Topock Project Executive Abstract

Document Title: Addendum to RCRA Facility Investigation/Remedial Investigation Report, Volume 1 Pacific Gas and Electric Company Topock Compressor Station, Needles, California Submitting Agency: DTSC, DOI Final Document? ☒Yes ☐ No	Date of Document: May 30, 2014 Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E
Priority Status: **HIGH** **X** **MED** **LOW** Is this time critical? ☒ Yes ☐ No Type of Document: ☐ Draft **X** Report ☐ Letter Memo ☐ Other / Explain:	Action Required: ☒ Information Only Other / Explain: Return to: _____ By Date:___ _____
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? Knowledge of the history and available data of 15 newly identified units associated with the compressor station would not be gained. What is the consequence of DOING this item? Understanding of the history and available data of 15 newly identified units.	Other Justification/s: ☐ Permit ☐ Other / Explain:

Brief Summary of attached document:

Since the RFI/RI Volume 1 report was completed in 2007, 15 new units have been identified and were added to the RFI/RI program. The purpose of this addendum to the Volume 1 RFI/RI (Volume 1 Addendum) summarizes the history of each unit and available data for these 15 new units.

Written by: PG&E

Recommendations:

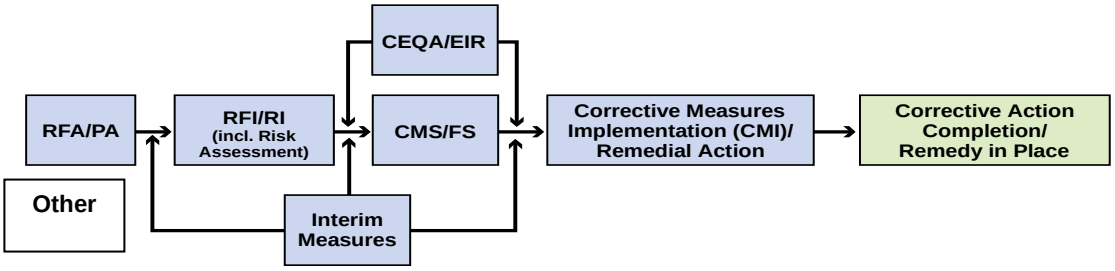
How is this information related to the Final Remedy or Regulatory Requirements:
Identification and understanding of units associated with the compressor station is required to understand which units may need

investigation or remediation.

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
CEQA/EIR – California Environmental Quality Act/Environmental Impact Report

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May 30, 2014

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Subject: Addendum to RCRA Facility Investigation/Remedial Investigation Report, Volume 1

PG&E Topock Compressor Station, Needles, California

Dear Mr. Marcos:

This letter transmits the revised *Addendum to RCRA Facility Investigation/Remedial Investigation Report, Volume 1, PG&E Topock Compressor Station, Needles, California.* A version of the text in track-changes mode, and a complete PDF of the entire report have been uploaded to the Topock Program SharePoint Site.

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

Sincerely,

Yvonne Meeks
Topock Project Manager

cc: Pam Innis/DOI

Addendum to RCRA Facility Investigation/Remedial Investigation Report, Volume 1

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

Prepared for

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

May 2014

On behalf of

Pacific Gas and Electric Company

CH2MHILL®

155 Grand Avenue, Suite 800
Oakland, CA 94612

Addendum to
RCRA Facility Investigation/Remedial Investigation Report, Volume 1

Pacific Gas and Electric Topock Compressor Station,
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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
APE	Area of Potential Effect
API	American Petroleum Institute
AOC	Area of Concern
bgs	below ground surface
BLM	U.S. Department of the Interior, Bureau of Land Management
BTEX	benzene, toluene, ethylbenzene, and xylene
BTV	background threshold value
CAM	California Assessment Manual
CHHSL	California human health screening level
CLP	Contract Laboratory Program
COPC	constituent of potential concern
DOI	United States Department of Interior
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
E&E	Ecology and Environment, Inc.
ESL	California Regional Water Quality Control Board, Region 2 environmental screening level
Final RFI/RI Work Plan	*Final Soil RCRA Facility Investigation/Remedial Investigation Work Plan, PG&E Topock Compressor Station, Needles, California*
IM-2	Interim Measure Number 2
IM-3	Interim Measure Number 3
mg/kg	milligrams per kilogram
mg/L	milligram per liter
ng/kg	nanograms per kilogram
OWS	oil/water separator
OWTS	Oily Water Treatment System
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RI	remedial investigation
RFI/RI Volume I	*Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California*

RSL	United States Environmental Protection Agency Region 9 regional screening level
STLC	soluble threshold limits concentration
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCLP	toxicity characteristic leaching procedure
TEQ	toxicity equivalent
TPH	total petroleum hydrocarbon
Trident	Trident Environmental Consultants
TRPH	total recoverable petroleum hydrocarbon
UA	Undesignated Area
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
Water Board	California Regional Water Quality Control Board, Region 2

Addendum to RCRA Facility Investigation/Remedial Investigation Report, Volume 1

1.0 Introduction

Pacific Gas and Electric Company (PG&E) is implementing a Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) at the PG&E Topock Compressor Station located near Needles, California. The report, *Revised Final RCRA Investigation/Remedial Investigation Report, Volume 1 - Site Background and History, PG&E Topock Compressor Station, Needles, California* (RFI/RI Volume 1), described the site history and background and was completed in September 2007 (CH2M HILL, 2007a). RFI/RI Volume 1 documented the Solid Waste Management Units (SWMUs), Areas of Concern (AOCs), and Oily Water Treatment System Units (OWTS Units) that had been identified as of that time and also identified two undesignated areas (UAs). The SWMUs, AOCs, OWTS Units, and UAs are collectively referred to as "units." A total of 35 units were included in the RFI/RI Volume 1. Of the 35 units identified, seven units were considered closed, and no further investigation was required. Eight other units were considered closed, but additional investigation was requested by the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC).

