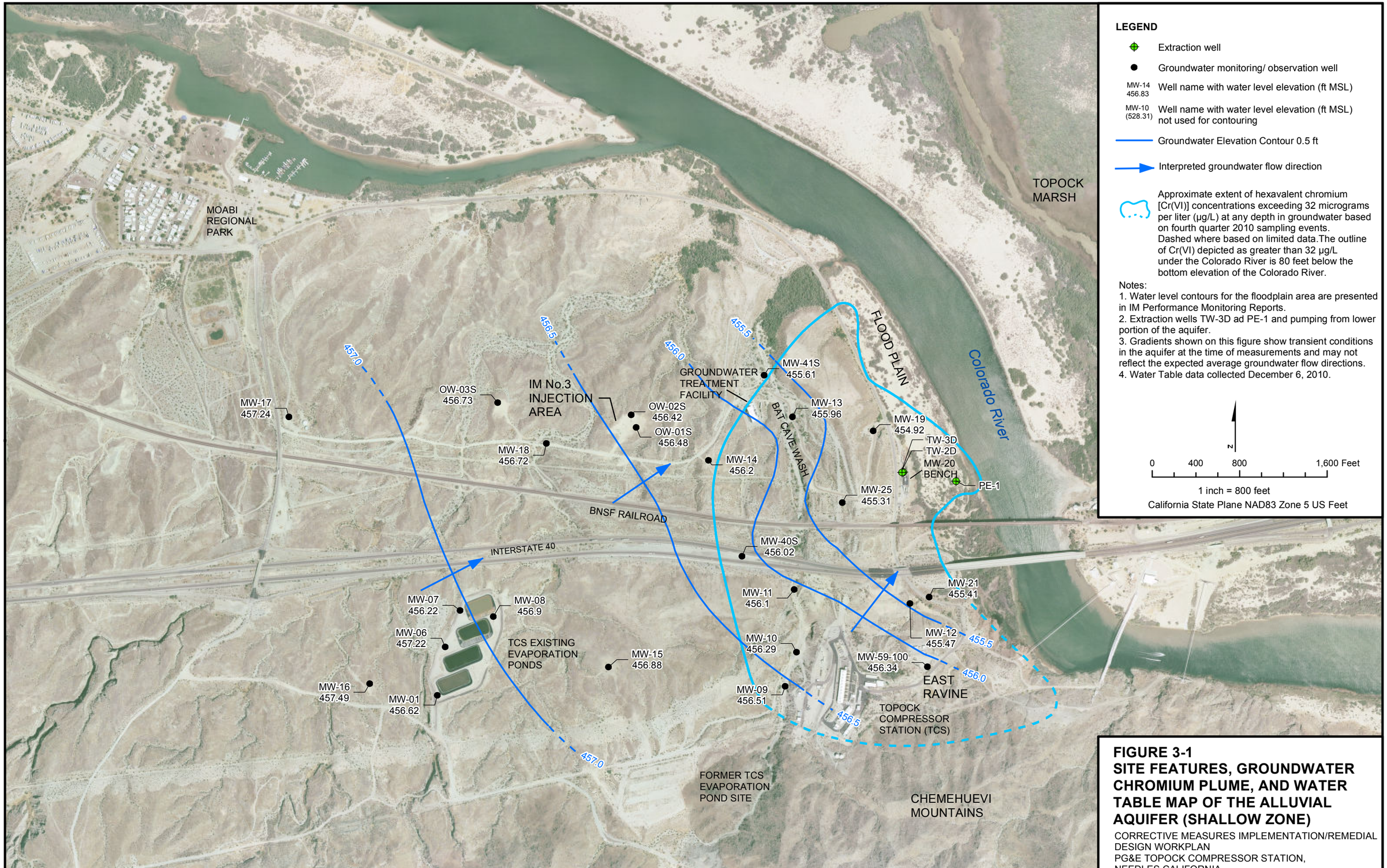


FIGURE 3-1
SITE FEATURES, GROUNDWATER CHROMIUM PLUME, AND WATER TABLE MAP OF THE ALLUVIAL AQUIFER (SHALLOW ZONE)

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORKPLAN
PG&E TOPOCK COMPRESSOR STATION, NEEDLES,CALIFORNIA

CH2MHILL

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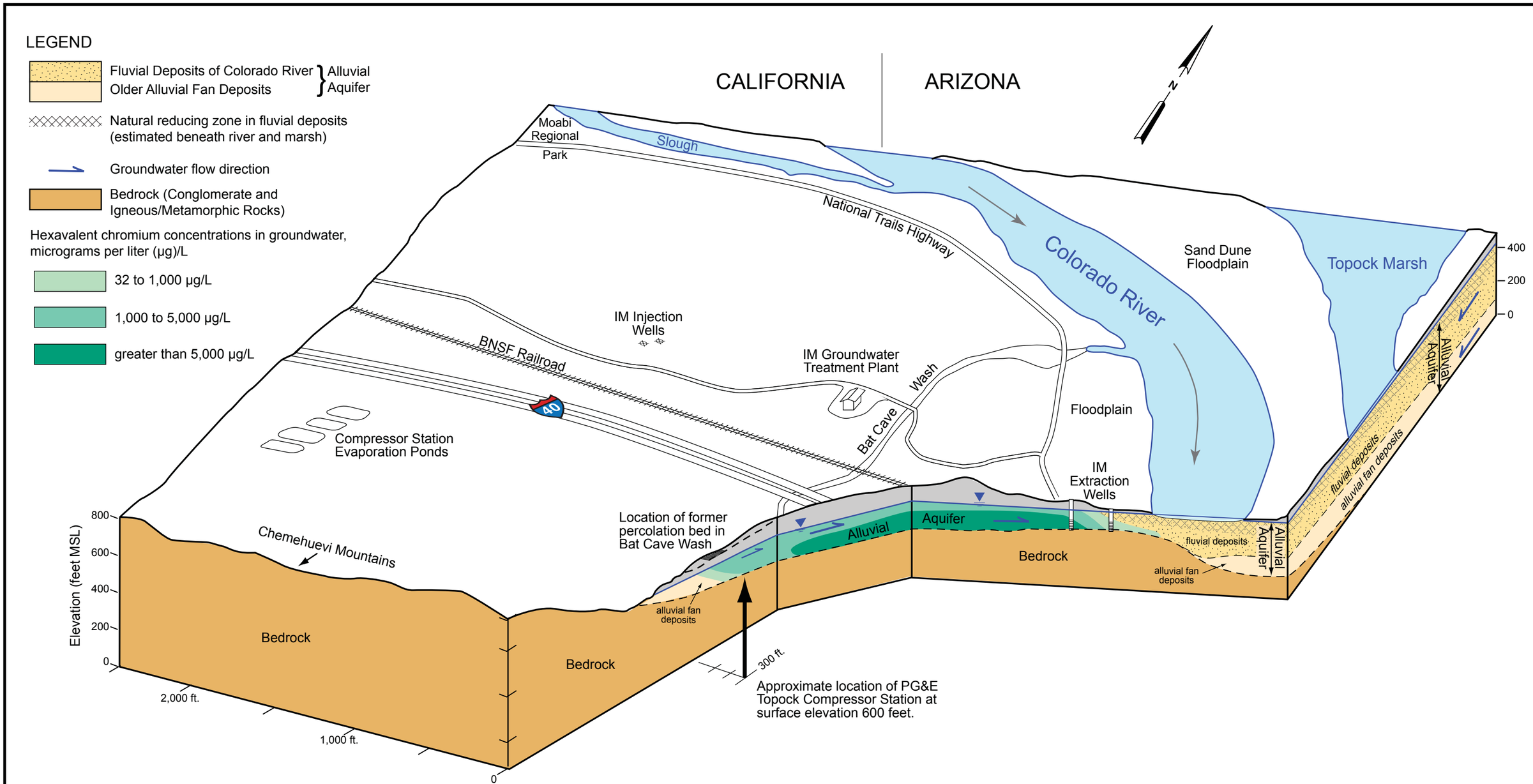

FIGURE 3-2
TOPOCK SITE SURFACE AND SUBSURFACE FEATURES
CORRECTIVE MEASURES IMPLEMENTATION/
REMEDIAL DESIGN WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES CALIFORNIA

CH2MHILL

ES102007005BAO_Fig_3-2_GW-CMI_RDW_hydrogeologic_features.ai 042611_lho

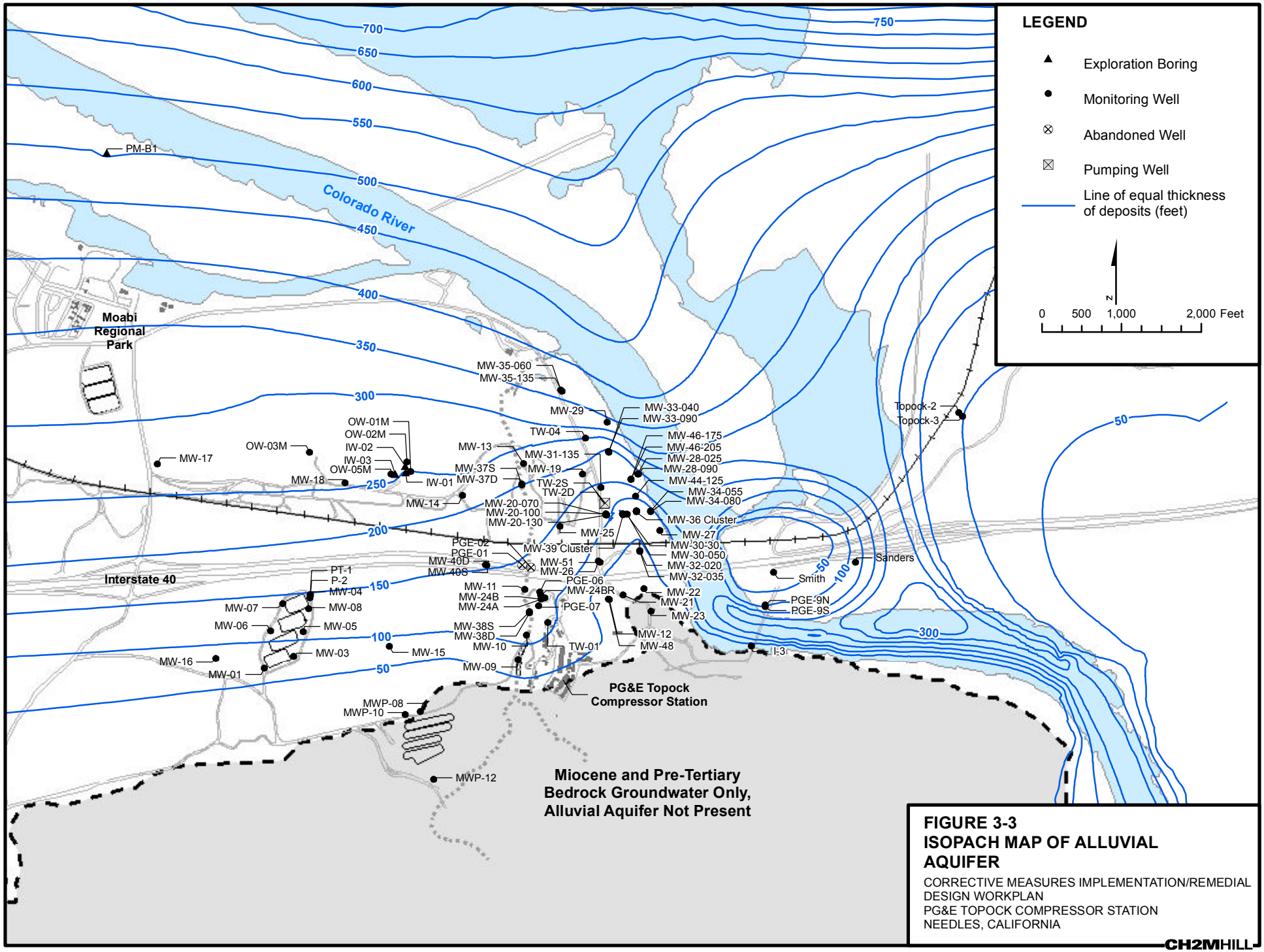

FIGURE 3-3
ISOPACH MAP OF ALLUVIAL AQUIFER

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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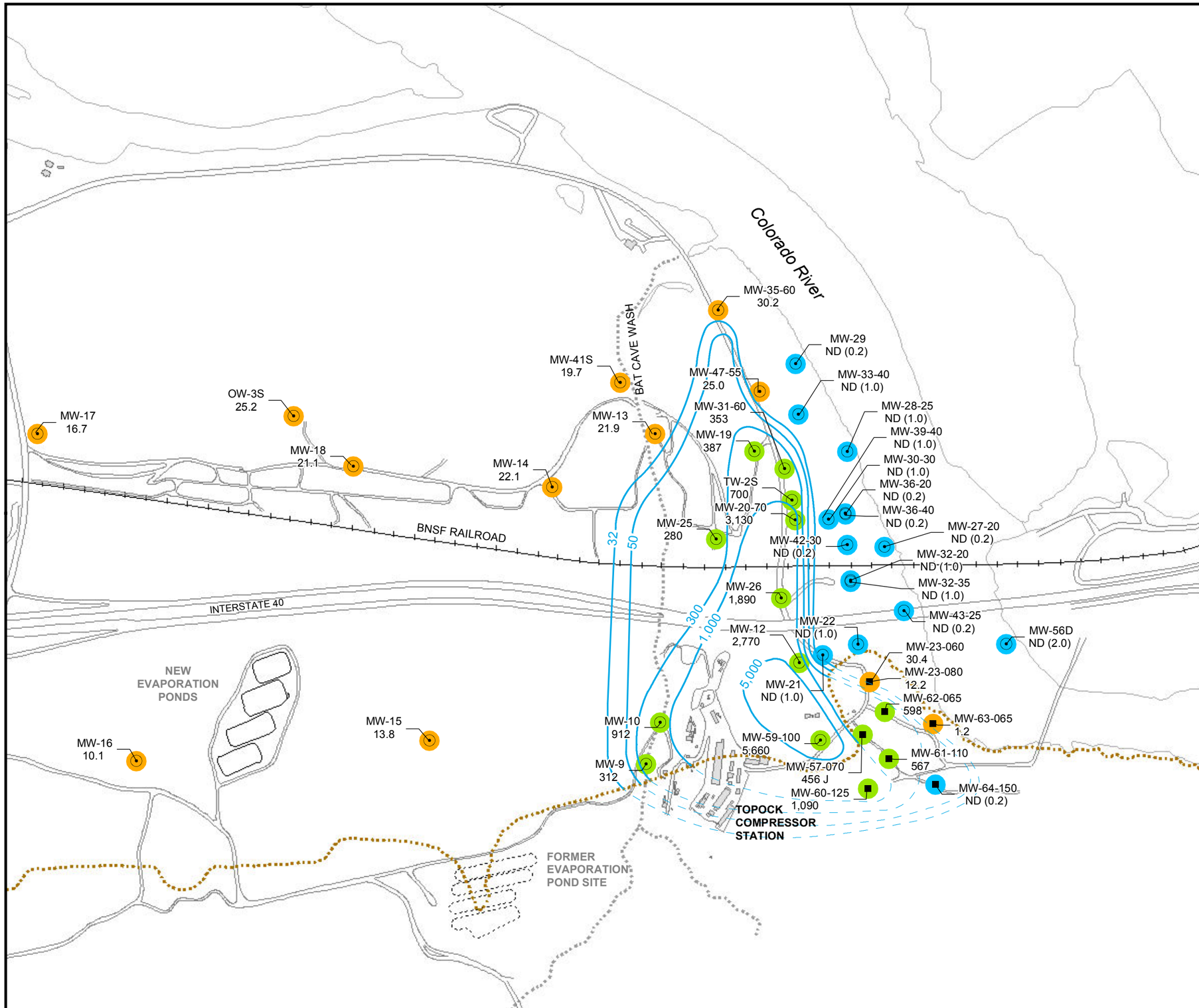

LEGEND

- Alluvial aquifer well sampled during sampling event
- Bedrock well sampled during sampling event

6.48 Concentration of hexavalent chromium [Cr(VI)] in groundwater, micrograms per liter (µg/L)

Results shown are maximum concentrations in primary and duplicate samples from wells completed in **Shallow zone** of alluvial aquifer and bedrock.

ND (0.2) Cr(VI) not detected at listed reporting limit (RL)

Cr(VI) Concentrations - Fourth Quarter 2010

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- Approximate outline of Cr(VI) concentrations of 32, 50, 300, 1,000 and 5,000 µg/L in the alluvial aquifer based on Fourth Quarter 2010 groundwater sampling.
- Approximate outline of Cr(VI) concentrations of 32, 50, 300, 1,000 and 5,000 µg/L in shallow bedrock based on Fourth Quarter 2010 groundwater sampling.
- Approximate bedrock contact at 455 feet above mean sea level.

Notes:
Results plotted are maximum concentration from primary and duplicate samples.

J= Concentration or RL estimated by laboratory or data validation

N

0 300 600 1,200 Feet

FIGURE 3-4a
Cr(VI) SAMPLING RESULTS, SHALLOW WELLS IN ALLUVIAL AQUIFER AND BEDROCK, FOURTH QUARTER 2010

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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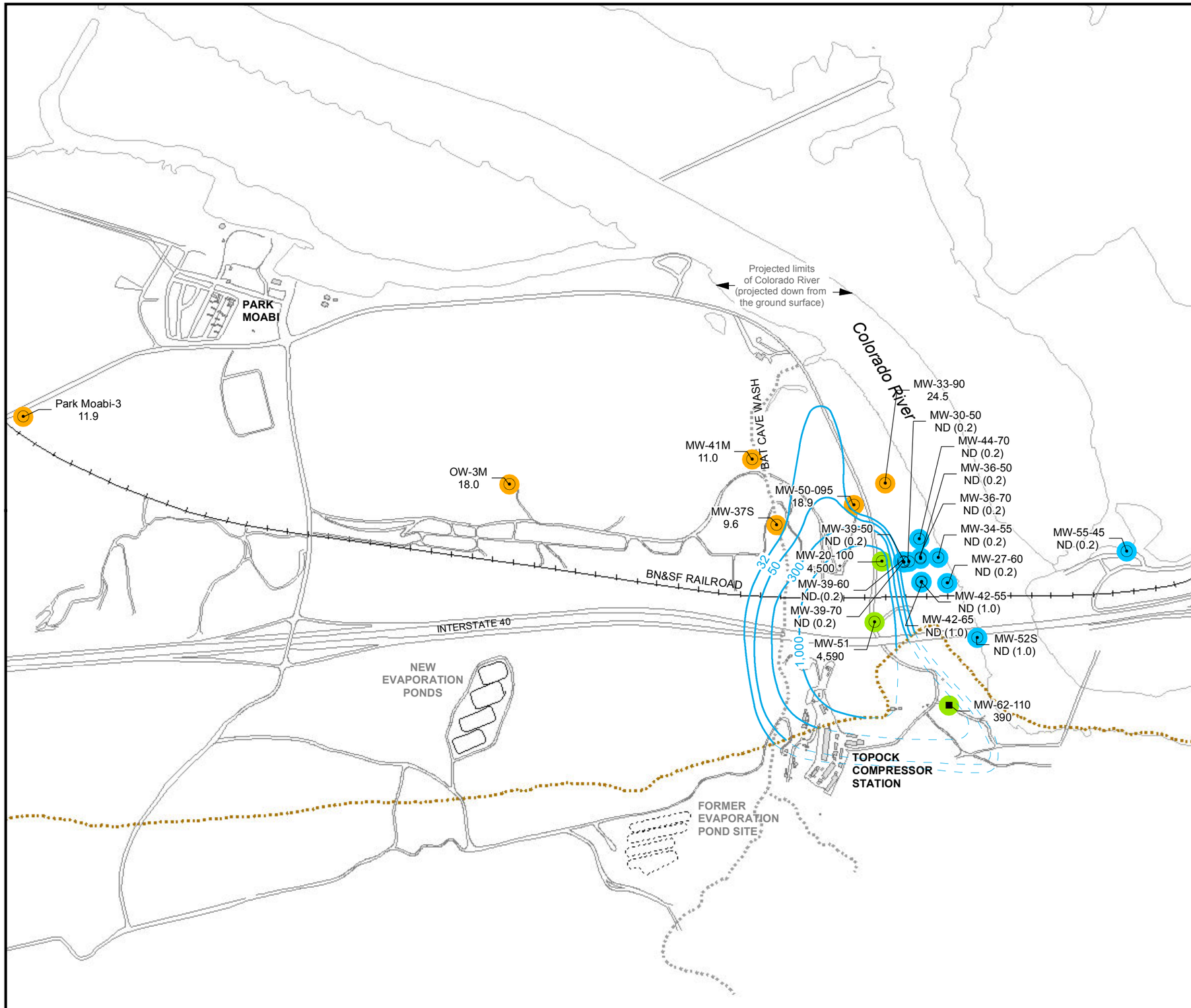

LEGEND

- ⊙ Alluvial aquifer well sampled during sampling event
- ■ Bedrock well sampled during sampling event

6.48 Concentration of hexavalent chromium [Cr(VI)] in groundwater, micrograms per liter (µg/L)

Results shown are maximum concentrations in primary and duplicate samples from wells completed in **Mid-Depth zone** of alluvial aquifer and bedrock.

ND (0.2) Cr(VI) not detected at listed reporting limit (RL)

Cr(VI) Concentrations - Fourth Quarter 2010

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L

32 Approximate outline of Cr(VI) concentrations of 32, 50, 300, 1,000 and 5,000 µg/L in the alluvial aquifer based on Fourth Quarter 2010 groundwater sampling.

32 Approximate outline of Cr(VI) concentrations of 32, 50, 300, 1,000 and 5,000 µg/L in shallow bedrock based on Fourth Quarter 2010 groundwater sampling.

Approximate bedrock contact at 425 feet above mean sea level.

Notes:

1. Results plotted are maximum concentration from primary and duplicate samples.
2. * = Data collected February 2011 due to field logistical issues.

N

0 500 1,000 2,000 Feet

FIGURE 3-4b
Cr(VI) SAMPLING RESULTS
MID-DEPTH WELLS IN ALLUVIAL AQUIFER AND BEDROCK, FOURTH QUARTER 2010

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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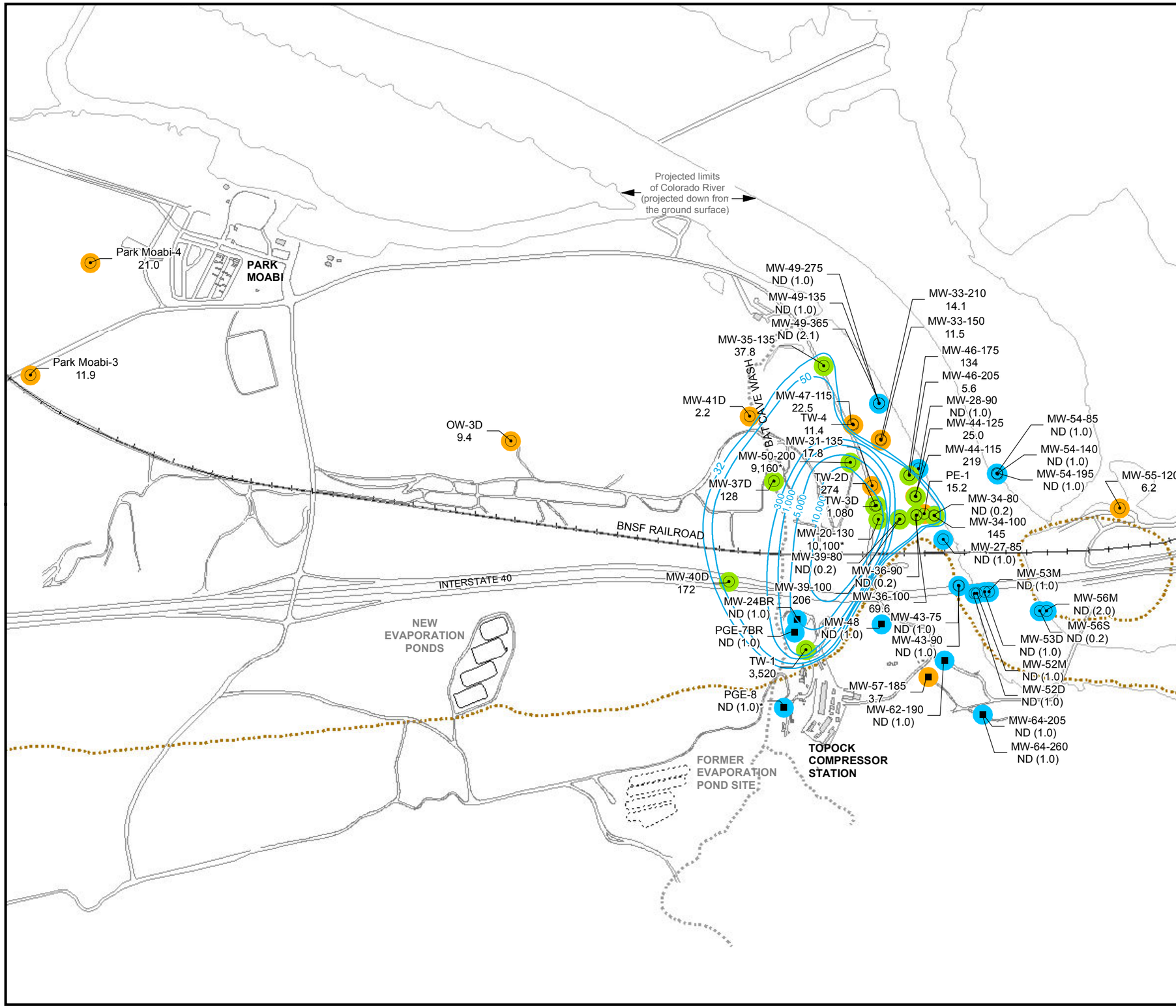

LEGEND

- ⊙ Alluvial aquifer well sampled during sampling event
- ■ Bedrock well sampled during sampling event

6.48 Concentration of hexavalent chromium [Cr(VI)] in groundwater, micrograms per liter (µg/L)

Results shown are maximum concentrations in primary and duplicate samples from wells completed in **Deep zone** of alluvial aquifer and bedrock.

ND (0.2) Cr(VI) not detected at listed reporting limit (RL)

Cr(VI) Concentrations - Fourth Quarter 2010

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- 32 Approximate outline of Cr(VI) concentrations of 32, 50, 300, 1,000 and 5,000 µg/L in the alluvial aquifer based on Fourth Quarter 2010 groundwater sampling.
- Approximate bedrock contact at 395 feet above mean sea level.

Notes:

1. Results plotted are maximum concentration from primary and duplicate samples.
2. In the floodplain area, the 32 µg/L line for Cr(VI) in deep zone (80-90 feet below Colorado River) is estimated based on available groundwater sampling, hydrogeologic and geochemical data. There are no data confirming the existence of Cr(VI) under the Colorado River.
3. * = Data collected February 2011 due to field logistical issues

N

0 500 1,000 2,000 Feet

FIGURE 3-4c
Cr(VI) SAMPLING RESULTS, DEEP WELLS IN ALLUVIAL AQUIFER AND BEDROCK, FOURTH QUARTER 2010

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

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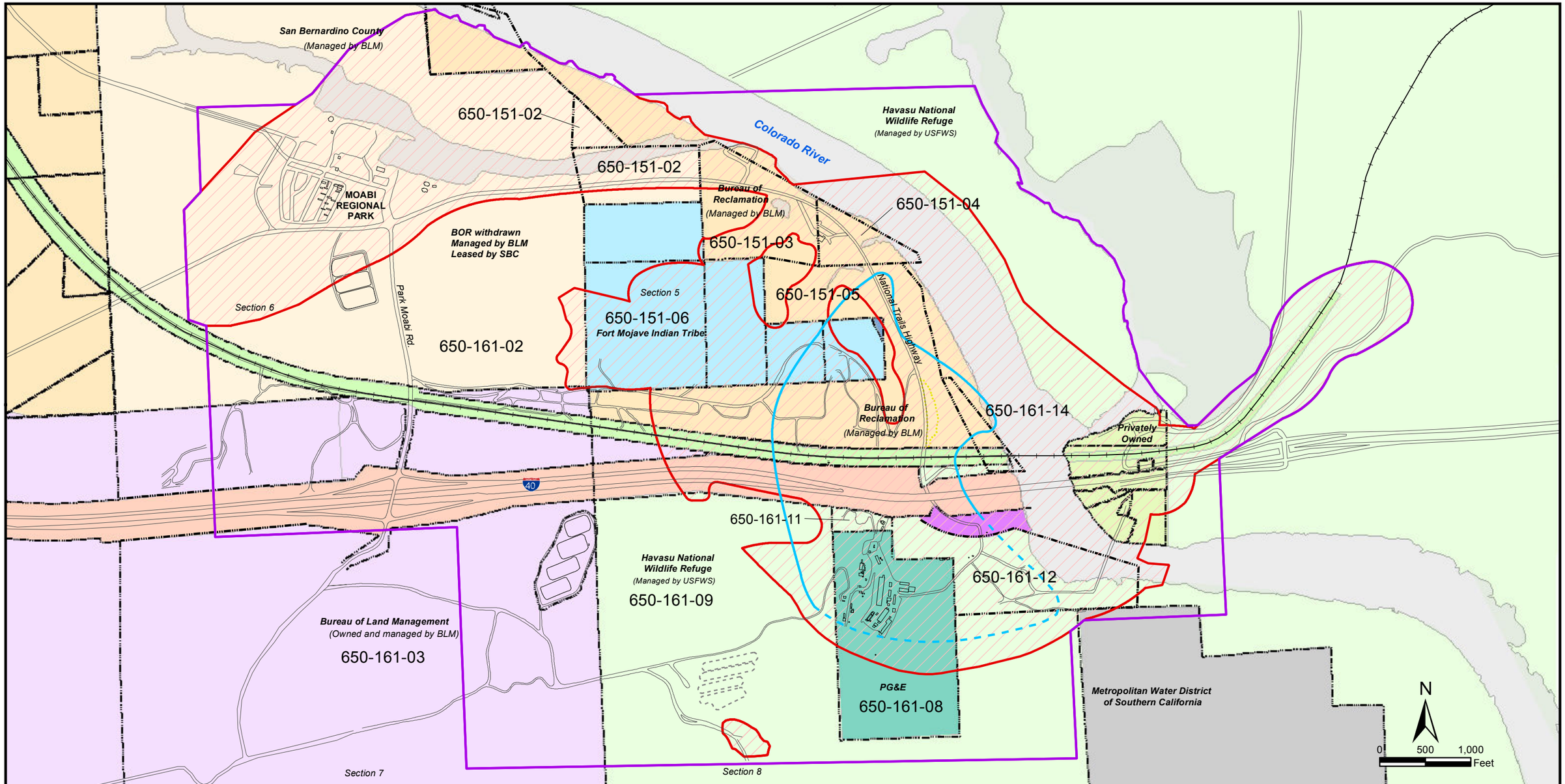

Legend

- Area of Potential Effect (APE)
- EIR Project Area
- Railroad
- Parcel Boundary
- Highway
- Paved Road
- Dirt or Gravel Road
- Building

Owner

- BNSF Railroad
- Bureau of Land Management (Owned and Managed by BLM)
- Bureau of Reclamation (Managed by BLM)
- Caltrans Leased From Underlying Federal Owner
- Fort Mojave Indian Tribe owner in fee, with PG&E easement and access for remediation
- Havasu National Wildlife Refuge
- Metropolitan Water District of Southern California
- PG&E
- Privately Owned
- San Bernadino County
- San Bernardino County Leased (Managed by BLM)
- State of California

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth in groundwater based on fourth quarter 2010 sampling event. Dashed where based on limited data. The outline of Cr(VI) depicted as greater than 32 µg/L under the Colorado River is 80 feet below the bottom elevation of the Colorado River.

Note:
The boundary lines shown are approximate and for reference only.

Sources:
1. San Bernadino County Assessor
2. Parcel quest
3. State Board of Equalization
4. Pacific Gas and Electric Company
5. Ecology and Environment and Plate maps provided by BLM.

FIGURE 3-5
SURROUNDING PROPERTIES MAP

CORRECTIVE MEASURES IMPLEMENTATION/REMEDIAL DESIGN WORKPLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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Topock Remediation Project Design and Construction (2011-2013)

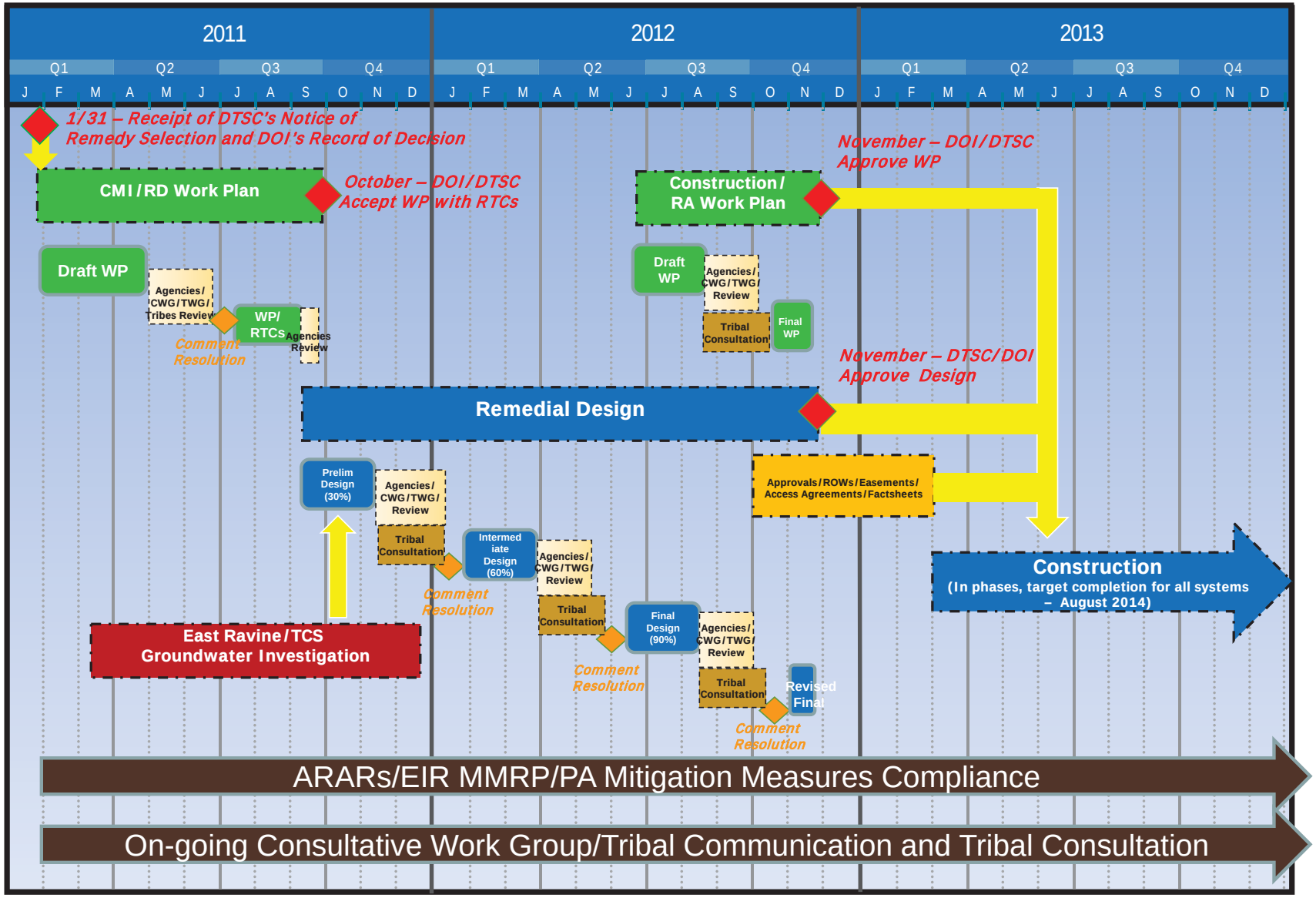
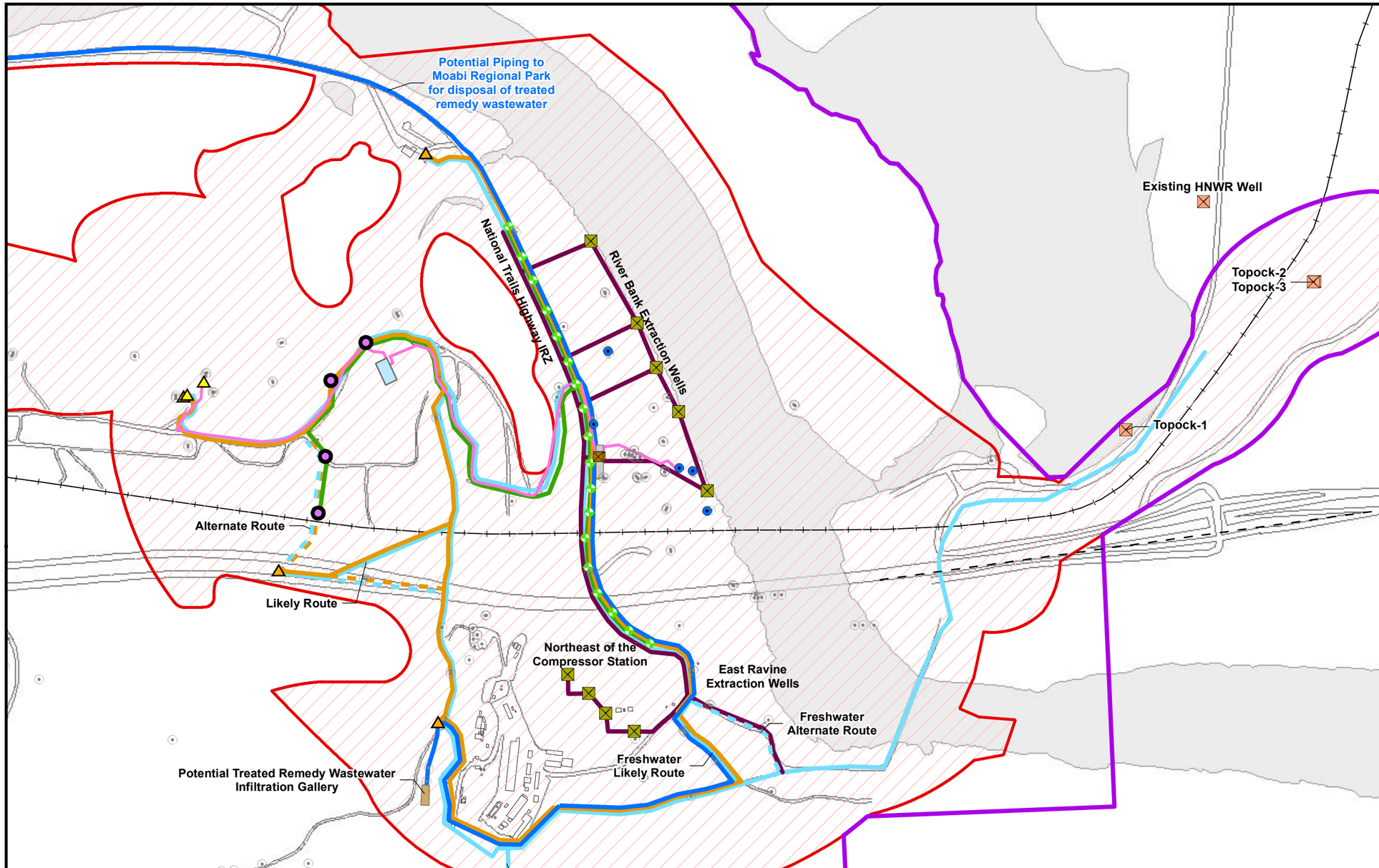


FIGURE 4-1
Groundwater Remedy Design, Construction, and Initial Start-Up Schedule
Corrective Measure Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California



LEGEND

- EIR Project Area
- Area of Potential Effects (APE)
- RailRoad

Existing Infrastructure

- Freshwater Injection for Treated Water
- Extraction Well
- Monitoring Well Used for Hydraulic Gradient Claculation
- Existing Groundwater Monitoring Well
- Utility/Pipeline
- IM No. 3 Facility

Conceptual Remedy Infrastructure

- IRZ Recirculation Well
- Extraction Well
- Freshwater Extraction Well
- Freshwater Injection
- Injection Well for Carbon Amended Water
- Remedy Faciltiy
- Infiltration Gallery

Remedy Piping (Approximate Locations)

- Treated Remedy Wastewater Piping
- Carbon Amended Water Piping
- Extracted Groundwater Piping
- Untreated Remedy Wastewater Piping
- Freshwater Piping
- Freshwater Piping Alternate Route
- Remedy Wastewater Piping Alternate Route

N

0 300 600 1,200 Feet

Note:
1. Remedy structures are schematic representations. The number of buildings, building footprints and orientation will be determined during design.
2. The location of wells shown is conceptual and is based on the CMS/FS. The number and location of wells may be revised based on groundwater modeling and results from the current groundwater investigation in the East Ravine and at the compressor station. Details will be shown in the preliminary (30%) design submittals. Multiple wells could be installed at each of the identified locations depending upon actual well performance.
3. Remedy piping shown represents pipe and electrical conduit. This is a schematic representation, and these routes and locations may vary depending on the results of future design and site specific constraints. The remedy piping may also be installed aboveground in certain areas.
4. Electrical connections and equipment not shown.
5. Potential treated remedy wastewater infiltration gallery shown schematically, location and size will be evaluated during the design.
6. Treated remedy wastewater could potentially be reused in the cooling towers (location not shown due to the scale). Cooling towers blowdown flows to the existing evaporation ponds in an existing pipeline (not shown).