Since the RFI/RI Volume 1 report was completed, 15 new units have been identified and were added to the RFI/RI program. This addendum to the Volume 1 RFI/RI (Volume 1 Addendum) summarizes the history of each unit and available data for these 15 new units. With the exception of two new units—AOCs 29, Interim Measure Number 3 (IM-3) Treatment Plant, and AOC 30, Interim Measure Number 2 (IM-2) Monitoring Well-20 Bench (MW-20 Bench)—the new units are being investigated in conjunction with the units originally included in the RFI/RI Volume 1. The proposed investigation program for each of these 13 units is described in the *Final Soil RCRA Facility Investigation/Remedial Investigation Work Plan, PG&E Topock Compressor Station, Needles, California* (Final Soil RFI/RI Work Plan; CH2M HILL, 2013). The Final Soil RFI/RI Work Plan also provides tables summarizing available data for each of these 13 units and figures showing the proposed sampling.

Investigation of AOCs 29 and 30 will be conducted as part of the decommissioning and removal activities for these areas, as proposed in the forthcoming *Interim Measures No. 3 Decommissioning, Removal, and Restoration Work Plan*, and as part of the baseline sampling during the Topock groundwater remedy system installation, as proposed in the forthcoming *Groundwater Remedy Implementation – Baseline Sampling and Analysis Plan*. A portion of AOC 30—MW-20 Bench—will be used to support the groundwater remedy, so this AOC will not be fully investigated until groundwater remedy decommissioning sampling is conducted.

Table 1 lists the SWMUs, AOCs, and other undesignated areas included in this addendum and in the RFI/RI Volume I, and Figures 1 and 2 show the locations of the RFI/RI units (the new units are outlined in orange). New information obtained regarding units described in the RFI/RI Volume 1 is presented in Section 3.0.

The SWMUs, AOCs, OWTS, and UAs included in the RFI/RI Volume 1 and this addendum are located within an area where over 170 archaeological and historical sites were identified within the Area of Potential Effect (APE) (Applied Earthworks, 2007, 2010). These archaeological and historical sites will be protected from work activities that may occur and will be monitored during the course of work within these SWMUs, AOCs, OWTS, and UAs. Tribes have stated that the APE contains sacred and ceremonial places and that the APE is also contained within a larger geographic area that is sacred to the Fort Mojave Indian Tribe and other tribes.

This addendum incorporates comments received from DTSC, Fort Mojave Indian Tribe and the Hualapai Indian Tribe. Comments, comment responses, and comment resolutions can be found in the Response to Comments Matrix in Appendix A.

2.0 Description of New Units

2.1 SWMU 11 – Former Sulfuric Acid Tanks

SWMU 11 consists of the locations of two former 2,600-gallon sulfuric acid tanks, located at Cooling Tower A (AOC 5) and Cooling Tower B (AOC 6) since circa 1958 (PG&E, 1956, 1958). SWMU 11 has been designated a unit at the request of DTSC (2010). The proposed investigation program for this SWMU is provided in Appendix B6 of the Final Soil RFI/RI Work Plan (CH2M HILL, 2013), and the locations of the former tanks are shown on Figures 3 and 4. Current existing 400-gallon sulfuric acid portable tanks were relocated in 2012 from the SWMU 11 containment areas into new containment areas at each cooling tower; the new areas are not part of SWMU 11. The current tanks are included in the discussion of chemical storage tanks in AOCs 5 and 6; see Appendices B7 and B8 of the *Final Soil RFI/RI Work Plan*.

2.1.1 Description and History

Sulfuric acid is used to control pH and minimize scaling in the cooling towers. The composition of the cooling water must be carefully maintained at optimal conditions to minimize the potential for scale, corrosion, and biological growth. As needed, an automatic controller adds sulfuric acid and other chemicals to maintain the proper conditions in the cooling water.

When the station first began operations, sulfuric acid was delivered to the facility in drums and pumped or dumped directly into the basins at the bottoms of the old cooling towers. The active sulfuric acid feed drums were located in the acid houses (also known as chemical storage sheds) located at the cooling towers, as shown schematically on Figures 3 and 4, in the 1955 aerial photograph included as Figure 5, and in the undated photograph believed to have been taken between 1954 and 1958 included as Figure 6.[1]

The original tanks were unlined steel aboveground storage tanks with a capacity of 2,600 gallons each and were installed between 1957 and 1958 as part of an overall effort to improve the chemical addition process for the cooling towers (PG&E, 1956, 1958).Because the tanks were unlined, sulfuric acid sludge was generated and required periodic removal (PG&E, 1972, 1982a). The steel tanks were replaced with new epoxy-lined tanks between 1982 and 1984 (PG&E, 1982b, 1984). It appears that the tanks may have been relocated from their former locations to the locations indicated by the concrete secondary containment at this time. An undated photograph of a sulfuric acid tank at Cooling Tower B with no secondary containment is included as Figure 7. Secondary containment was provided for the sulfuric acid tanks in 1988 (PG&E, 1988a). The epoxy-lined tank within containment at Cooling Tower A is shown in a 1999 photograph included as Figure 8. The steel tanks were replaced with polyethylene-lined 400-gallon tanks in 2006. Until early 2012, these tanks were located within the original epoxy-coated concrete containment structures. In 2012, the chemical feed facilities were relocated again. The chemical feed facilities at Cooling Tower A overlie the location of the original sulfuric acid tank and at Cooling Tower B are just south of the cooling tower, as shown on Figures 3 and 4. For clarity, the tank locations are referred to as the first tank location (for the tanks installed in 1957-1958), second tank location (for the tanks installed between 1982 and 1984), and the current tank location (the location of the chemical feed tanks and addition system in 2012).