FIGURE 5-1
EXISTING IM INFRASTRUCTURE AND CONCEPTUAL REMEDY INFRASTRUCTURE LOCATIONS

CORRECTIVE MEASURES IMPLEMENTATION/
REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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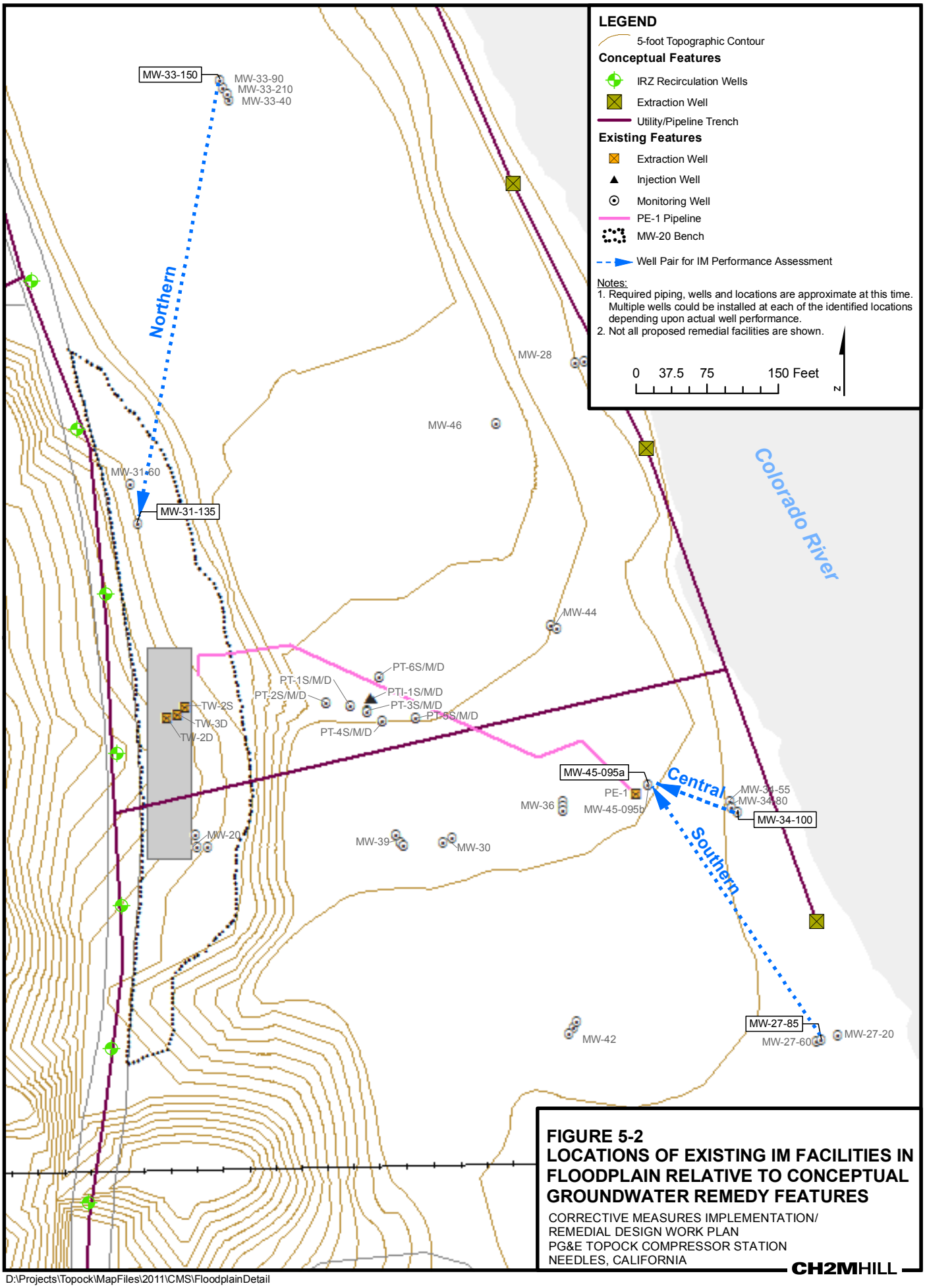

FIGURE 5-2
LOCATIONS OF EXISTING IM FACILITIES IN FLOODPLAIN RELATIVE TO CONCEPTUAL GROUNDWATER REMEDY FEATURES

CORRECTIVE MEASURES IMPLEMENTATION/
REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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FIGURE 6-1
TOPOGRAPHIC SURVEY AREA
CORRECTIVE MEASURES IMPLEMENTATION/
REMEDIAL DESIGN WORK PLAN
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

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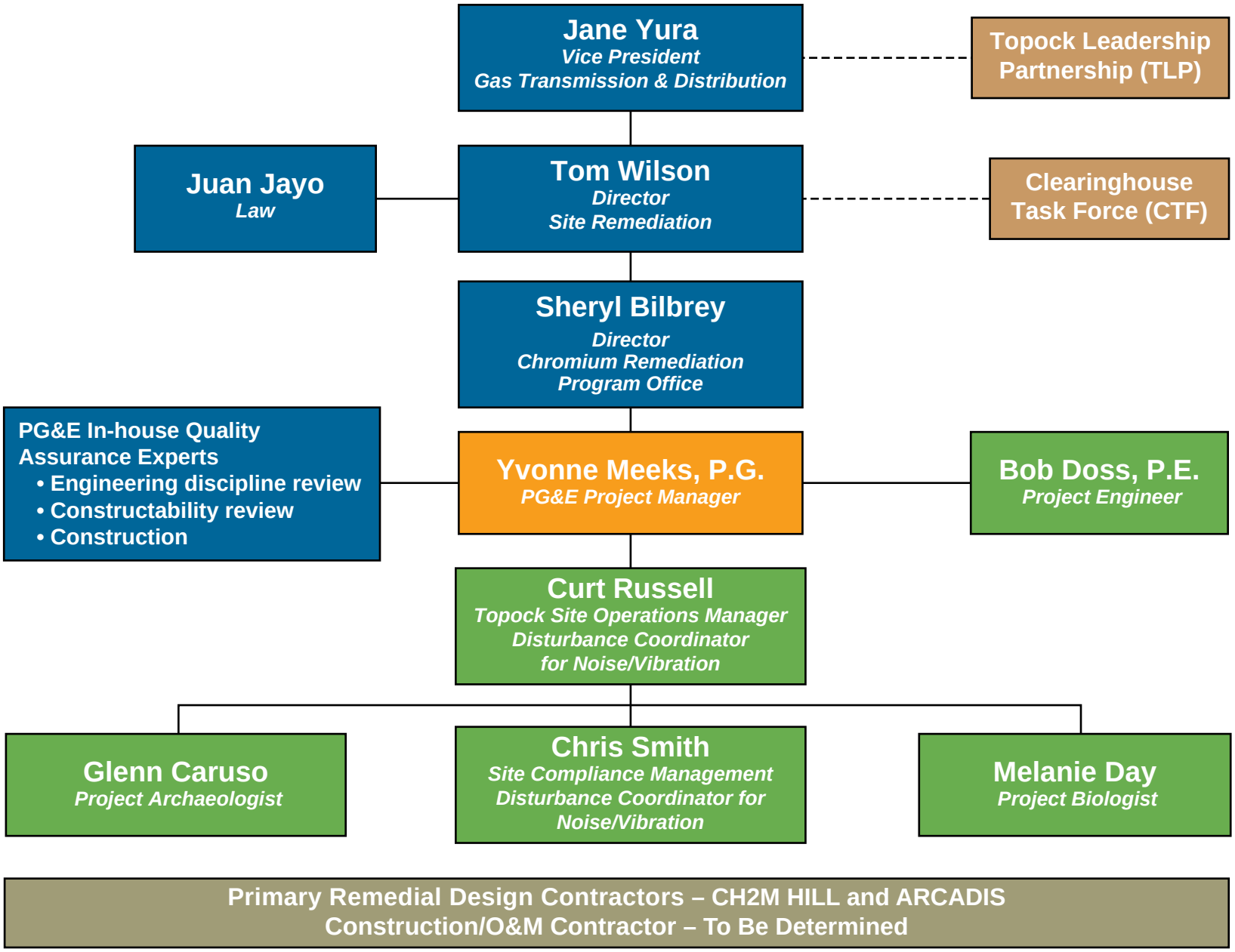

FIGURE 7-1
Project Team Organization Chart
Corrective Measure Implementation/Remedial Design Work Plan
PG&E Topock Compressor Station, Needles, California

Appendix A
Response to Comments

	Comment Number	Section/Page	Reference Text	Commenter	Comment	PG&E Response	DTSC Response	DOI Response	Final Comment Resolution
1	ADEQ-1	General Comments		Arizona Department of Environmental Quality	The VRP understands from the text and tables that the monitoring wells located on the Arizona side of the Colorado River are not to be included in the Corrective Measures/Remedial Action Monitoring Program (CM/RAMP). ADEQ requests for the wells in question to be included for monitoring of Cr (VI) in the CM/RAMP at the frequency currently approved under the existing groundwater monitoring program (see below). • MW-54: semi-annually • MW-55: annually • MW-56: semi-annually	Comment noted. MW-54, MW-55, and MW-56 will be included in the Corrective Measure/Remedial Action Monitoring Program.	Okay.	Concur.	Comment resolved.
2	DTSC-1	General Comments		California Department of Toxic Substances Control	In reviewing the content of the May 2011 CMI/RD Work Plan, DTSC is concerned that PG&E has deferred the submission of a significant amount of information until future design submittals (see Exhibit 1-3). Although DTSC agrees that some of the consent agreement requirements can only be fully satisfied after thorough review of the design proposal (e.g. site safety and security provisions), deferral of the identification and acceptance of critical design criteria may have significant schedule impacts associated with future design submissions. It is critical for PG&E to begin and commit to key elements of the design upfront. DTSC believes that PG&E should have, at this point, conducted a thorough review and defined the design criteria and basis for each of the critical components of the remedy stated in section 1.2.1. For example, PG&E should have conducted an analysis to provide the design criteria associated with fresh water extraction locations: What criteria or limitations would be used for the decision to accept or reject an extraction location (permit, cultural impacts, land owner agreements/ acceptance, hydro-geologic limitations, conveyance issues, etc.) What design basis would bind these criteria (i.e., pressure, mass, weight, flow rate, water conditions/ chemistry, etc.)? It is only after such analyses of each key remedy components would PG&E be able to properly formulate a realistic schedule for the design and implementation of the remedy. DTSC believes that the CMI/RD work plan will need significant revision to obtain up front “buy-in” of the evaluation to be conducted for the 30% design.	See response to Comment #5 DOI-1.	See response to comment #5 DOI-1.		Comment resolution deferred to 30% design.
3	DTSC-2	General Comments		California Department of Toxic Substances Control	The May 2011 CMI/RD Work Plan did not include specific design criteria and design basis. As written, DTSC is concerned that elevation in concentrations of various substances as a result of the remedy would be unnoticed unless a proper baseline is established. The work plan should establish localized baseline data of various substances of concern prior to implementing the remedy for	Section 3.1.2 (page 3-5) discusses the current plan for data collection to update the baseline chromium plume maps and to establish baseline levels of in-situ byproducts and constituents of potential concern (COPCs) (selenium, molybdenum, and nitrate) prior to remedy implementation.	DTSC will evaluate the Corrective Measure/Remedial Action Monitoring Plan in the upcoming design submittal.		Comment resolved.

APPENDIX A
Responses to Comments on the May 2, 2011 Groundwater Corrective Measure Implementation/Remedial Design Work Plan for SWMU 1/AOC 1 and AOC 10
PG&E Topock Compressor Station, Needles, California

	Comment Number	Section/Page	Reference Text	Commenter	Comment	PG&E Response	DTSC Response	DOI Response	Final Comment Resolution
					monitoring the performance of the remedy as well as determining compliance with the RAOs.				
4	DTSC-3	General Comments		California Department of Toxic Substances Control	Please note that because the CMI/RD Workplan presents the big picture framework and schedule for implementation of the selected groundwater remedy and the level of project definition will increase during the design process leading to the final design. When PG&E proposes the final design with a discrete footprint within the project area, DTSC shall determine if the impacts associated with the final design are generally consistent with the significance conclusions of the Final EIR, after implementation of mitigation. On this basis, DTSC shall determine whether the specific design for the final remedy is within the scope of the program EIR or if additional environmental review is needed.	Comment noted.			Comment resolved.
5	DOI-1	General Comments		U.S. Department of the Interior	The CMI/RD Work Plan is missing many components required by the DTSC CACA. Under CERCLA, many of the missing components can be included in the preliminary design, as shown in Table 4-5 of the CMI/RD WP. However, the underlying assumption for deferring these submittals to the preliminary design is that the concept for the remedy, including all of its components, has been largely fleshed out. In review of the CMI/RD WP, there are many aspects of the groundwater remedy for Topock that have not been defined at this time. These include carbon substrate for IRZ, piping routes, use of existing water storage tanks, the expected flow and characteristics of wastewater, wastewater treatment and disposal, source of raw water and power supply, and location of major equipment. It is critical these elements of the groundwater remedy be defined prior to the preliminary design. There will be issues associated with the various options for these elements, and there will need to be consensus on the selected preferred options. To defer the analysis of options and selection of the preferred option for each element to the preliminary design is to run the risk of significant rework of the design that could have been avoided. Therefore, in reference to Exhibit 1-3, DOI requests the following CMI/RD WP requirements that have been deferred to future design submittals be included in this CMI/RD WP: • Design criteria related to carbon substrate for IRZ, power and water supply, and wastewater treatment and disposal; • Design basis related to carbon substrate for IRZ, power and water supply, and wastewater treatment and disposal; • Tables listing number and type of major components with approximate location	To address this comment and Comment #2 DTSC-1, PG&E proposes the following for the systems requested. Note that since the submittal of the CMI/RD Work Plan on May 2, 2011, PG&E has been evaluating/narrowing options for most systems, and therefore more information is available now; however, there is additional work to be done before the evaluation is complete. More details on the systems will be presented in the 30% design. **Power supply** – Text will be added to Section 2.0 to discuss current status of the evaluation of options, the preferred options, and additional work to be done. **Freshwater supply** – Text will be added to Section 2.0 to present the preliminary design basis/ criteria, and the current evaluation of sources/selection of preferred option. **Freshwater conveyance** - Text will be added to Section 2.0 to discuss current status of the evaluation of I-40 median crossing from Bat Cave Wash, the preferred option, and additional work to be done. Results from the feasibility evaluation of using the arched bridge as the river crossing for the freshwater pipeline will be included in the 30% design. **Wastewater treatment and disposal** - A technical memorandum will be submitted that summarizes the current analysis of remedy wastewater from a quantity and quality perspective, disposal/reuse options, current preferred management plan, and the remaining work to be done to complete the analysis. **Location of major equipment** - Text will be added to Section 2.0 to discuss selection	DTSC will review submissions when they are made available by PG&E.	Acceptance of this response is based on the review of the text for each requirement noted. DOI has had the opportunity to review a strawman technical memorandum (TM) for management of wastewater. We recognize this is a critical portion of the overall remedy design and each option should be considered carefully. It is our understanding that the expanded tech memo will be include in the 30% design for our review. DOI looks forward to the opportunity to review the detailed TM. The preliminary substrate evaluation in the CMS/FS provides a general explanation of the types considered for IRZ. It also notes that ethanol will	Comment resolution deferred to 30% design.

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					(dimensions can be deferred to the preliminary design); • Waste management practices; • Required permits (for wastewater treatment and disposal only); • Appendices providing the analysis of options (including the selection of the preferred options) for carbon substrate for IRZ, piping routes, wastewater treatment and disposal, source and conveyance of raw water and, and location of major equipment. Additionally, specific design submittals should be identified in the text, as appropriate, even though to a large extent it is contained in Table 4-5.	criteria for candidate locations of major equipment, identification of the candidate locations, current status of analysis of options including the preferred option, and additional work needed to verify the viability of the preferred option. **Carbon substrate** - Text will be added to Section 2.0 to discuss the preliminary evaluation criteria and design criteria for carbon substrate selection, and the type of carbon substrates to be carried forward into the design. **Waste management practices** - As stated in Table 4-5, PG&E intends to include details about waste management practices associated with operations and maintenance (O&M) and construction in the forthcoming O&M Plan and Construction/Remedial Action Work Plan, respectively.		likely be used as part of any IRZ program at the site. This information should be refined and brought forward into the work plan. While the EIR may provided a discussion of current substrates now being considered, this information should be carried forward into the CMI/RD Work plan for consideration and acceptance by the federal agencies.	
6	DOI-2	General Comments		U.S. Department of the Interior	Please discuss how fundamental factors affecting the design basis, which can significantly impact the design process, will be integrated. These factors may include issues such as: minimizing the impacts to natural and cultural resources, use of land in areas that are already impacted, minimizing the generation of undesirable process by products, waste minimizations, and related direct and indirect impacts.	The fundamental factors affecting the design basis are discussed in Section 3 (how additional data collected during design will be incorporated), Section 4 (when each of the documents required to mitigate impacts to resources will be prepared and incorporated into the design process); and Section 7.3.4 (how compliance with ARARs and mitigation measures will be demonstrated). As to the specific factors mentioned in the comment, minimizing the impacts to natural and cultural resources will be achieved through implementation of the requirements in the EIR Mitigation Monitoring and Reporting Plan (MMRP) and the identified Applicable or Relevant and Appropriate Requirements (ARARs), including the Programmatic Agreement (PA), as well as Settlement Agreement and, as applicable, future access agreements. The EIR MMRP and the PA contain mitigation measures to address impacts associated with implementation of the remedy. The MMRP includes mitigation measures in nine resource areas (aesthetic, biological, air quality, cultural, geology and soils, hazardous materials, hydrology and water quality, noise, water supply), and the PA covers historic and cultural resources. With respect to the use of land in areas that are already impacted, PG&E is working with interested Tribes in the preparation of the Map of Disturbed Areas for use in guiding the design and to satisfy both EIR mitigation measure CUL-1a-9 and PA	Okay.	Concur with response.	Comment resolved.

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						Stipulation III(B)(2). In addition to using previously disturbed areas, PG&E will integrate into the design, where practicable, the use of existing infrastructure to further minimize disturbance. With respect to minimizing undesirable by-products and waste, applicable experience from operation of the Hinkley IRZ and/or similar systems will be incorporated into the design at Topock. No changes to the Work Plan are proposed as a result of this comment.			
7	DOI-3	General Comments		U.S. Department of the Interior	A more accurate schedule for submittal of the key documents required by the CACA, EIR, CERCLA and associated ARARs, the pending Consent Decree and the ROD identified in Table 4-3 needs to be proposed, e.g., submitted with the preliminary design or intermediate design, etc. (See also General Comments on Sections 4.1 and 4.2)	Please see revised Table 4-5 in response to Comment #160 DOI-46 and revised Figure 4-1 in response to Comment #8 HA-1.	Okay	Concur.	Comment resolved.
8	HA-1	General Comments		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This document is referred to as a work plan. However, the level of detail presented offers little more information on the actual work to be performed than preceding documents such as the Corrective Measures Study/Feasibility Study (CMS/FS) and the Final Environmental Impact Report (FEIR). This lack of specificity makes it difficult for the Tribe to comment on a plan that presents only broad generalities with regard to various project components and in some instances presents options that may differ widely in the Tribe's level of concern. For example, alternate freshwater pipeline routings are shown, and no information is presented as to the details of the pipeline construction, such as whether it will be installed above or below ground. Further, there is no specificity as to when such details will be forthcoming and the level of review and comment that will be accorded those details. Accordingly, the Tribe's limited ability to provide comments on certain matters at this time should not be construed as agreement or assent to the Work Plan in whole or in part. The Tribe reserves the right to comment further on detailed design documents that will necessarily need to be forthcoming and as to which consultation will be required at critical stages of design, as discussed and agreed upon during the recent May 2011 TLP meeting and related to Figure 7-1, that will be revised pursuant to TLP direction.	The intent of the CMI/RD Work Plan is to provide the framework for implementing the remedy and the roadmap for where and when design details will be developed and submitted for review in the future (see Section 4 – Schedule and Future Documents). The CMI/RD Work Plan is not intended as a design document, and therefore did not include design details such as belowground vs. aboveground installation or other pipeline construction details. Level of project detail increases through the design, construction, and implementation phases of the remedy. Nevertheless, the Tribe's comment is noted. PG&E notes that the discussion at the May 2011 TLP meeting on consultation at critical stages of design pertains to Figure 4-1 and not Figure 7-1. Per DOI's direction at the May 2011 TLP and the June 2011 Working Group (CWG), Figure 4-1 was revised to indicate that Tribal Consultation will occur at each design step, i.e., preliminary, intermediate, and final design submittals. In addition, Tribal Consultation will occur on the Construction/ Remedial Action Work Plan, prior to the start of any ground disturbance activities. Revised Figure 4-1 is attached to these responses.	DTSC agrees that the CMI/RD work plan should have further expanded the final remedy concept by including additional design criteria and design basis. However, in the interest of advancing the project design, DTSC will agree to defer the review of these elements until the upcoming design documents. These documents will be provided to the tribes and stakeholders for additional review and comment.	Concur with response. DOI and BLM anticipate further Tribal consultation during the design (preliminary, intermediate, and final).	Comment noted.
9	Hualapai-1	General Comments		Hualapai Department of Cultural Resources	At every step of the design process, we encourage serious reductions in the number of wells, soil borings, and trenches. For example, instead of injection wells, can fresh or carbon-amended water be allowed to infiltrate into the natural channel along	PG&E appreciates the Tribe's comment. We have and will continue to look for ways to reduce the number of wells, soil borings, and trenches. While infiltration can be used for soil	Okay.	Note response to comment #103. DOI and BLM appreciate the Tribe's perspective and look	Comment noted.

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					Bat Cave Wash? Contaminated soil may be simultaneously remediated by surface-water infiltration of carbon-amended water at SWMU-1 and AOC-1. We would like to suggest that new groundwater modeling efforts include the deletion of six injection wells to the west and northwest of the site (Figure 2-1a), and addition of surface-water infiltration sites in Bat Cave Wash. Pipes delivering fresh and carbon-amended water could be painted and camouflaged (to match the natural terrain) and routed along the ground surface. While these actions still represent desecration to the sacred Topock site, the reduction in the number of wells and trenches remains a significant issue for the Hualapai Tribe.	treatment and/or for management of remedy wastewater, it would not be an effective replacement for injection wells targeting deep groundwater. The amount of disturbed area would be comparable or larger than that associated with injection wells. From a hydraulic perspective, if infiltration were focused on Bat Cave Wash, the portion of the plume that lies west of the wash would not be pushed through the IRZ, but would move west and north toward Moabi Regional Park. In addition, there is uncertainty about whether a sufficient quantity of water could be infiltrated into Bat Cave Wash to provide adequate flushing of the plume that lies east of the wash through the IRZ. The injection wells west and northwest of the plume are being used to enhance the groundwater gradient and thus reduce the time to clean up. Surface water recharge would not be as effective nor reduce the impact on the land.		forward to further consultation to reduce and mitigate impacts to cultural resources and historic properties.	
10	Hualapai-2	General Comments		Hualapai Department of Cultural Resources	The CMI/RD report proposes additional geoarchaeological investigations throughout the area of potential effect. While we appreciate attention to the importance of cultural features, enough characterization and data collection have been done at the site. Foot and vehicle traffic near the sacred site must be minimized or eliminated. Topographic surveys could be done using photogrammetry from existing benchmarks, and remote sensing (for example, ground-penetrating radar) could be done only after consensus by the stakeholders.	PG&E defers to DTSC because geoarchaeological investigation/survey is a mitigation measure in the EIR (CUL-1b/c-2).	DTSC appreciates the Hualapai's desire to minimize foot and vehicular traffic within the project area. A geoarchaeological survey is proposed as part of a cultural resources study to be conducted by a "qualified cultural resources consultant" pursuant to mitigation measure CUL-1b/c-2 of the EIR. This mitigation measure provides for an evaluation, prior to construction, of the potential for the planned activities to demolish or materially alter any buried historical and/or archaeological resource. DTSC believes that PG&E should make the study available to the tribes as part of the remedy design. DTSC notes that PG&E will conduct the topographic survey using photogrammetry. However, existing benchmarks may not be sufficient without additional on-ground surveys. Similar to all ground activities, PG&E should invite Tribal involvement / monitoring.	DOI defers to DTSC.	Comment resolved. The geoarchaeological survey report will be submitted concurrent with the final design (see Table 4-5),

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11	DTSC-4	Page III, Certification		California Department of Toxic Substances Control	Need PE stamp for certification	PE stamp will be provided in the Final CMI/RD Work Plan.	Okay.		Comment resolved.
Section 1 Comments – Introduction									
12	DTSC-5	Page 1-1, Introduction, Last Paragraph	"This work plan describes the framework for activities to be conducted through design, construction, startup, operation, maintenance, monitoring, closure, and post-closure of the groundwater remedy."	California Department of Toxic Substances Control	Revise the work plan to eliminate the use of the RCRA terms "closure" and "post-closure". Replace with terms acknowledging remedy decommissioning and long term monitoring respectively.	Text will be revised to say (inserted verbiage shown in underline typeface): "This work plan describes the framework for activities to be conducted though design, construction, startup, operation, maintenance, ~~monitoring, closure, and post-closure of the groundwater remedy~~ decommissioning, restoration, and long-term monitoring following completion of the active treatment."	Okay.	Concur.	Comment resolved.
13	DTSC-6	Page 1-2, Project Background		California Department of Toxic Substances Control	PG&E should include a reasonable overview discussion on the cultural significance of the Compressor Station area to the Native American tribes.	The following text will be added to Section 1.1 Project Background: "The Topock site and adjacent lands are contained within a larger geographic area that is considered sacred by the Fort Mojave Indian Tribe and by other Native American tribes. The Tribes believe that the environmental, cultural, and spiritual resources may not be physically perceptible. DTSC has concluded within the January 2011 certified EIR that the project site "appears to qualify as a historic resource under CEQA as an area that is significant in the social and cultural annals of California," and the Bureau of Land Management also has determined that a traditional cultural property (TCP) or property of traditional religious and cultural significance that is eligible for listing on the National Register of Historic Places exists in the area of the Topock project. In recognition of this, all activities are planned in such a way as to minimize impact to this area. The work will be conducted in a manner which recognizes and respects these resources and the spiritual values of the area. Practices which will be implemented with this objective in mind include: minimizing additional disturbance to the area by installing facilities in previously disturbed areas where possible; minimizing the size of drilling pads and staging areas; use of all terrain drilling and sampling equipment in areas not served by existing roadways; constructing nested wells with multiple well screens at different depths in a single boring where possible rather than drilling individual borings for each well depth' minimizing the	See proposed text change	DOI concurs with the response as revised by DTSC.	Comment resolved.

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						amount of equipment and duration that equipment is present on site; and providing training to all site employees to ensure that they are aware of and respectful of the spiritual value of this area that is considered sacred by certain Tribes."			
14	DTSC-7	Page 1-2, Project Background, Second Paragraph	"Investigative and remedial activities at the Compressor Station date back to the 1980s with the identification of SWMUs through a RCRA Facility Assessment (RFA)."	California Department of Toxic Substances Control	Prefer to say "began in the 1980s". Not all AOCs and SWMUs were identified through the RFA. Note that additional information on potential historical waste management activities were released by PG&E as recent as 2010.	Text will be revised as suggested.	Okay.		Comment resolved.
15	DTSC-8	Page 1-2, Project Background, Second Paragraph	"To date, major portions of the site RCRA Facility Investigation/Remedial Investigation (RFI/RI) have been completed…"	California Department of Toxic Substances Control	This is only true for groundwater. Soil Investigation is just in the RFI/RI work plan stage. This sentence needs to be revised as follows. "To date, major portions of the site RCRA Facility Investigation/Remedial Investigation (RFI/RI) have been completed for groundwater,…"	Text will be revised as suggested.	Okay.		Comment resolved.
16	DTSC-9	Page 1-2, Project Background, Second Paragraph	"…an Interim Measure (IM) is being implemented,…"	California Department of Toxic Substances Control	Insert "... to stabilize chromium plume migration towards the river,..." after implemented.	Text will be revised as suggested.	Okay.		Comment resolved.
17	DTSC-10	Exhibit 1-1 and Exhibit 4-1	Interim Measures, CEQA EIR, Achieve RAOs and Closure, Post-closure Monitoring boxes	California Department of Toxic Substances Control	IM is not an assessment process. CEQA EIR is not a decision process, but an assessment of impacts. Remove word "Closure" in completion boxes because of RCRA specific implications. Use "post remediation monitoring" and "Achieve RAOs"	Revised exhibits that include the requested changes are attached to these responses.	Okay.		Comment resolved.
18	HA-2	p. 1-3 (Exhibit 1-1)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This exhibit should show how the Tribal consultation process relates to each of the various steps and processes depicted, as requested at the May 2011 TLP meeting.	Figure 4-1, not Exhibit 1-1, was presented and discussed at the May 2011 TLP. Per DOI's direction at the May 2011 TLP and the June 2011 CWG, Figure 4-1 was revised (see attached) to indicate that Tribal Consultation will occur at each step, from design through post-remediation monitoring.	Okay.	Concur with revised Figure 4-1.	Comment noted.
19	DTSC-11	Page 1-4, Remedy Decision, Second Paragraph	"The decision process steps identified on Exhibit 1-1 include the California Environmental Quality Act (CEQA) EIR, the RCRA SOB, the CERCLA Proposed Plan (PP), and the CERCLA ROD."	California Department of Toxic Substances Control	Modify this sentence and remove "the California Environmental Quality Act (CEQA) EIR". EIR is an assessment document for the final decision. Project approval is based on the Findings of Fact, Statement of Overriding Considerations and the signing of the Resolution of Approval.	Text will be revised to say (inserted verbiage shown in <u>underline</u> typeface): "The decision process steps identified on Exhibit 1-1 include ~~the California Environmental Quality Act (CEQA) EIR,~~ the RCRA SOB, <u>the Findings of Fact, the Statement of Overriding Considerations and Resolution of Approval,</u> the CERCLA Proposed Plan (PP), and the CERCLA ROD." Exhibit 1-1 was also revised (see attached) to expand the box "RCRA Statement of Basis" to include Findings of Fact, Statement of Overriding Considerations and the Resolution of Approval.	Okay.		Comment resolved.

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20	DTSC-12	Page 1-4, Remedy Decision, Second Paragraph	"The SOB, which identified the State's preferred alternative, was published by the DTSC in January 2011 (DTSC, 2011a)."	California Department of Toxic Substances Control	The draft SOB was published by DTSC in June 2010 and finalized as part of the Staff Report supporting the Resolution of Approval that was signed in January 2011. The section should be revised to incorporate this information.	Text will be revised to say (inserted verbiage shown in underline typeface): "The draft SOB, which ~~identified~~ described the rationale for the State's preferred alternative, was published by the DTSC in June 2010, and finalized as part of the Staff Report supporting the Resolution of Approval that was signed in January 2011 (DTSC, 2011a)."	Okay.		Comment resolved.
21	DTSC-13	Page 1-4, Remedy Decision, Third Paragraph	"The purpose of the IM has been to stabilize the groundwater contamination during the time period in which the site characterization, risk assessment, and alternative definition and evaluation steps are completed."	California Department of Toxic Substances Control	Insert "groundwater" into the cited sentence prior to "site characterization".	Text will be revised as suggested.	Okay.		Comment resolved.
22	DTSC-14	Page 1-4, Last Paragraph	"Following attainment of the RAOs, closure and post-closure activities will take place."	California Department of Toxic Substances Control	Change to: Following attainment of the RAOs, long term monitoring and remedy decommissioning and reclamation activities will take place.	For consistency with terminology used in the EIR MMRP and the PA, PG&E suggests that the text be revised to say (inserted verbiage shown in underline typeface): "Following attainment of the RAOs, ~~closure and post-closure~~ long-term monitoring and remedy decommissioning and restoration activities will take place."	Okay.		Comment resolved.
23	HA-3	p.1-4 (Interim Measure)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section states that: "The IM will be terminated upon the determination by the agencies that it is no longer required." In the past, the Tribe has commented on its active interest in the closure, decommissioning, and removal of the IM3 treatment facility and certain associated infrastructure. As suggested in earlier discussions and comments, criteria that the agencies will use to determine that the IM *"is no longer required"* must be established that is consistent with the agencies' legal obligations. The Tribe requests to be a party to any discussions that will be initiated on this subject.	PG&E defers to DTSC and DOI.	FMIT will be invited to review and provide comments on the IM3 decommissioning and restoration plan. The plan will be part of the Cultural Impact Mitigation Program (CIMP) as required in the Mitigation Monitoring and Reporting Program under CUL-1a-8 of the EIR.	It is recognized that the IM 3 treatment facility will need to remain operational until it is determined that the remedy is functioning properly and performing as designed. Specific criteria have not been established at this time. DOI/BLM will provide an opportunity for consultation during the review of the Remedial Action Work Plan and the IM3 Decommissioning Plan.	Comment noted.

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24	DTSC-15	Page 1-5, Section 1.2.1	Components of the groundwater remedy	California Department of Toxic Substances Control	The groundwater remedy, in accordance with the December 2009 CMS/FS, Section 3.3.3, also requires the monitoring of selenium, nitrate and molybdenum throughout the operation and maintenance phase of the remedy. This requirement should be added to the bulleted list. Furthermore, the EIR remedy description also includes "monitoring of the chemical parameters and hydraulic properties of groundwater at the site." Therefore, groundwater monitoring for the effectiveness of the remedy should also be added to the list.	The description of the groundwater remedy in Section 1 is intended to be high level (introductory) and not exhaustive of all components of the project. Additional details about the project are provided in subsequent sections, and future documents will contain even more detail. The bulleted list in Section 1.2.1 is consistent with DOI's ROD (Section D – Description of Selected Remedy) and the DTSC's Final Statement of Basis (Summary of the Preferred Alternative). Groundwater monitoring for selenium, molybdenum, and nitrate is discussed in Section 3.1.2 (Additional Data During Groundwater Remedy Design) and in Section 3.1.4 (Additional Data During Groundwater Remedy Operation and Closure). Additional details regarding the monitoring for these parameters in groundwater will be provided in design and operation documents discussed in Section 4. PG&E proposes no changes be made to the Work Plan as a result of this comment.	Okay.		Comment resolved.
25	DTSC-16	Page 1-5, Section 1.2.1	"Monitored natural attenuation (MNA) as a long-term component to address residual Cr(VI) that may remain in recalcitrant portions of the aquifer after in-situ treatment."	California Department of Toxic Substances Control	Modify the cited sentence to read as follows: Monitored natural attenuation (MNA) as a long-term component to address residual chromium that may remain in recalcitrant portions of the aquifer after enhanced in-situ treatment and optimized system performance.	The sentence will be revised as requested.	Okay	DOI concurs with the revised text.	Comment resolved.

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26	HA-4	p. 1-5 (Bedrock Extraction Wells)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	As a component of the selected groundwater remedy, the Work Plan indicates that bedrock extraction wells will be constructed. However, the number and locations of such wells is not specified. The approach recommended for the area of bedrock contamination is of concern to the Tribe because of the potential for a large number of extraction wells as a result of the hydraulic properties of the bedrock as well as questions as to the pipeline network and routings out of this area to the location of treatment. The potential for intrusion of infrastructure into this sacred area is of great concern to the Tribe and more detail regarding impacts, which must be minimized, must be provided in a timely manner.	As mentioned in Sections 2.1.1 and 6.3, the numbers and locations of wells will be defined during the design using modeling and described in the design submittals. Tribal Consultation will occur at each stage of the design, i.e., preliminary, intermediate, and final design submittals.	Okay	DOI concurs with the response. DOI and BLM anticipate the opportunity to have meaningful discussion with the Tribes during consultation on each design phase.	Comment resolved.
27	Hualapai-3	Section 1.2.1, page 1-5		Hualapai Department of Cultural Resources	To the east of the East Ravine bedrock contamination, the Colorado River sediments and alluvial deposits have not been adequately described to know whether an organic layer exists at the bedrock/sediment interface. Occurrence of such an organic layer can serve as the final defense to prevent Cr-6 from entering the river from the bedrock plume.	Several river sediment pore water samples were collected in the vicinity of the East Ravine in late 2005. Samples from upstream, downstream, and at the ravine-river intersection showed conditions similar to those in shallow floodplain waters. The samples contained detectable ammonia, dissolved iron, and dissolved organic carbon, and had no detectable nitrate present (Pore Water and Seepage Study Report, PG&E Topock Compressor Station, Needles, California. March 13, 2006). These qualities collectively describe a more reducing environment in which Cr(VI) is readily reduced to Cr(III) and consequently removed from solution. The river bathymetry survey conducted by USGS in 2006 confirmed a significant thickness of fluvial material in this area. Data from floodplain and sub-river borings support the site conceptual model that reducing conditions persist in fluvial groundwater at all depths in this area. Though a thorough analysis of the solid material at this location has not been conducted, the pore water samples represent the conditions present at the "endpoint" of any groundwater discharge that occurs to the river in this area, and conditions consistently indicate favorable conditions for the reduction of Cr(VI).	DTSC noted that this topic is currently under discussion with respect to the Soil RFI/RI Work Plan.	DOI noted that this topic is currently under discussion with respect to the Soil RFI/RI Work Plan.	Response noted.
28	DTSC-17	Page 1-5, Last Paragraph and Exhibit 1-2	"The level of project definition will increase during the remedial design phase and will continue to increase during the construction and operation and maintenance phases."	California Department of Toxic Substances Control	The project definition should not change beyond the remedy design phase. The concept of increasing project definition is for cost estimate accuracy (evident by cited reference USEPA, 2000) and not to be confused with remedy implementation. Revision is requested.	The project is expected to change following the remedial design phase. There will be changes made during the construction phase and during the (decades-long) operational phase for a number of reasons, such as to enhance performance, to provide for adjustments due to field conditions or changes in site conditions, to respond to contingency or emergency situations, and to	Okay.		Comment noted.

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						incorporate technological advances. It is expected that the remedy would be continuously optimized and modified throughout the operational period, resulting in changes to the number, location, and configuration of the extraction, treatment, and injection systems, and/or changes to the type, method and configuration of the treatment delivery systems. Exhibit 1-2 in the Work Plan is intended to illustrate this concept and to communicate the relative level of project certainty at this point (at remedy selection) and in future project phases. If helpful, the reference to the USEPA guidance can be removed from the 3rd sentence in the paragraph so that the sentence reads: "This concept of increasing project certainties as the project progresses through implementation phases after remedy selection is ~~referenced in U.S. Environmental Protection Agency (USEPA) guidance documents (USEPA, 2000) and~~ illustrated in Exhibit 1-2."			
29	HA-5	p. 1-6 (Exhibit 1-2)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This is a conceptual diagram intended to illustrate that the level of project definition increases along the project timeline. However, this exhibit cited from the EPA (2000) guidance document [1] [[1]See http://www.epa.gov/superfund/policy/remedy/pdfs/finaldoc.pdf]] was prepared to illustrate "Expected Cost Estimate Accuracy Along the Superfund Timeline." The exhibit purports to represent range in uncertainty along the vertical axis, but does not clarify that this represents cost uncertainty and not design or project definition. Instead, as discussed in the bottom paragraph of p. 1-5, this exhibit implies that progress along project timeline somehow decreases the uncertainty about the project definition. This is a circular representation and should be eliminated from the discussion.	Please see response to Comment #28 DTSC-17. The comment is correct that the graphic in the cited cost estimating guidance was intended to represent cost accuracy; however, because cost accuracy is directly related to the level of project definition, this graphic was incorporated (with modifications) into the work plan to illustrate the increasing certainty in the project details that will occur during the design, construction, and operational phases and to communicate the relative level of project certainty at this point (at remedy selection) and at future project phases.	Okay.	Comment noted.	Comment noted.
30	DTSC-18	Page 1-6, Section 1.2.2	"2. Prevent or minimize migration of total chromium (Cr[T]) and Cr(VI) in groundwater to ensure concentrations in surface water do not exceed water quality standards that support the designated beneficial uses of the Colorado River (11 µg/L Cr[VI])."	California Department of Toxic Substances Control	Although this is clearly a stated RAO from the CMS/FS and carried into the remedy, stakeholders have been concerned that the remedy would allow discharge of chromium into the Colorado River. DTSC's intent has always been to maintain the quality of the river water and not to allow the degradation of it to the water quality standard of 11 µg/L of Cr(VI). The Work Plan should clarify that the design criteria is to avoid exceeding the baseline conditions (nondetect to trace levels) while the project is implemented.	In response to this comment, Section 2.3.1 (last paragraph, bottom of page 2-16, 4th and 5th sentences) is proposed to be modified as follows (inserted verbiage shown in <u>underline</u> typeface): "River monitoring ~~may~~ <u>will</u> also be conducted to ensure that concentrations remain below numeric surface water quality criteria <u>and is consistent with river baseline levels for Cr(T) and Cr(VI)</u>. <u>Both chromium and potential byproducts (arsenic and manganese) will be</u>	Okay.		Comment resolved.

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						monitored in the river. The surface water quality criteria for Cr(VI) is 11 µg/L and for arsenic is 150 ug/L (Source: Table 2 of the ROD, ARAR #3, Federal Water Pollution Control Act. 33 USC 1251-1387, 40CFR 131.38). There are no surface water quality criteria for Cr(T) and manganese. Concentrations attributable to contributions from the Topock site (comparison of upgradient surface water results to downgradient surface water results) will result in contingency activities, such as system modifications."			
31	MWD-1	Page 1-6: 1.2.2 Remedial Action Objectives (#2)		Metropolitan Water District of Southern California	It states that this objective is to ensure that chromium does not migrate to the Colorado River. It lists the water quality standard for beneficial use as 11 µg/L for chromium VI. River monitoring to date has shown the levels of chromium VI and total chromium to be non detect (<1.0 µg/L). All the Applicable or Relevant and Appropriate Requirements (ARARs) are listed in Appendix B of the Final Groundwater Corrective Measures Study/Feasibility Study. RAO #101: State Water Resources Control Board Resolution No. 68-16 ("Antidegradation Policy"_ Statement of Policy with respect to Maintaining High Quality of Waters in California. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained. Therefore, the objective should include a non degradation objective to not exceed current conditions (i.e., <1.0 µg/L) in the Colorado River.	The RAOs were proposed in the CMS/FS and adopted by DTSC and DOI in RCRA Corrective Action and CERCLA decision documents, respectively. The restating of RAOs in Section 1 of the work plan is intended to communicate project background information. PG&E is committed to protecting both surface water and groundwater within the project area. While there are no numeric criteria in the State Water Resources Control Board Resolution No. 68-16 ("Antidegradation Policy", PG&E is committed to reducing chromium concentrations in groundwater, and as a result increase the level of certainty that surface water quality will continue to support present and anticipated beneficial uses, and be protective of potential receptors. PG&E is also committed to reducing chromium concentrations in groundwater in a manner that does not result in unnecessary infrastructure or operations in culturally or biologically sensitive areas or result in unnecessary energy use or increased carbon footprint, or result in public health costs to remedial workers that exceeds the public health benefits. In that sense, considering effects on all resources would meet the intent of the ARAR to obtain the highest water quality consistent with maximum benefit to the people of the State. PG&E will continue to monitor surface water quality during operations and compare downgradient concentrations to upgradient concentrations. If that comparison concludes that detected concentrations in downgradient samples are attributable to the Topock site, contingency activities will result such as system modifications (add wells, and/or modify extraction/injection rates, and/or	Okay.	Concur.	Comment noted.

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						modify amendment delivery rates or methods) and procedures identified in the EIR for potential exceedance of water quality standards.			
32	DTSC-19	Page 1-7, ARARs, First Paragraph	"Plans and procedures to comply with the identified location- and action-specific ARARs during construction, operation, monitoring, closure, and post-closure phases of the groundwater remedy will be developed, as discussed in Chapter 4."	California Department of Toxic Substances Control	Please remove the terms closure and post-closure as it pertains to the groundwater remedy. Unless the unit under cleanup was authorized as a waste management unit under a permit, interim status or listed under a RCRA Part A application, "closure" requirements do not apply. Nevertheless, it is subject to RCRA Corrective Action.	For consistency with similar comments above, text will be revised to say (inserted verbiage shown in underline typeface): "…during construction, operation, ~~monitoring, closure, and post-closure phases of the groundwater remedy~~ maintenance, decommissioning, restoration, and long-term monitoring after the completion of the active treatment will be developed, as discussed in Chapter 4."	Okay.		Comment resolved.
33	HA-6	p. 1-7 (ARARs & Figure 1-2)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The last sentence in this section refers to the Area of Potential Effects (APE), as defined by the Programmatic Agreement (PA).[2] [[2] The Tribe is not a signatory party to the PA.] Figure 1-2 illustrates the APE as well as the "project area" as defined in the FEIR, prepared pursuant to the California Environmental Quality Act (CEQA). Figure 1-2 does not define the APE as it has previously been defined. Compare Figure 1-2 with Figure 2-2, Volume 2 of the FEIR. The APE in this current document has been extended to the north, to the east and to the west. It also must be noted that the Tribal governments that participated in the PA discussions chose not to be signatory parties based largely on the fact that the PA failed to adequately identify and take into account the direct, indirect, and cumulative adverse impacts to the lands within and outside of the APE. These impacts, which the PA did not consider, are significant and irreversible intrusions to the Tribes' religious and cultural connection to the land. The APE, as shown in the FEIR, Figure 2-2, and in the CMI/RD Figure 1-2 were never presented to the Tribes for comment or consultation. As was pointed out in previous comments, the FEIR only considered the archaeological features of the land, and not the spiritual religious viewpoint of the Mojave people that the project area is within a much broader sacred landscape. Furthermore, Figure 1-2 is misleading as it represents that the so-called "loci" of the Topock Maze are exclusions to the EIR project area and implies that sacred areas are being avoided. The Tribe has commented numerous times that this representation of the "loci" as delineating a sacred area is inappropriate and misleading: The "loci" are only places determined to be archaeologically significant based upon the presence of artifacts. The	Figure 1-2 presents the project area as defined by the EIR and the APE as specified in the PA. PG&E defers to DTSC and DOI on response to the remainder of this comment.	There is no Fig 2-2 in the Volume 2 of FEIR. Nevertheless, the "EIR project area" identified in Figure 1-2 of the CMI/RD work plan is consistent with all Exhibits within the draft and final EIR that identified the proposed project area. The draft EIR was provided to the Tribes for preview between 4/27/10 – 6/4/10 followed by a 45 days comment period between 6/4 – 7/19/2010. The commenter's objection is noted, however, DTSC believes the FEIR did capture the spiritual religious viewpoint of the Mojave people that the project area is within a much broader landscape. See Section 4.4 of the FEIR. PG&E will provide language in the CMI/RD Work Plan regarding tribal cultural ties to the area.	DOI defers discussion related to the FEIR to DTSC. Through continued consultation on each design phase, DOI and BLM hope to further define the measures needed to mitigate or reduce the adverse effects to the TCP.	Comment noted.

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					"loci" as designated do *not* define areas that in themselves are sacred. To the Mojave people the area as a whole and in its totality is sacred as determined by Matavilya, the Creator. This applies to the whole area, not just this determined area. The Tribe has frequently commented that the APE extends well beyond the boundaries shown. Therefore such figures such as this misleadingly imply that the EIR project area, which snakes its boundaries around certain archaeological areas, does not affect or is minimizing the effect on sacred areas. The Tribe strongly disagrees with this implication.				
34	DOI-1	Section 1.2.4		U.S Department of the Interior	Although identified on Figure 1-2, the text should explicitly state that the project area as defined by the EIR is encompassed within the Area of Potential Effect (APE) specified in the Programmatic Agreement.	The following sentence will be added under Section 1.2.4 (after the second sentence) (inserted verbiage shown in <u>underline</u> typeface): "<u>The project area as defined by the EIR is encompassed within the APE specified in the PA</u>."		Concur with response.	Comment resolved.
35	HA-7	p. 1-7 (CEQA Mitigation Measures)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The reference to CEQA mitigation measures is incomplete. It fails to reference the nature and severity of the impacts to tribal cultural resources, and how this relates to possible remedy designs. Impacts that were found to be significant and unmitigable related to project impacts with bearing on tribal cultural resources and values. As expressed many times by the Tribe, it has been their consistent position that these affected spiritual and religious values are protected by the United States and California Constitutions and are therefore subject to strict scrutiny, meaning, that the project must be performed in the least intrusive manner. Moreover, the Tribe is deeply concerned about indirect and cumulative impacts, which were not adequately addressed in the FEIR and are the subject of ongoing litigation. Thus, there is considerable uncertainty regarding the completeness and appropriateness of the mitigation measures in the FEIR. Finally, while DOI has approved a Record of Decision (ROD), that document essentially largely left the issue of mitigation to be decided during design, and hence, mitigation is not complete as to the Federal agencies. Moreover, this section states that: *"The EIR concluded that implementation of the groundwater remedy would generate significant adverse environmental impacts, and for most potential impacts, the EIR prescribes mitigation capable of reducing these impacts to less-than-significant levels."*	PG&E defers to DTSC.	Tribe's objection is noted. The FEIR provided the detailed approach and rationale for the findings in discussion of each of the resource areas. The threshold of significance are also included.	DOI defers to DTSC regard the CEQA mitigation measures. DOI and BLM anticipate further consultation and discussions with the Tribes during the design review and CHPMP development. We hope that these opportunities will assist un in developing mitigative measures for impacts resulting from implementation of the ground water remedy.	Comment noted.

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					In past reviews, the Tribe has noted exceptions to this generality, particularly as it may apply to the impact on religious and spiritual values. As you are aware, the FEIR analysis with regard to CUL-1 concluded that: *"..., impacts on the TCA* [Topock Cultural Area] *as a historical resource would be* ***significant and unavoidable.****"* While this conclusion does not necessarily address impact to the religious and spiritual values of the TCA, it does in part illustrate the disservice that the above-quoted generalization pays to the sacredness of the area. The Tribe hereby reasserts its viewpoint that the mitigation measures do not properly address the impacts to the sanctity of the TCA.				
36	DOI-2	Section 1.3, Exhibit 1-3		U.S. Department of the Interior	Revise accordingly per General Comment 1.	Exhibit 1-3 was revised in accordance with response to Comment #5 DOI-1 (see attached)		DOI concurs with the response.	Comment resolved.
Section 2 Comments – Groundwater Remedy Components									
37	DOI-3	Section 2.0 General Comment		U.S. Department of the Interior	This section describes a framework for design and implementation of the remedy. The work plan does not have a consolidated discussion of the overall engineering design process. Table 4-5 indentifies the three design submittals. However, there is no discussion of the underlying principles PG&E will employ between establishing design requirements, how the requirements will be integrated in preliminary design, what information may affect refinement in the intermediate stage, and how the design rationale will be optimized in the final design stage. Please add a description of PG&E's engineering design process to help reviewers understand the rationale that will govern the design process from the feasibility study through design and the eventual expression in the Construction/ Remedial Action Work Plan.	To address this comment, PG&E proposes to add the following text to Section 2 (page 2-1, at the end of the second paragraph): "The future design packages will contain detailed information of the selected remedy designed to achieve the RAOs while meeting the substantive requirements of the identified ARARs and complying with the EIR MMRP and landowner and leaseholder requirements. The selected remedy described in the agencies' decision documents and the RAOs provide the foundational inputs to the project design basis. The identified ARARs, the EIR MMRP, and landowner/ leaseholder requirements provide the boundary within which the design will be developed and subsequent phases of the project will be implemented. Central to the design process is the groundwater modeling effort, which will be used to refine/optimize the key remedy features: from a macro scale, the groundwater flow model will be updated to define the well locations and pumping/ injection rates/capture zones, and from a finer scale, the new solute fate and transport model will be used to design the IRZ (see Section 6.2 for more details about the modeling effort). In addition, key supplies (e.g., freshwater supply, power supply, etc.) will be evaluated; one or more preferred option(s) will be carried forward in the design.		Concur with response.	Comment resolved.

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						Key assumptions will also be confirmed during the design, such as the ability of the arched bridge to carry freshwater supply pipe. Supporting facilities needed to ensure proper operation of the remedy will be further developed and designed, e.g., management of remedy wastewater, site security, etc. (see Section 2.2 for further details). Additional data collected during the design (see Section 3.1.2) will be incorporated into the design process. Additional engineering options may surface during the design; if deemed viable and appropriate, PG&E will include them in the design submittals for agencies and stakeholders' review. With the above, basic project information will be determined or calculated so as to prepare the project design basis. The project design basis will be described in the Basis of Design Report included in the preliminary/ intermediate/final design submittals (see Table 4-5). The Basis of Design Report will include updated site data, design basis (e.g., source of freshwater, well extraction/injection rates, well spacing, carbon substrate, carbon dosing, redundancy, level of automation, etc.), assumptions, uncertainties, governing codes/standards (including compliance with EIR MMRP and substantive requirements associated with ARARs), tools used to guide design (e.g., aerial map of disturbed areas, map of mature plant species, topographic survey, utility locations , etc.), updated cost estimates and schedule. Plans and specifications will be included in the design submittals as described in Table 4-5. It is anticipated that as the design progresses, the design basis and assumptions will be refined and the level of uncertainties will decrease. For example, assumptions about access for piping or facilities, substantive requirements associated with injecting of remedy wastewater into the ground or discharging remedy wastewater (e.g., to the Topock Compressor Station [TCS] evaporation ponds or future infiltration gallery), the ability of a given remediation well to accomplish its objective (e.g., achieve desired flow rates).Design assumptions will be or are being evaluated presently and will be included in the design submittals. In the event that design assumptions cannot be resolved by the time of the intermediate			

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						design stage, PG&E will propose to either carry options in the final design submittal, or to plan for potential re-design in the final design submittal."			
38	DTSC-20	Page 2-1, Section 2.1 and Exhibit 2-1		California Department of Toxic Substances Control	The list of remedy components should be revised to address related comments cited for Section 1. See Comments above.	See response to Comment #24 DTSC-15.	Okay.		Comment resolved.
39	DTSC-21	Page 2-1, Second Paragraph of Section 2.1	"The level of project definition will increase during the remedial design phase and will continue to increase during the construction and operation and maintenance phases."	California Department of Toxic Substances Control	See comment above regarding the inappropriate use of cost estimate guidance concept for project definition.	See response to Comments #28 DTSC-17 and 29 HA-5.	Okay.		Comment resolved.
40	DTSC-22	Page 2-1, Second Paragraph of Section 2.1	"It is fully expected that changes to the numbers, locations, methods, and configuration of remedy components will change as the remedy moves through the design, construction, and operational phases."	California Department of Toxic Substances Control	Please clarify what is meant by change in "methods" during design, construction, and operational phases? The sentence following the referenced text is clear on anticipated changes to optimize the system. Is this sentence redundant?	The word "Methods" is intended to mean techniques or procedures. It is intended to mean *how* something is constructed or operated rather than *what* or *where*, etc. For example, changes to in situ reactant type or delivery rate could be considered a change in method. The sentence following the referenced text provides the framework for changes during remedy implementation. Therefore, it provides context and is not redundant with the referenced text. No changes to the Work Plan are proposed as a result of this comment.	Okay.		Comment resolved.
41	DTSC-23	Page 2-1, Section 2.1		California Department of Toxic Substances Control	PG&E should establish short term RAOs to gauge the progress of the remedy as part of the five year review. This is done routinely at clean-up sites. Example can be expected outcome of floodplain IRZ chromium concentrations and by-product concentrations at monitoring or extraction points within five years. This concept should be part of the CMI/RD Work Plan.	The RAOs established in the decision documents will be used to define project success. Process control monitoring will provide data with respect to short-term performance of the remedy, and these data will then be used for system optimization. PG&E understands that short term RAOs referenced in this context, are operational targets intended to evaluate and guide remedy progress. These targets will be established and presented in the design documents and the O&M Plan for review and comment.	What are these monitoring parameters and what would be the appropriate measuring indices? PG&E will need to identify limitations and conditions at which point the remedial technology will need to be reconsidered… and not for refinement or optimization.		Comment resolved.

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42	DOI-4	Section 2.1, 2nd para.		U.S. Department of the Interior	It is stated that the numbers, methods, and configuration of remedy components will change as the remedy moves from the design to the operational phases. Some discussion is needed on how changes to impacts and mitigation measures will be handled and documented considering many of the relevant plans could have already been submitted and approved.	Changes are expected during construction and operation, as actual field/subsurface conditions may differ from assumptions made during the design. Protocols for communicating and documenting changes will be included in the O&M Plan and the Construction/Remedial Action Work Plan (Table 4-5, first and second bullets). Both of these plans will be submitted concurrent with the design submittals. In addition, Section 4.3 states that the Corrective Measure/Remedial Action Construction Completion Report will document substantive changes to the final design plans and specifications during construction. No changes to the Work Plan are proposed as a result of this comment.		Concur.	Comment resolved.
43	DOI-5	Section 2.1.1, 1st para.		U.S. Department of the Interior	The organic carbon substrate alternatives assessment should be presented in this document, and the preferred carbon substrate identified. There could be impacts associated with the preferred carbon substrate and there will need to be consensus. See General Comment 1.	Preliminary evaluation criteria and design criteria for carbon substrate selection was presented in the *Final Corrective Measures / Feasibility Study Report for Chromium in Groundwater, Appendix G - In Situ Reactive Zone Treatment Design Elements*. The carbon substrates currently being considered for the IRZs are covered under the Final EIR. The intent of the IRZ design is to engineer sufficient flexibility to facilitate the use of several carbon substrates (if needed) during the operational phase of the remedy, taking into consideration biodegradation half-life/pathway/ intermediates, mobility in the geologic formation, relative strength and persistence of reducing equivalents, biomass characteristics imparted by metabolizing the carbon substrate, physical/chemical characteristics of the reagent, and applicable substantive permit requirements. More comprehensive engineering criteria will be presented in the Basis of Design component of the 30% design submittal. No changes to the Work Plan are proposed as a result of this comment.	See comment to DOI 1 above. Agencies expect PG&E to provide parameters for design prior to evaluation of design. This is the fundamental focus and expectation of the CMI/RD work plan. However, in the interest of advancing the project, DTSC will agree to defer the review of these elements until the design submissions. Nevertheless, DTSC expects PG&E to present balanced chemical reaction equations (with primary, secondary and tertiary reactions if applicable) along with vendor provided empirical dose/ response recommendations and mass balance calculations as basis for design. From these considerations, DTSC expects PG&E to provide, as a product of the 30% design, a conceptual process flow logic and remediation infrastructure calculations.	See RTC DOI Comment #1. It is noted in the earlier PG&E response that the information from the CMS/FS (and presumably the EIR) can be summarized in the work plan, as it should.	Comment resolved.
44	DTSC-24	Page 2-2, Section 2.1.1, Third Paragraph	"Effective distribution of organic carbon (as measured by total organic carbon [TOC]) is one of the key design criteria for the establishment of the IRZ."	California Department of Toxic Substances Control	How will PG&E measure this "key criteria"? Would additional pilot tests need to be conducted beyond the modeling and/or enhanced monitoring? PG&E has not provided necessary schedule to complete these evaluations in Chapter 6.	TOC will be measured using the monitoring network. No additional pilot tests are planned or anticipated for this purpose. No adjustment to the schedule is needed. No changes to the Work Plan are proposed as a result of this comment.	Although TOC can be measured directly from monitoring wells, the key to effective in-situ treatment is good delivery of reducing agents throughout the IRZ. DTSC will defer additional monitoring related concerns until review of the monitoring plan.		Comment resolution pending review of Corrective Measure/Remedial Action Monitoring Program

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45	DTSC-25	Page 2-2, Section 2.1.1, Fifth Paragraph	"Solute transport modeling will support the design of the IRZ. The model will establish the number of IRZ wells, the spacing between those wells, injection flow rates, carbon dose rates, as well as the location and flow rates of extraction wells within the line of IRZ wells. The plan for developing the model and modeling efforts is discussed in Section 6.2."	California Department of Toxic Substances Control	The Work Plan should also state that the model will also assist in locating monitoring wells associated with the IRZ and preparing an adequate groundwater monitoring and reporting program.	The following text will be added: "The modeling will also be used to identify the well locations to monitor remedial performance."	Okay	Concur.	Comment resolved.
46	HA-8	p. 2-2 (*In Situ* Reactive Zone)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The last sentence in the last paragraph on this page indicates that: *"Solute transport and geochemical modeling will be used to develop strategies for minimizing generation and migration of byproducts."* The Tribe is interested in the details of this modeling activity. Additionally, will the solute transport models be used to predict and evaluate the overall performance of the cleanup? Why were solute transport models not used earlier in characterization and evaluation of the feasibility of alternative remedies? The Tribe recommends that the process of model development be reviewed openly in the Technical Working Group (TWG) forum.	As discussed in Section 6.3, modeling details will be provided in the 30% design submittal. The fate and transport model will be used to project overall chromium clean-up. The transport modeling will provide an additional estimate of the period of performance and will be a metric to evaluate the remedial design. Transport modeling was not performed initially as hydraulic capture and pore volume flushing were used as the performance metrics in the CMS/FS. No changes to the Work Plan are proposed as a result of this comment. PG&E defers to DTSC on TWG forum.	Okay, will further analyze at 30%	DOI anticipates further discussion at the TWG regarding the modeling. If, during the TWG, there is additional information that is identified that would assist in clarifying the text, it should be incorporated into the work plan.	Comment noted. A TWG meeting was held on September 1, 2011 to discuss the modeling approach to support the design and ongoing modeling efforts. A decision was made to hold frequent discussions on modeling details. The next modeling discussion will occur at the next TWG meeting on October 18, 2011. Timing of follow-up discussions will be determined by the TWG at the next meeting. No changes to the CMI/RD Work Plan are required.

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47	Hualapai-4	Section 2.1.1, and Section 6.3.2		Hualapai Department of Cultural Resources	In order to conduct geochemical and solute transport modeling, the solid phase minerals of the aquifer need to be defined. X-ray diffraction and scanning electron microscopy (SEM) could be done to define the solid-phase mineral suites on aquifer precipitates, and the results correlated to geochemical modeling. Sequential extractions could be done to determine, for example, whether adsorbed arsenic occurs as arsenate or arsenite.	Topock aquifer soil has been characterized through the use of geochemical and mineralogical methods. These data have provided the identity of the chemical form of iron and manganese in the aquifer soil. This information is being used to assist in providing relevant information for the geochemical model of byproducts. This information will be included in the 30% design submittal. No changes to the Work Plan are proposed as a result of this comment.	Okay, will further analyze at 30%	Concur.	Comment resolved.
48	DTSC-26	Page 2-3, IRZ System Footprint, First Paragraph	"Wells will be installed on one or both sides of the road (possibly extending into the floodplain or areas adjacent to natural gas pipeline corridors northeast of the Topock Compressor Station)."	California Department of Toxic Substances Control	The location of the pipeline corridors mentioned should be included in a figure for clarity.	Location of the natural gas pipelines northeast of the Topock Compressor Station was added to the revised Figure 2-1a.	Okay		Comment resolved.
49	DTSC-27	Page 2-3, IRZ System Footprint, Second Paragraph	"These structures could be located at the MW-20 Bench as this area is easily accessible and is next to the IRZ, minimizing the required distance for piping to and from the extraction and injection wells and operational logistics."	California Department of Toxic Substances Control	If PG&E intends to construct facilities on MW-20 bench and may need Department of Interior approval, a list of anticipated key approvals should be considered in the CMI/RD Work Plan as part of the project schedule (see expected submissions in Table 4-1 and 4-2).	A list of anticipated approvals is planned for inclusion in the Construction/Remedial Action Work Plan and the O&M Plan (see Table 4-5). The new tables 4-1A and 4-2A further clarifies this point.	Revised tables are okay, however, for cost estimate line, it will be required at each phase of design. Please remove "if financial assurance is necessary."	The revised tables are adequate.	Comment resolved.
50	DTSC-28	Page 2-3, IRZ System Footprint, Second Paragraph		California Department of Toxic Substances Control	In this section, PG&E describes the remedial system in concept, but it is difficult for readers to visualize what the system may look like. Perhaps it would be beneficial for PG&E to show photos of the Hinkley control buildings and associated tank as real life examples of the type of structures that may be used at Topock.	Comment noted. Photographs of the Hinkley Central Area IRZ carbon amendment storage, amendment, and control facilities were presented in the Final Corrective Measures / Feasibility Study Report for Chromium in Groundwater, Appendix G - In Situ Reactive Zone Treatment Design Elements (refer Figure G1 hereto attached). The location, footprint, layout, and configuration options are being developed for the final groundwater remedy; they will be refined based on the results of the ongoing groundwater modeling efforts, taking into consideration staffing needs/occupancy classification for buildings, operations and maintenance considerations, and constructability. All options being considered are covered under the Final EIR and will be engineered to comply with the constraints of Final EIR mitigation measures. More comprehensive details will be presented in the preliminary (30%) design submittal.	Okay		Comment resolved.

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51	DOI-6	Section 2.1.1, IRZ System Footprint, 2nd para.		U.S. Department of the Interior	The text states that the MW-20 Bench could be used to locate IRZ related structures. Is PG&E evaluating alternatives for locating these structures? If so, is this evaluation critical to the design and construction plan? When does PG&E intend to complete the evaluation? See General Comment 1. The text could be improved with background information and discussion of the significance of the MW-20 Bench and the role this location plays in the project Please call out its location on Figure 2-1a.	See response to Comment #5 DOI-1. A call-out to the MW-20 bench location was added to the revised Figure 2-1a.	Okay	DOI and the agencies look forward to the opportunity to review the Technical Memorandum referenced in the response to DOI #1.	Comment resolution deferred to 30% design.
52	HA-9	p. 2-3 (IRZ System Footprint)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section suggests that, to the extent practicable, disturbances related to facility construction will be limited to "previously disturbed areas." As you are aware from previous comments from the Tribe on, among other things, the FEIR, the Tribe has emphasized that limiting future construction to areas with previous physical disturbances to the surface do not necessarily avoid cultural impacts: that an area has been previously disturbed on the surface does not mean that that area has lost its spiritual and cultural value or is any less significant than a disturbance in an alternative area, even if that alternative area is undisturbed. The only way to assess the cultural significance of a disturbance is to consult with the Tribe, not solely an archaeologist. It is noted that, during the "design phase," PG&E will be preparing an "Aerial Map of Disturbed Areas" pursuant to CUL-1a-9.[3] [[3] See Table 4-4.] As discussed at the 2011 TLP meeting, this map is expected within the next few weeks.[4] [[4] Preliminary hard copies of the map(s) were delivered to the Tribe on June 2, 2011. However the Tribe has not yet had time to perform a technical review or to conduct ground-truthing. Electronic copies in GIS format have not yet been provided.] For that map to be meaningful, the type of previous disturbance (*e.g.,* underground pipeline, grading, surface facility, etc.) should be clearly identified. This could best be done using various types of overlays in the geographic information system (GIS). With such a map, the Tribe may be able to comment on the significance of alternative locations, and focus "ground-truthing" of the map more efficiently.	PG&E is currently working with interested tribes in the preparation of the Map of Disturbed Areas.	Okay	DOI defers to PG&E and DTSC regarding the map of the disturbed areas.	Comment Noted No changes to the CMI/RD Work Plan are required.
53	DTSC-29	Page 2-3, IRZ System Details, Third Paragraph	"The IRZ wells can be designed with one to three discrete screen intervals targeting specific zones of the water-bearing unit for treatment by the IRZ."	California Department of Toxic Substances Control	The rationale for the number of discrete screens should be discussed. Modeling results should be utilized to assist in IRZ well design.	The discrete screen intervals in the extraction and injection wells will be based upon the lithology and chemistry at each well location. However, the modeling will be used to assist in identifying target depth intervals which will improve the remedy (i.e., treat the most mass in the most efficient manner). The following text will be added to the CMI/RD Work Plan: "The groundwater flow	Okay.	Concur with new text.	Comment resolved.

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						and solute transport models will be utilized to evaluate the optimum discrete screen zones by first determining the chromium plume distribution throughout the model. With the plume initialized in the appropriate model layers, IRZ wells will be distributed horizontally and vertically to target the impacted groundwater. The well spacing, rates, duration, and carbon concentrations will then be optimized to intercept the impacted groundwater to reduce the potential of chromium impacted groundwater flowing to the east of National Trails Highway. The model will act as a tool to evaluate potential remedial scenarios and can then be further refined as additional hydrogeologic and water quality data is collected during implementation of the well design. Details of the fate and transport modeling approach will be provided in the preliminary (30%) design submittal for review and comment."			
54	HA-10	p. 2-3 (IRZ System Details)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	As mentioned earlier, this section fails to provide sufficient detail on which to provide meaningful comments. At the very least, a conceptual diagram(s) of the system configuration and assembly should have been provided. This section refers to the use of groundwater modeling to determine actual well design specifications. How will modeling be used for this purpose? Will the model be available to determine the effectiveness of alternative designs or locations that might be needed to accommodate potential cultural impacts?	In response to this comment, a new Figure 2-3 was added to the CMI/RD Work Plan to better illustrate the system configuration. Please refer to responses to Comments #46 HA-8 and #5 DOI-1, on the use of the modeling in the design process.	Responses to comments 5 and 46 did not provide much discussion on the use of modeling in the design process. It basically only says that it will be used. It does little to help readers understand the range of considerations, assumptions, input parameters, validation and expected errors in the use of the model.	DOI will defer comment until the conceptual diagrams are provided and reviewed. Discussions at the September TWG may serve to provide additional clarifying text for this section.	A TWG meeting was held on September 1, 2011 to discuss the modeling approach to support the design and ongoing modeling efforts. A decision was made to hold frequent discussions on modeling details. The next modeling discussion will occur at the next TWG meeting on October 18, 2011. Timing of follow-up discussions will be determined by the TWG at the next meeting. No changes to the CMI/RD Work Plan are required.
55	DTSC-30	Page 2-3, IRZ System Details, Fifth bullet	"Equipment to facilitate batch addition of well maintenance compounds at the well head"	California Department of Toxic Substances Control	What are the anticipated compounds, and the type of equipment necessary at the well head?	Details on chemicals use will be included in the O&M Plan and the forthcoming design. The following statement has been added to the end of the referenced text: "…which may include acids, oxidizing agents, biocides, and chelating agents (additional	Reagents and equipment needs are not a matter of O&M, but also of design. Given PG&E's projection of quantity of annual waste water to be generated, DTSC is apprehensive of the		Comment resolved.

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						information regarding potential reagents that may be used during well maintenance activities is presented in Section 2.1.2)."	effectiveness of the proposed remedy, but will reserve judgment until remedy proposal are fully developed in design submittals.		
56	DOI-7	Section 2.1.1, Well Maintenance, 1st para.		U.S. Department of the Interior	This implies that a treatment facility may be located on the MW-20 bench. Further information regarding said treatment facility should be included (i.e., mobile or permanent unit, potential size of unit, etc.). Also, there is no discussion of piping to be used for return of treated water. Additionally, under what conditions would waste water be conveyed to the MW-20 Bench and another location? See General Comment 1.	See response to Comment #5 DOI-1		DOI defers comment until review of the technical memorandum.	Comment resolution deferred to 30% design.
57	DTSC-31	Page 2-4, Well Maintenance, Fifth Paragraph	"To maintain the performance of the injection wells, the IRZ will be equipped with facilities to provide routine and preventive in-well maintenance, including backflushing pumps, and chemical addition access piping."	California Department of Toxic Substances Control	The anticipated type of chemicals to be utilized for well maintenance should be mentioned in the Work Plan.	General classes of well maintenance chemicals will be included in the O&M Plan.	See response to comment 55 above.		Comment resolved.
58	HA-11	p. 2-4 (Well Maintenance)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section states that operational experience and pilot testing may offer information that will indicate the frequency and type of well maintenance that will be required. Will that information be included in the preparation of operations and maintenance (O&M) documentation and be the subject of review and comment? Are well replacements anticipated during the duration of remedy operations? If so, what is the expectation of numbers and frequencies?	Relevant information from operating systems will be used to inform the design decisions at Topock related to O&M. This information will be documented in the O&M Plan. Tribal Consultation will occur at each stage of the design, i.e., preliminary, intermediate, and final design submittals. Yes, well replacement is expected over the life of the remedial system. Estimates of well replacement frequency will be included in the 30% design submittal.	Okay	DOI and BLM look forward to the opportunity to consult with the Tribes during consultation on each design phase.	Comment noted. No changes to the CMI/RD Work Plan are required.
59	DOI-8	Section 2.1.2, 1st para.		Department of the Interior	It is stated that the extraction wells along the Colorado River are used to capture Cr(VI) that was already beyond the IRZ, and to control the migration of byproducts. Assuming groundwater flows toward the river (a potentiometric surface map has not been provided to verify this assertion), it would appear the river bank extraction well array should be extended to the south to capture contamination at wells MW26 and MW51.	Water level and groundwater capture maps will be included in the CMI/RD work plan to show the influence of the capture wells along the river. The ambient groundwater flow is toward the Colorado River. The extraction wells will increase the groundwater flux through the IRZ line. The final location for the extraction wells may be more to south but will need to be balanced with bedrock elevations that become shallower toward the south. The following text has been added to Section 2.1.2: "The objective of the riverbank extraction wells is to capture impacted groundwater. Because the solute transport model indicates the NTH IRZ effectively remediates groundwater hexavalent chromium concentrations, complete capture of the initial	See comment to 60 below.	DOI concurs with the response pending review of the maps.	

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						plume footprint is not the primary objective. However, according to ARCADIS the draft pathline analysis (Figure 2-4) indicates the groundwater in the vicinity of MW-26 and MW-51 is still effectively captured by the simulated riverbank extraction wells."			
60	DTSC-32	Page 2-5, Section 2.1.2	"Extraction downgradient of the IRZ line will serve the purpose of capturing Cr(VI) that was already downgradient of the IRZ line prior to IRZ operation. It will also help draw the chromium plume through the IRZ and draw carbon-amended water from the IRZ line into the floodplain to expand the extent of treatment in the floodplain."	California Department of Toxic Substances Control	In order to facilitate all the goals set in this section, the extraction wells will need to be screened at proper intervals. To protect the Colorado River water, PG&E must demonstrate, as part of the design, the ability of the extraction wells to control the plume hydraulics and to capture any potential by-products of treatment. PG&E will also need to provide a contingency plan that describes actions to be taken to mitigate the failure of capture from these wells prior to implementation and start up. See Table 4-5, Key Elements for Operation and Maintenance Plan.	Comment noted. As noted in response to Comment #53, the discrete screen intervals in the extraction and injection wells will be based upon the lithology and chemistry at each well location. However, the modeling will be used to assist in identifying target depth intervals which will improve the remedy, i.e., treat the most mass in the most efficient manner. In-situ byproducts generation will be monitored in groundwater compare to the maximum natural levels associated with the natural reducing rind. In-situ by-products will also be monitored in surface water. As noted in Table 4-5, contingencies associated with the operation and maintenance of the remedy will be included in the O&M Plan. No changes to the Work Plan are proposed as a result of this comment.	Much more information will need to be presented for the design. Recent Water Board order to PG&E regarding management of Manganese at Hinkley is troubling on the viability of remedy to control secondary by products. More importantly, compare to baseline conditions at each well. Should also compare to mean values for site and subregions (e.g., floodplain, uplands, bedrock).	Defer to DTSC.	Deferred to review of detailed Corrective Measure Monitoring Program.
61	HA-12	p. 2-5 (Inner Recirculation Loop)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section indicates that extraction wells in the East Ravine area will be tied into the "inner recirculation loop." Figure 2-1a indicates the water coming out of the area is referred to as "extracted groundwater." The fate of this water is not clear from the figure, as flow directions along the line are not shown. Will this water become a part of the IRZ line? It appears that part of the problem in viewing the figure is its size. A larger figure should be prepared so that the missing information could be added (such as directional arrows and differentiation between pipe routings).	Arrows were added to the revised Figure 2-1a to clarify flow directions. A note was also added to the revised Figure 2-1a to read: "The location of wells shown is conceptual and is based on the CMS/FS. The number and location of wells may be revised based on groundwater modeling and results from the current groundwater investigation in the East Ravine and at the compressor station. Details will be shown in the preliminary (30%) design submittals."	DTSC will further evaluate piping and water management in upcoming design documents.	DOI concurs with the changes to Figure 2-1a and anticipates further details in the 30% design submittals.	Comment resolved.

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62	DTSC-33	Page 2-5, River Bank Extraction Wells, Section 2.1.2	"Valve/fittings to facilitate batch addition of well maintenance reagents at the well head"	California Department of Toxic Substances Control	The type or range of well head reagents should be discussed.	The following text will be added to Section 2: "A preliminary listing of potential well maintenance reagents was provided in the Final Corrective Measures / Feasibility Study Report for Chromium in Groundwater, Appendix G - In Situ Reactive Zone Treatment Design Elements. The listing of reagents was developed from commonly applied chemical agents approved for drinking water supply well maintenance. The potential well maintenance reagents include acids (some with dispersants) to dissolve mineral deposits and break up biofilms (muriatic acid, phosphoric acid, glycolic acid, etc.); oxidizing agents to disinfect and degrade microbial biofilms (hydrogen peroxide, chlorine); biocides to inhibit microbial growth (Tolcide®); and chelating agents to aid acid and disinfectant penetration, remove mineral deposits, and break down and disperse biofilms (e.g. citric acid). More comprehensive well maintenance details will be provided in the O&M Plan."	Okay if response is properly inserted into CMI/RD work plan.		Comment resolved.
63	DOI-9	Section 2.1.2, East Ravine Extraction Wells, 1st para.		U.S. Department of the Interior	Table 6-1 indicates that the East Ravine groundwater investigation will be concluded in the Fall of 2011. Figure 4-1 indicates that the 30% design is to be submitted by September 30, 2011. Incorporating the findings from the investigation into the design would be difficult. Please provide an explanation of the process that will be used to determine design parameters for East Ravine	To date, the East Ravine-Topock Compressor Station groundwater investigation has focused on collecting the most important data for the design first and those data (groundwater quality beneath potential sources and bedrock topography beneath the TCS) have been incorporated into the groundwater model as efficiently as possible, following validation and QA. The model will be used to determine the design parameters for the East Ravine (e.g., determine well locations, pumping rates, injection rates, estimate time to cleanup, etc.). See proposed new text in RTC #67 (below).		This discussion regarding the influence of the currently available data should be included within the work plan to justify only considering an extraction well network. DOI will continue to review the relevant East Ravine and TCS data to assist in determining whether utilization of extraction wells is the appropriate remedial system for East Ravine.	Comment resolved.