The primary sources of contamination at SWMU 11 are likely to be historical incidental spills of sulfuric acid during transfer. The quantity of acid released, if any, is unknown, but is expected to be relatively small, as any spills or incidental leaks would have quickly been addressed due to the inherent hazards of the acid. Early chemical handling procedures at Topock indicated that baking soda was maintained at the station to neutralize sulfuric acid spills (PG&E, 1953a). The primary source medium at SWMU 11 is surface soil. Because most of the area around the former tank locations is covered with gravel, liquids released in SWMU 11 would have been released to surface soil and infiltrated shallow soil. Acid released to soils could have solubilized metals in the soil matrix.

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

2.1.2 Summary of Previous Soil Characterization

No data have been collected specifically to evaluate potential concerns associated with the sulfuric acid tanks; however, one surface soil sample (2 B-Tower) was collected in AOC 6 at 0 feet below ground surface (bgs) in the immediate vicinity of the second sulfuric acid tank. This sample was analyzed for hexavalent chromium, total chromium, copper, nickel, and zinc. Hexavalent chromium was not detected, and nickel was detected at a concentration below its background threshold value (BTV). Total chromium, copper, and zinc were each detected at concentrations exceeding their BTVs. The detected total chromium concentration of 78 milligrams per kilogram (mg/kg) exceeds the BTV of 39.8 mg/kg, the detected copper concentration of 41 mg/kg exceeds the BTV of 16.8 mg/kg, and the detected zinc concentration (120 mg/kg) exceeds the BTV for zinc (58 mg/kg). All constituent concentrations are well below the applicable commercial screening levels (California human health screening levels for commercial use [commercial CHHSLs] or United States Environmental Protection Agency (USEPA) Region 9 regional screening levels for commercial use).

2.1.3 Constituents of Potential Concern

Based on the unit description, history, past characterization data, and discussions with DTSC and the United States Department of the Interior (DOI), the constituents of potential concern (COPCs) for soil within SWMU 11 are Title 22 metals, hexavalent chromium, and pH.

2.2 AOC 20 – Industrial Floor Drains

AOC 20 consists of industrial floor drains within the compressor station buildings and other industrial structures and facilities within the upper yard of the compressor station that are routed to the oily water treatment system (formerly OWTS Units 4.3, 4.4, and 4.5). AOC 20 was incorporated in the *Draft RCRA Investigation/ Remedial Investigation Soil Investigation Work Plan Part B, PG&E Topock Compressor Station, Needles, California* (CH2M HILL, 2007b) at the request of DTSC (DTSC, 2007a). AOC 20 does not include the miscellaneous floor drains in areas such as lavatories that drain to one of the three septic systems on the station. The proposed investigation program for AOC 20 is provided in Appendix B17 of the Final Soil RFI/RI Work Plan (CH2M HILL, 2013).

2.2.1 Description and History

Several of the industrial buildings within the compressor station are equipped with floor drains that capture liquids released to the floor of the building and convey the liquid to the current oily water treatment system; previously, these drains conveyed the flow to the former American Petroleum Institute (API) oil/water separator (OWS) (part of AOC 24, discussed below) and the old oily water treatment system (comprising OWTS Units 4.3, 4.4, and 4.5, discussed in Appendix B25 of the *Final Soil RFI/RI Work Plan*) (PG&E, 1988b). In addition, other industrial facilities, such as the steam-cleaning area and the main jacket water surge tanks, are equipped with drains that capture overflow and spills. A pipe trench that extends from the sump next to the steam-cleaning area to the east side of the compressor building also drains to OWTS Units 4.3, 4.4, and 4.5 and has been included in AOC 20. Collectively, these drains are referred to as industrial drains to distinguish their use and intent from the storm drains that are also present at the facility.[2] Industrial drains are found in the following buildings and facilities: Compressor Building, Auxiliary Building, Jacket Cooling Water Pumps (AOC 15), Oil Storage Tank Area (AOC 32), Steam Rack (steam-cleaning area), Fire Water Pump Building, and Former Water Conditioning Building (AOC 23). These drains and lines are shown in the PG&E Engineering Drawing Number 481785 (Revision 22), titled Sewers & Drains (PG&E, 1967), included in Appendix B, and also in Figure 9. Pipelines that are connected to the oily water treatment system historically were made primarily of vitrified clay (PG&E, 1967). Currently, the system contains a variety of pipe materials, including reinforced fiberglass, polyvinyl chloride (PVC), cast iron, and acrylonitrile-butadiene-styrene. The aboveground lines are all welded carbon steel pipe (PG&E, 1991). Many of the pipes leading from the industrial floor drains to the OWTS system are located under building floors and machinery and/or are buried below ground, making them largely inaccessible. The liquids potentially discharged to the industrial drains would consist of liquids present within the industrial buildings and facilities. Liquids used in industrial building operations included lubricating oil, oily water from the steam-cleaning area and compressor