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64	DOI-10		Section 2.1.2, page 2-5, 1st para.	U.S. Department of the Interior	The term "Embayment Area" is used in the text for the first time and is not found in other documents. Provide a definition of the "Embayment Area" or clarify the definition found on page 2-6 and include a topographic figure for reference.	For clarity, text and figures will be changed to reflect the location of these wells as "northeast of the Compressor Station".		Concur.	Comment resolved.
65	DTSC-34	Page 2-6, Embayment Extraction Wells	"The Embayment Area lies east of the Topock Compressor Station where the alluvial aquifer extends southward following a depression in the bedrock. The Embayment Area will have approximately four groundwater extraction wells"	California Department of Toxic Substances Control	The remedy will need to incorporate new data being collected at the Compressor Station and East Ravine. Data collected to date already shows that the alluvial sequence is thicker than originally expected in the Compressor Station area. The groundwater model will also need to incorporate the new data.	Comment noted. As stated in Section 3.1.2, data collected from the current East Ravine investigation will be incorporated into the groundwater remedy design. In addition, as stated in Section 6.2 (Item 2), the refined model grid will be extended into the East Ravine and Compressor Station areas to incorporate data in the current groundwater investigation program. No changes to the Work Plan are proposed as a result of this comment.	Will evaluate after review of model design and parameters.		Comment resolved.
66	DTSC-35	Page 2-6, East Ravine Extraction Wells	"The East Ravine extraction well network is expected to consist of a series of groundwater extraction wells installed in bedrock along the lower (eastern) end of the East Ravine."	California Department of Toxic Substances Control	Although some extraction wells are likely needed at the East Ravine area, it is too soon to specify the specific locations for these wells since additional investigation is on-going.	The cited text reflects the current thinking about the East Ravine wells, based on an understanding of the bedrock hydraulic properties. Specific locations for the extraction wells have not been specified. It is clear, however, that a closely spaced line of wells between the East Ravine chromium plume and the river would provide the most assurance of capture of the chromium plume in bedrock. Due to the limited volumes that can be pumped from East Ravine wells, it would not be practical to try and "pull" the plume back from the river with pumping further up in the East Ravine. The design process is flexible enough to allow changes in well locations as new data becomes available. The most recent set of data will be used in the 30% and each subsequent design step so that the design reflects the best information available at the time the design is issued.	Okay, but expect design thinking to change. Major changes mid-stream of design should be avoided. PG&E should consider how data gaps can potentially influence the design process.		Comment resolved.
67	DOI-11	Section 2.1.2, page 2-6, East Ravine Extraction Wells		U.S. Department of the Interior	The text notes that only extraction wells are included for the East Ravine area. The DOI ROD left options open for freshwater injection for flushing and injection of carbon amendments. DOI requests justification for <u>only</u> considering extraction wells, given that the East Ravine Investigation is, at this point, incomplete.	Based on the sensitivity of the area, the proximity to the river and the nature of the geology, extraction appears to be the most appropriate approach at this point in the design. New data will be considered in subsequent design stages to ensure the most appropriate system is designed. The following text will be added to Section 2.1.2, page 2-6, East Ravine Extraction Wells: "As described in the ROD, remediation of the East Ravine groundwater could take one or more of three forms: (1) groundwater extraction, to be reinjected upgradient for in situ treatment in the alluvial aquifer, (2) in situ treatment within the East Ravine bedrock		DOI will continue to review the relevant East Ravine and TCS data to assist in determining whether utilization of extraction wells is the appropriate remedial system for East Ravine. Concurrence will be based on review of the final text.	Comment resolved.

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						groundwater, or (3) fresh water flushing of east ravine groundwater. Options (2) and (3) would require that there be sufficient fracture interconnection and effective permeability within the East Ravine bedrock zone so that carbon amendment injection and/or flushing would be effective and sustainable. The second phase of East Ravine groundwater investigation is ongoing, and an assessment of groundwater conditions and hydraulic properties will be made at the conclusion of the investigation. Sustainable purge rates of the wells drilled in the first phase were too low for injection to be a viable option, so the discussion below assumes, for the time being, that extraction is the only viable option in this area. Further evaluation of these options will be provided in the next stage of design."			
68	MWD-2	Page 2-6: East Ravine Wells		Metropolitan Water District of Southern California	It states that each well will be connected to a groundwater conveyance header that will be connected to the Embayment extraction well network. Will this be routed to the MW-20 Bench?	At this preliminary stage, water from the East Ravine can be routed to the MW-20 bench or to other locations.	Will wait and evaluate during 30% design	DOI anticipates further detail in the 30% design.	Comment Noted. No changes to the CMI/RD Work Plan are required.
69	HA-13	p. 2-8 (Fresh Water Injection System)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	See Comment 8 regarding areas of previous disturbance. Additionally, during the 2011 TLP meeting, the matter of alternative routings of the pipelines was discussed. Will there be an opportunity for the Tribe to walk these routings so that it might provide relevant comments prior to finalizing the route? To the extent needed, the Tribe reiterates its request that these routes be "ground-truthed" by qualified professionals before being finalized. Periodic replacement of wells and other structures "as needed" is categorized as an operation and maintenance activity. It is the Tribe's view that well and structure replacement be subject to consultation with and field monitoring by the Tribe.	As discussed at the May 2011 TLP meeting, the pipeline routes shown in the Work Plan are conceptual and not final. Design and placement of the pipeline routes will be included in the design submittals. Per DOI's direction at the May 2011 TLP and the June 2011 CWG, Tribal Consultation will occur at each design step, i.e., preliminary, intermediate, final design submittals and will include site visits to potential pipeline alignments. In addition, Tribal Consultation will occur on the Construction/ Remedial Action Work Plan, prior to the start of any ground disturbance activities. Well replacement is expected over the life of the remedial system. Relevant information regarding wells and structure replacement will be documented in the O&M Plan. Tribal Consultation will occur during the intermediate design submittal review.	DTSC anticipates PG&E to continue notification and dialogue with tribes and stakeholders on activities related to the remedy in accordance with the MMRP set forth by the certified EIR.	DOI and BLM look forward to the opportunity to consult with the Tribes during consultation on each design phase.	Comment noted.
70	DOI-12	Section 2.1.3, Fresh Water Production Well(s). 1st para.		U.S. Department of the Interior	Several options are proposed for sources of fresh water. The text should provide the factors that were considered in proposing that the fresh water would be from production wells in Arizona and a preferred option for fresh water should be proposed. See General Comment 1.	Factors considered included: 1. Influence of drawdown from freshwater pumping on performance of the remedy 2. Quantity and quality of water available 3. Need for treatment of water prior to injection 4. Disturbance associated with construction Text will be added to include discussion of these factors.		DOI concurs with the response pending review of the final text.	Comment resolved.

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71	DOI-13	Section 2.1.3 Freshwater Production Wells(s). 1st para.		U.S. Department of the Interior	A summary of the available well information for the proposed fresh water options should be provided. This summary should include well design for current wells and water quality information.	No existing wells in the APE provide a sufficient quantity of water for the remedy. The only existing well being considered as a potential fresh water option is the HNWR well, which, based on available hydraulic and quality information, provides sufficient quantity and quality of water but is located just outside the APE. Available well design and water quality information for the HNWR well will be summarized and included in this Work Plan. If desired, similar information can be provided for Topock-2, Topock-3, and the Park Moabi wells, even though none of these are candidate supply wells.		DOI concurs with the response pending review of the text.	Comment resolved.
72	DOI-14	Section 2.1.3, Fresh Water Production Well(s). 2nd para.		U.S. Department of the Interior	It seems the text is "dancing around" the use of the existing HNWR well as an option for fresh water, although the well is shown on Figure 2-1b. See previous comment and General Comment 1.	The existing HNWR irrigation well is the only existing well that can provide sufficient quantity of water for the remedy. The CMI/RD Work Plan attempts to describe the benefits of utilizing this well without presuming that it would be feasible, available, or approved for PG&E's use. A new well could be constructed in Arizona to provide a source for remedy fresh water.		DOI concurs with the response pending review of the final text.	Comment resolved.
73	HA-14	p. 2-8 (Fresh Water Production Well(s))		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	Please explain why it is now being proposed that the source of fresh water for the remedy will come from Arizona. What was PG&E's decision process? Have all potential alternative well locations in Arizona been subjected to cultural field surveys? Additional mitigation may be required.	The CMS/FS included three potential sources of fresh water, well(s) in Arizona, well(s) in California, or water from the Colorado River. To support the CMI/RD Work Plan, PG&E conducted further evaluations of the three water supply options. Preliminary model simulations showed that pumping from a hypothetical well near Moabi Regional Park may create northerly gradients which could result in non-containment of carbon-amended injection water. In addition, there is uncertainty whether the aquifer near Park Moabi could yield sufficient quantity of fresh water for the remedy. Water drawn from the river would likely require filtration and disinfection prior to injection into the aquifer. This would require filters and chemical feed equipment that would increase the footprint of the remedy. In addition, additional construction footprint is required for the river bank intake and associated mitigation measures to protect biological resources. The hydraulic data obtained from the HNWR well show that the quantity and quality of water a available from a well in Arizona is more than adequate for the remedy. Pumping in Arizona provides easterly gradients which are beneficial to maintaining capture of both	Okay, but DTSC has alerted PG&E to concern with that elevated arsenic concentrations from well HNWR that are greater than MCLs and concentrations in wells where water are planned to be injected. A well closer to the river may ensure that river quality water is tapped. However, PGE-9 suggests significant water quality variability. PG&E should consider contingencies if water quality changes significantly as the fresh water well is pumped over time.	Please provide further information in the response regarding "the easterly gradients which are beneficial to maintaining capture of both carbon-amended injection and floodplain groundwater". It is not clear where this information can be found.	Comment noted. Additional information on benefits of easterly gradients will be provided in 30% design.

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						carbon-amended injection and floodplain groundwater. Initial simulations with the PHAST geochemical model showed no reduction in aquifer porosity during injection of HNWR water, and as a result no pre-injection treatment of this water is anticipated from the porosity reduction perspective. Additional water quality data will be collected from the HNWR well and geochemical modeling will be performed to evaluate the effects from injecting HNWR water in California and to confirm that no pre-injection treatment of this water is anticipated from a water quality perspective. PG&E has not conducted field cultural or biological surveys related to the Topock remediation project related to the HNWR site.			
74	DOI-16	Section 2.1.3, Fresh Water Injection System Routing, 1st para.		U.S. Department of the Interior	See General Comment 1.	See response to Comment #5 DOI-1.		DOI defers concurrence until we have the opportunity to review the text.	Comment resolved.
75	DOI-17	Section 2.1.3, Fresh Water Injection System Routing, 2nd para.		U.S. Department of the Interior	There needs to be some discussion as to the reasoning behind the "likely route" for fresh water versus the alternate route shown on Figure 2-1a. See General Comment 1.	See response to Comment #5 DOI-1.		DOI defers concurrence until we have the opportunity to review the text.	Comment resolved.
76	DOI-18	Section 2.1.3, Fresh Water Injection System Routing, 1st para.		U.S. Department of the Interior	See General Comment 1 as it pertains to the routing feasibility evaluation.	See response to Comment #5 DOI-1.		DOI defers concurrence until we have the opportunity to review the text.	Comment resolved.
77	DTSC-36	Page 2-9, Fresh Water Injection System Routing, Last Sentence	"Along the pipe route, booster stations may be required to meet the operational requirements."	California Department of Toxic Substances Control	Please provide additional specificity for a booster station. Perhaps a picture and/or drawing of a typical booster station can be included in the Work Plan for reference.	It is too early in the design process to describe a booster station that would be relevant to the project. A booster station is mounted near the pipeline to increase line pressure and is essentially a pump with instrumentation and pipe appurtenances. Additional information regarding booster station (if determined to be needed) will be provided in the 30% design submittal.	Will evaluate during 30%		Comment resolved.
78	DOI-15	Section 2.1.3, page 2-10 and 11		U.S. Department of the Interior	Further information regarding well rehabilitation methods and details of the chemical use will be required for agency approval. The text should specify which future documents will provide the detail regarding well rehabilitation (presumed O&M manual).	Comment noted. Well rehabilitation methods and details of the chemical use are planned for inclusion in the O&M Plan. Table 4-5 describes the content of the O&M Plan; text will be added in bullet #6 (under O&M Plan) to read (inserted verbiage shown in <u>underline</u> typeface): "O&M procedures – description of tasks for operation and maintenance, <u>including well rehabilitation methods and chemicals use</u>, description of prescribed treatment or operation conditions…"		DOI concurs with the response.	Comment resolved.

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79	DTSC-37	Page 2-10, Fresh Water Injection System Operation, Last sentence	"The water quality of the production well(s) in Arizona may require pH adjustment to prevent potential scaling on injection wells. In that case, a water conditioning facility may be required."	California Department of Toxic Substances Control	Similar to the discussion on booster stations, perhaps a picture and/or drawing of a typical water conditioning facility would assist readers in visualizing this facility. Some level of detail describing this system should also be included in the workplan.	Consistent with response to Comment #73 HA-14, the following text will be added in Section 2.1.3 after the referenced text "However, after the submittal of the Draft Work Plan in May 2011, simulations with the PHAST geochemical model showed no reduction in aquifer porosity during injection of HNWR water (presumed representative of water quality in AZ), and as a result no pre-injection treatment or conditioning of this water is anticipated from the porosity reduction perspective. Additional water quality data will be collected from the HNWR well and geochemical modeling will be performed to verify the effects from injecting HNWR water in California and to confirm that no pre-injection treatment of this water is anticipated from a water quality perspective. If such a facility is determined to be needed, details will be provided in future design submittals."	Okay.	DOI concurs with the revised text.	Comment resolved.
80	HA-15	p. 2-10 (Well Maintenance, Rehabilitation, and Replacement)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	See earlier Comment 10. Additionally, as you are aware, the Tribe has entered into discussions with PG&E, DTSC, and DOI with regard to well decommissioning alternatives that may require variances. This should be acknowledged in regard to the term "properly decommissioned."	See response to Comment #81 DOI-19 below.		DOI concurs with the response.	Comment resolved.
81	DOI-19	Section 2.1.3, page 2-11, first full para.		U.S. Department of the Interior	The California Department of Water Resources standards are noted for decommissioning wells. When considering previous discussions with stakeholders, the agencies may evaluate other options in the future. Modify the text to include "or other approved methods based on ongoing discussions with stakeholders."	Text will be modified to read as follows (new text in <u>underline</u> typeface): "Wells will be decommissioned in accordance with the California Department of Water Resources standards <u>or other methods approved by agencies based on ongoing discussion with stakeholders</u>. Different well designs may require different approaches to decommissioning. Wells must be properly decommissioned to ensure the protection of groundwater quality by preventing the borehole from being a conduit for (a) the infiltration of surface water to the aquifer, or (b) the migration of contaminated groundwater to uncontaminated portions of the aquifer. In addition, wells must be properly decommissioned to eliminate a possible physical hazard to humans and animals…"	Okay	DOI concurs with the response.	Comment resolved.

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82	DTSC-38	Page 2-11, Well Maintenance, Rehabilitation, and Replacement	"Wells will be decommissioned in accordance with the California Department of Water Resources standards."	California Department of Toxic Substances Control	Revise the cited sentence to read: Wells will be decommissioned in accordance with the California Department of Water Resources standards and an agency approved well decommissioning plan for the Topock site.	See response to Comment #81 DOI-19.	Okay	DOI concurs with the response.	Comment resolved.
83	DTSC-39	Page 2-11, Well Maintenance, Rehabilitation, and Replacement	"Wells may also be damaged during flooding or storm events."	California Department of Toxic Substances Control	Revise the cited sentence to read: Wells may also be damaged and become inoperable due to a number of reasons including vehicular collision, vandalism, loss of equipment down the well, as well as during flooding or storm events.	Text will be revised as directed.	Okay		Comment resolved.
84	DOI-20	Section 2.1.3, Fresh Water Injection System Operation, 1st para.		U.S. Department of the Interior	There needs to be some discussion on an alternative to the use of the existing fresh water storage tanks above the Compressor Station, since it is only a possibility that the existing tanks could be used. See General Comment 1.	The use of the fresh water storage tanks above the Compressor Station (or its alternative) will be evaluated holistically, as part of the entire freshwater conveyance system, to meet the operational needs of the remedy. Additional details will be provided in the preliminary (30%) design.	Okay	Concur with response.	Comment resolved.
85	DOI-21	Section 2.1.3, Fresh Water Injection System Operation, last para.		U.S. Department of the Interior	See General Comment 1 as it pertains to groundwater from Arizona production wells requiring pre-treatment? If a stationary facility is needed, impacts from construction of a water conditioning unit would need to be assessed. Further information should be provided regarding the possible pre-treatment/conditioning options	See response to Comment #79, DTSC-37.		Concur with revised text.	Comment resolved.

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86	DOI-22	Section 2.1.4		U.S. Department of the Interior	It should be noted that the BLM and HNWR management plans only address federal lands. Specific covenants or restrictions for state, county and private lands should be in place during remedy implementation. Detail on these restrictions should be provided in this section.	As stated in Section 2.1.4, key parameters needed to set up ICs or their equivalent includes definition of the area over which the ICs should be applied, location of remedial facilities, and implementation timing. The following text will be added to Section 2.1.4: "Once updated, the groundwater flow model will be used to help determine the area within which off-site pumping could influence the remedy hydraulics. This area is important as it will assist in defining the area over which the ICs should be applied. The location of the remedial facilities will be determined through the design process. The implementation timing will be refined with each design (updated schedule will be submitted to the agencies per the CACA and Model CD). Different landowners and operators may have different processes for establishing an IC or its equivalent, based on whether they are a landowner or leaseholder, whether they are a private party or a government agency, etc. Parties near the site with non-federal lands, for which an IC or its equivalent may need to be established (if available) could include: • County Agencies, • Transportation Agencies, • Utility Companies, and • Owners of private parcels. Once the area over which ICs should be applied and the location of remedial facilities are identified, the process of establishing ICs or their equivalents, if available, will commence."	Okay	DOI concurs with the revised text.	Comment resolved.
87	DOI-23	Section 2.1.4, last para.		U.S. Department of the Interior	What is the timing for setting up the ICs? ICs are not identified in Table 4-5.	The following text will be to Section 2.1.4: "The target timeframe for having in place the ICs or their equivalents (where available) is prior to remedy construction." A footnote will be added to Table 4-5 as follows: "The target timing for ICs or their equivalent, where available, is prior to remedy construction".	Okay	Concur.	Comment resolved.

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88	DTSC-40	Page 2-12, Monitored Natural Attenuation	"MNA … could be utilized in the O&M phase after sufficient data are available to evaluate the effectiveness of the in-situ treatment and the hydraulic containment components."	California Department of Toxic Substances Control	MNA is a component for remediation only after optimization attempts have been implemented (including installation of additional remedial wells) and that the natural reductive capacity has been shown through monitoring to be effective at the area in question.	The following sentences will replace the 2nd sentence in the first paragraph of Section 2.1.5: "MNA could be utilized for remediation of specific area during the O&M phase after sufficient data are available to evaluate the effectiveness of the in-situ treatment and hydraulic containment components of the remedy. Remediation by MNA as a sole component may be appropriate after optimization attempts have been implemented (including installation of additional remedial wells) and when the natural reductive capacity has been demonstrated through monitoring to be effective at the area in question."	Concur with revised text.	Concur with revised text.	Comment resolved.
89	DTSC-41	Page 2-12, Monitored Natural Attenuation, Second Paragraph	"At the Topock site, attenuation occurs naturally in the fluvial sediments near the Colorado River, where…"	California Department of Toxic Substances Control	Revise the cited sentence to read: At the Topock site, attenuation occurs naturally in most of the fluvial sediments in the floodplain near the Colorado River, where…	The sentence will be revised as requested.	Okay	Concur with change.	Comment resolved.
90	DTSC-42	Page 2-12, Monitored Natural Attenuation, Second Paragraph	"The available data indicate that the fluvial sediments adjacent to and beneath the river have sufficient reducing capacity to reduce all or at least a significant portion of the Cr(VI) plume (CH2M HILL, 2008c; 2009e)."	California Department of Toxic Substances Control	Revise the cited sentence to read: The available data indicate that the fluvial sediments adjacent to and beneath the river have sufficient reducing capacity to reduce a significant portion of the Cr(VI) plume (CH2M HILL, 2008c; 2009e).	PG&E proposes modifying the sentence to read "The available data indicate that the shallow and medium fluvial sediments adjacent to and beneath the river have sufficient reducing capacity to reduce *at least* a significant portion of the Cr(VI) plume (CH2M HILL, 2008c; 2009e)."	Okay	Concur with change.	Comment resolved.
91	DTSC-43	Page 2-12, Monitored Natural Attenuation, Second Paragraph, Last Sentence		California Department of Toxic Substances Control	Add the following sentence to the end of the paragraph for full disclosure: "reducing materials, however, appears to be absent in the bedrock contaminated area near the Colorado River."	PG&E proposes modifying the added sentence to read "Reducing conditions have not been found consistently in bedrock of the East Ravine area, however reducing conditions were found in fluvial sediments beneath the Colorado River upstream, downstream, and adjacent to the mouth of the East Ravine."	Okay	Concur with change.	Comment resolved.
92	HA-16	p. 2-12 (Monitored Natural Attenuation (MNA))		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	Under what conditions would MNA be relied upon as a component of the remedy?	MNA could be utilized for remediation of specific area during the O&M phase after sufficient data are available to evaluate the effectiveness of the in-situ treatment and hydraulic containment components of the remedy. Remediation by MNA as a sole component may be appropriate after optimization attempts have been implemented (including installation of additional remedial wells) and when the natural reductive capacity has been demonstrated through monitoring to be effective at the area in question.	Okay.	Concur with response.	Comment resolved.

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93	MWD-3	Page 2-12: Monitored Natural Attenuation (MNA)		Metropolitan Water District of Southern California	It is not clear how the geochemical conditions that provide the reducing zone in the fluvial sediments will be monitored with respect to MNA and the potential loss of the reducing zone, such as during a period of river scour.	The monitoring program for the remedy has not yet been fully developed but will include monitoring redox-sensitive parameters (nitrate, dissolved iron, manganese, and TOC) in floodplain groundwater to evaluate the geochemical conditions in the floodplain. As indicated in Table 4-5, the monitoring program will be included in future design submittals, specifically the Basis of Design report (O&M provisions) and the O&M Plan.	Okay, will evaluate as part of design and O&M plan	DOI will reserve judgment pending review of future documents.	Comment resolved.
94	DTSC-44	Page 2-12, Section 2.2.1 Security and Site Access	"locks to prevent authorized access"	California Department of Toxic Substances Control	The sentence should be revised… prevent "unauthorized" access.	Text will be revised as indicated.	Okay		Comment resolved.
95	DTSC-45	Page 2-12 and 13, Section 2.2.1 Security and Site Access	"…as required by EIR mitigation measure…"	California Department of Toxic Substances Control	Although DTSC specified that the site access and security plan are to be developed as part of the CMI Work Plan, DTSC acknowledges that the full scope of the plan cannot be accomplished without completion of the design. Therefore, DTSC agrees that PG&E can provide conceptual ideas within the CMI Work Plan for the development of a detailed plan as part of the final design. Please note that DTSC did encourage PG&E, as part of the mitigation measures, to work with interested Tribes on the development of mitigation procedures so that Tribal input can be properly reflected in the execution of the developed measures which are subject to DTSC review and approval.	Comment noted. No changes to the Work Plan are proposed as a result of this comment.	Okay		Comment resolved.
96	HA-17	p. 2-12 (Security and Site Access)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The site access plan needs to be prepared as soon as possible to prevent further intrusions and desecration of sacred grounds. The Tribe requests permanent closure of roads that are already closed and installation of effective barriers to prevent intrusions. Additional security should be in force on all lands, including Tribal and Bureau of Land Management Lands (BLM). The Tribe requests a meeting with PG&E, and other affected agencies to discuss this matter. It should be noted that the Tribe is the owner of certain land within the project area and has rights of access to that land, as defined by a recorded easement.	PG&E has been in contact with the BLM, which has responsibility for preparing the Access Plan required by the PA. BLM has indicated that they are planning to complete their Access Plan by Fall 2011. Given that the majority of land within the area is Federal land, PG&E is waiting for BLM to complete their Access Plan in order to avoid the potential for conflicts. PG&E will then prepare an Access Plan for the lands not under Federal management. As discussed in Section 2.2.1, the EIR mitigation measure CUL-1a-3b requires that a Security Plan be developed as part of the final design with the goal to provide increased observation and reporting of potential intrusions into the project area that may impact significant cultural resources during construction and operation of the final remedy. PG&E will participate in a meeting with the Tribe and other affected agencies on security provisions as requested.	Okay	Concur. BLM will consult with the Tribes, PG&E and other effected agencies to produce a tribal access plan by its due date of November 26, 2011, as specified by Stipulation 1(C) in the Topock Groundwater Remediation Project Programmatic Agreement .	Response noted.

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97	DOI-24	Section 2.2.2, 1st para.		U.S. Department of the Interior	It is stated that power for the remediation systems will be drawn from the City of Needles electric system, if possible. This needs more discussion. Are we saying larger power lines may be necessary given the expected load, or that the power may not be available if the load is too large? What are the alternatives if power is not available? See General Comment 1.	Larger power lines will not be necessary from the City of Needles. PG&E has developed information to determine that the electrical load for the remedy is well within the FEIR limits and parameters. Page 4.11-7 of the FEIR states that "During the preparation of the EIR, PG&E provided supplemental information on how electricity would be supplied for the 1.6 million additional kilowatt-hours needed to serve the proposed remedy while IM-3 continues operating. Potential sources of electricity for the proposed project would be supplemental power from the compressor station, a dedicated portable diesel generator (approx. 320 kW), or small solar panels. These sources of electricity would be used either individually or in combination to meet the electrical demands of the project (PG&E 2010)…"	Okay	DOI concurs with the response.	Comment resolved.
98	DTSC-46	Page 2-13, Section 2.2.3, Management of Remedy Wastewater	"Such maintenance activities will create a wastewater stream that must be managed. Other types of wastewater (smaller volume) will also need to be managed, such as monitoring well sampling purge water, equipment decontamination wastewater, and rainfall that collects in secondary containment. Collectively, these types of wastewater are called remedy wastewater."	California Department of Toxic Substances Control	Why would PG&E consider the rainfall cited to be related to the remedy?	Rainfall that collects in secondary containment structures of remedy facilities are related to the remedy. For example, rainfall onto secondary containment structure for the loading/ unloading platform for carbon substrate or untreated wastewater. The volume of rainfall to be collected and managed is anticipated to be fairly small compared to the volume of wastewater generated from well maintenance.	In general, rain water is not considered "waste water" if it is not hazardous and can be managed differently from extracted water or water used for well rehabilitation and maintenance. DTSC, however, understands the practical reasons for PG&E's desire to manage them in the same manner. However, DTSC cautions that PG&E should characterize the waste water as a separate waste stream prior to comingling with rain water.		Comment resolved.
99	DTSC-47	Page 2-13 to 15, Section 2.2.3, Management of Remedy Wastewater	"It is estimated that 3 to 16 million gallons per year of remedy wastewater will be generated."	California Department of Toxic Substances Control	As stated, 3 to 16 million gallons translate to 5.7 to over 30 gallons per minute of wastewater generated continuously throughout the year. PG&E should verify this estimate and seek alternative means to avoid significant generation of wastewater from the remediation efforts. Also, discussion on the composition of the wastewater and why the wastewater cannot be reinjected into the aquifer should be included in the Work Plan.	See response to Comment #5 DOI-1.	Will evaluate the tech memo when submitted.	DOI looks forward to review of the wastewater technical memorandum.	Comment resolution deferred to 30% design.
100	DTSC-48	Page 2-13, Section 2.2.3, Transport of Wastewater		California Department of Toxic Substances Control	Would offsite disposal at an appropriate facility be an appropriate option for waste water? If so, it should be evaluated.	Transport to an off-site disposal facility is an option being evaluated and has been added to Section 2.2.3.	Okay	DOI has had the opportunity to review the strawman technical memorandum (TM) for management of wastewater. It is our understanding that	Comment resolution deferred to 30% design.

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								this memo will be included in the 30% design for our technical review. DOI looks forward to the opportunity to review the detailed TM.	
101	DTSC-49	Page 2-14, Section 2.2.3, Transport of Wastewater	"It is not anticipated that these will require removal as disposal/reuse options exist that can receive such water – including water from the carbon-amended injection wells in the plume and the existing Compressor Station evaporation ponds."	California Department of Toxic Substances Control	Are the PG&E ponds that are regulated by the Water Board permitted to accept non-cooling tower wastewater streams including those discussed in this section?	The following text will be added to Section 2.2.3: "Current WDRs for the Compressor Station ponds (Board Order No. R7-2004-0080) do not include discharge of remedy wastewater discussed in this section. The allowed discharges are cooling tower blow-down, and wastewater generated from intermittent operational activities such as degreasing of equipment and compressor engine parts, and draining of cooling systems. Therefore, the WDRs (or its substantive requirements) will need to be amended in order for the ponds to accept the remedy wastewater."	Okay		Comment resolved.
102	DTSC-50	Page 2-14, Section 2.2.3, Transport of Wastewater	"2. Discharge to the evaporation ponds, 3. Discharge to Moabi Regional Park Wastewater ponds, 5. Discharge to an infiltration gallery in Bat Cave Wash."	California Department of Toxic Substances Control	Would off-site disposal at an appropriate facility be an appropriate option for waste water? If so, it should be evaluated.	Off-site disposal is an option being evaluated and has been added to Section 2.2.3.	Okay	See previous comment on off-site disposal.	Comment resolution deferred to 30% design.
103	DTSC-51	Page 2-15, Disposal/Reuse of Treated Wastewater	"An injection gallery in Bat Cave Wash is another potential method to dispose of treated water."	California Department of Toxic Substances Control	The Work Plan will need to clearly define what an infiltration gallery is if PG&E wishes it to be considered as part of the project. This newly proposed concept would have to be fully evaluated for potential impacts to: clean soils; existing soils contamination on the surface of the wash and below in the vadose zone; as well as impacts to flora and fauna.	An infiltration gallery is similar to a septic field in the ground that is designed to allow for infiltration of treated water. In Bat Cave Wash, the infiltration gallery would need to be installed at a depth adequate to avoid damage. It is fully expected that the implementation of an infiltration gallery in Bat Cave Wash will be coordinated with the ongoing soil work at the site. Design details will be included in the forthcoming design submittals. The remedy relies primarily on flushing to remove contaminants from the upland portion of the aquifer. An infiltration gallery could offer the advantage of assisting the plume movement towards the IRZ line along National Trails Highway. Groundwater modeling will be performed to verify the hydraulics to avoid unwanted effects on the plume. The following text will be added to Section 2.2.3, Disposal/Reuse of Treated Wastewater, Item 5 (Discharge to an	Depending on the soil characterization within Bat Cave Wash, infiltration gallery can potentially increase downward gradient of soluble contaminants into the subsurface or groundwater. Since waste water is likely not of the same general chemistry as storm water, geo-chemical reaction may also create an adverse impact to the soil and/or groundwater. PG&E must present all expected chemistry evaluation along with design for review.	This option cannot fully be considered until the completion of the soil investigation and related future evaluation documents (RFI/RI, CMS/FS).	Comment resolved with addition of new text.

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						infiltration gallery built in Bat Cave Wash near the Compressor Station): "In addition, the evaluation of this option will be coordinated with the soil characterization and regulatory process (RFI/RI, CMS/FS) for SWMU1 and AOC1."			
104	DOI-26	Section 2.2.3, 2nd para. and follow on bullets		U.S. Department of the Interior	Wastewater treatment and disposal should be identified in the CMI/RD work plan so that impacts can be reviewed and agreed to prior to completing of a 30% design submittal. A conservative estimate of the expected annual volume, with appropriate justification, should be presented in this work plan for preliminary design purposes, rather than a range of 3 to 16 million gallons. It is clear from the information provided that PG&E is providing options will be considered over the life of the groundwater treatment project. This consideration should be discussed in the opening paragraph. The process and timing for the evaluation and selection of the preferred disposal/reuse option(s) for wastewater should be presented in the CMI/RD Work Plan. The five disposal/reuse options will likely have widely varying treatment requirements. The option of discharge to Bat Cave Wash would need to consider the presence of soil contamination in this area. This is particularly critical as the soil investigation is incomplete and impacts from discharge cannot be adequately evaluated at this time. Pending the outcome of the characterization, consideration of this option could limit or alter soil remedial alternatives considered for the wash. Please provide an alternative analysis and propose a preferred alternative. See General Comment 1.	See response to Comment #5 DOI-1. The following text will be added to Section 2.2.3, Disposal/Reuse of Treated Wastewater, Item 5 (Discharge to an infiltration gallery built in Bat Cave Wash near the Compressor Station): "In addition, the evaluation of this option will be coordinated with the soil characterization and regulatory process (RFI/RI, CMS/FS) for SWMU1 and AOC1."	DTSC believes that any wastewater management would be a significant component of the remedy design. DTSC will review and comment as necessary during the design submissions.	DOI has had the opportunity to review the strawman technical memorandum (TM) for management of wastewater. We recognize this is a critical portion of the overall remedy design and each option should be considered carefully. It is our understanding that the expanded tech memo will be included in the 30% design for our review. DOI looks forward to the opportunity to review the TM.	Comment resolved with addition of new text.
105	DOI-27	Section 2.2.3, page 2-14, option 1		U.S. Department of the Interior	The text infers that multiple streams of wastewater with multiple treatment criteria/standards will be generated during operations. Additional information on how PG&E will assess this situation and the general management of these waste streams should be provided for consideration by the agencies. See General Comment 1.	See response to Comment #5 DOI-1.		DOI looks forward to the opportunity to review the wastewater technical memorandum.	Comment resolution deferred to 30% design.
106	HA-18	p. 2-14 (Disposal/ Reuse of Treated Wastewater)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	Will any of the listed options require permitting? Without the benefit of more detail and layout of pipelines mentioned, size, length to disposal, it is hard to assess the impacts of various options at this time. However, use of the Moabi Park sewage treatment system would have both direct and cumulative environmental effects that would be significant and have not been studied.	Some options will require modifications of existing permits, Some options will be under CERCLA permit exemption. Additional information will be provided in future design documents with opportunities for review and comment.	Okay, will evaluate as part of design	DOI looks forward to the opportunity to review the wastewater technical memorandum and future design documents.	Comment noted.

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107	MWD-4	Page 2-14 and 2-15: Disposal/ Reuse of Treated Wastewater		Metropolitan Water District of Southern California	The quality of the Remedy Wastewater after treatment is not clear from the work plan, although presumably the wastewater would meet Waste Discharge Requirements. Options 3 and 5 involve discharge of the wastewater to ponds or galleries that allow the water to percolate back to the groundwater and subsequently to the Colorado River. Due to the uncertainty of the quality of the Remedy Wastewater, these two options (3 & 5) plus any other that would involve either a direct or indirect discharge to the Colorado River should be eliminated from the work plan.	Water infiltrating into Bat Cave Wash near the Compressor Station is within the footprint of the chromium plume and would pass through the IRZ and be captured by the River Bank Extraction Wells. The groundwater modeling being performed will be used to verify the maximum flow to avoid unwanted effects on the plume. If water were discharged to the infiltration ponds at Moabi Regional Park, the quality of that water would have to comply with the substantive requirements of WDRs for that facility, and therefore the quality of the water being discharged would be known and controlled. The evaluation of reuse/ disposal options has not been complete; therefore, it is too early to eliminate options. Current status of the evaluation will be summarized in a technical memorandum (see response to Comment #5 DOI-1), and additional details will be provided in the 30% design submittal.	Okay, will evaluate as part of design	DOI looks forward to the opportunity to review of future design documents.	Comment noted.
108	HA-19	p. 2-13 (Utilities and Support Facilities)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section appears vague as to whether additional electric system structure would be needed. The FEIR removed supplied electric from the project description and therefore its impacts were not studied or mitigated. This section of the Work Plan needs clarification.	Larger power lines will not be necessary from the City of Needles. PG&E has developed information to determine that the electrical load for the remedy is well within the FEIR limits and parameters. Page 4.11-7 of the FEIR states that "During the preparation of the EIR, PG&E provided supplemental information on how electricity would be supplied for the 1.6 million additional kilowatt-hours needed to serve the proposed remedy while IM-3 continues operating. Potential sources of electricity for the proposed project would be supplemental power from the compressor station, a dedicated portable diesel generator (approx. 320 kW), or small solar panels. These sources of electricity would be used either individually or in combination to meet the electrical demands of the project (PG&E 2010)…"	Okay	DOI defers to DTSC and PG&E.	Comment resolved.

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109	DOI-28	Section 2.3.1, page 2-16, last para.		U.S. Department of the Interior	It is acknowledged that manganese will be generated as a by-product of the in-situ treatment and information is contained within the CMS/FS regarding calculated manganese levels. PG&E should propose an action level for manganese in this document.	The anticipated manganese concentrations that would result from the remedial activity would be consistent with the naturally-reducing conditions of the shallow and southern floodplain. Natural background manganese concentrations are higher in these areas due to organic carbon availability and manganese present in the fluvial aquifer soil matrix. The in situ remedy will essentially duplicate this condition throughout the IRZ line. Pilot testing was performed in the floodplain, and the concentration of manganese that was generated during this testing was consistent with concentrations of manganese observed within the natural reducing zone (see CMS/FS Appendix G). The manganese concentration within the IRZ will be limited by the natural abundance of manganese in the aquifer materials Natural variation in aquifer soil conditions within the location of the IRZ line precludes establishing actions levels. Therefore, due to the variability of Mn that will be generated, PG&E believes that it is not practical to establish an action level for manganese prior to the implementation of the remedy. The following text was added to Section 2.3.1: "…as requested by DOI, preliminary action levels for manganese will be identified in the Construction/Remedial Action Work Plan."	Increase manganese can be a byproduct of the change in geochemistry as the IRZ is created. Although PG&E's response suggests that manganese should not be a problem. This is not the case with the PG&E Hinkley facility. DTSC notes that the Water Board recently ordered PG&E to manage the elevated concentration of manganese in groundwater. DTSC believes an action level (or at least a preliminary value) should be developed now to see if it is a show stopper and ensure everyone is on the same page. DTSC is reluctant to allow mean Mn concentrations rise in many floodplain wells especially if long-lived.	A preliminary action level should be established for Mn prior to implementation. After further evaluation of data after the IRZ has stabilized, the parties can reevaluate an appropriate action level. The DOI expectation is that a preliminary action level will be proposed RA Work Plan.	Comment resolved
110	DOI-29	Section 2.3.1, page 2-16, last para.		U.S. Department of the Interior	It is stated the river monitoring may be conducted. Because RAO #2 is to ensure Cr(VI) concentrations are at or below 11 µg/L, some monitoring is required to provide direct evidence that the RAO is being achieved. Please change may to will in the 5th sentence. Also, provide a listing of constituents that will be considered in river water monitoring and the corresponding surface water quality criteria.	Text will be revised to read (new text in underline typeface): "River monitoring ~~may~~ will also be conducted to ensure that concentrations remain below numeric surface water quality criteria. Both chromium and potential byproducts (arsenic and manganese) will be monitored in the river. The surface water quality criteria for Cr(VI) is 11 ug/L and for arsenic is 150 ug/L (Source: Table 2 of the ROD, ARAR #3, Federal Water Pollution Control Act. 33 USC 1251-1387, 40CFR 131.38). There are no surface water quality criteria for Cr(T) and manganese."		DOI concurrence will be based on the review of the text.	

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111	DTSC-52	Page 2-16, Section 2.3.1 Monitoring Goals and Objectives	"When the groundwater remedy is implemented, the current groundwater monitoring programs will be replaced by a new Corrective Measure/ Remedial Action Monitoring Program with the focus of evaluating the performance of the remedy to attain the RAOs and to comply with ARARs."	California Department of Toxic Substances Control	Although DTSC generally agrees with PG&E's stated goals and objectives for the "new" monitoring program, the purpose should be expanded beyond the four RAOs. DTSC does expect PG&E to refine this CMI work plan to define short term RAOs, which can be part of the design criteria, that would provide short term milestones for measuring remedial performance (example: complete chromium reduction within floodplain in two years while establishing a viable IRZ). With that in mind, DTSC expects the monitoring program to be capable of providing data to determine the plume conditions (i.e., three dimensional snap-shot of contamination within plume, plume changes over time as remedy is implemented, groundwater chemistry changes during remedy, and tracking of potential by products), tracking of other COPCs that were identified in the RFI, as well as data collection for remedy performance determinations. DTSC also agrees with PG&E that compliance monitoring will be necessary to assess the groundwater condition from injection activities.	The RAOs established in the decision documents will be used to define project success. Process control monitoring will provide data with respect to short term performance of the remedy: this data will then be used for system optimization. PG&E understands that short term RAOs referenced in this context, are operational targets intended to evaluate and guide remedy progress. These targets will be established and presented in the design documents and the O&M Plan for review and comment.	DTSC remains concerned over the ability for PG&E to measure and intercept potential adverse impacts from the proposed remedy. While the RAOs are defined end points of remediation. DTSC will require PG&E to define specific boundaries and conditions for triggering contingencies. Case in point, while PG&E argued that RAO number 4 is to ensure geographic plume boundaries are not permanently expanded AFTER completion of remedial action. There are no measurable goals or protection from plume movement during remediation. DTSC believe that without additional conditions, PG&E can potentially create an adverse groundwater impact which may be worse than current conditions (e.g. arsenic contamination as a result of reducing hex chrome).		Comment resolved.
112	HA-20	p. 2-16 (Compliance Monitoring During Remedy Implementation)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section reiterates the earlier-listed RAOs for the groundwater remedy. However, the Tribe notes that in an earlier draft of the Corrective Measures Study/Feasibility Study (CMS/FS), PG&E had listed an RAO that stated: *"Implement remedial actions in a manner that is respectful of, and causes minimal disturbance to, cultural resources including, in particular, resources that are of special significance to tribes in the area."* On questioning the omission of this language in the CMS/FS revision during the 2010 TLP meeting, the Tribe was told that PG&E was directed by DTSC to base RAOs only on quantifiable parameters related to the groundwater chemistry. The Tribe has never been provided any authority for such limitation. The Tribe believes such a limitation is inappropriate in light of the ARARs applicable to this remedial effort. (E.g., Letter from FMIT to DTSC re Comments on NOP for DEIR, July 1, 2008.) Apart from this limitation imposed on the RAOs, the program designed to achieve the established RAOs be guided by awareness and respect for spiritual and cultural values to mitigate significant impacts. This is a position that would equally apply to the establishment of RAOs for the soils remedy.	PG&E defers to DTSC.	The quoted RAO was proposed by PG&E in a pre-draft CMS/FS which was shared with the tribes prior to consulting with agencies. Please note that the entire list of RAOs was substantively changed from the tribal discussion draft as a result of consultation with agencies on identification of appropriate RAOs.	The RAOs provided in the CMS/FS are based on CERCLA guidance. The National Contingency Plan specifies that "In developing and, as appropriate, screening the alternatives, the lead agency shall: Establish remedial action objectives specifying contaminants and media of concern, potential exposure pathways, and remediation goals. Initially, preliminary remediation goals are developed based on readily available information, such as chemical-specific ARARs or other	Comment noted.

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								reliable information."	
113	DTSC-53	Page 2-16, Compliance Monitoring During Remedy Implementation, 1st paragraph after bullets	"While RFI/RI characterization at the site has been focused on both Cr(T) and Cr(VI), future monitoring during the remediation will be focused on Cr(VI)."	California Department of Toxic Substances Control	As stated, the focus of the monitoring seems too limiting to only Cr(VI). To properly evaluate the goals and purpose, PG&E will need to monitor for a suite of constituents including all COPCs and potential by-products of remediation.	In-situ byproducts and the COPCs (selenium, molybdenum, and nitrate) will be monitored during remedy implementation. The focus in the cited paragraph was on chromium in order to speak directly to the RAOs. Monitoring for in-situ byproducts is described under Process Control Monitoring During Remedy Implementation (page 2-17) and again in Sections 3.1.2 and 3.1.4. Monitoring for the COPCs (selenium, molybdenum, and nitrate) is described in Section 3.1.4. The following text was added to the referenced text: "Additional monitoring during remedy implementation, including analysis of in-situ byproducts and COPCs (selenium, molybdenum, and nitrate) is discussed in Sections 3.1.2 and 3.1.4."	Will evaluate the revised workplan	Concurrence will be based on review of the text.	
114	DTSC-54	Page 2-16, Compliance Monitoring During Remedy Implementation	"While RFI/RI characterization at the site has been focused on both Cr(T) and Cr(VI), future monitoring during the remediation will be focused on Cr(VI)."	California Department of Toxic Substances Control	Periodic monitoring for total chromium will be required as RAOs / MCLs are based on total chromium.	As stated in the 2009 CMS/FS (Section 3.3.1, last paragraph), dissolved chromium exists nearly entirely as Cr(VI) under the geochemical conditions of site groundwater. Historical data from the Topock site show that Cr(T) and Cr(VI) concentrations are statistically equivalent. The reduced form, Cr(III), is highly insoluble, with precipitation reactions maintaining the dissolved concentration below the analytical detection limit. Use of Cr(VI) for measurement of RAO attainment will insure that RAOs are also achieved for Cr(T). Text in Section 2.3.1 will be revised to state that "Cr(T) will be periodically monitored to verify that Cr(VI) is an accurate indicator of Cr(T) and to compare to the MCL for Cr(T)".	Site wide monitoring is not only to confirm RAO attainment, but evaluate site condition during remediation period. All analytes in current monitoring program should remain in future monitoring program.		Comment resolved pending review of Corrective Measure Monitoring Program.
115	DTSC-55	Page 2-16, Compliance Monitoring During Remedy Implementation	"Water quality monitoring in groundwater outside the plume will focus on analysis for Cr(VI), as well as in-situ byproducts (arsenic and manganese)."	California Department of Toxic Substances Control	Water quality monitoring outside the plume will also consist of periodic monitoring of general minerals, total metals, isotopes, et al. to evaluate overall plume movement.	Comment noted. Table 2-1 was revised to add monitoring for constituents that could be indicative of plume water or injected water movement. In addition, the following text was added to Section 2.3.1 Compliance Monitoring During Remedy Implementation: "In addition, select wells will be monitored for constituents that could be indicative of plume water or injected water movement, such as TOC and injection tracers." General chemistry parameters and stable isotopes are not anticipated to be useful for these purposes, as they are similar for plume and alluvial non-plume wells.	See comment above	Concurrence will be based on review of the text.	

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116	DTSC-56	Page 2-16, Compliance Monitoring During Remedy Implementation	"Concentrations in groundwater outside the plume will be evaluated against background concentrations (32 parts per billion [ppb] for Cr[VI] and 24 ppb for arsenic)."	California Department of Toxic Substances Control	The Work Plan must also acknowledge that metals/general minerals/etc., will have to be evaluated via intra well comparisons where data from a single well are evaluated overtime (e.g., time series graphs) and that compliance wells will be compared to individual trigger levels developed for each well as currently done for the IM-3 performance monitoring. Therefore, baseline conditions will have to be established for all wells prior to system start up. PG&E will need to sequence new well installation and baseline groundwater sampling early in the process. The baseline issue should be documented in the Work Plan. Site trends over specific areas could be compared to background concentrations, but area specific concentrations (e.g., mean arsenic, manganese, and chromium floodplain concentrations) should also be evaluated due to acknowledged limitations associated with the regional background study. This concept should be added to the Work Plan.	Baseline issue is discussed in Section 3 (Baseline Site Conditions and Plan for Additional Data Collection). Specifically, Section 3.1.2 (Additional Data During Groundwater Remedy Design) states that data from the current groundwater and surface water monitoring programs will be used to update the baseline December 2010 chromium plume maps and to establish baseline levels of in-situ byproducts prior to remedy implementation. It also states that general water quality data (alkalinity, TDS, sulfate, and chloride) and stable isotopes of oxygen will be collected to assist with remedy design. Considering the limitations on the number of wells that can be installed, PG&E does not believe that statistically valid, area-specific background concentrations could be developed for multiple areas around the plume. Regional background concentrations have been identified and should be used as the criteria for evaluation everywhere except in the geochemically reduced fluvial sediments associated with the Colorado River.	Baseline conditions and area specific background (within plume boundaries) is a subject that requires additional discussion.		Deferred to review of detailed Corrective Measure Monitoring Program.
117	DTSC-57	Page 2-16, Compliance Monitoring During Remedy Implementation	"River monitoring may also be conducted to ensure that concentrations remain below numeric surface water quality criteria. Concentrations above water quality criteria attributable to contributions from the Topock site will result in contingency activities, such as system modifications."	California Department of Toxic Substances Control	Revise the cited sentence as follows: River monitoring will also be conducted to ensure that concentrations remain below numeric surface water quality criteria and river background levels. Concentrations attributable to contributions from the Topock site will result in contingency activities, such as system modifications.	As stated in Section 3.1.2, specific constituents will be monitored in the river prior to the implementation of the remedy in order to establish baseline. Similar to the current site monitoring programs under the RFI and IM, river background levels will not be formally established. PG&E proposes to revise the cited sentence to read: "River monitoring ~~may~~ will also be conducted to ensure that concentrations remain below numeric surface water quality criteria and is consistent with river baseline levels for Cr(T) and Cr(VI). Both chromium and potential byproducts (arsenic and manganese) will be monitored in the river. The surface water quality criteria for Cr(VI) is 11 ug/L and for arsenic is 150 ug/L (Source: Table 2 of the ROD, ARAR #3, Federal Water Pollution Control Act. 33 USC 1251-1387, 40CFR 131.38). There are no surface water quality criteria for Cr(T) and manganese. Concentrations attributable to contributions from the Topock site (comparison of upgradient surface water results to downgradient surface water results) will result in contingency activities, such as system modifications."	Will evaluate based on revision of workplan and design. Additional analytical parameters or constituents may be added depending on expected chemistry of the organic substrate.	DOI concurs with the revised text.	Comment resolved.

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118	DTSC-58	Page 2-16/17, Compliance Monitoring During Remedy Implementation	"Most compliance monitoring would likely occur in wells around the perimeter of the plume, particularly along the western and northern margins where the fresh water injection wells are located."	California Department of Toxic Substances Control	DTSC reserves comment on the compliance monitoring network until the remedy and monitoring program are no longer conceptual.	Comment noted.			Comment noted.
119	DOI-30	Section 2.3.1, page 2-17, 1st full para.		U.S. Department of the Interior	It is likely that compliance monitoring within the floodplain area will be at a higher frequency due to the potential generation of by-products and proximity of the Cr(VI) plume to the river. An optional monitoring frequency for the floodplain is proposed in Table 2-1 and should be discussed in this section. Additionally, the text and Table 2-1 should include a discussion and rationale regarding reevaluation of the monitoring system and frequency when significant changes are made during the operational period.	Monitoring of byproducts and Cr(VI) in the floodplain as part of the process control monitoring program is directed toward optimizing operation of the remedy and monitoring frequency is designed to be flexible in order to accommodate this. Monitoring for byproducts and Cr(VI) monitoring in the floodplain is separate from compliance monitoring. Note that Table 2-1 details compliance monitoring inside the plume as part of an annual monitoring program. Additional details about the monitoring program will be presented in the O&M Plan and the 30% design.	DTSC will reserve its opinion until review of detailed monitoring program.	DOI concurs with the response.	Comment resolved.
120	DTSC-59	Page 2-17, Compliance Monitoring During Remedy Implementation	"Inside the plume, the monitoring program is focused on measuring progress towards attainment of RAOs, and therefore will primarily be measuring changes in Cr(VI) concentrations."	California Department of Toxic Substances Control	See comments on Table 2-1 below. Revision to text is requested.	Changes in Cr(VI) concentrations will be monitored inside of the plume and this will be performed as part of the compliance monitoring program. Other parameters, such as IRZ byproducts, will be monitored inside of the plume as part of the process control monitoring program. As mentioned in prior responses, monitoring for the COPCs identified in the RFI (selenium, molybdenum, and nitrate) is described in Section 3.1.4, and will be conducted as part of the site monitoring program throughout the remediation process. The following text will be added at the end of the introductory paragraph of Section 2.3: "In addition, at DTSC and DOI direction, COPCs (selenium, molybdenum, and nitrate) will be monitored as part of the site monitoring program throughout the remediation process. As stated in the CMS/FS, it is expected that concentrations of COPCs will change during the course of remediation from the concentrations present today, and that the concentrations and distribution of the COPCs will be re-evaluated following attainment of the RAOs for Cr(VI) and prior to removing the ICs."	As stated in comment 118, DTSC reserves comment on the monitoring program until the design is no longer conceptual. Please note that sentry wells outside the plume will be required.	DOI concurs with the additional text.	Comment resolved.

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121	DTSC-60	Page 2-17, Compliance Monitoring During Remedy Implementation	"…compliance monitoring inside the perimeter of the plume will be less frequent than monitoring outside the perimeter of the plume, likely on an annual or bi-annual basis."	California Department of Toxic Substances Control	DTSC may agree with this frequency when the remedial system is in steady state and hydraulics and geochemical fate and transport is better understood. In the beginning, DTSC expects monitoring at higher frequencies to ensure proper understanding of effects from remedy implementation. DTSC will be better able to address this comment after PG&E establishes a defined, non-conceptual remedy and monitoring program that will be based on updated modeling and anticipated flow rates and contaminant transport estimates.	Comment noted. As illustrated in Table 2-1, it is important to note that during operation of the remedy, compliance monitoring is most important to focus on areas outside of the plume. Locations inside the plume will be evaluated through an annual or less frequent monitoring program; and process control monitoring will continue more or less frequently in order to provide information relative to the effects of remedy implementation. No changes to the Work Plan are proposed as a result of this comment.	Will evaluate as design becomes less conceptual		Comment resolved.
122	DTSC-61	Page 2-17, Compliance Monitoring During Remedy Implementation	"Unlike the areas outside the plume, increases in concentrations inside the plume will not result in contingency activities because of the ICs."	California Department of Toxic Substances Control	The cited sentence will need to be revised because there will be situations where monitoring inside, but along the edge of the plume (e.g., river's edge) could call for some contingency activities.	PG&E proposes to revise the cited sentence as follows: "Unlike the areas outside the plume, increases in concentrations inside the plume will not result in contingency activities because of the ICs. <u>However, persistent increases in concentrations along the edge of the plume may result in contingency activities such as more frequent monitoring, adjustment of system hydraulic, etc."</u>	Okay with revised text.		Comment resolved.
123	HA-21	p. 2-17 (Process Control Monitoring During Remedy Implementation)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section indicates that "...the geochemistry of the aquifer will be altered to create the reducing conditions that will remove the Cr(VI) from groundwater." While the focus of this monitoring is on the functioning of the IRZ, will there be a concurrent effort to monitor potential geochemical alteration of the natural reductive zone along the Colorado River and whether this zone will retain its effectiveness as a Cr(VI) barrier. That information could be critical to a determination of when active remedy components, *e.g.,* the IRZ system, can be terminated. If a non-certified laboratory is needed for process control monitoring during the groundwater remedy, where will this laboratory be located? The last sentence in the third paragraph indicates that: *"... frequency of process control monitoring will be reduced or eliminated when the systems are optimized and steady-state conditions result."* The Tribe requests further definition and explanation of the terms "optimized" and "steady state conditions" in the context of process control monitoring during implementation. Will quantitative metrics be applied?	Monitoring wells in the floodplain and along the Colorado River will be monitored for redox sensitive species (Table 2-1) which will not only track the progress of carbon-injection, but also the integrity of the naturally-reducing portion of the floodplain. An onsite non-certified laboratory, if needed, will likely be located at the Compressor Station or the MW-20 bench. In the context of this paragraph, "optimized" refers to the target operating condition of the final remedy after the start-up period. During start-up, flows and dosing rates will be adjusted to maximize the effectiveness of the remedy. Once these adjustments have been made, the remedy will be considered optimized. "Steady state" refers to the hydraulic and geochemical status of the final remedy after the start-up period. Based on experience with IM-3, it is anticipated that the groundwater system will be hydraulically in steady state within days to weeks of startup. Geochemical steady-state refers to the point at which the IRZ is fully developed and the carbon being added is being fully consumed by naturally-occurring microorganisms within the IRZ. It is anticipated that full development of the IRZ and fine tuning of carbon dosing rates to achieve steady state may require a number of months of operation. PG&E does	DTSC will reserve its opinion until review of detailed monitoring program.	DOI concurs with the response.	Comment noted.

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						not envision quantitative metrics for the process control monitoring.			
124	DTSC-62	Table 2-1	Primary Constituents, Frequency and Monitoring Objectives	California Department of Toxic Substances Control	DTSC disagrees with constituents listed for compliance monitoring. In order to define the effectiveness of the remedy and track the generation and conversion of by products, redox-sensitive species will be required inside the plume. Why are there no constituents measured in process control monitoring at the west and north of fresh water injection wells and East Ravine? DTSC also does not see the monitoring of Molybdenum, Nitrate, and Selenium as other COCs stated in the RFI, CMS and EIR. In general, DTSC disagrees with the frequencies listed. Frequency can be adjusted based on operational phases, but more frequent during remedy startup is required. Also, additional monitoring objectives will need to be defined. Therefore, additional primary constituents or general chemistry, such as TDS, ORP, isotopes, and pH, may need to be added or modified throughout the table. DTSC will be better able to address the framework and frequency for monitoring after PG&E establishes a defined, non-conceptual remedy and monitoring program that will be based on updated modeling and anticipated flow rates and contaminant transport estimates. Monitoring Objectives should include evaluating changes in plume	The effectiveness of the remedy will be most directly tracked inside the plume by monitoring the Cr(VI) levels. Generation of byproducts is expected and is included under process control monitoring. Under Compliance Monitoring (Outside the Plume), Cr(VI) and redox-sensitive species are proposed to be monitored at the west and north of fresh water injection wells and Cr(VI) is proposed to be monitored at the East Ravine wells. Monitoring for the COPCs identified in the RFI/CMS/ EIR (selenium, molybdenum, and nitrate) is described in Section 3.1.4 (Additional data during groundwater remedy operation and closure). A footnote will be added to Table 2-1 to read: “At DTSC and DOI direction, COPCs (selenium, molybdenum, and nitrate) will be monitored as part of the site monitoring program throughout the remediation process. As stated in the CMS/FS, it is expected that concentrations of COPCs will change during the course of remediation from the concentrations present today, and that the concentrations and distribution of the COPCs will be re-evaluated following attainment of the RAOs for Cr(VI) and prior to removing the ICs.” As stated in Section 2.3.1., over the expected decades-long O&M period, it is expected that the plume will change in size and shape, and therefore the compliance monitoring program surrounding the plume will be modified accordingly. PG&E concurs that the monitoring frequency at startup in some areas (e.g., to the west and north) will be more frequent and reduced over time. Additional details about the monitoring program will be provided in the 30% design submittal and the O&M Plan.	See response to comment 120		Response noted.
125	DTSC-63	Page 2-18, Compliance Monitoring During Remedy Implementation	“It is anticipated that non-certified lab analysis will also be a component of process control monitoring during the groundwater remedy.”	California Department of Toxic Substances Control	PG&E will need to specify which analyses will be performed by on-site non-certified labs and for what purpose.	Comment noted. Details will be included in the sampling and monitoring plan which is part of the O&M Plan (see Table 4-5). No changes to the Work Plan are proposed as result of this comment.	See response to comment 120		Comment resolved.
126	DTSC-64	Page 2-18, Evolution of Monitoring Programs Over	“Once the floodplain is clean, it may be possible to turn off the pumping wells near the river and	California Department of Toxic Substances Control	PG&E will need to develop upfront criteria for major changes to the remedy. For instance, PG&E would need to consider if shutting down pumping along the river would result in a significant increase in time for	A set of criteria will be developed to define when changes are appropriate during operation. These criteria will be presented and developed in concert with the	Will evaluate as part of design		Comment resolved.

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		Time	the carbon-amended injection wells. Changes such as this would result in changes in the monitoring program. Eventually, it will be determined that the active part of the remedial action is no longer needed."		the remedy to reach RAOs.	stakeholders over the course of the design process. The fate and transport model will be used to support the evaluation and definition of periods for field verification. The plan will be flexible enough to allow adjustments based on data collected in field after the system is on line.			
Section 3 Comments – Baseline Site Conditions and Plan for Additional Data Collection									
127	DTSC-65	Page 3-1, First Paragraph	"The additional information will be collected for various reasons such as to further document baseline conditions prior to remedy implementation, provide information as needed for design and construction planning, and provide information to evaluate remedy performance during future operational and closure phases."	California Department of Toxic Substances Control	Please use "decommissioning" instead of "closure" to avoid confusion in permitting status under RCRA. Furthermore, PG&E should highlight up front the need to collect additional information for the East Ravine. At a minimum, revise this sentence… "provide information as needed for design and construction planning, especially in the East Ravine area,…"	The cited sentence will be revised to read (inserted verbiage shown in <u>underline</u> typeface): "The additional information will be collected for various reasons such as to further document baseline conditions prior to remedy implementation, provide information as needed for design and construction planning, <u>especially in the East Ravine area,</u> and provide information to evaluate remedy performance during future operational and ~~closure~~ <u>decommissioning</u> phases."	Okay		Comment resolved.
128	DTSC-66	Page 3-1, Section 3.1 Hydrogeology and Plume Dimensions	"…during the groundwater remedy design, construction, operation, and post-closure phases."	California Department of Toxic Substances Control	Same as comment above. Do not use closure terminologies. In this case, use "post remediation" phases.	Changes to the terminology will be made as directed.	Okay		Comment resolved.
129	DTSC-67	Page 3-1, Section 3.1.1 Site Characteristics	"The geologic and hydrogeologic conditions of the site described below are discussed in greater detail in the RFI/RI Volume 2 Report (CH2M HILL, 2009a), the Volume 2 Addendum (CH2M HILL, 2009b), the Summary of Findings Associated with the East Ravine Groundwater Investigation included in Appendix A of the CMS/FS (CH2M HILL, 2009c), and ongoing monitoring reports."	California Department of Toxic Substances Control	The cited section must acknowledge that additional data are currently being collected for the East Ravine and Topock Compressor Station Areas and will be utilized in developing the remedy.	The requested acknowledgement was included in Section 3.1.2 (Additional Data During Groundwater Remedy Design) as follows: "..Data collected during the East Ravine investigation in 2011 will be used to update the hydrogeologic site characteristics and plume dimension described in Section 3.1.1 and will be incorporated into the groundwater remedy design…" No changes to the Work Plan are proposed as a result of this comment.	Okay		Comment resolved.

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130	DOI-32	Section 3.1.1, page 3-2, 1st para.		U.S. Department of the Interior	Figure 3-1 should show the potentiometric surface with arrows to denote groundwater flow direction to support the text discussion.	Revised Figure 3-1 is attached to these responses.	Okay	DOI concurs with the response.	Comment resolved.
131	DOI-33	Section 3.1.1, page 3-2		U.S. Department of the Interior	The phrase "significant quantities of groundwater" may not be appropriate in this context. Typically, that phrase relates to "significance" as a groundwater supply. Bedrock may in fact be a significant contaminant transport pathway, especially in the East Ravine. DOI suggests deletion of this last portion of the sentence	The discussion in Section 3.1.1 relates to the regional properties of the bedrock in Mohave Valley. The sentence in question is paraphrased from "Geohydrology of the Needles Area, Arizona, California, and Nevada" (Metzger and Loeltz, 1973). The reference states: "There is no evidence to indicate any sizable potential for development of ground water in the bedrock, although locally, small yields may be developed from fractures". The actual sentence from the reference will be inserted in place of the paraphrased sentence and a citation to the reference will be provided.	Okay	DOI concurs with the response.	Comment resolved.
132	DOI-34	Section 3.1.1, top of page 3-3		U.S. Department of the Interior	An isopach map of saturated alluvial thickness would be useful to support the discussion in the text.	A new Figure 3-3 (Isopach map) was created and attached with these responses.		DOI concurs with the response.	Comment resolved.
133	DTSC-68	Page 3-4, Section 3.1.1 Site Characteristics, Chromium Plume Dimensions, December 2010	"Based on current site characterization data, the existing dimensions of the plume exceeding natural background levels underlie an area that is approximately 175 acres, including alluvium and bedrock."	California Department of Toxic Substances Control	The cited sentenced should be modified to as follows: "…exceeding natural alluvial background levels …" as background values for bedrock have not been determined.	The sentence will be changed as requested.	Okay		Comment resolved.
134	DOI-35	Section 3.1.2, 1st para.		U.S. Department of the Interior	The meaning of COPC should be defined in context of its use here. The term COPC can have different meanings depending on its context (risk assessment, compliance assessment, etc.).	The text will be revised to clarify that the three COPCs identified in Section 3.1.2 of the Work Plan (selenium, nitrate, and molybdenum) are the constituents that DTSC and DOI requested be monitored in groundwater. The following text was added to Section 3.1.2: "DTSC and DOI concluded during review and finalization of the Groundwater Risk Assessment for SWMU 1/AOC 1 that although the noncancer hazards associated with selenium, molybdenum, and nitrate are much lower than those associated with Cr(VI), the noncancer hazard index exceeds the threshold of 1.0 in one or more wells for these three constituents using conservative exposure assumptions. Therefore, DTSC and DOI directed that molybdenum, selenium, and nitrate be monitored in the groundwater monitoring program (DTSC 2009b, DOI 2009)." The following references will be added to Section 8:	Okay	DOI concurs with the response pending review of the final text.	

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						DTSC. 2009b. Letter to Ms. Yvonne Meeks/PG&E. "Acceptance of Final Groundwater Risk Assessment Report, Topock Compressor Station, Needles, California (EPA ID NO. CAT080011729)." December 10. DOI. 2009. Letter to Ms. Yvonne Meeks/PG&E. "PG&E Topock Compressor Station Remediation Site – DOI Approval of the *Human and Ecological Risk Assessment of Groundwater Impacted by Activities at Solid Waste Management Unit (SWMU) 1/Area of Concern (AOC) 1 and SWMU 2, Topock Compressor Station, Needles, California*." December 15.			
135	DOI-38	Section 3.1.2, 2nd to the last para.		U.S. Department of the Interior	The first sentence implies a listing of monitoring programs that will be used to update baseline maps "… monitoring programs listed below...". No list is provided. Please clarify.	There was a typo in the subject sentence. Text will be revised to read: "...monitoring programs listed ~~below~~ above..."		DOI concurs.	Comment resolved.
136	DOI-39	Section 3.1.2, last paragraph		U.S. Department of the Interior	The work plan addendum was submitted to both DTSC and DOI.	Text will be revised as directed.		DOI concurs.	Comment resolved.
137	DTSC-69	Page 3-5, Section 3.1.3 Additional Data During Groundwater Remedy Construction	"During the initial construction of the groundwater remedy, wells will be installed in some areas where there are currently few or no existing wells."	California Department of Toxic Substances Control	Revise the cited sentence as follows: "During the initial construction of the groundwater remedy, wells will be installed in areas where they are needed." New wells may be installed adjacent to existing wells for a number of reasons including vertical definition and aquifer assessment. The following sentence should also be revised in a similar fashion.	The point intended by the cited sentence is there are parts of the site that have lower density of existing wells and the understanding of aquifer properties in areas without existing wells is currently estimated /approximated. Drilling of new wells will give real data for the areas without existing data. There may indeed be new wells installed adjacent to existing wells but because there are existing wells it is not likely to learn much new information about aquifer properties in the areas with existing wells. To address this comment, the cited sentences will be revised to read (inserted text in underline typeface): "During the initial construction of the groundwater remedy, wells will be installed in ~~some~~ areas where they are needed, including areas where there are currently few or no existing wells. The hydrogeologic characterization and plume dimensions described in Section 3.1.1 are based on the data set as of December 2010; installation of wells in areas of the site where there are few or no existing wells, such as to the north and west of the interpreted plume boundary, will be used to confirm and/or update the hydrogeologic site characterization following their construction."	Okay		Comment resolved.

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138	DTSC-70	Page 3-6, Section 3.1.3 Additional Data During Groundwater Remedy Construction	"Information to be collected from these wells will include geologic logging, depth to groundwater, analytical constituent concentrations, and possibly aquifer properties."	California Department of Toxic Substances Control	Include geophysical logging to the information that may be collected from wells.	The following sentence will be added at the end of the cited text: "Geophysical logging may also be collected from the wells."	Okay		Comment resolved.
139	DOI-40	Section 3.1.4, page 3-6		U.S. Department of the Interior	General water quality parameters should also be monitored to evaluate potential geochemical condition changes that could influence Cr, Mn, and As distributions during remedial action.	Table 2-1 specifies that general water quality parameters will be monitored at locations where these are most important to be quantified, specifically in extraction wells from the River Bank and East Ravine, as well as specific monitoring wells in the floodplain. Monitoring of these parameters at these locations will establish baseline and will be evaluated during remedy implementation. Text has been edited to this effect in Section 3.1.4 (inserted text in <u>underline typeface</u>): "In addition, measurements of groundwater quality for in-situ treatment byproducts, <u>general water quality parameters,</u> and hydraulic measurements will be collected in select areas of the site."	DTSC will review revised text.	DOI reserves judgment until after the text is reviewed.	
140	DTSC-71	Page 3-6, Section 3.1.4, Additional Data During Groundwater Remedy Operation and Closure		California Department of Toxic Substances Control	See comments above on use of closure and post closure terminologies.	Changes to the "closure" and "post closure" terminologies "decommissioning" and "post remediation" will be made as directed.	Okay		Comment resolved.
141	DTSC-72	Page 3-6, Section 3.1.4, Additional Data During Groundwater Remedy Operation and Closure	"Implementation of the Corrective Measure/ Remedial Action Monitoring Program. Data collected from monitoring wells for RAO attainment during operation will be for Cr(VI) concentrations. In addition, measurements of groundwater quality for in-situ treatment byproducts and hydraulic measurements will be collected in select areas of the site. DTSC and DOI have also directed that nitrate, molybdenum, and selenium concentrations in groundwater be monitored periodically	California Department of Toxic Substances Control	See comments on Table 2-1 and pages 2-16 to 2-18. Text from this section (Section 3) should correspond to that contained in Section 2.	Please see responses to Comments #111, 113-118, 120, 122, 124, 125, and 126.	DTSC will review revised work plan for consistency.		Comment resolved.

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			throughout the remediation process."						
142	DTSC-73	Page 3-6, Section 3.1.4, Additional Data During Groundwater Remedy Operation and Closure	"Additional site characterization information from wells installed during operation, closure, and postclosure phases will include geologic logging, depth to groundwater, analytical constituent concentrations, and possibly aquifer properties."	California Department of Toxic Substances Control	Include geophysical logging to the information that may be collected from wells.	The text will be revised as follows (inserted verbiage shown in underline typeface): "Additional site characterization information from wells installed during operation, decommissioning, ~~closure,~~ and post-~~closure~~ remediation phases will include geologic logging, depth to groundwater, analytical constituent concentrations, and possibly geophysical logging and aquifer properties."	Okay		Comment resolved.
143	MWD-5	Section 3.1 Hydrogeology and Plume Dimensions		Metropolitan Water District of Southern California	In this section, recognition should be made to the saline plume that occurs on the alluvium/bedrock interface within the chromium plume as it may impose recalcitrant characteristics with respect to the planned remedy.	There is no saline plume that has been identified at the Topock site. There is however, a trend of increasing salinity with depth that is typical of alluvial aquifers across the arid southwest. Generally, the most saline water at the Topock site is found in bedrock. Upward gradients cause this saline water to slowly mix into the overlying alluvial aquifer. In areas where low permeability alluvium overlies bedrock, mixing is poor and salinity in the alluvium is more typical of bedrock. In other areas where coarser alluvium overlies bedrock, salinity in the alluvium is not so elevated due to better mixing. The salinity is not anticipated to impede cleanup, but there are undoubtedly low permeability zones throughout the site that will be slower to clean up than other zones. Where these low permeability zones overlie bedrock, they typically have higher salinity. In situ pilot studies have been applied to high-TDS groundwater in the deep zone with effective reduction/ removal of Cr(VI). No changes to the Work Plan are proposed as a result of this comment.	Okay	DOI concurs with the response.	Comment resolved.
144	DOI-41	Section 3.2.1, second para.		U.S. Department of the Interior	For clarification, PG&E should include BOR, USFWS and the HNWR in the landowners listing for Arizona. A property ownership map should be included for reference.	Text will be changed and a new Figure 3-5 will be added as directed.	Okay, but what is meant by "BOR withdrawn Managed by BLM…"	DOI concurs with the response pending review of the final text.	Comment resolved. The terminology "BOR Withdrawn, Managed by BLM" is language used by BOR.
145	HA-22	p. 3-7 (Existing Information)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The Tribe requests information on where the various easements and/or rights-of-way can be reviewed.	PG&E does not have information on the whereabouts of land rights documents that belong to other entities.	Comment noted	Noted.	Response noted.
146	HA-23	p. 3-8 (Additional Land Ownership,		Hargis + Associates, Inc. (on behalf of	In addition to "guiding design" and documenting "pre-construction" baseline conditions, what	The aerial map of disturbed areas is a requirement of the EIR MMRP, for the	Tribal concerns are noted	Noted.	Response noted.

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		Disturbance and Development Information During Design)		Fort Mojave Indian Tribe)	additional uses may be made of the aerial map referred to in the second paragraph? Please explain what is meant by the last line in the second paragraph relative to identifying areas outside of "documented archaeological site boundaries" that have experienced ground disturbance in the last 50 years. As was discussed in reference to the soils area UA-1, the Tribe may have concerns about locations where geophysical surveys may be used for the underground utility location.	purpose of guiding the design and placement of remedy infrastructure. The map also aids in documenting pre-construction baseline conditions. PG&E does not envision other uses for this map at this time. The last line of the second paragraph was lifted verbatim from the EIR MMRP (CUL-1a-9). Please also refer to response to Comment #171 HA-28.			
147	DOI-36	Section 3.2.1, 1st bullet on page 3-8		U.S. Department of the Interior	The feasibility of using the arched bridge for the fresh water pipeline should be presented in the CMI/RD Work Plan so that a 30% design can be prepared for this option, or another option for conveying the water. See General Comment 1.	See response to Comment #5 DOI-1.		DOI reserves judgment until the new text to be included in Section 2.0 is reviewed.	Comment resolved.
148	DOI-37	Section 3.2.1, 2nd bullet on page 3-8		U.S. Department of the Interior	See comment Section 2.2.2, 1st para.	See response to Comment #97 DOI-24.		DOI concurs with the response.	Comment resolved.
149	DTSC-74	Page 3-9, Second bullet	"Additional information will be gathered during the design phase on capacities of various disposal/reuse options for treated wastewater"	California Department of Toxic Substances Control	PG&E has mentioned treated waste water in several locations in the work Plan. However, thus far, PG&E has not described the treatment process or the infrastructures and logistics for such treatment in detail. Figure 2-3 (schematic diagram) appears to be the same process as the current IM treatment plant. Is this what PG&E is considering? Additional information is needed.	See response to Comment #2 DTSC-1 and Comment #5 DOI-1.	Will evaluate tech memo		Comment resolution deferred to 30% design.
150	DTSC-75	3.2.5 Surface Water and Wetlands	"…the Final Human and Ecological Risk Assessment of Groundwater Impacted by Activities at SWMU 1/ AOC 1 and SWMU 2 concluded that the potential transport of constituents in groundwater to the Colorado River represents an insignificant transport pathway (ARCADIS, 2009)."	California Department of Toxic Substances Control	For completeness, the paragraph should mention that the risk assessment did not evaluate the potential transport of groundwater contamination in bedrock in the East Ravine area to surface water.	The following text will be added to Section 3.2.5 the Work Plan (4th paragraph, before last sentence) (inserted verbiage shown in underline typeface): "Data for groundwater contamination associated with the East Ravine were not available at the time the risk assessment was completed. Therefore, the risk assessment did not specifically consider the potential transport to surface water for groundwater contamination subsequently detected within the bedrock in the East Ravine area."	Okay		Comment resolved.

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151	DOI-42	Section 3.2.7		U.S. Department of the Interior	In addition to referencing the new consultation for construction of the groundwater remedy apparatus, PG&E needs to discuss the potential for effects of this project on the Yuma clapper rail. A survey will be required for the clapper rail if construction is likely to occur in marsh habitats.	Comment noted. The EIR evaluates the potential for effects of the project on the Yuma clapper rail. Section 4.3.3.3 of the Final EIR (AECOM, 2011) states the following under subsection Impact BIO-2: <u>Disturbance of Special-Status Birds and Loss of Habitat (page 4.3-28)</u> "…Road and pipeline construction and well development could occur within 300 feet of marsh habitat occupied by Yuma clapper rails. Direct and indirect effects could occur, such as dewatering of freshwater marsh habitat resulting in habitat loss, stranding of active nests (usually built at edge of water), and increasing predation and nest failure. Construction-related disturbance from traffic or noise during the rail's breeding season could cause rails to have nest failures and/or abandon nesting territories. Implementation of freshwater flushing associated with the proposed project could result in disturbance to Yuma clapper rail during construction-related drilling if wells are located within 300 feet of occupied marsh habitat…" As part of remedy implementation, PG&E will fully comply with the requirements specified by the Mitigation Measure Monitoring and Reporting Program (MMRP), which includes the following requirement for surveys under Mitigation Measure BIO-2a that addresses special-status birds: "Preconstruction Measures – Preconstruction breeding season surveys shall be conducted during the general nesting period…..if the final design (including East Ravine investigation Sites I, K, and L) could result in disturbance or loss of active nests of special-status bird species. If vegetation removal or other disturbance related to project implementation is required during the nesting season, focused surveys for active nests of special-status birds shall be conducted before such activities begin. A qualified biologist shall conduct preconstruction surveys to identify active nests that could be affected. The appropriate area to be surveyed and the timing of the survey may vary depending on the activity and species that could be affected. For the Yuma clapper rail, the preconstruction surveys shall specifically identify habitat within 300 feet of construction areas, in accordance with substantive policies of USFWS including	Okay	DOI and FWS request that modified language from the EIR be included in the CMI/RD WP, specifically directed toward communication and consultation with FWS. The RD WP must stress the importance of having completed ESA consultation to ensure that incidental take is addressed whenever work in the marsh is going to occur. DOI and FWS withhold concurrence until review of the text in the revised WP.	

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						those set out in USFWS protocols." Compliance with EIR mitigation measures will be documented and reported. The following text will be added to Section 3.2.7: **Additional Information During Design** "In compliance with the Endangered Species Act of 1973 (16 USC §§ 1531-1544; 50 CFR 402), Section 7 consultation with the USFWS will occur prior to the implementation of the groundwater remedy to ensure that remedial activities will not result in the take of, or adverse impacts to, threatened and endangered species or their habitats. The current PBA addresses activities up to the selection of the remedy and expires at the end of 2012. A new PBA will be prepared in coordination with BLM and USFWS to address remedy implementation as well as future RFI/RI and remedial activities that are anticipated to occur in the APE. A biennial protocol survey for the SWFL will be conducted in 2012; survey information will be incorporated into the new PBA. At the request of the USFWS in September 2011, a survey for the Yuma clapper rail will be conducted on the California side of the Colorado River, in the potentially suitable rail habitat under the (below/near) the I-40 bridge. The survey is anticipated to occur in 2012, with the exact timing to be determined by qualified biologist. **Additional Information During Construction** "For the Yuma clapper rail, the preconstruction surveys shall specifically identify habitat within 300 feet of construction areas, in accordance with substantive policies of USFWS including those set out in USFWS protocols".			
152	HA-24	p. 3-15 (Cultural Resources)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The first bullet indicates that CUL-3 "... requires that a paleontological investigation be conducted to refine the potential impacts on unique paleontological resources within the final design area." Has a paleontological survey been conducted to date? If so, what unique resources exist? Sections of the text related to paleontological resources should be separate from those sections on cultural resources. Whenever cultural resources surveys or monitoring are performed, the Tribe requires advance notification and the opportunity to participate.	The paleontological study has not yet been completed, and will be conducted in a manner consistent with the requirements of the FEIR. Interested tribes are invited as a matter of course to monitor all new ground disturbing activities and to participate in archaeological surveys. Efforts are made to give the tribes early notification. Confidential site locations are not disclosed in the referenced section. Archaeological and historical sites are listed by site names or	DTSC concurs with PG&E response.	DOI defers to DTSC.	Comment noted.

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					The last sentence in "Existing Information" should be deleted as it seems to disclose confidential information about archaeological findings. This text must be revised to reflect DTSC's finding that the Topock Cultural Area (TCA) is an historic resource under CEQA and BLM's determination that Traditional Cultural Property (TCP) or property of traditional religious and cultural significance within the APE is eligible for listing on the National Register under Criterion A, as part of what tribes have identified as a larger area of traditional and cultural importance. Why was this information, so critical to the Tribe, omitted from this document? It should be part of the standard section in all Project reports and work plans. It is not clear whether the bullets listed represent all the additional information and studies that are required. Please confirm. Figure 3-1 - What is the base date for this map? Are all the IM3 facilities visible on this graphic? The disturbance areas around the IM3 injection areas appear quite large. Is this size disturbance the minimum necessary?	numbers, but this in no way discloses their locations. Page 1-2 (Project Background) will be revised to reflect that DTSC has found that the project site qualifies as a historic resource, and that the Bureau of Land Management also has determined that a traditional cultural property (TCP) or property of traditional religious and cultural significance that is eligible for listing on the National Register of Historic Places exists in the area of the Topock project, as part of what the tribes have identified as a larger area of traditional and cultural importance. Bulleted items represent requirements of the FEIR. The date of the aerial photo used in Figure 3-1 is either 2005 or 2006. All of the IM-3 facilities that were in place at the time of the photograph are visible. Since that date, the only visible difference is that the facilities in the MW-20 Bench area now have a smaller footprint. The ground disturbance that is visible around the injection well area was created prior to the project and during the drilling activity for the injection wells. No additional disturbance has been created in that area since the completion of the wells			
Section 4 Comments – Schedule and Future Documents									
153	DOI-43	Section 4.0 General Comment		U.S. Department of the Interior	This section appears to be developed for the primary purpose of satisfying the EIR mitigation requirements. References to DTSC approvals and determinations occur throughout. A majority of the remedy implementation activities occur on Federal lands and will require review and approval by DOI and the Bureau's input or concurrence. It is recommended that PG&E review this section to assure that DOI approvals appear as appropriate and consultation/coordination with BOR, USFWS/HNWR, and BLM are called out.	See response to Comment #155 DOI-45 for plan to address action- and location-specific ARARs. The new Table 4-4A presents an initial assessment of the identified ARARs. In addition, as stated in Table 4-5, a list of anticipated approvals for construction and operation of the remedy will be included in the Construction/Remedial Action Work Plan and O&M Plan, respectively.		DOI concurs with the response regarding the addition of Table 4-4A. As noted in our discussion, DOI does not approve the Health and Safety Plan.	Comment resolved.