[2] Storm drains are addressed in Appendix D to the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

and generator engine cleaning, jacket cooling water, and lubricating-oil cooling water. Drainage from the various cooling-water systems would have contained chromium compounds and, later, molybdenum. No records exist of any specific releases to the industrial drains; however, the drains are expected to have captured incidental drips and spills during plant operations, as well as occasional washing liquid from floor cleaning within the buildings. Information collected during the facility assessment indicated that the oil/water holding tank (OWTS Unit 4.3) collected approximately 220,000 gallons of oily water per year from the compressor floor drainage (about 200,000 gallons per year), compressor-engine-cleaning operations (about 10,000 gallons per year), and steam-cleaning operations (about 10,000 gallons per year) (Kearny, 1987). In general, all oily water was discharged to the oily water system, as it is today.

The primary sources of contamination at AOC 20 are likely to be incidental spills and leaks from the industrial drain system of lubricants and cooling water generated during plant operations. The quantity of liquid released from the industrial floor drains and associated piping to the environment is unknown. The primary source media at AOC 20 are shallow and/or subsurface soil because the system consists primarily of underground piping. Short runs of aboveground piping overlying unpaved (gravel covered) soil are also part of this unit.

2.2.2 Summary of Previous Soil Characterization

No sampling of the industrial floor drains has been conducted; however, two samples located on piping segment I-1 were collected during closure of former OWTS Units 4.3, 4.4, and 4.5 in 1989. Piping segment I-1 conveyed influent to Units OWTS 4.3, 4.4, and 4.5. Pressure-testing conducted during closure of OWTS Units 4.3, 4.4, and 4.5 suggested that pipe segment I-1 might have been leaking. Because pressure-testing suggested that this pipe might have leaked, accessible portions were exposed and visually inspected and then removed. During the closure, leaks in the OWS system appeared to have occurred in the pipeline segment leading from a valve box east of the new oily water treatment system to the former oil/water holding tank (OWTS Unit 4.3), and two samples were collected in this area. The approximate location of these samples (derived from the text description; a sample location figure is not available) is shown in Figure 9. One sample was collected underneath the piping, and one sample was collected underneath a valve (Mittelhauser, 1990).

The samples were tested for total petroleum hydrocarbon (TPH) compounds only. TPH-motor oil was detected at concentrations of 800 and 1,200 mg/kg, respectively, which is below the applicable screening level of 1,800 mg/kg (California Regional Water Quality Control Board, Region 2 [Water Board] environmental screening levels [ESL] [Water Board, 2008]). TPH-gasoline, TPH-diesel, and TPH-jet fuel were not detected. Visibly stained soil from around the piping was also excavated and disposed of. Inaccessible piping was capped and left in place.

2.2.3 Constituents of Potential Concern

Based on the unit description, history, past characterization data, and discussions with DTSC and DOI, the COPCs for soil within AOC 20 are Title 22 metals, hexavalent chromium, volatile organic compounds (VOCs), TPH, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs).

2.3 AOC 21 – Round Depression near Sludge Drying Bed

AOC 21 is a former round structure partially filled with white material adjacent to the Sludge Drying Bed 1 (part of SWMU 5) that is visible in the May 19, 1955, aerial photographs presented in Figures 5, 10, and 11. It can also be seen in the background of the 1954 photograph presented in Figure 12. A topographic map dated January 17, 1957, identifies this structure as a “water treatment sump” (PG&E, 1957a). AOC 21 was incorporated into the RFI/RI at the request of DTSC based on a review of historical aerial photographs (DTSC, 2010). The proposed investigation program for AOC 21 is provided in Appendix B18 of the Final Soil RFI/RI Work Plan (CH2M HILL, 2013).

2.3.1 Description and History

The structure appears to consist of a circular earthen berm. No information is available regarding the construction materials. The round structure appears to have a diameter slightly greater than the width of Sludge Drying Bed 1 (the eastern bed), which was approximately 20 feet wide by 50 feet long. The depth of the structure is uncertain. The sludge drying beds were constructed to a depth of 2 feet bgs (CH2M HILL, 2007a), and from the aerial photographs, the structure appears to be similar in elevation to the deeper portions of the sludge drying beds.

The structure appears to contain material of the same color as the material in the sludge drying bed and may have served a similar function as the sludge drying bed. During the 1950s and early 1960s, Sludge Drying Bed 1[3] (part of SWMU 5) was used to dry lime treatment sludge from the Permutit water-softening system. The Permutit water-softening system used a combination of lime and soda ash to remove excess minerals from Topock well water (for a more detailed discussion of the Permutit water-softening system see Appendix B2 [SWMU 5] and Subappendix B20 [AOC 23]) of the *Final Soil RFI/RI Work Plan* [CH2M HILL, 2013]). The available information indicates that at least a portion of the dried or partially dried sludge was transported to the Railroad Debris Site (AOC 14) (PG&E, 2006a). Some apparent spillage of the white material is visible between the sludge drying bed and the round structure. Based on data from the white powdery material in AOC 14, the material could contain low levels of total and hexavalent chromium.

The primary sources of contamination at AOC 21 are likely to be incidental spills of water-softener sludge when transferring material from the sludge drying beds to AOC 21 and/or when loading the material onto trucks to haul it to AOC 14. Some incidental spills apparently occurred because there is some white coloration present between AOC 21 and the Sludge Drying Bed 1 in the 1995 aerial photograph. The water-softener sludge likely contained some liquid because former employees reported that it was sprayed onto the ground at AOC 14 (CH2M HILL, 2007a). The potential quantity of solids sludge and/or associated liquid released in the vicinity AOC 21 is unknown. The bottom of the structure might have consisted solely of soil, and softened water might have been released to shallow soil directly beneath the structure. The primary source media at AOC 21 are surface and shallow soil.

2.3.2 Summary of Previous Soil Characterization

No samples have been collected in this area.

2.3.3 Constituents of Potential Concern

Based on the unit description, history, and discussions with DTSC and DOI, the COPCs for soil within AOC 21 are Title 22 metals, hexavalent chromium, VOCs, TPH, semivolatile organic compounds (SVOCs), PAHs, PCBs, calcium, sodium, and pH.

2.4 AOC 22 – Unidentified Three-Sided Structure

AOC 22, which is visible in Figures 5, 6, 10, and 11, consists of a three-sided structure located in the upper yard, along what is now the compressor station fence line. The location of AOC 22 in relation to the current compressor station layout is shown in Figure 13. AOC 22 was incorporated into the RFI/RI at the request of DTSC (2010). The proposed investigation program for AOC 22 is provided in Appendix B19 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.4.1 Description and History

AOC 22 is a small structure. The northern end of the structure was slightly north of what is now the Technical Maintenance Shop (the Technical Maintenance Shop did not exist in the aerials that show the three-sided structure). Based on the aerial photo, it appears that the footprint of the structure would have been located within the current unpaved area adjacent to the existing fence. In the aerial photo, a container that appears to be a drum is located near this structure. There is no available information on the use of this structure or any materials that may have been stored at this structure or in its vicinity. Soil around this former structure, as observed in the May 19, 1955, oblique aerial photographs (Figure 5 and Figure 10) and the 1954-1956 oblique aerial photograph (Figure 11), appears lighter in color than surrounding soil. The primary sources of contamination at AOC 22 are likely to be incidental spills of any materials stored in this area. The potential type and quantity of any materials released in the vicinity of this structure are unknown. The primary source medium at AOC 22 is surface soil. In addition, contaminated surface soil runoff would have been a potential migration pathway to the east to the area outside the fence line.

[3] Sludge Drying Bed 2 was installed ca. 1967.

2.4.2 Summary of Previous Soil Characterization

No samples have been collected in this area.

2.4.3 Constituents of Potential Concern

Based on the unit description, history, and discussions with DTSC and DOI, the COPCs for soil within AOC 22 are Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH.

2.5 AOC 23 – Former Water Conditioning Building

AOC 23 is the former Water Conditioning Building, located in the southern portion of the upper yard. AOC 23 was incorporated into RFI/RI at the request of DTSC (DTSC, 2010). Two SWMUs—SWMU 7 Precipitation Tank (closed), and SWMU 8 Process Pump Tank—are located immediately south of the building. The tanks associated with these two units were removed in 1990 as part of the closure of the former hazardous waste treatment system (the area occupied by the two former tanks is now covered by the Fire Pump Building). The location of AOC 23 is shown in Figure 14. AOC 23 is also shown during and immediately after construction in Figure 15. The proposed investigation program for AOC 23 is provided in Appendix B20 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.5.1 Description and History

AOC 23, the Former Water Conditioning Building, has also previously been identified as the "Water Softening Building" and is currently identified as the "Storage Building." This building is currently used to store miscellaneous dry materials; no hazardous materials are stored here. Available information indicates that the Former Water Conditioning Building may have been used for dry storage of the chemicals (primarily soda ash and lime) used in the Permutit water-softening process. Water softening (mineral removal from raw well water) was conducted at the station to reduce the amount of cooling tower blowdown generated during plant operations and to reduce cooling tower maintenance requirements.

The water-softening process occurred in the large Permutit precipitator outside the building (Permutit, 1948). Raw (incoming) well water was pumped into the Permutit precipitator and mixed with soda and lime slurry to remove excess minerals and thereby soften the water. The Permutit process was used at the compressor station until approximately 1962. The need for water softening was eliminated when the source of plant water was switched to new water supply wells on the Arizona side of the river in the early 1960s.

The primary chemical used was soda ash; plant records from 1958 indicate that soda ash was delivered in bulk shipments of approximately 50,000 pounds every 4 to 6 weeks. Lime was provided in 50-pound bags, and the process apparently consumed several hundred pounds per day (PG&E, 1959). Sodium aluminate was another chemical used in the process.

The building was divided into eastern and western sides. The western side contained the mixing tanks used to dissolve the soda ash and lime, as well as pumps to feed the lime and soda ash slurries to the precipitation tank outside the building. The pre-mixed chemicals were pumped to the precipitation tank through dedicated lines leading directly from inside the building to the precipitation tank. The eastern side of the building contained pumps used to circulate the treated (softened) water and fire water (PG&E, 1960).