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154	DOI-44	Section 4.0, 1st para.		U.S. Department of the Interior	What aspects of design would overlap construction and startup? According to Figure 4-1, there will be an approved design before any construction activities.	Final design and construction schedules for individual components are not defined at this time. Design, construction, startup, and operations will each be processes involving multiple steps and overlap may occur due to phasing and schedules for individual project features. It is not uncommon at complex remediation sites that one part of the system is in design, other parts in construction, and other parts in operation. At this site, there is the possibility that, for example, floodplain construction and testing activities might be occurring at the same time that final design is occurring for East Ravine bedrock infrastructure. Another example may be that installation and testing of extraction or injection wells is occurring prior to pipeline construction, or that installation and testing of extraction wells for freshwater in Arizona occurs prior to the installation and testing of freshwater injection wells in California. Final plans and phasing of construction, start-up and testing of individual facilities will be provided in the Construction/Remedial Action Work Plan identified in Table 4-5.	It is DTSC's expectation that all design are completed and presented in one final package for approval prior to any groundbreaking construction occurs. Although fine tuning and minor changes can occur during construction, PG&E should not be in the mindset that any substantive design can be concurrent with construction. If any pilot studies are required, PG&E must complete those as separate approvals with separate workplans and design documents.	Figure 4.1 indicates that an approved design will be in place prior to construction. Conversely, Exhibit 1-1 and 4-1 show construction concurrent with design. The response also indicates that activities will be occurring prior to completion of design of the "longer-term infrastructure support facilities." It is DOI's expectation that a final design will be in place and approved by the agencies prior to construction.	Noted. Final plans and phasing of construction, start-up and testing of individual facilities will be provided in the Construction/Remedial Action Work Plan.
155	DOI-45	Section 4.0, page 4-1		U.S. Department of the Interior	The second paragraph discusses regulatory requirements including ARARs. The text indicates that CERCLA requirements are identified in Table 4-2. ARARs, however, are not identified in Table 4-2. The text in the second paragraph indicates that ARARs compliance will be addressed through a documentation process. Please expand the discussion in Section 4 to describe how and when action and location specific ARARs, as set forth in the Record of Decision, Table 2 (ROD), will be addressed, how their potential impact on the project will be assessed, and how they will be integrated into the different project implementation phases. Please note we are not asking for an assessment at this time; rather for PG&E to articulate their plan for addressing action and location specific ARARs.	Table 4-2 summarizes the requirements of the 2009 CERCLA RD/RA Model Consent Decree. The word "ARARs" was not used in the 2009 Model RD/RA Consent Decree (a word search of the pdf was performed). The last sentence of the last paragraph of Section 4.1 will be expanded to read (inserted verbiage in underline typeface): "Compliance with substantive requirements of ~~other ARARs will be addressed through similar documentation~~ the identified action- and location-specific ARARs will be assessed by first, identifying the trigger for compliance, e.g., underground injection activity, transfer and storage of hazardous wastes, RCRA-regulated facilities in 100-year floodplain, etc.; second, determine the steps for compliance, e.g., file the inventory of injection well, adhere to design requirements for containers, etc.; third, identify the parties responsible for compliance; and fourth, identify overlaps with EIR requirements. Table 4-4A presents an initial assessment of the identified ARARs. PG&E will provide information (a checklist if requested) to document implementation and	Okay	DOI concurs with the response.	Comment resolved.

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						completion of identified ARARs, as part of the Basis of Design Report (see Table 4-5)."			
156	DTSC-76	Page 4-1, section 4.0 Schedule and Future Documents, First Paragraph	"The implementation of the groundwater remedy consists of several phases, including design, construction, O&M, closure, post-closure, and decommissioning of remedial facilities."	California Department of Toxic Substances Control	Replace closure and post-closure wording.	The sentence will be changed to read: "The implementation of the groundwater remedy consists of several phases, including design, construction, O&M, ~~closure, post-closure,~~ achievement of RAOs, post-remediation monitoring, and decommissioning of remedial facilities."	Okay		Comment resolved.
157	DTSC-77	Page 4-1, section 4.0 Schedule and Future Documents, First Paragraph	"Multiple activities and documents will occur during each phase of the project and any one phase may overlap with other phases of the project; for example, some parts of the remedy may be in start-up while other parts are under construction."	California Department of Toxic Substances Control	DTSC only envisions some construction and decommissioning activities to overlap with operational activities. There should not be any overlap of other phases of the project prior to design approval.	See response to Comment #154 DOI-44.	Okay		Noted. Final plans and phasing of construction, start-up and testing of individual facilities will be provided in the Construction/Remedial Action Work Plan.
158	DTSC-78	Page 4-1, section 4.0 Schedule and Future Documents, First Paragraph	"At this early stage of project implementation, a timeline for the latter phases of the project is not meaningful."	California Department of Toxic Substances Control	DTSC disagrees with this statement. Like all project planning, an initial project schedule of all phases allows for better planning and tracking of short term goals. DTSC agrees that future changes in the schedule during implementation will be likely, but PG&E should be considering the project in whole and propose short term goals (short term RAOs) as suggested in comments above.	To address this comment, the following text will be added to the end of the 1st paragraph in Section 4.0: "Note that the 2009 CMS/FS stated that it may take approximately 29 years to flush five pore volumes, and the range of cleanup time is from 10 years (based on two pore volumes) to 110 years (based on 20 pore volumes). After the cleanup is complete, monitoring will continue for 10 years. Using this as a basis, the year when cleanup is achieved could range from 2024 to 2124. Monitoring after cleanup is complete would then extend another ten years beyond that date." See response to Comment #111 DTSC-52 on short-term RAOs.	Okay		Comment resolved.
159	DOI-48	Section 4.0, page 4-1, second para.		U.S. Department of the Interior	It is recommended that the text reference the pending Consent Decree between PG&E and DOI and the Programmatic Agreement and how it may affect design.	The PA is mentioned in the 2nd paragraph, in two ways: in the 1st sentence, the PA is mentioned indirectly as part of ARARs, and in the 3rd sentence, the PA is mentioned directly. The following text will be added at the end of the 2nd paragraph: "In addition, once final, requirements from the pending Consent Decree between PG&E and DOI will be compared to those listed on Tables 4-2/4-2a (2009 CERCLA RD/RA Model Consent Decree), 4-3, and 4-5. If there are any differences, they will be evaluated for impact to the project as a whole."		DOI concurs.	Comment resolved.

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160	DOI-46	Section 4.1 General		U.S. Department of the Interior	DOI agrees with the concept of "packaging" documents when it is sensible. However, we request that the packaging be segmented and organized so that review and approval of individual components can be accomplished without intertwining other components in the package. For example, it appears that the IM-3 decommissioning plan is included as a part of the CIMP. It is also part of the Programmatic Agreement and will need to be addressed separately by the federal agencies. In addition to considering by similarity of content and mission; please expand on how the timing (e.g., last bullet on page 4-3) will be addressed to ensure that the Agency's review and approval requirements are accommodated.	Table 4-5 was originally organized under the principle that, for ease of review and tracking of information and requirements, supporting materials/documents will be packaged with the documents that rely upon the supporting conclusions. To address this comment, Table 4-5 was adjusted to facilitate Agency approval. The revised Table 4-5 is attached to these responses.		Response accepted.	Comment resolved.
161	DOI-47	Section 4.2 General		U.S. Department of the Interior	Section 4 identifies many of the documents and deliverables impacting the project. However, the presentation does not provide much discussion of how the requirements of these documents affect project implementation. Please provide an initial "cross walk" or compliance matrix of the major requirements stemming from the key documents during the design phase so that their impact can be anticipated. The crosswalk should then be updated as project definition increases through the construction, operations, and closure phases. In addition to the crosswalk, please provide a preliminary schedule illustrating when the deliverable will be provided relative to the design, construction, and implementation phases. See also General Comments Section 4 and 4.1 above.	As discussed in Section 4.2, the key technical documents to be produced during the design includes: • Design submittals • O&M Plan • Construction/Remedial Action Work Plan Table 4-5 is the cross walk for these documents because it outlines the content or requirements of each submittal, from which one can assess and anticipate their effects on implementation. There are several documents required by the EIR MMRP during the design phase. The EIR MMRP is the cross walk for these documents because it contains a detailed description of each mitigation measure including a discussion of the effect of each measure on implementation. If desired, Table 4-4 can be expanded to include detailed description for those mitigation measures that are mapped to at least one future document. Similarly, there are documents required to meet substantive requirements of the identified ARARs during the design phase and prior to construction. The new Table 4-4A presents an initial cross walk for these documents.		DOI acknowledges that Table 4-5 is an adequate cross wall for the documents. Table 4-4 does not need to be expanded.	Comment resolved.
162	HA-25	p. 4-2 (Exhibit 4-1)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This appears to be identical to Exhibit 1-1. Please refer to Comment 1.	Revised Exhibit 4-1 is attached to these responses.	Okay		Comment resolved.

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163	HA-26	p. 4-3 (Table 4-4)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This table is generally a helpful organization and mapping of the plan for documentation. However, it would benefit from a summary of the mitigation measure in the Mitigation Number column. The Tribe requests a discussion with PG&E on Tables 4-4 and 4-5 and on Exhibit 4-2 (compliance report template) before this Work Plan is finalized so it can better understand, item by item, what the ramifications are for the timing and placement of mitigation, especially those related to cultural resources. The Tribe wants to be assured it understands what the terms used in the table mean to PG&E. While not specifically mentioned in this draft, it should be noted that the Tribe specifically objected to a consolidation of the Cultural Impact Mitigation Program (CIMP) and Cultural Historic Property Management Plan (CHPMP) documents.	PG&E will work with the Tribe as requested. Tribe's objection to consolidation of the CIMP and the CHPMP documents are noted.	Okay	Noted.	Comment noted.
164	DOI-49	Section 4.2		U.S. Department of the Interior	Much of the information provided within this section is geared toward compliance with the EIR and associated mitigation measures. It is clear that coordination with BLM in their development of the CHPMP and coordination with DOI in specification of stipulation for the remedy must occur. PG&E should, at a minimum, describe how this coordination will occur throughout the process.	The following text will be added to Section 4.2.1: "The BLM, in consultation with interested Tribes, the California and Arizona SHPOs, the Advisory Council on Historic Preservation and PG&E prepared and executed a Programmatic Agreement (PA) to fulfill their Section 106 responsibilities for the ground water remediation Record of Decision. As a requirement of the PA, a Cultural Historic Properties Management Plan (CHPMP) is to be completed by January 2012. Requirements of the PA and the forthcoming CHPMP will be closely integrated with the requirements of the DTSC EIR. When possible, requirements of the PA/CHPMP and EIR will be coordinated so as to avoid conflict. Requirements from both the PA/CHPMP and EIR will be utilized when preparing all future work plans. Until the CHPMP is completed by the BLM, the existing 2007 Cultural Resources Management Plan (CRMP) will be followed."	Okay	DOI concurs with the proposed text.	Comment resolved.
165	DOI-50	Section 4.2, 1st para.		U.S. Department of the Interior	As noted in the previous comments, there are many analyses that need to be performed and presented in the CMI/RD Work Plan so that a 30% design can proceed without incurring subsequent changes. According to Table 4-5, elements of the preliminary design do not include presentation of the analyses that are yet to be performed. See General Comment 1.	See response to Comment #5 DOI-1.		DOI concurs with the response.	Comment resolved.
166	DOI-51	Section 4.2.1.1		U.S. Department of the Interior	This section should also reference coordination with the CHPMP and PA. For example, the PA references development of a decommissioning and restoration plan for the IM-3 facility as well. Please provide discussion of how CHPMP and PA	The following text will be added to Section 4.2.1: "The BLM, in consultation with interested Tribes, the California and Arizona SHPOs,		DOI concurs with the proposed text.	Comment resolved.

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					requirements will be integrated.	the Advisory Council on Historic Preservation and PG&E prepared and executed a Programmatic Agreement (PA) to fulfill their Section 106 responsibilities for the ground water remediation Record of Decision. As a requirement of the PA, a CHPMP is to be completed by January 2012. Requirements of the PA and the forthcoming CHPMP will be closely integrated with the requirements of the DTSC EIR. When possible, requirements of the PA/CHPMP and EIR will be coordinated so as to avoid conflict. Requirements from both the PA/CHPMP and EIR will be utilized when preparing all future work plans."			
167	DOI-52	Section 4.2.1.2		U.S. Department of the Interior	Provide detail on how PG&E, DTSC, and BLM are coordinating on the Site Access Plan.	The following text will be added to Section 4.2.1: "PG&E has been in contact with the BLM who has responsibility for preparing the Access Plan required by the PA. BLM has indicated that they are planning to complete their Access Plan by Fall 2011. Given the majority of land within the area is Federal Land, PG&E is waiting for BLM to complete their Access Plan in order to avoid the potential for inconsistencies. PG&E will then prepare an Access Plans for the lands not under Federal management."	Okay	Concur with response. Concur. BLM will consult with the Tribes, PG&E and other effected agencies to produce a tribal access plan by its due date of November 26, 2011, as specified by Stipulation 1(C) in the Topock Groundwater Remediation Project Programmatic Agreement .	Comment resolved.
168	DOI-53	Section 4.2.1.5		U.S. Department of the Interior	The section references "substantial adverse change". This is clearly in reference to the EIR. A definition of 'substantial adverse change" should be provided for reference.	Since the term "substantial adverse change" came from the EIR, PG&E defers to DTSC. The following text has been added to Section 4.2.1.5 to define "substantial adverse change": "Per the EIR (Section 4.4.3.2), Section 15064.5(b) of the CEQA Guidelines clarifies the meaning of "substantial adverse change" by defining this phrase as the physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings. Additionally, the significance of a historical resource or a unique archaeological resource would be "materially impaired" by the proposed project if it demolishes or materially alters in an adverse manner those physical characteristics of a resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR, including those resources for which eligibility has been	Section 15064.5(b) of CEQA guideline provided the definition of "substantial adverse change." See also Section 4.4.3.2 of the FEIR, Volume 2.	Please bring this definition forward into the work plan.	Comment resolved.

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						determined by the lead agency for the purposes of CEQA."			
169	DOI-54	Section 4.2.1.7		U.S. Department of the Interior	Clearly coordination with the Federal agencies and the Section 106 process is necessary with respect to potential impacts to cultural/historic properties and consult with SHPO/ACHP and agencies necessary in designing a treatment plan. Please add discussion elaborating on this point.	The following text will be added to the end of Section 4.2.1.7: "PG&E will also coordinate with the Federal agencies and SHPO/ACHP in designing a treatment plan."		Concur with new text.	Comment resolved.
170	HA-27	p. 4-4 (Cultural and Historical Resources Documents)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section refers repeatedly to "communications" with "Interested Tribes." However, DOI and PG&E are both legally required to consult with the Tribe, and although DTSC prefers the term "communications," it should also consult the Tribe as intended by its settlement agreement and the Cal/EPA and USEPA policies. Under the CIMP section, the Tribe remains concerned the PG&E is apparently proposing to "re-use" parts of the IM3 facility in the final remedy, although the presentation by DTSC at the May 2011 TLP meeting confirmed that IM3 is not a part of the project. This discrepancy should be clarified, and other comments regarding IM3 herein considered. This statement also seems inconsistent with Part 3 (aerial map) of the same section.	The text used on page 4-4 tracks verbatim the language of mitigation measures CUL-1a-8 ("Prior to commencement of construction, PG&E shall submit as part of the final Remedial Design, a CIMP developed in coordination with Interested Tribes for DTSC's review and approval") and CUL-1a-9 ("During selection of the design and specific locations for physical remediation facilities, PG&E shall, in communication with the Interested Tribes (and subject to their review)..."). PG&E have and will continue to adhere to the requirements of its respective settlement agreements with the FMIT. The IM3 treatment plant is not included as part of the final remedy. Once the final remedy is in place and determined to be operating properly and successfully by DTSC and DOI, the IM3 facilities will be decommissioned in accordance with EIR requirements, the Programmatic Agreement, PG&E's Settlement Agreement with the Fort Mojave Indian Tribe, and a subsequent Decommissioning Plan to be submitted with the CIMP during the final remedial design. Consistent with these requirements, it is anticipated that various portions of the remedial facilities, other than the treatment plant, may continue to be used as part of the final groundwater remedy. No changes to the Work Plan are proposed as a result of this comment.	Okay.	DOI acknowledges that consultation with Tribes will be required in the design (preliminary, intermediate, and final).	Comment noted.
171	HA-28	p. 4-4 (3. Aerial Map of Disturbed Areas)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	See earlier Comment 8. The Tribe was not consulted on the definition of "Disturbed Areas" and objects to its use here.	PG&E defers to DTSC.	In response to the FMIT's concerns regarding mitigation measures, DTSC met with Chairman Williams and other representatives of the Tribe on May 27, 2010; July 6, 2010; and October 25, 2010 to specifically discuss mitigation measures for the EIR. During these meeting DTSC invited the Tribe to provide input on the definition of the term "previously disturbed areas"	DOI defers to DTSC.	Comment noted.

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							however none was provided. Based on FMIT's comments on this term used in the DEIR, DTSC provided a more specific definition of the term in the FEIR. As a requirement of the FEIR mitigation measures, PG&E provided draft maps of these "disturbed areas" to the tribes for discussion on 5/26/2011. Please note PG&E did not seek input from the agencies on these draft maps.		
172	Hualapai-5	Section 4.2.1.3		Hualapai Department of Cultural Resources	The use of "previously disturbed areas" for placement of wells, trenches, pipelines, and utilities does not necessarily provide for wanton trenching and drilling in these areas. Tribal inspections and monitoring of all intrusive activities must be allowed.	PG&E concurs with the Tribe's point of view. As previously mentioned, Tribal Consultation will occur at each stage of the design (preliminary, intermediate, and final design submittals), and again at the Construction/ Remedial Action work plan stage. As with Tribal monitoring of intrusive activities, PG&E welcomes participation and inputs from the Tribal Monitors. No changes to the Work Plan are proposed as result of this comment.	Okay.	Comment noted.	Comment noted.
173	HA-29	p. 4-5 (Cultural Resources Study/ Geoarchaeological Investigation Report)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	What type of remote sensing surveys are under consideration?	Remote sensing techniques contemplated for use include examination of historical aerial photography of the area, low-angle-sun recent aerial photography, and false-color infrared imagery taken by satellite and space shuttle, to the extent that they are available. Imagery will be electronically enhanced during analysis if image density and resolution are sufficient. These passive, visually based techniques lend themselves best to the project area, which includes a wide array of landforms over short distances, from geologically old mesa tops, to recent washes, to floodplains choked with salt cedar. They also would be most effective given the nature of the soils. Active (as opposed to passive) remote sensing techniques, such as ground penetrating radar or magnetometer, cannot be expected to yield useful information here since the soils are derived from the Colorado River sediments and, as can readily be seen in the numerous cuts and exposures, they contain abundant cobbles and boulders. Active techniques work best when fine, homogenous soils extend to some depth over a broad area that doesn't have a lot of changes in elevation.			Comment noted.

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174	HA-30	p. 4-5 (7. Cultural Resource Treatment Plan (if needed))		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The Tribe does not understand why the phrase "if needed" is used here and elsewhere. The Tribe has informed PG&E and the agencies that other projects and the Final Remedy will have an adverse effect on the TCA and the TCP, thereby a plan of some type, even if the focus is on measures to reduce indirect and cumulative effects/impacts, would be required.	Text on page 4-5 on the Cultural Resource Treatment Plan reflects the following language in the EIR MMRP for CUL-1b/c-3: "If the cultural resources study determines that the construction of physical improvements would result in significant impacts on identified historically significant resources described in Impacts CUL-1b and CUL-1c, and avoidance of the resource is not feasible, PG&E shall prepare a treatment plan that identifies measures to reduce these impacts (see above description of the CIMP) for DTSC's review and approval." No changes to the Work Plan are proposed as a result of this comment.	Okay.		Comment noted.
175	HA-31	p. 4-7 (Training/ Education Manual for Cultural Resources, Historical Resources, and the Identification of Human Remains)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	As discussed in the TLP meeting, the Tribe should be invited to actively participate in these training programs to ensure proper and adequate appreciation of cultural resources from a Tribal perspective.	PG&E concurs and acknowledges the Tribes' contribution to the sensitivity training/education provided at project initiation meetings to project workers/ contractors available to participate. No changes to the Work Plan will be made as a result of this comment.	Okay.	Concur with response.	Comment noted.
176	DTSC-81	Section 4.2 Schedule of Key Documents During Design Phase and Table 4-3		California Department of Toxic Substances Control	As part of remedy approval, PG&E is required to submit to DTSC an update of the remedy cost estimate with each phase of the design refinement and annually thereafter. PG&E should note this requirement in the CMI/ RD Work Plan.	Update of the remedy cost estimate is included in Table 4-1 (Summary of 1996 CACA Requirements) and Table 4-5 (Content of Selected Key Documents During Design). The new Table 4-1A adds further clarification to the final disposition of this required update. No additional changes to the Work Plan will be made as a result of this comment.	Okay		Comment resolved.
177	DOI-55	Section 4.2.2		U.S. Department of the Interior	USFWS does not anticipate a Programmatic Biological Assessment (PBA) Addendum. Although most of the information in the current PBA is likely still accurate, it is appropriate to submit a new PBA for implementation of the remedy. Also, it is not clear how the plant transplant/ monitoring plan is different than the revegetation plan? If PG&E is going to monitor plant success for 5 years after moving/ revegetating, performance goals will need to be established to determine success/level of acceptable failure.	Item 1 under Section 4.2.2 will be revised to refer to a new PBA. Although both plans appear similar, the plant transplant/ monitoring plan will focus on addressing impacts to indigenous plant(s) of traditional cultural significance. The revegetation plan will focus on the restoration of riparian vegetation along the Colorado River. The transplant/monitoring plan will only be implemented if plants of cultural significance are identified and cannot be avoided or will be displaced. The revegetation plan will be implemented due to the disturbance of riparian vegetation as part of remedy implementation. Both plans will have a monitoring component and performance criteria. Example performance criteria are survivability and percent cover metrics per year of monitoring.	Okay	DOI concurs with response.	Comment resolved.

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178	HA-32	p. 4-9 (Other Key Documents During Design)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	As related in the Tribe's January 29, 2011, objection letter on the FEIR, the Tribe requests to be consulted at an early point in time in the development of many of these documents, especially the Site Security Plan, Grading, and Erosion Control Plan, SWPPP, and HMPB.	PG&E defers to DTSC.	Documents required by the MMRP will be available for tribal review and comment as part of the design process. Formal comments will also be accepted during the construction/ Remedial Action Work Plan phase. Please refer to Figure 4-1 (Conceptual Schedule) in the CMI/RD Work Plan for Agencies/ CWG/ TWG/ Tribal Review opportunities.		Comment noted.
179	DTSC-79	Page 4-10, Section 4.3 Key Documents During the Construction Phase	"The Corrective Measure/ Remedial Action Construction Completion Report may include the following elements:"	California Department of Toxic Substances Control	Change "may" to "will" in the cited sentence. Do the same for Section 4.5 as well.	Text will be revised as directed.	Okay		Comment resolved.
180	DOI-56	Section 4.4		U.S. Department of the Interior	The 5-year reviews are the responsibilities of the agencies (DTSC and DOI). The purpose of the outline of the 5-year review is unclear. It is suggested that PG&E anticipate their deliverables/activities needed to support the review and provide a listing for agency review/acceptance. PG&E should include a summary of anticipated deliverables including data evaluations, plume maps, progress reports, etc. Activities should include an evaluation of changes since remedy implementation or the previous review such as assumptions regarding remedy byproducts, costs, land use, and plume characteristics.	The purpose of including the content of the Five-Year Review in Section 4.4 is to communicate the types of information to be included in the review. If requested, the outline of the Five-Year Review will be removed from Section 4.4. The anticipated key deliverables are included in Sections 4.2 through 4.7. The items noted in the comment will be covered in the performance monitoring reports submitted to DTSC and DOI during remedy operations. The specific content of the performance monitoring reports will be presented in the O&M Plan.	DTSC concurs that the language regarding five year review is only to outline future process and type of documents for the review. DTSC recommends retaining the five year review language.	DOI concurs with the response.	Comment resolved.
181	HA-33	p. 4-10 (Key Documents During the Construction Phase)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	Will there be a document governing construction management? For example, will there be a plan or guidance that outlines best management practices (BMPs) during the construction phase or at least points to existing plant BMPs that have been developed previously at Topock? Will the Tribe be allowed to participate in the selection of construction management and construction contractors to ensure that tribal cultural values are understood by those personnel?	The Construction/Remedial Action Work Plan includes, amongst others, information on management during construction. Table 4-5 lists the key elements for this Work Plan (note that this Work Plan will be subject to Tribal Consultation). In addition, Table 4-5 provides a listing of submittals to be submitted concurrently with or included in the Construction/Remedial Action Work Plan. One of those documents includes BMP plans and monitoring reporting. The 2009 model CD requires the Remedial Action Work Plan to include the method for selecting contractors (see Table 4-2). Inputs from Interested Tribes are encouraged on this aspect to ensure that Tribal cultural values are understood. As mentioned in response to Comment #175 HA-31, PG&E acknowledges the Tribes' contribution to the sensitivity training/education provided at project initiation meetings to project	Okay	Comment noted. DOI and BLM anticipate further consultation with the Tribes regarding the Remedial Action Work Plan.	Comment noted.

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						workers/contractors available to participate.			
182	DTSC-83	Page 4-11, Section 4.4, last paragraph, Section 4.5 and 4.6.	"… closure of infrastructure determined unnecessary for future operations, and/or partial closure…"	California Department of Toxic Substances Control	Please refrain from use of closure, partial closure and post closure language due to RCRA regulatory implications of these terminologies.	The sentence in the last paragraph of Section 4.4 will be changed to read (inserted verbiage shown in underline typeface): "…~~closure~~ decommissioning of infrastructure determined unnecessary for future operations, and/or partial ~~closure~~ shut-down of systems where those portions of the plume attain RAOs earlier…" The title of Section 4.5 will be changed to: "Key Documents ~~During Closure~~ Following Attainment of RAOs" References to the Closure Plan in Section 4.5 will be changed to Decommissioning Plan." The title of Section 4.6 will be changed to: "Key Documents During Post-Remediation" Section 4.6 text will be changed to: "Following agencies' approval of the Corrective Measure/Remedial Action Completion Report, PG&E will perform post-~~closure~~ remediation monitoring. Post-~~closure~~ remediation monitoring reports will be prepared to document the continued effectiveness achieved by the remedy"	Okay		Comment resolved.
183	HA-34	p. 4-11 (Key Documents During Operations)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The last paragraph of this section addresses potential changes to the remedy. The possibility of construction of new infrastructure is mentioned. Such contingencies are of particular interest to the Tribe, and consultation is appropriate, should such issues arise. The Tribe would also like to be involved in any technical assessments that might occur.	The cited text refers to the possibility of new infrastructure as a result of five year reviews. The five year reviews will be conducted by DOI and DTSC. PG&E defers to BLM/DOI on consultation.	Okay	New construction resulting from changes in the remedy and needing approval by the DOI will adhere to NHPA Section 106 requirements for consultation.	Comment noted.
184	HA-35	p. 4-12 (Key Documents During Closure)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	Chapter 5.0 discusses IM Termination, but there is no mention of the documentation in Chapter 4.0.	Documents related to the decommissioning and closure of IM facilities are mentioned in Section 4.2.1 (first item) and Table 4-3. Specifically, the "Plan for decommissioning and removal of IM No. 3 facility and site restoration" is listed under Key Documents Required by the EIR Mitigation Measures (first bullet). Footnote #1 of Table 4-3 also mentions that a closure report will be submitted after completion of the IM decommissioning and site restoration.	Okay	Noted.	Comment resolved.
185	Hualapai-6	Section 4.5, page 4-12		Hualapai Department of Cultural Resources	A decommissioning plan for wells and construction features is needed early on in the design process. From page 4-12, "a closure plan will be prepared for the agencies' review and approval following remedial action completion." This indicates that the decommissioning plan will not be written until 30	Please note that from a schedule standpoint, once the remedy is determined to be complete (cleanup goals and RAOs are achieved), the active operation will cease. However, monitoring will continue for an estimated 10 years (2009 CMS/FS) to	DTSC is in favor of developing a decommissioning plan as part of the design documentation; however, such plan will likely not include many of the specific activities as the remediation	Comment noted. DOI/ BLM will continue to work with the Tribes in the development of the CHPMP to	Comment noted.

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					years or more into the future. Decommissioning and site closure need to be addressed before remediation begins.	document the continued effectiveness achieved by the remedy. After this long-term monitoring period is complete, remedial infrastructure will be decommissioned. The CIMP will include the development of protocols for restoration of the environment upon decommissioning of groundwater remedy facilities. The CIMP will be submitted as part of the final design for consultation, review, and comment. No changes to the Work Plan are proposed as a result of this comment.	system will likely be modified over time.	resolve concerns regarding site restoration.	
186	HA-36	p. 4-13 (Protocols for Review of Future Submittals of Cultural Resources and Design Documents)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The Tribe agrees with the last sentence under Item 3, which states that "... comment resolution meetings are more efficient [effective] than the traditional comment response process." However, this section should not be read that PG&E is limited to doing only that which it has been directed by DTSC or DOI to do: PG&E may have obligations to or voluntarily or by agreement with the Tribe, do more than that directed by the agencies relative to tribal concerns and issues.	The text on page 4-13 states the anticipated protocol for review of future submittals of cultural resources and design documents. PG&E have and will continue to adhere to the requirements of its settlement agreement with the FMIT. No changes to the Work Plan are proposed as a result of this comment.	Noted	Noted.	Comment noted.
Section 5 Comments – IM Termination/Coordination with Groundwater Remedy Implementation									
187	DTSC-84	Page 5-1, Section 5.0, bullet	"Ensure that the geographic location of the target remediation area does not permanently expand following completion of the remedial action."	California Department of Toxic Substances Control	The Work Plan should note (in another section) that expanding the plume boundary at any time during remedy implementation will be avoided if possible.	Section 2.1.2 provides the purpose and design goals of the inner recirculation loop and Section 2.1.3 provides the purpose and design goals of the freshwater injection wells. Both of these systems will be designed and operated to control the flow of groundwater and flush the chromium plume towards and through the IRZ line. Because not expanding the plume boundary is inherent in successful operation of these systems, the Work Plan may not require additional revision. However, if requested, the following changes may be made: The following sentence may be added at the end of the first paragraph Section 2.1.2: "An operational goal of the inner recirculation loop will be to control movement of the chromium plume through the IRZ and as a result avoid temporary expansion of the plume boundary. Outside the perimeter of the plume, water quality monitoring will be implemented to ensure that the target remediation area is not expanding and that in-situ byproducts are being adequately controlled" The following sentence may be added at the end of the first paragraph in Section 2.1.3: "An operational goal of the freshwater injection system will be to flush the chromium	DTSC agrees with the proposed language and recommends that they be included in the work plan.		Comment resolved.

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						plume through the IRZ and as a result avoid temporary expansion of the plume boundary. Outside the perimeter of the plume, water quality monitoring will be implemented to ensure that the target remediation area is not expanding and that in-situ byproducts are being adequately controlled"			
188	DTSC-85	Page 5-1, Section 5.0, last paragraph	"The goals of the IM are different from the RAOs because the RAOs were developed based on the conclusions of the RFI/RI, risk assessment, and ARARs identification, which were not complete at the time the IM objectives were defined in 2004."	California Department of Toxic Substances Control	The comparison of the intent and goal of the IM from final remedy is irrelevant. PG&E is correct that the purpose of the IM was to stabilize the hexavalent chromium plume and to keep it away from the Colorado River while the final remedy can be properly evaluated and selected.	The side-by-side comparison of the objectives of the IM versus the objectives of the Final Remedy and the reasons for the difference in objectives is background information for some stakeholders and provides context for the remaining discussion in Section 5. No change to the Work Plan is proposed in response to this comment.	Response noted.		Comment resolved.
189	DTSC-86	Page 5-4, Section 5.2, Example 2	"During this period of IRZ construction, which will likely extend over many months, it may not be possible to continuously maintain the required gradient control metrics in all of the IM well pairs. There would still be landward gradients across most of the floodplain, but injection or extraction in the IRZ recirculation wells may affect water levels in one or more of the designated gradient measurement well pairs."	California Department of Toxic Substances Control	DTSC agrees with PG&E that the IM metric will likely be incompatible to the final remedy. Given that understanding, how can PG&E ensure that there would still be landward gradient when "significant quantity" of water with amendment will be injected along National Trails Highway? This statement may not be true without proper groundwater modeling and monitoring.	The referenced Example 2 on page 5-4 was one example intended to illustrate that achieving the IM metrics may not be possible during the construction and start-up of the groundwater remedy. To clarify, the 2nd paragraph in Section 5.2 will be revised to read: "There are several ways in which the current IM metrics or the operation of the IM wells or treatment plant may be incompatible with the construction and start-up of the groundwater remedy. Examples of those incompatibilities, <u>which will be addressed during planning for the transition between the IM and groundwater remedy</u>, include:" In addition, the last sentence of Example 2 will be modified to delete the words "There would still be landward gradients across most of the floodplain, but…" The transition strategy will be presented in the Construction/ Remedial Action Work Plan and the O&M Plan to be submitted concurrently with the remedial design submittals.	Okay		Comment resolved.

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190	DTSC-87	Page 5-5, Section 5.2, Example 5	"Once carbon has been distributed along the IRZ, it will be necessary to allow some time for the microbes to digest the carbon and create the geochemical reducing conditions needed to remove the chromium. During this time, it is desirable to have a minimal flow of groundwater across the IRZ so that the carbon substrate remains in the target treatment zone rather than being pulled away downgradient. The period of time required for complete development of the IRZ following carbon injection may be weeks to months. During this time, pumping from TW-3D would adversely affect the development of the IRZ by pulling un-amended water through the target treatment zone, particularly in the center portion of the IRZ line. This could result in incomplete distribution of carbon, and therefore only partial treatment, in the central portion of the IRZ, where some of the highest concentrations of Cr(VI) are found in groundwater."	California Department of Toxic Substances Control	DTSC agrees with PG&E's assessment that the operation of the remedial system will require careful planning in a stepwise fashion. Since PG&E agrees in Section 5.3 that a detailed implementation plan with several discrete steps for the remedial system startup is necessary. PG&E should lay out the performance goals for each step that must be achieved prior to the start up of the subsequent step. PG&E must also consider the flow path of the byproducts as a result of the geochemical changes and provide an equally robust monitoring plan to ensure protection of the river water as well as control of the plume hydraulics during startup. DTSC advises PG&E to provide these procedures in concepts for review as soon as possible and should be considered in the preliminary design phase.	PG&E will provide the requested procedures in the Basis of Design Report, part of the preliminary (30%) design and subsequent design submittals. No change to the Work Plan is proposed in response to this comment.	Okay, DTSC will evaluate the procedures in future design submittals.		Comment resolved.
191	DTSC-88	Page 5-5, Section 5.2, Example 6	"The IM treatment process is not designed to remove carbon compounds in the extracted water. Carbon compounds in the IM water could increase fouling of the IM extraction and injection wells, potentially reducing the effectiveness and capacity of the IM	California Department of Toxic Substances Control	DTSC does not disagree with PG&E's assessment that fouling is a real possibility. However, if PG&E is correct in assuming that the carbon compounds in the extracted water can increase fouling of the extraction and injection wells, please discuss what steps PG&E will take to eliminate this issue when the entire premise of the selected remedy is to use carbon amendment, extraction and injection wells to effectively remove soluble mass of hexavalent chromium in the groundwater. Please note that PG&E's recommended remedy included extraction by the river's edge which may contain carbon amendment and then injection of amended water to	In response to this comment, the fourth sentence in the 6th example will be revised to state (inserted verbiage shown in <u>underlined typeface</u>): "Carbon compounds in the IM water could increase fouling of the IM extraction and injection wells, potentially reducing the effectiveness and capacity of the IM system <u>and requiring increased maintenance.</u>" Maintenance of the IRZ wells, extraction wells, and injection wells is anticipated for the groundwater remedy, and proposed	DTSC is concerned that the extent of "increased maintenance" and/or necessary maintenance would reduce the scoring of effectiveness and implementability factors considered during the CMS/FS evaluation. DTSC may have to further evaluate the remedy decision prior to final construction/ RA work plan approval.		Comment noted. All alternatives (except alternative A) will include maintenance of wells. Even Alternative B will include well maintenance, fewer wells but longer time period.

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			system."		the west of the plume.	procedures for maintenance will be provided in the O&M Plan to be included with the design submittals.			
192	MWD-6	Pages 5-3 to 5-6: Section 5.2 and 5.3		Metropolitan Water District of Southern California	This section discusses the transition from the Interim Measures to the Groundwater Remedy. Currently the WP does not include specific criteria for evaluating the protection of the Colorado River water during the transitioning from the IM to the final groundwater remedy. Specific criteria must be delineated during the remedial design process.	An implementation strategy will be further developed for transition from the IM to the final remedy as discussed in Section 5.3. The implementation strategy will be developed and presented in the Basis of Design report (part of the design submittals), and again in the Corrective Measure Construction/ Remedial Action Work Plan as well as the O&M Plan. Please also see response to Comment #189 DTSC-86. No change to the work plan is proposed in response to this comment.	DTSC will review the implementation strategy when submitted.	Concur.	Comment noted.
193	HA-37	p. 5-4 & 5-5 (Considerations for Transitioning from the IM to the Final Groundwater Remedy)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The transition from the IM to the final remedy is to be performed in a stepwise manner. This section outlines some of the possible outcomes during this transition, but under Item 6, discusses the possible necessity of modifications to the existing IM3 treatment plant involving construction. This relates to the contingency that PG&E would be required to operate the IM during remedy startup, while at the same time meeting current discharge requirements. The Tribe regards this as an unnecessary contingency, and the imposition of such a requirement would be inappropriate on the part of the agencies and has not been subject to environmental review, as discussed above. Operating the IM during startup so as to create the type of interfering conditions described in this section does not make sense. As the Tribe has urged at multiple times in the past, discussion regarding this transition and the decommissioning of IM3 needs to be initiated as soon as possible. Additionally, the last paragraph in this section suggests that certain infrastructure components of the IM3, such as wells and pipelines, may be incorporated into the final remedy design. However, no process for that consideration is identified. The details of such possibilities, particularly if infrastructure related to the IM3 treatment plant and other facilities on the Tribe's property are involved, need to be identified. As the Tribe has previously commented, use of IM3 facilities during the Final Remedy has not been adequately reviewed under CEQA or in a manner consistent with the settlement agreements from the earlier litigation.	The IM3 treatment plant is not included as part of the final remedy. Once the final remedy is in place and determined to be operating properly and successfully by DTSC and DOI, the IM3 facilities will be decommissioned in accordance with EIR requirements, the Programmatic Agreement, PG&E's Settlement Agreement with the Fort Mojave Indian Tribe, and a subsequent Decommissioning Plan to be submitted with the CIMP during the final remedial design. Consistent with these requirements, it is anticipated that various portions of the IM facilities, other than the treatment plant, may continue to be used as part of the final groundwater remedy. Such use is anticipated both in PG&E's Settlement Agreement with the Fort Mojave Indian Tribe and in the EIR. Section 2(a) of the Settlement Agreement notes that PG&E provided to the Tribe, in 2006, materials indicating the remedial facilities on the IM3 site that may continue in use after removal of the IM3 treatment plant. That section provides that such facilities (other than the treatment plant) may be used as part of the remedy. The EIR also indicates that facilities on the IM3 site (other than the treatment plant) may be incorporated into the final remedy.	Criteria for determining that the remedy is operating properly and successfully have not yet been defined. The FMIT will be invited to review and provide comments on the IM3 decommissioning and restoration plan, which will be part of the CIMP as required in the Mitigation Measure and Reporting Program CUL-1a-9.	It is recognized that the IM 3 treatment facility will need to remain operational until it is determined that the remedy is functioning properly and operating as designed. Specific criteria have not been established at this time. DOI/BLM will provide an opportunity for consultation during the review of the Remedial Action Work Plan and the IM3 Decommissioning Plan.	Comment noted.

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194	HA-38	p. 5-5 & 5-6 (Decision Process for Transition to Groundwater Remedy Operation)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	This section refers to a process of developing appropriate scenarios for the remedy transition. Please clarify the *type* of "consequences" that will be developed - are these environmental, engineering, cost, etc. PG&E proposes to complete the evaluation before "consult[ing] with stakeholders." PG&E should consult with affected stakeholders *prior to initiating* this process, because such consultation will provide important input on stakeholder requirements and preferences that must shape the evaluation. Moreover, PG&E must consult with it to ensure compliance with the terms of its settlement agreement with the Tribe.	The potential consequences that may flow from each transition scenario may include those related to environmental, engineering, cost, etc. PG&E intends to consult with stakeholders prior to final identification and selection of the best transition option between IM-3 operations and the final groundwater remedy. PG&E will continue to comply with the terms of its settlement agreement with the FMIT. To clarify PG&E's intent, the text of the CMI/RD on page 5-6 will be revised as follows: "~~Once this evaluation is complete~~, PG&E will consult with stakeholders regarding the best transition option that provides continued safeguards for the floodplain and Colorado River while ensuring the integrity of the construction and operation of the groundwater remedy."			Comment noted.
195	DTSC-89	Page 5-6, Section 5.4	"Other IM monitoring programs (e.g., PMP, CMP) will be terminated when the agencies determine that the IM, and therefore the IM monitoring programs, is no longer required; similarly, existing contingency plans for the injection well field area, the floodplain area and the Colorado River initiated during the IM will be terminated and replaced by contingency plans appropriate for the groundwater remedy."	California Department of Toxic Substances Control	Similar to PG&E's discussion on transitioning between IM and final remedy, DTSC will likely require PG&E to "transition" the monitoring program from IM to final remedy compliance monitoring. Although this concept is appropriate, agencies must review and concur with PG&E's concepts on the final remedy monitoring program before such transition can happen. Please note, as stated above, the monitoring program will likely be tailored to each phase of the project implementation plan since the monitoring needs will likely change with the changing geochemistry.	Comment noted. PG&E will submit monitoring plans for agency review and approval. No change to the Work Plan is proposed in response to this comment.	DTSC will evaluate the monitoring program when it becomes available.		Comment resolved.
196	DTSC-90	Page 5-6, Section 5.5	"…IM infrastructure that are not incorporated into the groundwater remedy are expected to be decommissioned following determination by DOI and DTSC that the facilities are not needed to meet the RAOs."	California Department of Toxic Substances Control	Please note that in conformance with the remedy decision documents, the determination that the IM treatment plan can be decommissioned will be tied to the finding that the remedy is operating properly and successfully, not if the IM facilities are needed to meet RAOs for the final remedy. The cited text should be revised.	The sentence has been revised to (inserted verbiage shown in <u>underline</u> typeface): "…IM infrastructure that are not incorporated into the groundwater remedy are expected to be decommissioned following determination by DOI and DTSC that the ~~facilities are not needed to meet the RAOs~~ <u>groundwater remedy is operating properly and successfully</u>."	Okay		Comment resolved.
197	HA-39	p. 5-6 (IM Decommissioning and Restoration)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	Again, this section starts with the false premise that "[t]he treatment plant and other IM infrastructure that are not incorporated into the groundwater remedy are expected to be decommissioned *following determination by DOI and DTSC that the facilities*	Please see response to Comment 196 DTSC-90. The timing referred to in Table 4-4 came from the EIR MMRP, which includes both the	FMIT's comment is noted. DTSC has communicated on several occasions to the Tribe that the IM3 facility will be decommissioned when the	Noted.	Comment noted.

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					are not needed to meet the RAOs." (Italics added.) The treatment plant and other IM infrastructure are supported only to the extent an emergency exists: These facilities cannot lawfully continue in existence and operation based upon a simple, undefined determination of "need." Operation of those facilities must cease when the need for them as a "specific action to prevent or mitigate an emergency" ceases. Furthermore, any continuation of the IM facilities would have to be in compliance with the settlement agreements between the Tribe, DTSC and PG&E. Additionally, this section refers to a decommissioning plan pursuant to mitigation measure CUL-1a-8f. Table 4-4 indicates that the timing of this plan is *"During the design, construction, O&M, and decommissioning phases."* Is this actually meant to apply such an extremely long and vague timeframe to this plan preparation? In past reviews, the Tribe has expressed a preference for initiating the planning of IM3 decommissioning in a much earlier timeframe, even prior to construction. DOI has agreed. Based on the information presented in this Work Plan, there may be operational uncertainties and requirements that could, at least in part, prevent finalization of such a decommissioning plan in this timeframe. These uncertainties, however, should not preclude discussions involving Tribal input and initial drafting of a decommissioning and restoration plan, even if the actual scheduling of the implementation of that plan has not been determined. This section also indicates that the *"... decommissioning plan will be prepared as described in Chapter 4 ...."* However, there does not appear to be a description of that particular document anywhere in Chapter 4. The purpose and meaning of the final sentence, which refers to the "decommissioning plan [being] consistent with other requirements such as the basis for the closure cost estimate," is unclear. First, those "other requirements" should be identified. Second, as to the cost closure estimate (and the written closure plan) required by the Conditional Authorization, that requirement should not be a limitation on the decommissioning plan: To the extent there is any inconsistency with the cost closure estimate (or the written closure plan), that estimate (or plan) must be updated to be consistent with the decommissioning plan, not vice versa.	preparation *and implementation* of the decommissioning plan. The decommissioning plan will be prepared during the remedial design. As discussed in Section 4.2.1, the decommissioning plan will be an appendix to the Cultural Impact Mitigation Program (CIMP). As noted in Table 4-3 the CIMP (including the decommissioning plan) will be submitted with the Final Remedial Design. For clarification, the last sentence of the first paragraph in Section 5.5 will be revised to read (inserted verbiage shown in <u>underline</u> typeface): "The decommissioning plan will ~~also be consistent with other requirements such as~~ <u>form</u> the basis for the closure cost estimate that is submitted to the Certified Unified Program Agency every year as part of the Conditional Authorization renewal."	selected remedy has been demonstrated to be operating properly and successfully. DTSC, however, does not object to an early preparation of the IM3 decommissioning plan. Nevertheless, DTSC does expect a decommissioning plan to be submitted as part of the CIMP and incorporated into the Final Remedy Design at the latest,		
198	DTSC-91	Page 5-7, Second Paragraph	"This effort will involve reviewing equipment use and historical spills or leaks to identify potential waste disposal or	California Department of Toxic Substances Control	Please be reminded that DTSC had communicated with PG&E that all facilities used for interim measures are to be considered SWMUs under Corrective Action and are subject to proper evaluation under RCRA standards. Soil sampling beneath and around the IM3 treatment plant will is	The following sentence will be added to the paragraph: "Soil sampling will be conducted beneath and around the IM No. 3 treatment plant."	Okay.		Comment resolved.

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			salvage options."		required in addition to concrete wipe and chip sampling for confirmation. Soil sampling should be included in the proposed decommissioning plan.				
198a	DTSC-91a	Page 5-7, Second Paragraph, first sentence	"The decommissioning of the treatment plant will generate solid and liquid waste."	California Department of Toxic Substances Control	DTSC recommends the following changes to the first sentence of the paragraph. "The decommissioning of the treatment plant will be subject to full characterization for potential contamination under RCRA and will likely generate solid and liquid waste."	PG&E suggests the reference text be revised to read: "The decommissioning of the treatment plant will likely generate solid and liquid waste that will be managed in compliance with RCRA". Please note that the IM3 treatment plant currently operates under Conditional Authorization Approval issued by the CUPA. The closure requirements for conditionally authorized facilities like IM3 are specified in Section 25200.3(g) of the California Health and Safety Code. The topic of classifying IM3 treatment plant as an area of concern (AOC) under RCRA is being discussed as part of the Soil RFI/RI Work Plan. Results from the Soil RFI/RI will be reported in the forthcoming Volume 3 of the RFI/RI report. If helpful, the above information can be added to Section 5.5 for context.			
199	DTSC-92	Page 5-7, Second or Third Paragraph		California Department of Toxic Substances Control	Text should be revised to acknowledge the potential for soil waste to be generated and require disposal/treatment.	The text of the second paragraph will be modified as follows (inserted verbiage shown in underline typeface): "…. If the concrete foundation and/or soil are found to be contaminated, it will be managed and disposed of in accordance with applicable regulations."	Okay		Comment resolved.
200	HA-40	p. 5-6 & 5-7 (IM No. 3 Treatment Plant Decommissioning)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The first sentence states that "No *aboveground* component of the existing IM infrastructure that is located within the footprint of the existing treatment plant building will be re-used (in its current location) as part of the groundwater remedy." (Emphasis added.) Does this imply that there may be below-ground infrastructure left in place? Later in this section, it is stated that "*If* foundation material beneath the plant is to be removed, fill or other appropriate materials will *likely* be placed over the area ..." (Emphasis added.) Again, the Tribe needs to be consulted, as it may not want any part of the construction left in place, especially on its property. Moreover, the emplacement of fill materials needs to be approved by the Tribe as importation of fill could pose additional cultural impacts to the Tribe.	The IM No. 3 treatment plant is not included as part of the final remedy. Once the final remedy is in place and determined to be operating properly and successfully by DTSC and DOI, the IM No. 3 facilities will be decommissioned in accordance with EIR requirements, the Programmatic Agreement, PG&E's Settlement Agreement with the Fort Mojave Indian Tribe, and a subsequent Decommissioning Plan to be submitted with the CIMP during the final remedial design. Consistent with these requirements, it is anticipated that various portions of the remedial facilities, other than the treatment plant, may continue to be used as part of the final groundwater remedy. The Tribe will be consulted regarding the infrastructure and decommissioning activities on the Tribe's property. No change to the Work Plan is proposed in response to this comment.	Okay.	DOI/BLM will provide an opportunity for consultation during the review of the Remedial Action Work Plan and the IM3 Decommissioning Plan.	Comment noted.
201	DTSC-93	Page 5-7, Section	"The two IM injection	California	Wells decommissioned will also need to follow an	Please see responses to Comments #170	Okay		Comment resolved.

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		5.5.2	wells (IW-02 and IW-03) and four extraction wells (PE-1, TW-2D, TW-2S, and TW-3D) will be decommissioned using procedures required by San Bernardino County and the California Department of Water Resources."	Department of Toxic Substances Control	approved decommissioning plan. The Work Plan should indicate if the wells cited are currently planned to be reused in the remedy.	HA-27 and #193 HA-37. There are currently no specific proposals as to whether the existing extraction and injection wells will or will not be used in the remedy; this will be determined in the design and included in the decommissioning plan. No change to the Work Plan is proposed in response to this comment.			
202	DTSC-94	Page 5-7, Section 5.5.2	"Demolition of brine storage and loading facilities on the MW-20 bench will involve procedures similar to tank demolition at the treatment plant building. Pipelines will be decontaminated as appropriate."	California Department of Toxic Substances Control	Similar to the IM3 treatment plant, DTSC considers the MW-20 bench to be a RCRA SWMU under corrective action and should be investigated due to past spills. In addition, since PG&E is contemplating the reuse of the MW-20 bench for the final remedy, proper sampling and protection of onsite workers should be considered during final remedy construction activities.	Details of the soil sampling in regard to the decommissioning of the IM facilities will be included in the future decommissioning plan. Worker protection will be addressed in the forthcoming Health and Safety Plan. The following sentence will be added to Section 5.5.2: "Soil sampling will be performed in the vicinity of IM facilities during decommissioning as appropriate based on the potential for release of hazardous materials." Please note that in February 2009, five confirmation soil samples were collected following the deconstruction of the IM2 Batch Treatment Facility, located on the MW-20 Bench. The purpose for this confirmation sampling was to verify that no releases occurred from the facility. Samples were analyzed for total chromium; the results ranged from 10 to 18 mg/kg. The June 2009 Closure report was submitted to San Bernardino County Fire Department with a copy to DTSC and BLM.	Okay		Comment resolved.
203	DTSC-95	Page 5-7, Section 5.5.2	"Subsurface pipelines from the extraction wells to the treatment plant will likely be abandoned in place following decontamination unless the regulatory agencies or landowner requires removal."	California Department of Toxic Substances Control	Soil samples from below potential or known pipeline leaks are requested and should be planned in the revised Work Plan.	Comment noted. The details of the soil sampling in regard to the decommissioning of the IM facilities will be included in the future decommissioning plan. The following sentence will be added to Section 5.5.2: "Soil sampling will be performed in the vicinity of IM facilities during decommissioning as appropriate based on the potential for release of hazardous materials."	Okay		Comment resolved.
204	HA-41	p. 5-8 (IM Restoration)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	Again, this section requires solicitation of early input from the Tribe, and there does not appear to be a description of a document addressing such restoration anywhere in Chapter 4. Furthermore, several years ago DTSC ordered PG&E to restore an area used (without authorization) for parking adjacent to the IM3 treatment facility, and that restoration has yet to occur. When will that restoration plan be developed and the restoration take place? Based upon this, and other, experience, restoration plans need to be developed and approved with clear requirements as to when	As described in the last sentence of Section 5.5.3, PG&E will prepare a plan for decommissioning, removal, and restoration of the IM-3 facility as part of the design documents for the groundwater remedy, as describe in Chapter 4. As requested, PG&E will solicit early input from the Tribe, because PG&E agrees that is an important element of an effective plan. In addition, s requested in the past, PG&E will need to get additional Tribe input for next steps for this work on Tribe land. PG&E agrees with the last	It is DTSC's understanding that PG&E had discussed the restoration of that property with the Tribe, but agreement has not been reached. DTSC will review the restoration plan when it becomes available.	DOI/BLM will provide an opportunity for consultation during the review of the Remedial Action Work Plan and the IM 3 Decommissioning Plan.	Comment resolved.

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					restoration will occur.	comment that "restoration plans need to be developed and approved with clear requirements as to when restoration will occur."			
Section 6 Comments – Planned Short-Term Activities to Support Remedial Design									
205	DTSC-96	Page 6-1 to 6-4, Section 6		California Department of Toxic Substances Control	PG&E should submit a proposed schedule for the activities included in the chapter. Furthermore, PG&E should specify what level of stakeholder and agency involvement is anticipated with these activities.	Table 6-1 was revised to reflect this comment. The anticipated level of stakeholder and agency involvements included in this table is for PG&E's own planning purpose only, and is not intended as a requirement for involvement/interaction.	Okay, but note that Table 6-1 included activities such as plant surveys where the tribes were invited, but not specified in stakeholder involvement column		Comment resolved. Table 6-1 was updated to reflect the Tribes invited to the August 2011 plant survey and the Tribes who participated in activities related to the August 2011 plant survey.
206	HA-42	p. 6-1 (Plan for Data Collection in 2011)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	It seems that archaeological surveys are not included in this list. Recognizing that general surveys have been performed across the APE, the Tribe emphasizes that findings for a particular area are not necessarily static. Surveys where specific intrusive activities are about to take place may need to be re-performed and with qualified Native American Monitors. Also, see Comment 5, above, pointing out the APE in the CMI/RD is larger than the APE in the FEIR. Any such expansion is inappropriate without surveys, tribal consultation and following the formal amendment process laid out in the PA, Section B "Revising the APE".	EIR Mitigation Measure CUL-1b/c-2 requires that PG&E prepare, during the preparation of the final design, a cultural resources study that assesses the potential for the construction, operations, or decommissioning of specific proposed improvements to result in significant impacts on identified historically significant resources. This may include a geoarchaeological investigation and/or non-destructive remote-sensing surveys of potentially disturbed areas to determine if a potential exists for buried historical and archaeological resources. Since the final design is a mid to late 2012 activity, the cultural resources study is not included in the Plan for Data Collection in 2011/early 2012. As a matter of protocol, areas of proposed ground disturbance are reexamined for archaeological and historical resources during the planning phase and again immediately prior to the work. Tribal monitors are invited to participate in these field efforts. Regarding the APE, please refer to the response to Comment #33 HA-6. No changes to the Work Plan are proposed as a result of this comment.	Okay.	Okay.	Comment noted.
207	DTSC-97	Groundwater Model Updates, Pages 6-2 to 6-4		California Department of Toxic Substances Control	What type of model calibration will be associated with the changes proposed for the groundwater flow models?	See response to Comment #211 DOI-61 for information related to calibration of the fate and transport solute transport model. For the groundwater flow model, no recalibration was performed on the California side of the river, since the original calibration matched observed data in areas where no current model adjustments were made. In the area east of the Colorado River, existing model parameters produced reasonable	Will evaluate as information is submitted for 30% design		Comment resolved.

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						matches to observed drawdown data from the HNWR-1 test, so no adjustments in parameter values were necessary.			
208	Hualapai-4	Section 2.1.1, and Section 6.3.2		Hualapai Department of Cultural Resources	In order to conduct geochemical and solute transport modeling, the solid phase minerals of the aquifer need to be defined. X-ray diffraction and scanning electron microscopy (SEM) could be done to define the solid-phase mineral suites on aquifer precipitates, and the results correlated to geochemical modeling. Sequential extractions could be done to determine, for example, whether adsorbed arsenic occurs as arsenate or arsenite.	Topock aquifer soil has been characterized through the use of geochemical and mineralogical methods. These data have provided the identity of the chemical form of iron and manganese in the aquifer soil. This information is being used to assist in providing relevant information for the geochemical model of byproducts. This information can be included in the 30% design.	Will evaluate as information is submitted for 30% design	DOI will further evaluate the information to be provided in the 30% design.	Comment resolved.
209	DOI-60	Section 6.3.2, page 6-4		U.S. Department of the Interior	Please explain this step in more detail. Specifically, what floodplain geochemical data set is being referred to here? Please comment on the calibration step and discuss the general calibration acceptance process (e.g., will calibration criterion be established).	The floodplain geochemical data set from the floodplain in situ pilot test will be used in the geochemical evaluation of byproducts. The geochemical evaluation will use this data set in order to correlate byproduct concentration with TOC concentration. Calibration criteria will not be established but rather the data set will be used to assure that the model can simulate the field data. No changes to the Work Plan are proposed as a result of this comment. Modeling details will be provided in the preliminary design submittal.	DTSC will evaluate preliminary design when available.	The concept of not establishing calibration criteria, but somehow assuring that the model can simulate field data is not clear. In the next preliminary design document, DOI expects to see a more detailed explanation of the geochemical modeling approach, including definition of specific calibration targets and criteria by which the model will be judged to be a reliable tool for assessing the likely geochemical changes resulting from the remedy.	Pending review of forthcoming design documents.

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210	DTSC-98	6.3.2 Geochemical Evaluation	"The input parameters will be developed from the in-situ pilot test data set collected in the floodplain." "The geochemical model will be calibrated against the existing floodplain data set."	California Department of Toxic Substances Control	Modeling of amended injection wells will occur exclusively in the upland, oxidizing portion of the aquifer. How will the model for the upland area be calibrated?	The geochemical evaluation that serves as the basis for the fate and transport model will be focused within and downgradient of the IRZ. Byproducts are generated in this zone; fate and transport evaluation of byproducts in the injected water in the Uplands will account for those geochemical processes that occur in the oxidizing portion of the aquifer. These specifically include sorption of byproducts to aquifer minerals, and oxidation reactions. The Upland pilot test results provides data for the reaction between byproducts and toxic aquifer soils; these data, along with published thermodynamic constants and reaction kinetic data, will serve as the basis for the model and will assist in model calibration. No changes to the Work Plan are proposed as a result of this comment. Modeling details will be provided in the preliminary design submittal.	Will evaluate when submitted with design		Comment resolved.
211	DOI-61	Section 6.3.3, page 6-4		U.S. Department of the Interior	Please explain this step in more detail. Specifically, what data will be used in the model? Please discuss the general calibration acceptance processes (e.g., will calibration criterion be established).	The fate and transport evaluation utilizes data for groundwater flow (transport parameters) as well as TOC fate (based upon half-life data for TOC) chromium fate (rate of treatment in the presence of TOC) and byproduct fate (based upon the concentration of byproducts and geochemical reactions that affect byproduct concentrations). Data for geochemical reactions are based upon soil aquifer characterization (e.g., concentration and identity of iron minerals in the aquifer soil that can sorb byproducts) as well as groundwater characterization data before, during, and after operation of the floodplain pilot test. The floodplain geochemical data set from the floodplain in situ pilot test will be used in the geochemical evaluation of byproducts. The geochemical evaluation will use this data set in order to correlate TOC concentration to byproduct concentration. Calibration criteria will not be established but rather the data set will be used to assure that the model can simulate the field data. No changes to the Work Plan are proposed as a result of this comment. Modeling details will be provided in the preliminary design submittal.	DTSC will review modeling data when available.	In the next preliminary design document, DOI expects to see a more detailed explanation of the fate and transport modeling approach, including definition of specific calibration targets and criteria by which the model will be judged to be a reliable tool for assessing the likely fate and transport of byproducts resulting from the remedy.	Comment noted.
212	MWD-7	Section 6.3.3: Fate and Transport Evaluation		Metropolitan Water District of Southern California	This section describes that "various in-situ remedial scenarios" will be developed and used to "provide detailed information to guide the engineering design task while serving as a platform to evaluate the effects of design decisions on the by-product	The following text will be added to Section 6.3.3 (after the 1st paragraph): "Various in-situ remedial scenarios will be evaluated with the groundwater flow and solute transport model in order to minimize infrastructure,	Okay	Noted.	Noted

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					footprint." This section should include some conceptual examples or the criteria base for the various in-situ remedial scenarios that will be developed for the purpose of engineering design.	shorten period of active remediation, manage transient byproducts, utilize available disturbed areas, and comply with ARAR and MMRP. Key optimizations for the modeling will include well flow rates (NTH IRZ wells, riverbank wells, freshwater injection wells, recirculated riverbank water injection wells, extraction wells located northeast of the Compressor Station, and East Ravine extraction), well locations (both horizontally and vertically), IRZ well spacing, and locations of extraction and injection wells within the IRZ. With respect to remediation, optimizations will be made to TOC concentrations, timing of TOC addition, frequency of TOC injections, with overall objectives of maximizing chromium treatment, shorting the period of active remediation, while minimizing site impacts and byproduct generation. The results of these various groundwater flow and solute transport modeling scenarios will be used as a tool to guide the engineering design task."			
213	HA-43	p. 6-2 through 6-4 (Groundwater Modeling)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The Tribe agrees with the proposal to update and refine the existing flow model and to create new models based on MODFLOW, MT3DMS, and PHREEQC, etc. Upon development these models should be exercised to refine the remedy design and for the purposes of performance evaluation. Will these activities be ongoing during the design phase as depicted on the Figure 4-1 timeline? As suggested earlier, It would be appropriate to initiate a series of meetings with the TWG to discuss the approach at the outset of this activity as well as to monitor progress and developments at key junctures.	Per Comment #205 DTSC-96, Table 6-1 was revised to include a more detailed schedule for activities (including modeling) proposed in Section 6 and anticipated stakeholders/ agencies involvement. Model updates throughout the design process are likely. Changes will be reported in each design submittal. PG&E defers to DTSC on TWG forum.	DTSC would like PG&E to be transparent regarding the development and use of the flow model on remedy and encourage the use of TWG forum for discussions. PG&E should notify DTSC of significant updates on the modeling work so that TWG meetings can be convened for discussion.	DOI anticipates further discussion at the TWG regarding the modeling. If, during the TWG, there is additional information that is identified that would assist in clarifying the text, it should be incorporated into the work plan.	Comment noted. A TWG meeting was held on September 1, 2011 to discuss the modeling approach to support the design and ongoing modeling efforts. A decision was made to hold frequent discussions on modeling details. The next modeling discussion will occur at the next TWG meeting on October 18, 2011. Timing of follow-up discussions will be determined by the TWG at the next meeting. No changes to the CMI/RD Work Plan are required.
Section 7 Comments – Project Organization and Management									
214	DOI-62	Section 7.0, General Comment		U.S. Department of the Interior	The opening statement leads one to believe that the importance of the development of a project management plan is driven only by an imposed	The opening statement recites the requirements prescribed in the CACA for this section in order to provide context for the	While Figure 4-1 is a good communication tool for high level process overview, it does not	DOI concurs with the response.	Comment noted.

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					requirement (the CACA). Managing a remedial design and remedial action of this scope will require consistent communication and coordination with multiple parties including contractors, the regulatory agencies and stakeholders. The information provided in this section should provide the sequencing and logic for each stage of the project through completion of the final design and initial implementation activities.	readers of this section, as the topic of Project Management can encompass a fairly wide array of subareas depending on the intent. PG&E understood the intent of this section as being to describe the organization structure/ line of communication of the PG&E Team and to discuss PG&E's approaches to manage the remedy implementation. PG&E agrees that this project, as a whole, has and will continue to require consistent communication and coordination with multiple parties including stakeholders, Tribes, regulatory agencies, contractors, etc. Numerous communication and coordination points and processes exist today on the project; some are regularly scheduled/formal meetings and some are more flexible in format to meet the objectives of the communication. Both DTSC and DOI have published public participation/ outreach plans that describe the mandated communication and outreach processes; these documents can be downloaded from the virtual document library on the project website: www.dtsc-topock.com. If requested, these documents can be included in appendices of this Work Plan. The sequencing and logic for each phase of the project are dictated by the RCRA/ CERCLA regulatory and stakeholders compliance processes and are best conveyed via the implementation schedule. Figure 4-1 of the work plan shows the current implementation schedule for the design and construction phases of the groundwater remedy. As stated in the introductory paragraph of Section 4.0, as work progresses, the implementation schedule will be updated, expanded, and incorporated into future submittals. The forthcoming design documents, the Construction/Remedial Action Work Plan and the O&M plan will all contain more detailed schedules.	contain sufficient details for concern parties to understand how each aspects of the project are tied into the next or what conclusion will be used to determine the subsequent steps. Although the various Tables in chapter 4 provided the details of the types of documents to be generated, it is too cumbersome to under a logic flow leading to design and approval. DTSC believe this is the reason for the majority of the comments received on the CMI/RD work plan. At present, DTSC does not have sufficient understanding of PG&E's remedial design to offer solution to this issue, Therefore, we will defer the discussion on project sequencing and decision logic until PG&E submits the project design basis report.		
215	DOI-63	Section 7.3 General		U.S. Department of the Interior	The Project Organization and Management section does not adequately address overall planning, scheduling, and control of the numerous components and dependencies associated with the project. Please describe in Section 7.3 how PG&E intends to manage the various institutional, technical, and construction aspects, many of which are likely to be interrelated by dependencies. PG&E should consider the possible benefits a work breakdown structure, network type planning and	See response to Comment #214 DOI-62. PG&E appreciates DOI's suggestion regarding the use of PERT/CPM. It is commonly used for planning, scheduling, and reporting on construction projects, and is supported by reputable software engines such as Microsoft Project, Primavera, etc. This topic has been identified as a key element in the forthcoming Construction/Remedial Action Work Plan	Since a "Rainbow Schedule" was never introduced into any official report, DTSC recommend either including a version of the schedule or removing this term and simply use Gantt Chart representation of the project schedule created in Microsoft Project. Also see response to comment	DOI concurs with the response.	Comment resolved.

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					scheduling system such as Program Evaluation and Review Technique of Critical Path Method (PERT/CPM) to aid in identifying and monitoring critical sequencing and dependencies. PERT/CPM methods are commonly used in construction project management.	(Table 4-5). The following bullet will be added at the end of Section 7.3.7: • Project controls/scheduling during construction – PG&E will continue to use the Rainbow Schedule (in Microsoft Project) as the overall Topock project schedule that covers both soil and groundwater. A construction schedule (including WBS) will be developed as part of the Construction/Remedial Action Work Plan; this schedule will be incorporated into the Rainbow Schedule to the extent needed for additional critical path analysis during construction. For reference, a version of the Rainbow Schedule is included in Appendix B. See response to Comment #214 DOI-62 on managing stakeholders' inputs/comments, response to comments, and comment resolution (institutional aspects).	#214.		

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216	DOI-64	Section 7.3		U.S. Department of the Interior	The Project Organization and Management Section does not address Project Risk Management. There are technical (e.g., discussed in Appendix G in the CMS/FS) and institutional uncertainties (e.g., Stakeholders inputs), and other uncertainties that can have adverse impacts on project success. PG&E should evaluate project risk and consider initiating a risk management activity that will be revisited as project definition increases (Exhibit 1-2). As project definition increases, multiple and cascading effects may emerge that place the project implementation in jeopardy. Please add discussion in Section 7 acknowledging Project Risk Management and the need to identify critical variables, their impacts, and how they will be addressed as the project definition increases.	Design assumptions/uncertainties as wells as ways to reduce uncertainties (if appropriate and available) will be discussed in the Basis of Design report, part of the design submittals. Contingency plans will be included in the O&M Plan and the Construction/Remedial Action Work Plan (see Table 4-5). These contingency plans will identify and discuss contingency actions to address potential failure modes during O&M and construction. Potential failure modes/risks to success can be related to: <u>Construction phase</u> • Changes to the design and/or specifications due to issues that may arise during construction • Unforeseen events that prevent the construction of the groundwater remedy (e.g., acts of God like earthquake, flooding, fires) <u>Operation and maintenance phase</u> • Attainment of RAOs and ARARs compliance • System breakdowns and operational problems • System not performing to design specifications • Unforeseen events that prevent the operation of the groundwater remedy (e.g., acts of God like earthquake, flooding, fires) Agencies and stakeholders' inputs will be obtained through the review and comment of the documents/submittals (Section 4), as laid out in the implementation schedule (revised Figure 4-1). Tribal consultation will occur as laid out in the implementation schedule. The traditional comment-response process and/or the comment resolution process are both available and transparent tools to discuss, resolve, and/or incorporate inputs. The project schedule will be updated and submitted with each design submittals (Table 4-5). The Rainbow schedule will continue to be updated as is done currently to keep stakeholders informed of the project schedule and changes to the schedule. It is anticipated that the O&M Plan will be updated or amended at appropriate time during remedy implementation to reflect actual operational experience.	See response to comment #214 and #215 above	DOI concurs with the response.	Comment resolved.

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217	DOI-65	Section 7.3.1		U.S. Department of the Interior	It is clear from the discussion that safety is a priority for PG&E on the Topock project, as it should be, and DOI anticipates an opportunity to review the health and safety plans and procedures that will be put into place to ensure protection of all associated with the site. To address protection of the environment, this section only notes implementation of "protocols consistent with EIR mitigation measures and ARARs." This, however, only addresses human health. It is expected that this section would, at a minimum, discuss the plans and procedures that will be put into place to protect of wildlife, indigenous plants, air quality and waterways potentially impacted by the remedy implementation.	The following text will be added at the end of Section 7.3.1: "There are 154 mitigation measures from the EIR that address nine resource areas including aesthetic, biological, air quality, cultural, geology and soils, hazardous materials, hydrology and water quality, noise, and water supply. There are 59 action-specific and location-specific ARARs that address several resource areas including biological, air quality, cultural, hazardous materials, and waterways."	Okay	Okay.	Comment resolved.
218	DOI-66	Section 7.3.3		U.S. Department of the Interior	PG&E should also consider opportunities for agencies and stakeholders for site visits during the design stages. These could include visits to the similar remediation facilities (i.e., Hinkley) to facilitate a better understanding of the system layout and potential impacts from remedy implementation,	Comment noted.		Okay.	Comment noted.
219	HA-44	p. 7-3 (Ensuring Respect of the Sacredness and Sensitivity of the Cultural, Historical, and Biological Resources)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The Tribe agrees that respect should be accorded to each of these types of resources. At the same time, however, the Tribe does not believe it is appropriate to lump these diverse resources together. Each demands respect for widely different and unique reasons. In particular, the Tribe's ties to the land are based largely on its spirituality and protection of religious practices that trigger a different standard of review and accommodation. Global edits in this regard should be made throughout this Work Plan.	While recognizing that these are diverse resources and are respected for their own unique reasons, PG&E is committed to implementing the design and remedial action in a manner that is respectful of the sacredness and sensitivity of all resources at and near the project area.	Okay.	Okay.	Comment noted.
220	HA-45	p. 7-3 (Ensuring Opportunities for Inputs)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	"Solicitation" of input from tribes, as compared with other "stakeholders," is not sufficient to comply with the legal and moral obligations of the agencies to "consult" with the tribes, particularly under, but not limited to, pursuant to NHPA section 106. Not only must input be solicited, but meaningful and timely consultation must occur to meet agency obligations. Additionally, both DTSC and PG&E have added consultation obligations with the Tribe under their settlement agreements.	Comment noted. PG&E has adhered to the requirements of its settlement agreement with the FMIT and will continue to do so.	DTSC will continue to fulfill its legal requirements under the Settlement Agreement with the FMIT.	DOI/BLM will continue to pursue its obligations under the NHPA Section 106.	Comment noted.

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221	DOI-67	Section 7.3.4		U.S. Department of the Interior	ARAR compliance is required for remedy implementation. This section should discuss how PG&E will evaluate and monitor ARAR compliance during remedy development and implementation. Additionally, DOI has recommended that a "checklist" be part of the design documentation to facilitate documentation of ARAR compliance. This section specifies that PG&E will provide information to "DTSC to document implementation and completion of identified mitigation measures". The Programmatic Agreement specifies stipulations for remedy implementation and it is anticipated that the CHPMP and DOI direction for remedy implementation, after Tribal consultation, will identify similar and possibly additional mitigation measures/stipulations that must be addressed for compliance. This should be discussed in Section 7.3.2 and this section.	The following text will be added to Section 7.3.4 (after the 4th paragraph): "Compliance with substantive requirements of the identified action- and location-specific ARARs will be assessed by first identifying the trigger for compliance, e.g., underground injection activity, transfer and storage of hazardous wastes, RCRA-regulated facilities located in a 100-year floodplain, etc.; second, by determining the steps for compliance, e.g., file the inventory of injection wells, adhere to design requirements for containers, etc.; third, by identifying the parties responsible for compliance; and fourth, by identifying overlaps with EIR requirements. Table 4-4A presents an initial assessment of the identified ARARs. PG&E will provide information (a checklist if requested) to document implementation and completion of identified ARARs, as part of the Basis of Design Report (see Table 4-5)."	DTSC requests that PG&E also track compliance with the mitigation measures by using a similar check list or table as for ARAR compliance.	DOI concurs with the response.	Comment resolved.
222	HA-46	p. 7-5 (Incorporation of Sustainability)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The Tribe supports PG&E efforts to integrate sustainability principles into the design and implementation of remedial action. The Tribe also reminds PG&E that pursuant to its settlement agreement with the Tribe, PG&E is supposed to consult with the Tribe and develop "appropriate changes to PG&E's Environment or Environmental Justice policies to ensure future recognition and consideration of the interests of Native Americans, including respect for their sacred places." To our knowledge, this commitment has not been initiated by PG&E.	In 2006, after the settlement agreement with the Fort Mojave Indian Tribe was executed and approved, PG&E provided the Fort Mojave Indian Tribe a copy of the then current corporate responsibility report. As a result of the settlement agreement, PG&E reviewed the corporate responsibility report and made modifications relating to tribal interests, including adding a section relating to the FMIT-PG&E settlement. Since then, PG&E has sponsored numerous efforts to promote better understanding between PG&E and the various River Tribes, including the Fort Mojave Indian Tribe, such as the Topock Leadership Partnership, the Technical Clearing House, and others that all provide platforms for ongoing consultation with the Fort Mojave Indian Tribe relevant to PG&E's ongoing efforts to include Tribal concerns in its Corporate Responsibility program. PG&E welcomes the opportunity to meet with the Fort Mojave Indian Tribe to review the progress made, and to continue to solicit the Tribe's views on PG&E's ongoing corporate responsibility programs.			Comment noted.
223	HA-47	p. 7-5 (Continuous Optimization of Processes and Resources)		Hargis + Associates, Inc. (on behalf of Fort Mojave Indian Tribe)	The Tribe has some concerns about using contractors with prior experience at Topock as the Tribe may not necessarily have been satisfied with their work methods and products, particularly those regarding tribal cultural resources.	Comment noted. PG&E to discuss with the Tribe.			Comment noted.

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224	DTSC-99	Page 7-5, section 7.3.7 Continuous Optimization of Processes and Resources, Third Bullet	Consideration of detailed design specifications vs. performance-based specifications	California Department of Toxic Substances Control	PG&E did not provide any substantive proposal on the reference issue beyond the stated advantage and disadvantage of detailed design specification. What is PG&E's intention regarding this matter?	The bullets in Section 7.3.7 are examples of approaches or tools that will be considered and implemented, as applicable. The cited 3rd bullet acknowledges the pros and cons of the different specifications that will be considered by PG&E in its own evaluation of these available tools. There is no proposal at this stage related to a specification format. A proposed format or format(s) will be included in the preliminary design submittal (Table 4-5).	DTSC will defer this discussion to future design discussions.		Comment resolved.
Tables									
225	DTSC-80	Tables 4-1, 4-2, 4-3, 4-4, and 4-5		California Department of Toxic Substances Control	These tables provide good summaries of the documents required under its respective programs and requirements (CACA, Consent Decree, and EIR MMRP). DTSC understands that PG&E is combining documents with similar functions or requirements into a single submission to improve review efficiencies. However, to ensure that all requirements are considered and will be submitted in future documents, PG&E should provide a cross reference in Tables 4-1 and 4-2 of where in the combined process (Tables 4-3 and 4-5) will each of the requirements be fulfilled. Please also propose a schedule for submission of the documents associated with these requirements.	New cross reference Tables 4-1A and 4-2A were created to address this comment. With the exception of the May 2011 Draft CMI/RD Work Plan, the target submittal schedule of the documents to the agencies is based on the following assumptions: 1. Comment resolution on the Draft CMI/RD WP can be completed within one week, by August 24, 2011. 2. Agencies review/accept the Final CMI/RD WP by October 3, 2011. 3. Tribal consultation (55-calendar day period) occurs at the preliminary (30%), intermediate (60%), and final (90%) design submittals. The revised final submittal is anticipated to be for incorporation of minor, editorial review comments. After receipt of comments on the above design submittals, a comment resolution period will occur. Comment resolution can be completed within 2 weeks.	Okay		Comment resolved.
226	DOI-57	Table 4-2		Department of the Interior	It is not clear if an additional treatability study is planned for the remedy. It is included in the listing of elements under the RDWP.	The 2009 Model CD language lists treatability study as an element (Table 4-2). At this time, treatability study is not contemplated to support remedy design.	Okay	Noted.	Comment resolved.