Treated (softened) water was pumped into a holding tank, and water treatment was discontinued when the treated water tank was full. Precipitated water-softening sludge was transferred directly to Sludge Drying Bed 1 via a dedicated pipeline.[4] In approximately 1957, a bulk chemical storage and feed system was constructed to handle the soda ash (PG&E, 1957b, 1970a). This system consisted of a conveyor trench, an elevator, and storage bins on top of the building. The components of this system are visible in the 1967 aerial photograph, and may have been removed when the two-step hazardous waste treatment system was constructed. At that time, one of the mixing tanks was reused as the chromate reduction tank (SWMU 6), and the other tank was reused as part of

[4] This pipeline was later reused for the hazardous waste treatment system.

the Precipitation Tank (SWMU 7) (PG&E, 1970a-c). Based on data from the white powdery material in AOC 14, the water-softening sludge might have contained low levels of total and hexavalent chromium.

The foundation of the building was built up around the mixing tanks (also referred to as "chemical vats" in some of the old drawings) to provide easy access during operations. Sometime after the tanks were removed, the concrete foundation was brought to a common level, and a small former stairwell was also filled in. The doorway leading to the stairwell was sealed off, thereby dividing the building in half. Floor drains were present on both sides of the building and were initially connected to the industrial drains (AOC 20). The drain in the western half of the building (containing the chemical mixing tanks) was later cut off and rerouted to the sludge drain pipeline (PG&E, undated).

From 1969 to 1985, the former Permutit Precipitation Tank (SWMU 7) was used as the precipitation tank for the hazardous waste treatment system. Therefore, it is also possible that this building may have been used to store chemicals or house incidental equipment associated with the hazardous waste treatment system. The chemicals used in the hazardous waste treatment system at this location consisted of sodium hydroxide, Poly Floc II, and ferric sulfate in the precipitation tank. No chemicals were known to have been added to the process pump tank. No organic compounds were used in the water-softening process.

The primary sources of contamination at AOC 23 are likely to be historical incidental spills of dry soda ash or lime and/or water-softening sludge. If sodium hydroxide, Poly Floc II, and ferric sulfate were stored in the building, then incidental spills of these chemicals also could have occurred at AOC 23. The primary source medium at AOC 23 is concrete within the building (the building floor). Secondary source media include surface soil adjacent to the building and shallow soil underneath the building.

2.5.2 Summary of Previous Soil Characterization

No samples have been collected in this area.

2.5.3 Constituents of Potential Concern

Based on the unit description, history, and discussions with DTSC and DOI, the COPCs for soil within AOC 23 are Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH.

2.6 AOC 24 – Stained Area and Former API Oil/Water Separator

AOC 24 consists of the formerly stained area near the former API OWS structure and also includes the footprint of the former OWS. AOC 24 was incorporated into the RFI/RI at the request of DTSC (DTSC, 2010). The proposed investigation program for AOC 24 is provided in Appendix B21 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.6.1 Description and History

An elongated area of dark staining near a structure located northeast of the north scrubbers in the lower yard of the compressor station is shown in the May 19, 1955, aerial photographs presented in Figures 5 and 10. The area of staining is also seen in the 1954-1956 aerial photograph presented in Figure 11. Recently located engineering drawings identify the structure as the former OWS (PG&E, 1967, 1993) located on the northern edge of the lower yard. Figure 16 presents the layout of the area in 2011 and a schematic of the historical layout, including topographic contours prior to the 1990 expansion in the area.

The unit is also visible in a January 26, 1954, photograph documenting the construction of the first three northern scrubbers and a subsequent (May 27, 1954) photo showing the completed scrubbers (Figure 17). No staining is visible in the January 26, 1954, photo but a small area of dark soil is seen to the northwest of the scrubbers in the May 27, 1954, photograph. Staining is also visible in a June 25, 1954, photo (Figure 12). It appears that the staining may have potentially come from a discharge emanating from the former OWS.

The OWS was 14 feet long by 8 feet wide and had 1-foot-thick walls. The unit was 4 feet deep and had a 1-foot-thick concrete bottom. The unit was apparently installed during the initial construction of the station, as Engineering Drawing 382956 (PG&E, 1970d) (included in Appendix B) was released for construction on April 4, 1951 (i.e., during the initial construction of the compressor station). A section view of the former OWS is shown

on the PG&E Engineering Drawing Number 481785 (Revision 22), titled Sewers & Drains (PG&E, 1967), included in Appendix B. It is unknown whether the drawing represents as-built conditions because dates and information on early revisions are incomplete. The drawing shows the former OWS being connected to an 8-inch vitrified clay influent pipeline via an 8-inch Schedule 30 pipeline located aboveground on the slope between the upper and lower yards. The drawing indicates that effluent water from the former OWS was to be discharged via a "ditch to low area." However, no as-built drawings of the former OWS have been located, and the actual discharge point of the effluent water is not known. The disposal process for the oil collected in the former OWS and the solid material removed from the bottom of the separator is unknown.

In approximately 1967, the former OWS was moved to the southern portion of the lower yard to allow for more effective gravity flow to the unit (PG&E, 1968). The former OWS then became OWTS Unit 4.4 (discussed in Appendix B25 of the *Final Soil RFI/RI Work Plan* [CH2M HILL, 2013]) of the oily water treatment system. It is unknown if any part of the foundation remains in the original location. Discharges from the original OWS location in the northern part of lower yard would also have ceased in approximately 1967.

Subsequent to the 1955 aerial photo, additional grading was performed in the lower yard, and the northern portion of the lower yard was filled in late 1989.[5] Based on the available information, portions of the fill may be as much as 40 to 45 feet deep (PG&E 1989a-b).