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227	DOI-58	Table 4-3		Department of the Interior	It appears that PG&E intends to include the IM-3 decommissioning plan within the CIMP. This plan is also a part of the Programmatic Agreement. It is recommended that this be a separate document or appendix to the RA Work Plan for approval by both agencies. It is unclear what is meant by a "hazardous materials business plan." Is this similar to a hazardous materials management plan? Many of the documents that are specified as EIR-related documents (highlighted by Note 6) are also required to satisfy CERCLA ARAR. This is not apparent in the text discussion or in the "Road Map". See comment on Section 4.2.2 regarding PBA Addendum.	Per the EIR MMRP (CUL-1a-8f), the IM3 decommissioning plan will be included as an appendix to the CIMP. The same plan will also be included in the Construction/ Remedial Action Work Plan for approval by both agencies. California Health and Safety Code, Div 20, Chapter 6.95 requires disclosure of hazardous materials used for a business and to develop a Hazardous Material Management Plan or a "business plan" for emergencies if handling over a certain quantity or volume of hazardous materials. See response to Comment #221 DOI-67 for overlap between ARARs and EIR. See response to Comment #177 DOI-55 for PBA Addendum.	Okay	DOI concurs with the response.	Comment resolved.
228	DTSC-82	Table 4-5, Construction/ RA work plan	Construction Contingency Plan	California Department of Toxic Substances Control	Although a contingency plan for construction related changes is a good idea, PG&E should prepare an operational contingency plan which anticipates various failure modes under operation and maintenance (e.g. lack of plume capture, plume or by-product migration beyond current plume boundaries).	Table 4-5 lists, under the O&M Plan, contingency plans to address potential failure modes associated with remedy operation and maintenance. No changes to the Work Plan are proposed as a result of this comment.	Okay		Comment resolved.
229	DOI-59	Section 6.1, Table 6-1		U.S. Department of the Interior	Table 6-1 identifies a number of activities to be performed in the summer of 2011 that affect the preliminary design, in particular the East Ravine study that is not scheduled to be completed until the Fall of 2011. Figure 4-1 indicates the preliminary design is due September 30, 2011. It does not seem reasonable that the findings from conducting all these activities in the summer can be folded into the preliminary design submittal. Please provide discussion of how the East Ravine groundwater characterization will be integrated into the preliminary (30%) design. Additionally, address the impact on the preliminary design should the East Ravine groundwater investigation be extended and identify a point in the preliminary design phase when the overall design process and project schedule would be adversely affected.	To date, the East Ravine-Topock Compressor Station groundwater investigation has focused on collecting the most important data for the design first and those data (groundwater quality beneath potential sources and bedrock topography beneath the TCS) have been incorporated into the groundwater model as efficiently as possible, following validation and QA. The model will be used to support the overall design (e.g., determine well locations, pumping rates, injection rates, estimate time to cleanup, etc.). As the investigation proceeds into the bedrock, the point at which the overall remedial design and project schedule become adversely affected is when the results cause the current remedy to fail, and therefore require a modification or amendment. One example scenario would be if a contaminant is found that cannot be treated by the current remedy. Another scenario is if a highly conductive fracture is found that would require significantly more pumping to achieve containment of the chromium plume in bedrock. If the flow rate from the bedrock were so large that it could not be accommodated in the IRZ or in the upland wells, it could necessitate some	At this juncture, DTSC still does not have a clear understanding of PG&E's proposal to manage the bedrock contamination. For example, what is PG&E's plan for the extracted water from the East Ravine area if the water contains high concentrations of cr(VI)? What is the meaning behind the hypothetical scenario of bedrock yielding too much volume for the IRZ? Will the contaminated water be injected along with carbon amendment into the IRZ by National Trails Highway? DTSC believes that PG&E has yet to answer many of the conceptual design questions. DTSC will review and provide comments on the remedy design as they are submitted.	DOI will continue to review the relevant East Ravine and TCS data to assist in determining whether utilization of extraction wells is the appropriate remedial system for East Ravine.	Comment resolution pending 30% design.

APPENDIX A
Responses to Comments on the May 2, 2011 Groundwater Corrective Measure Implementation/Remedial Design Work Plan for SWMU 1/AOC 1 and AOC 10
PG&E Topock Compressor Station, Needles, California

	Comment Number	Section/Page	Reference Text	Commenter	Comment	PG&E Response	DTSC Response	DOI Response	Final Comment Resolution
						redesign and cause some delay. The current assumption, based on hydraulic data from existing bedrock wells, is that the total volume of water pumped from the bedrock to achieve containment will be insignificant in the context of the volume of water originating from the alluvium, and therefore can be easily accommodated by the remedy.			
Figures									
230	DTSC-100	Figure 1-2, Groundwater Remedy Project Area Comment also applies to Figure 5-1	"The outline of Cr(VI) depicted as greater than 32 µg/L near or under the Colorado River is 80 feet below the bottom elevation of the Colorado River."	California Department of Toxic Substances Control	The cited text included in the plume boundary legend should be deleted as it is not true within the East Ravine area adjacent to the river.	The text will be changed to read: "The outline of Cr(VI) depicted as greater than 32 µg/L ~~near or~~ under the Colorado River is 80 feet below the bottom elevation of the Colorado River."	Okay.		Comment resolved.
231	DTSC-101	Figure 2-1a, Conceptual Remedy Site Plan California Portion		California Department of Toxic Substances Control	The CMI should indicate why it is necessary to have freshwater and wastewater pipelines located in Bat Cave Wash. Are these lines redundant and can the waters be transported along the other proposed segments?	At this conceptual stage, the portion of the freshwater and wastewater pipelines in Bat Cave Wash is envisioned to be part of a looped system. The loop system increases system redundancy (e.g., freshwater supplied from Bat Cave Wash or National Trails Highway), increases system flexibility to accommodate future changes (e.g., able to serve future wells), and reduces friction loss and electricity costs. Wastewater from maintenance of the injection well in the I-40 median will be piped back (via Bat Cave Wash) to the compressor station for treatment prior to reuse/disposal.	DTSC does not understand how the addition of +1000 feet of water conveyance piping would reduce friction loss and electricity costs? Aren't water conveyance pipelines uni-directional? Would not additional piping create a greater pressure drop and potentially requiring more power to pump the water around? If they are shut off by valves, what would be their purpose other than possibly increasing the likelihood of damage and leaks? Although DTSC understands PG&E's desire to have "flexibility for future changes," Agencies must be mindful that additional piping is additional intrusion into a landscape which the project is supposed to minimize.		Additional analysis will be presented in the 30% design.
232	MWD-8	Figure 2-1a - Conceptual Remedy Site Plan California Portion		Metropolitan Water District of Southern California	This figure includes similar symbols for freshwater injection wells and injection wells for carbon amended water. It is difficult to discern the difference between these wells on the figure because of the close similarity in symbols. It is suggested to use dissimilar symbols for these wells.	Figure 2-1a was revised to address this comment.		Noted.	Comment addressed.
233	DTSC-102	Figure 2-3, Conceptual remedy wastewater treatment schematic diagram	"Solids for Disposal" and "Water Storage"	California Department of Toxic Substances Control	Should the "Water Storage" box be renamed to "Untreated Wastewater Storage"?	Figure 2-3 will be revised.	Okay.		Comment resolved

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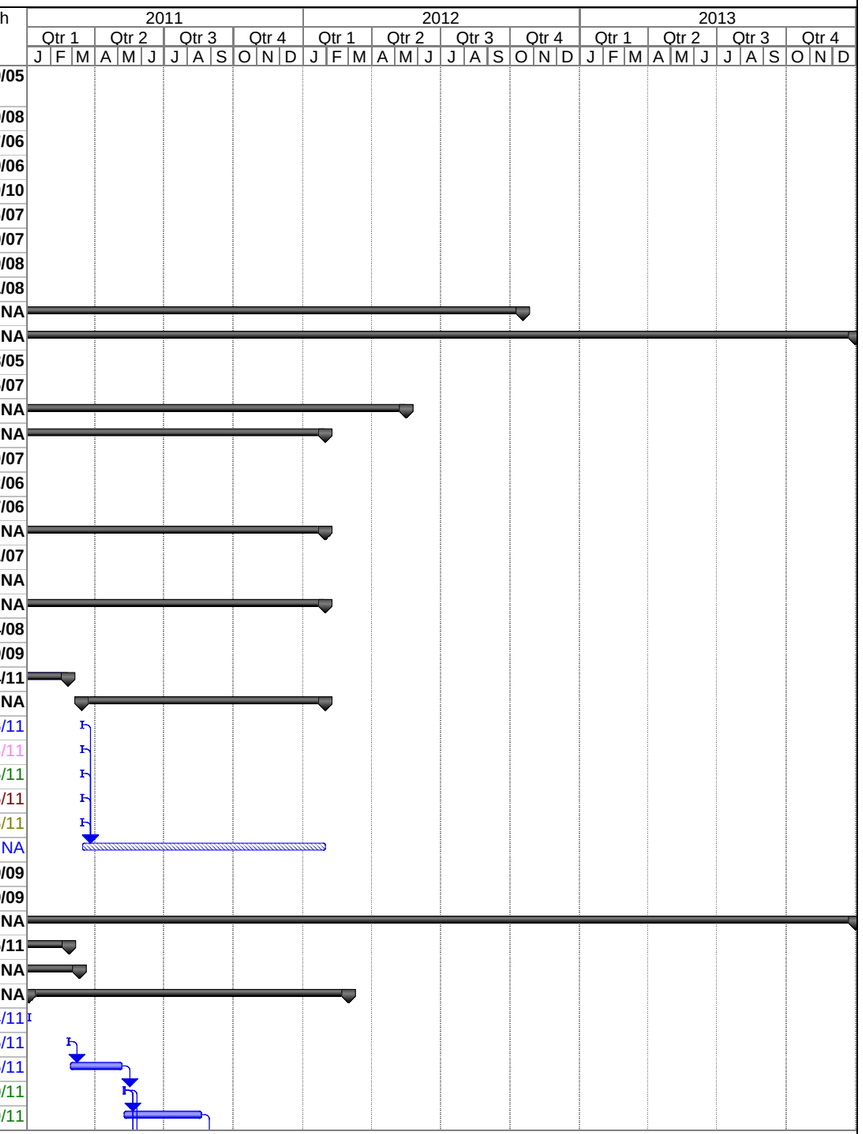
	Comment Number	Section/Page	Reference Text	Commenter	Comment	PG&E Response	DTSC Response	DOI Response	Final Comment Resolution
234	DOI-31	Figure 2-3		U.S. Department of the Interior	The diagram has two “neutralization” steps. Provide additional information regarding the process occurring in these steps.	Figure 2-3 will be revised.	Okay.	DOI looks forward to the opportunity to review the wastewater technical memorandum.	Comment resolution deferred to 30% design

Appendix B
Rainbow Schedule

Handout 6A
Topock Remediation Project Detailed Schedule
October 19, 2011 CWG Meeting (Rev. 13)

ID	Task Name	Duration	Forecasted Start	Forecasted Finish	Actual Start	Actual Finish
1	**IM Installation (Note that IM3 is currently in operation and will remain in operation until directed otherwise by agencies)**	**512 days**	**Thu 1/22/04**	**Tue 12/20/05**	**Thu 1/22/04**	**Tue 12/20/05**
32	**IM3 Cultural Resources Management Plan (IM3 CRMP)**	**986 days**	**Thu 7/1/04**	**Mon 3/10/08**	**Thu 7/1/04**	**Mon 3/10/08**
37	**Extraction Well PE-1/Facilities**	**230 days**	**Mon 3/21/05**	**Fri 1/27/06**	**Mon 3/21/05**	**Fri 1/27/06**
47	**Supplemental Extraction Well and Facilities**	**127 days**	**Fri 7/29/05**	**Thu 1/19/06**	**Fri 7/29/05**	**Thu 1/19/06**
55	**Decommissioning of IM2 Batch Treatment**	**1182 days**	**Fri 8/5/05**	**Fri 1/29/10**	**Fri 8/5/05**	**Fri 1/29/10**
66	**Interim Measures and Treated Water Management**	**751 days**	**Mon 5/3/04**	**Fri 2/16/07**	**Mon 5/3/04**	**Fri 2/16/07**
210	**Public Participation Plan**	**578 days**	**Mon 12/20/04**	**Fri 2/9/07**	**Mon 12/20/04**	**Fri 2/9/07**
219	**Baseline Resources Assessments**	**897 days**	**Mon 11/1/04**	**Mon 3/10/08**	**Mon 11/1/04**	**Mon 3/10/08**
233	**Sitewide CEQA Documentation**	**586 days**	**Wed 5/17/06**	**Fri 8/1/08**	**Wed 5/17/06**	**Fri 8/1/08**
237	**Programmatic Biological Assessment (PBA)**	**1531.05 days**	**Tue 12/19/06**	**Thu 10/18/12**	**Tue 12/19/06**	**NA**
253	**REMEDIAL FACILITY INVESTIGATION/REMEDIAL INVESTIGATION (RFI/RI)**	**4685 days**	**Sat 2/24/96**	**Tue 12/31/13**	**Sat 2/24/96**	**NA**
254	**Historical RFI/RI Reports (Feb. 2005 and Prior Versions)**	**2455 days**	**Sat 2/24/96**	**Fri 7/8/05**	**Sat 2/24/96**	**Fri 7/8/05**
272	**Prepare Site History Report (Vol 1)**	**466 days**	**Tue 11/15/05**	**Wed 8/15/07**	**Tue 11/15/05**	**Wed 8/15/07**
287	**Prepare RFI/RI Vol 1 Addendum**	**1271 days**	**Wed 7/11/07**	**Wed 5/16/12**	**Wed 7/11/07**	**NA**
311	**Prepare Final Groundwater RFI/RI (Vol 2)**	**1739 days**	**Mon 6/27/05**	**Mon 1/30/12**	**Mon 6/27/05**	**NA**
312	**Response to comments on Feb. 2005 RFI/RI Report**	**258 days**	**Tue 10/3/06**	**Wed 9/19/07**	**Tue 10/3/06**	**Wed 9/19/07**
319	**Floodplain Data Gap Investigation**	**93 days**	**Fri 1/6/06**	**Fri 5/12/06**	**Fri 1/6/06**	**Fri 5/12/06**
322	**Pore Water and Seepage Study**	**151 days**	**Mon 6/27/05**	**Tue 1/17/06**	**Mon 6/27/05**	**Tue 1/17/06**
335	**Additional Plume Characterization Investigation**	**1402 days**	**Fri 9/29/06**	**Mon 1/30/12**	**Fri 9/29/06**	**NA**
336	**CA Slant Drilling**	**305 days**	**Fri 9/29/06**	**Wed 11/21/07**	**Fri 9/29/06**	**Wed 11/21/07**
384	**AZ Groundwater Investigation**	**657 days**	**Fri 12/1/06**	**Fri 5/29/09**	**Fri 12/1/06**	**NA**
454	**Additional Investigation**	**1387 days**	**Fri 10/20/06**	**Mon 1/30/12**	**Fri 10/20/06**	**NA**
455	**PGE-7/PGE-8 Hydraulic Test and PGE-6 Decommissioning**	**393 days**	**Fri 10/20/06**	**Mon 4/14/08**	**Fri 10/20/06**	**Mon 4/14/08**
518	**East Ravine Groundwater Investigation**	**516 days**	**Mon 10/29/07**	**Mon 10/19/09**	**Mon 10/29/07**	**Mon 10/19/09**
556	**East Ravine Groundwater Investigation Phase 2/TCS wells**	**264 days**	**Thu 2/25/10**	**Thu 2/24/11**	**Thu 2/25/10**	**Thu 2/24/11**
574	**Field Implementation/Reporting**	**231 days**	**Tue 3/15/11**	**Mon 1/30/12**	**Tue 3/15/11**	**NA**
575	Stakeholder Attending Kick-Off Meeting at Site	1 day	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11
576	Stakeholder Attending Kick-Off Meeting at Site	1 day	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11
577	Stakeholder Attending Kick-Off Meeting at Site	1 day	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11
578	Stakeholder Attending Kick-Off Meeting at Site	1 day	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11
579	Stakeholder Attending Kick-Off Meeting at Site	1 day	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11	Tue 3/15/11
580	Field Implementation/Reporting (assume fieldwork ends 10/30/11)	46 wks	Wed 3/16/11	Mon 1/30/12	Wed 3/16/11	NA
581	**Prepare and Submit Final GW RFI/RI**	**387 days**	**Mon 8/20/07**	**Mon 2/9/09**	**Mon 8/20/07**	**Mon 2/9/09**
602	**Prepare and Submit GW RFI/RI Addendum**	**229 days**	**Wed 8/13/08**	**Mon 6/29/09**	**Wed 8/13/08**	**Mon 6/29/09**
626	**Prepare Final Soil RFI/RI (Vol 3)**	**1958 days**	**Sat 7/15/06**	**Tue 12/31/13**	**Sat 7/15/06**	**NA**
627	**Implementation of Off-site Soil Sampling (Part A Phase 1) and Data Gaps Evaluation**	**1215 days**	**Sat 7/15/06**	**Fri 2/25/11**	**Sat 7/15/06**	**Fri 2/25/11**
776	**Draft On-site Soil Sampling (Part B) DQOs**	**1122 days**	**Wed 12/6/06**	**Fri 3/11/11**	**Wed 12/6/06**	**NA**
831	**Soil RFI/RI Work Plan**	**304 days**	**Tue 1/4/11**	**Thu 3/1/12**	**Tue 1/4/11**	**NA**
832	Receive DTSC's direction to combine Soil Part A and Part B into one Work Plan	1 day	Tue 1/4/11	Tue 1/4/11	Tue 1/4/11	Tue 1/4/11
833	Receive additional directions from agencies on Part A data gaps evaluation	1 day	Fri 2/25/11	Fri 2/25/11	Fri 2/25/11	Fri 2/25/11
834	Prepare/submit Soil Work Plan (assumes no pre-meeting with agencies/Tribes)	50 days	Mon 2/28/11	Fri 5/6/11	Mon 2/28/11	Fri 5/6/11
835	DTSC forward to CWG/TWG	2 days	Mon 5/9/11	Tue 5/10/11	Mon 5/9/11	Tue 5/10/11
836	DTSC review/comment on Soil Work Plan	101.38 edays	Tue 5/10/11	Fri 8/19/11	Tue 5/10/11	Fri 8/19/11



Project: PG&E Topock Remediation Project
Date: Fri 10/14/11

Tasks Not Started/In Progess
Tasks Finished
Baseline Schedule
Milestone
Overall Task Duration

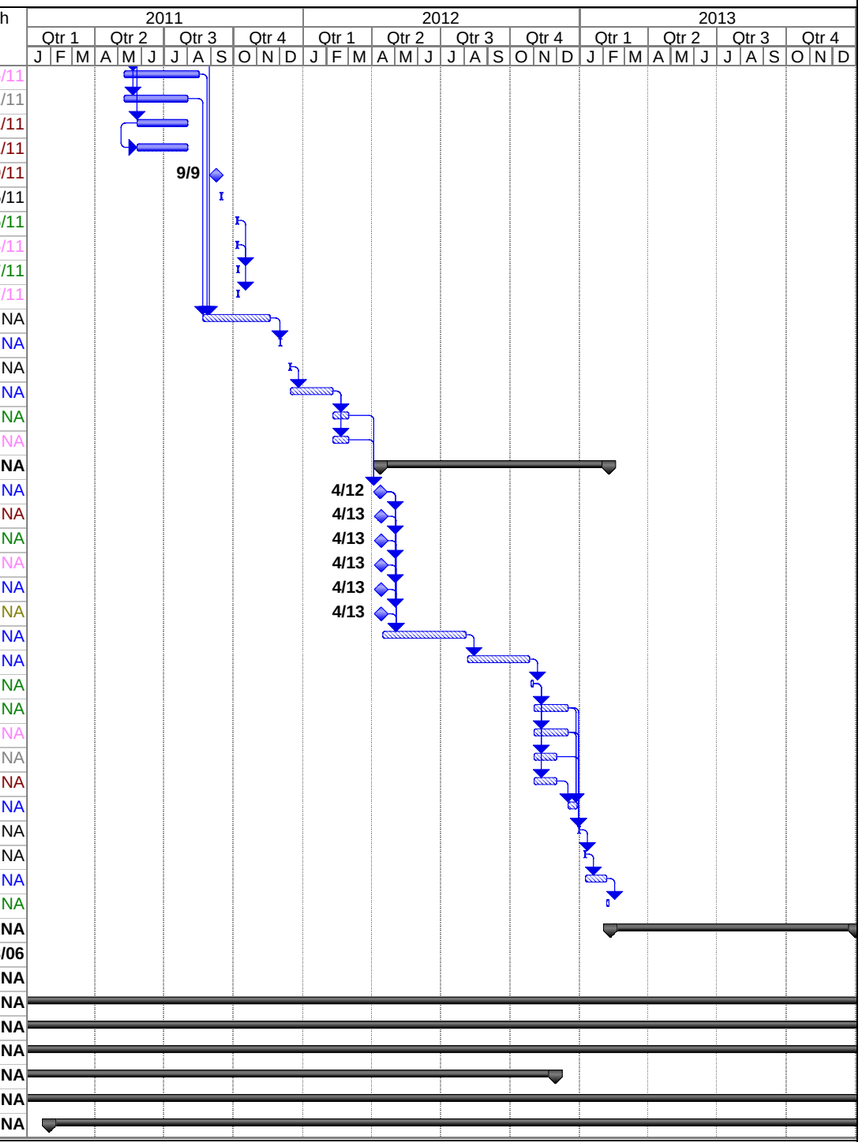
edays = calendar days; days = work days
Baseline Schedule is the 8/15/07 CWG Schedule (rev 1, 12/12/07).
*Timeframes shown are for planning purpose. Actual timeframes may vary.

Color Coding:
PG&E Federal Agencies CWG/TWG Public
DTSC Tribes/SHPO Other CA Agencies AZ Agencies

Major Assumptions
- Permits, CWG/ stakeholder review, and DTSC review & approvals are estimated.
- Actual dates may vary depending on field conditions.

Handout 6A
Topock Remediation Project Detailed Schedule
October 19, 2011 CWG Meeting (Rev. 13)

ID	Task Name	Duration	Forecasted Start	Forecasted Finish	Actual Start	Actual Finish
837	DOI review/comment on Soil Work Plan	98.38 edays	Tue 5/10/11	Tue 8/16/11	Tue 5/10/11	Tue 8/16/11
838	CWG/TWG review/comment on Soil Work Plan	83.38 edays	Tue 5/10/11	Mon 8/1/11	Tue 5/10/11	Mon 8/1/11
839	Tribal Consultation	66.38 edays	Fri 5/27/11	Mon 8/1/11	Fri 5/27/11	Mon 8/1/11
840	SHPO Consultation	66.38 edays	Fri 5/27/11	Mon 8/1/11	Fri 5/27/11	Mon 8/1/11
841	FMIT comment on DTSC's/DOI's comments	0 days	Fri 9/9/11	Fri 9/9/11	Fri 9/9/11	Fri 9/9/11
842	FMIT, Hualapai, DTSC and DOI discuss FMIT's comments on Agencies' comments	1 day	Thu 9/15/11	Thu 9/15/11	Thu 9/15/11	Thu 9/15/11
843	DTSC respond to FMIT's comment on DTSC's comments	1 day	Thu 10/6/11	Thu 10/6/11	Thu 10/6/11	Thu 10/6/11
844	DOI respond to FMIT's comment on DOI's comments	1 day	Thu 10/6/11	Thu 10/6/11	Thu 10/6/11	Thu 10/6/11
845	DTSC provides additional direction to PGE	1 day	Fri 10/7/11	Fri 10/7/11	Fri 10/7/11	Fri 10/7/11
846	DOI provides additional direction to PG&E	1 day	Fri 10/7/11	Fri 10/7/11	Fri 10/7/11	Fri 10/7/11
847	Comment resolution	13 wks	Mon 8/22/11	Fri 11/18/11	Mon 8/22/11	NA
848	Response to comments to Tribes	1 day	Fri 12/2/11	Fri 12/2/11	NA	NA
849	Sitewalk to review soil sample locations	1 day	Thu 12/15/11	Thu 12/15/11	NA	NA
850	PG&E submits Revised Work Plan	8 wks	Fri 12/16/11	Thu 2/9/12	NA	NA
851	DTSC review/approve Revised Work Plan	3 wks	Fri 2/10/12	Thu 3/1/12	NA	NA
852	DOI review/approve Revised Work Plan	3 wks	Fri 2/10/12	Thu 3/1/12	NA	NA
853	**Field Implementation/Reporting/Data Gaps Evaluation**	**216 days**	**Thu 4/12/12**	**Fri 2/8/13**	**NA**	**NA**
854	Field mobilization/preparation	0 days	Thu 4/12/12	Thu 4/12/12	NA	NA
855	Stakeholder Attending Kick-Off Meeting at Site*	0 days	Fri 4/13/12	Fri 4/13/12	NA	NA
856	Stakeholder Attending Kick-Off Meeting at Site*	0 days	Fri 4/13/12	Fri 4/13/12	NA	NA
857	Stakeholder Attending Kick-Off Meeting at Site*	0 days	Fri 4/13/12	Fri 4/13/12	NA	NA
858	Stakeholder Attending Kick-Off Meeting at Site*	0 days	Fri 4/13/12	Fri 4/13/12	NA	NA
859	Stakeholder Attending Kick-Off Meeting at Site*	0 days	Fri 4/13/12	Fri 4/13/12	NA	NA
860	Field Implementation (placeholder, duration will be adjusted after Work Plan approval)	16 wks	Mon 4/16/12	Fri 8/3/12	NA	NA
861	Prepare/submit report (placeholder, duration will be adjusted after Work Plan approval)	12 wks	Mon 8/6/12	Fri 10/26/12	NA	NA
862	DTSC submits report to CWG/TWG	3 days	Mon 10/29/12	Wed 10/31/12	NA	NA
863	DTSC review/comment on report and provides direction	45 edays	Thu 11/1/12	Sun 12/16/12	NA	NA
864	DOI review/comment on report and provides direction	45 edays	Thu 11/1/12	Sun 12/16/12	NA	NA
865	CWG/TWG review/comment on report	30 edays	Thu 11/1/12	Sat 12/1/12	NA	NA
866	Tribes review/comment on report	30 edays	Thu 11/1/12	Sat 12/1/12	NA	NA
867	PG&E compiles comments and prepares RTCs (duration to be confirmed after receipt of comments)	2 wks	Mon 12/17/12	Fri 12/28/12	NA	NA
868	Meeting to resolve comments	1 day	Mon 12/31/12	Mon 12/31/12	NA	NA
869	Comments Resolution Complete	1 day	Tue 1/8/13	Tue 1/8/13	NA	NA
870	Prepare/submit Final Report* (with response to comments)	4 wks	Wed 1/9/13	Tue 2/5/13	NA	NA
871	DTSC forward to CWG/TWG	3 days	Wed 2/6/13	Fri 2/8/13	NA	NA
872	**Prepare and Submit Final Soil RFI/RI**	**232 days**	**Mon 2/11/13**	**Tue 12/31/13**	**NA**	**NA**
885	**ADEQ Topock Groundwater Study**	**475 days**	**Thu 11/18/04**	**Wed 8/23/06**	**Thu 11/18/04**	**Wed 8/23/06**
889	**CORRECTIVE MEASURES/REMEDIAL ALTERNATIVE DEVELOPMENT**	**1527 days**	**Mon 3/29/04**	**Thu 12/31/09**	**Mon 3/29/04**	**NA**
1037	**CORRECTIVE MEASURE STUDY/FEASIBILITY STUDY (CMS/FS) AND RISK ASSESSMENT**	**3140 days**	**Mon 12/16/02**	**Wed 11/19/14**	**Mon 12/16/02**	**NA**
1205	**STATEMENT OF BASIS**	**1385.6 days**	**Mon 1/4/10**	**Tue 4/21/15**	**Mon 1/4/10**	**NA**
1220	**RECORD OF DECISION**	**1486 days**	**Fri 12/18/09**	**Mon 8/24/15**	**Fri 12/18/09**	**NA**
1243	**Section 106 Programmatic Agreement (PA)**	**1084.05 days**	**Fri 10/10/08**	**Fri 11/30/12**	**Fri 10/10/08**	**NA**
1276	**EIR DOCUMENTATION**	**2537 days**	**Thu 9/1/05**	**Sun 5/3/15**	**Thu 9/1/05**	**NA**
1362	**DESIGN, PERMITTING, AND CONSTRUCTION OF GROUNDWATER REMEDY**	**1016.55 days**	**Mon 1/31/11**	**Mon 12/22/14**	**Mon 1/31/11**	**NA**



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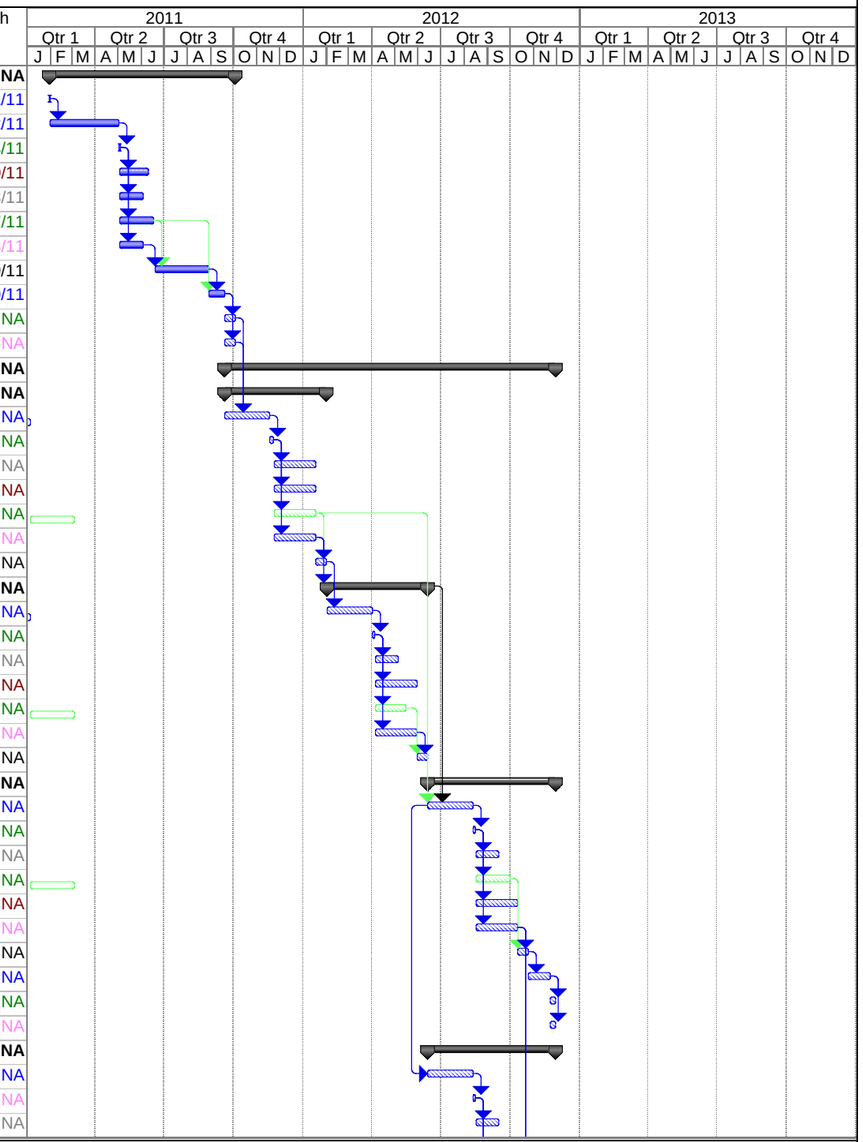
Handout 6A
Topock Remediation Project Detailed Schedule
October 19, 2011 CWG Meeting (Rev. 13)

ID	Task Name	Duration	Forecasted Start	Forecasted Finish	Actual Start	Actual Finish
1363	**Corrective Measure Implementation/Remedial Design (CMI/RD) Workplan**	**176 days**	**Mon 1/31/11**	**Mon 10/3/11**	**Mon 1/31/11**	**NA**
1364	Receipt of notification of DTSC's selection of the corrective measure	1 day	Mon 1/31/11	Mon 1/31/11	Mon 1/31/11	Mon 1/31/11
1365	Prepare/submit Draft Workplan	90.38 edays	Tue 2/1/11	Mon 5/2/11	Tue 2/1/11	Mon 5/2/11
1366	DTSC forward Draft Workplan to CWG/TWG	2 days	Tue 5/3/11	Wed 5/4/11	Tue 5/3/11	Wed 5/4/11
1367	Tribes review of Draft Work Plan	37.38 edays	Wed 5/4/11	Fri 6/10/11	Wed 5/4/11	Fri 6/10/11
1368	CWG/TWG review of Draft Workplan	30.38 edays	Wed 5/4/11	Fri 6/3/11	Wed 5/4/11	Fri 6/3/11
1369	DTSC review/comment on Draft Workplan and provide direction to PG&E	44.38 edays	Wed 5/4/11	Fri 6/17/11	Wed 5/4/11	Fri 6/17/11
1370	DOI review/comment on Draft Workplan and provide direction to PG&E	30.38 edays	Wed 5/4/11	Fri 6/3/11	Wed 5/4/11	Fri 6/3/11
1371	Comment resolution	70.38 edays	Mon 6/20/11	Mon 8/29/11	Mon 6/20/11	Mon 8/29/11
1372	Prepare/submit Redline Workplan with RTCs	3 wks	Tue 8/30/11	Mon 9/19/11	Tue 8/30/11	Mon 9/19/11
1373	DTSC review Final Workplan	2 wks	Tue 9/20/11	Mon 10/3/11	Tue 9/20/11	NA
1374	DOI review/approve Final Workplan	2 wks	Tue 9/20/11	Mon 10/3/11	Tue 9/20/11	NA
1375	**Remedial Design (Preliminary, Intermediate, and Final)**	**314.05 days**	**Tue 9/20/11**	**Fri 11/30/12**	**Tue 9/20/11**	**NA**
1376	**Preliminary Design**	**97.05 days**	**Tue 9/20/11**	**Wed 2/1/12**	**Tue 9/20/11**	**NA**
1377	Prepare/submit Prelim Design Package	2.05 mons	Tue 9/20/11	Fri 11/18/11	Tue 9/20/11	NA
1378	DTSC forward to CWG/TWG	3 days	Fri 11/18/11	Wed 11/23/11	NA	NA
1379	CWG/TWG review/comment on Draft Design Package	55 edays	Thu 11/24/11	Wed 1/18/12	NA	NA
1380	Tribes consultation	55 edays	Thu 11/24/11	Wed 1/18/12	NA	NA
1381	DTSC review/comment on Draft Design Package	55 edays	Thu 11/24/11	Wed 1/18/12	NA	NA
1382	DOI review/comment on Draft Design Package	55 edays	Thu 11/24/11	Wed 1/18/12	NA	NA
1383	Comments resolution	2 wks	Wed 1/18/12	Wed 2/1/12	NA	NA
1384	**Intermediate Design**	**95 days**	**Thu 2/2/12**	**Thu 6/14/12**	**NA**	**NA**
1385	Prepare/submit Intermediate Design Package (duration to be confirmed after receipt of comments)	2 mons	Thu 2/2/12	Mon 4/2/12	NA	NA
1386	DTSC forward to CWG/TWG	3 days	Mon 4/2/12	Thu 4/5/12	NA	NA
1387	CWG/TWG review/comment on Intermediate Design Package	30 edays	Fri 4/6/12	Sun 5/6/12	NA	NA
1388	Tribes Consultation	55 edays	Fri 4/6/12	Thu 5/31/12	NA	NA
1389	DTSC review/comment on Intermediate Design Package	40 edays	Fri 4/6/12	Wed 5/16/12	NA	NA
1390	DOI review/comment on Intermediate Design Package	55 edays	Fri 4/6/12	Thu 5/31/12	NA	NA
1391	Comments resolution	2 wks	Thu 5/31/12	Thu 6/14/12	NA	NA
1392	**Final Design (include plan for decommissioning, removal, and restoration of IM3 facility)**	**121 days**	**Thu 6/14/12**	**Fri 11/30/12**	**NA**	**NA**
1393	Prepare/submit Final Design Package (duration to be confirmed after receipt of comments)	2 mons	Thu 6/14/12	Mon 8/13/12	NA	NA
1394	DTSC forward to CWG/TWG	3 days	Mon 8/13/12	Thu 8/16/12	NA	NA
1395	CWG/TWG review/comment on Final Design Package	30 edays	Fri 8/17/12	Sun 9/16/12	NA	NA
1396	DTSC review/comment on Final Design Package	45 edays	Fri 8/17/12	Mon 10/1/12	NA	NA
1397	Tribal Consultation	55 edays	Fri 8/17/12	Thu 10/11/12	NA	NA
1398	DOI review/comment on Final Design Package	55 edays	Fri 8/17/12	Thu 10/11/12	NA	NA
1399	Comments resolution	2 wks	Thu 10/11/12	Thu 10/25/12	NA	NA
1400	Prepare/submit Revised Final Design Package (duration to be confirmed after receipt of comments)	1 mon	Thu 10/25/12	Fri 11/23/12	NA	NA
1401	DTSC approves design	5 days	Fri 11/23/12	Fri 11/30/12	NA	NA
1402	DOI approves design	5 days	Fri 11/23/12	Fri 11/30/12	NA	NA
1403	**Construction/Remedial Action Work Plan**	**121.5 days**	**Thu 6/14/12**	**Fri 11/30/12**	**NA**	**NA**
1404	Prepare/submit Draft Work Plan	2 mons	Thu 6/14/12	Mon 8/13/12	NA	NA
1405	DOI forward to DTSC/CWG/TWG	3 days	Mon 8/13/12	Thu 8/16/12	NA	NA
1406	CWG/TWG review/comment on Draft Work Plan	30 edays	Fri 8/17/12	Sun 9/16/12	NA	NA



Project: PG&E Topock Remediation Project
Date: Fri 10/14/11

Tasks Not Started/In Progess
Tasks Finished
Baseline Schedule
Milestone
Overall Task Duration

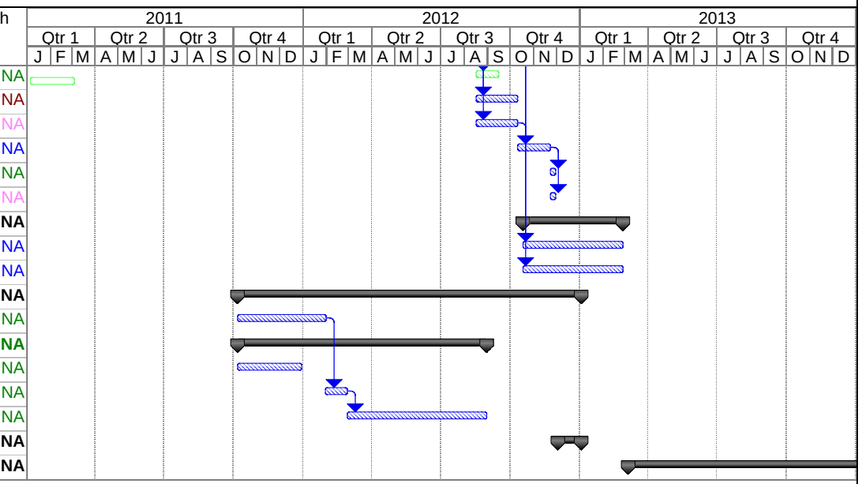
edays = calendar days; days = work days
Baseline Schedule is the 8/15/07 CWG Schedule (rev 1, 12/12/07).
*Timeframes shown are for planning purpose. Actual timeframes may vary.

Color Coding:
PG&E Federal Agencies CWG/TWG Public
DTSC Tribes/SHPO Other CA Agencies AZ Agencies

Major Assumptions
- Permits, CWG/ stakeholder review, and DTSC review & approvals are estimated.
- Actual dates may vary depending on field conditions.

Handout 6A
Topock Remediation Project Detailed Schedule
October 19, 2011 CWG Meeting (Rev. 13)

ID	Task Name	Duration	Forecasted Start	Forecasted Finish	Actual Start	Actual Finish
1407	DTSC review/comment on Draft Work Plan	30 edays	Fri 8/17/12	Sun 9/16/12	NA	NA
1408	Tribal Consultation on Draft Work Plan	55 edays	Fri 8/17/12	Thu 10/11/12	NA	NA
1409	DOI review/comment on Draft Work Plan and provides direction to PG&E	55 edays	Fri 8/17/12	Thu 10/11/12	NA	NA
1410	Prepare/submit Final Work Plan	1.5 mons	Thu 10/11/12	Fri 11/23/12	NA	NA
1411	DTSC approves Final Work Plan	5 days	Fri 11/23/12	Fri 11/30/12	NA	NA
1412	DOI approves Final Work Plan	5 days	Fri 11/23/12	Fri 11/30/12	NA	NA
1413	**ROWs/Easements/Landowner Agreements/Approvals/Compliance**	**94.5 days**	**Thu 10/18/12**	**Wed 2/27/13**	**NA**	**NA**
1414	Other Approvals and Compliance	4.5 mons	Thu 10/18/12	Wed 2/27/13	NA	NA
1415	Landowner Agreements/Leasing/ROW Agreements	4.5 mons	Thu 10/18/12	Wed 2/27/13	NA	NA
1416	**Community Outreach**	**325.55 days**	**Fri 10/7/11**	**Thu 1/3/13**	**NA**	**NA**
1417	Prepare/Issue Project Update Factsheet	4 mons	Fri 10/7/11	Tue 1/31/12	NA	NA
1418	**Prepare/Issue Outreach Plan**	**236.3 days**	**Fri 10/7/11**	**Fri 8/31/12**	**NA**	**NA**
1419	Update mailing list	2.95 mons	Fri 10/7/11	Fri 12/30/11	NA	NA
1420	Conduct Community Survey	1 mon	Tue 1/31/12	Tue 2/28/12	NA	NA
1421	Prepare Outreach Plan	6.3 mons	Wed 2/29/12	Fri 8/31/12	NA	NA
1422	**Outreach/Public Participation**	**23 days**	**Mon 12/3/12**	**Thu 1/3/13**	**NA**	**NA**
1426	**Construction/Startup**	**468 days**	**Wed 3/6/13**	**Mon 12/22/14**	**NA**	**NA**



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