The primary sources of contamination at AOC 24 are likely to be historical water discharges from the former structure. The quantity of water released from the structure is unknown. The discharge could have been directed into the former low area north of the former northern boundary of the lower yard. Due to the fill in the northernmost portion of the lower yard, the affected area is now covered by several to tens of feet of additional soil.

2.6.2 Summary of Previous Soil Characterization

No data have been collected specifically to investigate AOC 24. Two opportunistic soil samples[6] (AOC24-OS1 and AOC 24-OS2) have been collected in the vicinity of AOC 24. These opportunistic samples were analyzed for Title 22 metals, Contract Laboratory Program (CLP) inorganics, PAHs, pesticides, PCBs, and TPHs. Laboratory analytical results for these opportunistic samples are presented in Tables 2 through 7.

Twenty-four constituents, including one calculated quantity (benzo[a]pyrene equivalents), were detected in the opportunistic samples near AOC 24. The detected constituents included the following:

- Seventeen metals (aluminum, arsenic, barium, calcium, total chromium, hexavalent chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc)
- Two pesticides (alpha-Chlordane and gamma- Chlordane)
- One PCB (Aroclor 1254)
- Two TPH compounds (TPH-diesel and TPH-motor-oil)
- Eleven PAHs and 1 calculated value (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, fluoranthene, indeno[1,2,3-cd]pyrene, phenanthrene, pyrene, and benzo[a]pyrene equivalents)

Two metals (hexavalent chromium and lead) were detected at concentrations exceeding their respective BTVs but were below their respective commercial CHHSLs and USEPA Region 9 regional screening levels for commercial use (commercial RSLs). These two sets of screening levels are collectively referred to as commercial screening levels.

[5] The fill was apparently placed in part to buttress the west slope below Cooling Tower B and the slope north of the northern scrubbers. Available documentation indicates that soil from the new evaporation pond excavation, as well as "from the small hill adjacent to the ravine located west of Cooling Tower B" was contemplated as fill for this area.

[6] An opportunistic soil sample is a soil sample that was collected during routine compressor station maintenance or repair activities. These soil samples are collected when maintenance and repair activities occur in an area of potential interest for the RFI/RI.

No other constituents were detected above background or at concentrations that exceeded their respective commercial screening levels.

2.6.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 24 are Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, PCBs, and pH.

2.7 AOC 25 – Compressor and Generator Engine Basements

AOC 25 consists of the compressor station engines and associated basements and the auxiliary (generator) engines and associated basements. AOC 25 was incorporated into the RFI/RI at the request of DTSC (DTSC, 2010). The Compressor Building contains 10 compressor engines; nine of these engines are currently active. The Auxiliary Building houses four generators that provide electricity to the station. The compressors and generators are fueled by natural gas. The proposed investigation program for AOC 25 is provided in Appendix B22 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.7.1 Description and History

Compressor Engine Basements. Each compressor engine is mounted on a concrete block; the top of the concrete pedestal is above the level of the floor of the building. Each concrete pedestal is surrounded by an open concrete trench. This open area is referred to as the compressor engine basement. The layout of the compressor pedestals is shown on Engineering Drawing Number 482377 (PG&E, 1953b), included in Appendix B, and the photographs of the pedestals are shown in Figure 18. The basements for each unit extend across the entire width of the Compressor Building and have small openings (open air windows) on each side of the building to allow pipes to enter the basement. The lower edge of the openings is approximately 36 inches above the floor of the basement. Each compressor basement is also equipped with two drains that are connected to the oily water treatment system. The basements provide access to piping leading to and from the compressor engines, as well as to the lower portions of the compressor engines themselves a photograph into a compressor engine basement is shown on Figure 18. During normal operation, the basements are covered with solid trench plates. Incidental drips and leaks from the compressor engines can enter the basements and would be discharged through the drains connected to the oily water treatment system.

The pedestals are approximately 57 inches high. The bottom of the basement is also concrete and is approximately 2 feet thick (PG&E, 1953b). Concrete sampling of select compressor pedestals was conducted in 1990 to evaluate cracks in the concrete pedestals. The sampling indicated that oil saturation was present to depths of 10 to 30 inches into the top of the concrete, with the deeper penetrations occurring at the location of the cracks. The concrete sampling work was performed to assist with the selection of future pedestal replacements. Pedestals have been repaired at Compressor Engines 1, 3, 5, 6, 7, 8, 9, and 10. The pedestals were repaired between the late 1980s and 2004. The original pedestals were removed only to the point required to reach competent concrete; the new concrete was then tied into the existing concrete.

PG&E has taken various steps to minimize leakage into the compressor engine basements. For example, historical information (as documented in GM 459732[7] [PG&E, 1971]) indicated that oil leakage from the compressor engines was cleaned up by plant staff daily. In 1971, new mechanical valve seals were installed under GM 459732 to minimize the leakage. Similarly, in 1968, PG&E upgraded pipe joints from the cooling-water headers to the compressor engines to minimize the potential for cooling-water leaks prior to increasing the operating pressure of the cooling-water system (PG&E, 1971).

Generator Engine Basements. The generators are equipped with basements similar to the compressors; however, the basements are present only on the south and east sides of the generator engines and are shallower than the compressor engine basements (approximately 30 inches deep). The generator engines are also located on pedestals. The pedestals are approximately 42 inches high measured from the bottom of the engine basement.

[7] GMs are internal project justification, costing, and tracking documents used by PG&E.

The layout of the generator pedestals is shown on Engineering Drawing Number 481826 (PGE, 1951a), included in Appendix B, and the generator pedestals are shown in Figure 19.

The generator basements are shallower, have only one drain, and only have an open air window on the east side of the Auxiliary Building. The bottom of the window opening is level with the basement floor. Incidental drips and leaks from the generator engines that collect in the basements would be discharged to drains connected to the oily water treatment system and could also leak out through the basement window. The area outside the generator engine basements was paved with concrete in the early 1990s.

Similar to the compressor engines, the generator engine foundations were also tested (PG&E, 1992). Oil penetration and decomposing concrete were noted at the four generator engines at Topock. The generator engine pedestals were repaired between 2001 and 2007 in the same way as the compressor engine pedestals. Data from four samples collected during the replacement of the Generator P-2 and P-4 pedestals (BC Laboratories 2005, 2006) indicated oil and grease were present in the waste concrete samples at concentrations ranging from 18,000 to 37,000 mg/kg; no screening level exists for oil and grease. The concrete samples were also analyzed for Title 22 metals. All metals concentrations were well below commercial screening levels.

Engine Basement Use and Operation. The compressor and generator engine basements were designed to contain incidental spills and leaks. The two types of liquids present in the compressor and generator engines are lubricating oil and cooling water. When the lubricating oil is drained from the compressor or generator engines during engine maintenance, it is, and historically has been, drained directly to a holding tank via piping specifically installed for that purpose. Cooling water was contained in a closed-loop system. When this system was drained, the water was combined with the oily water and was routed to the OWTS. The OWTS effluent was then combined with the cooling-tower blowdown. Currently, the cooling water is still drained to the OWTS through the industrial drains. The engine basements are cleaned periodically to remove surface coatings of oil; the cleaning water is also allowed to drain to the oily water treatment system.

2.7.2 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 25 are Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, and PCBs.

2.8 AOC 26 – Former Scrubber Oil Sump

AOC 26, the Former Scrubber Oil Sump (scrubber sump), was located in the lower yard south of the south scrubbers and was removed May 15, 1996. AOC 26 was incorporated into this work plan at the request of DTSC (DTSC, 2010). The scrubber sump was removed as part of an upgrade of the waste oil system and was replaced with a pipeline liquids-collection point. Waste oil from the scrubber sump was pumped to the waste oil sump in the upper yard (part of AOC 32), and pipeline liquids from the collection point continue to be pumped directly to the waste oil sump. The proposed investigation program for AOC 26 is provided in Appendix B23 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.8.1 Description and History

The scrubber sump consisted of an underground concrete structure with three compartments, each measuring 5 feet wide by 5 feet long (including walls) by 4 feet deep. Drawings (Engineering Drawing No. 382914) uncovered during the engineering file review provide an accurate configuration of the scrubber sump (PG&E, 1951b), as well as its location relative to existing piping (Engineering Drawing No. 481766, Revision 21) (PG&E, 1994), have been included in Appendix B. The location of the scrubber sump is shown in Figure 20 and photographs of the scrubber sump are presented in Figure 21. The scrubber sump received pipeline liquids removed from two banks of natural gas scrubbers. When the northern compartment of the scrubber sump filled up, the pipeline liquids were either transferred to one of the other two compartments or were pumped directly to the waste-oil sump (Trident Environmental Consultants [Trident], 1996b).

Closure of the sump consisted of the following steps:

- Piping was emptied, disconnected, and capped at abandoned ends.

- Residual liquid was removed from the sump by vacuum.
- Oily sludge in the sump was removed, placed into 55-gallon drums, and disposed of at a Class I landfill as non-RCRA hazardous waste.
- The sump was steam-cleaned after removal of the liquids, and sludge and was completely removed from the site.
- Discolored soil was excavated and stockpiled.
- Stockpiled soils were analyzed for California Assessment Manual (CAM) 17 metals TPH using USEPA Method 418.1; and benzene, toluene, ethylbenzene, and xylenes (BTEX) using USEPA Method 5030/8020.
- The sludge within the sump was also analyzed for PCBs.
- Additional soil excavation was performed, and four initial confirmation samples were collected at 6 feet bgs and were analyzed for TPH using USEPA Method 418.1.
- Supplemental excavation was conducted to 10 bgs, and four additional soil samples were collected.

Although TPH was present in the bottom of the excavation, safety considerations precluded further extending or deepening the excavation. High-pressure gas pipelines are present to the south and west of the excavation area, and the scrubber oil pump foundation and enclosed electrical conduits are present to the north. The electrical conduits prevented removal of the pump foundation. Increasing the depth of the excavation beyond 10 feet bgs was not possible due to the proximity of the high-pressure gas lines and pump foundation. Upon receipt of the closure certification report, the County of San Bernardino requested further delineation of the residual contamination (sidewall samples) and additional data for metals.

To further assess the extent of the remaining contamination, platforms were constructed at the corners of the excavation to allow use of a hand sampling tool without having workers enter the excavation. The success of the hand sampling was limited by the very rocky soil encountered in the bottom of the excavation; soil samples were successfully obtained from four locations ranging from 10.4 to 11 feet bgs; at two locations, two soil samples were collected (Trident, 1996c). Although there was residual contamination, closure of the scrubber sump was proposed based on leaking underground fuel tank manual criteria, including low rainfall and depths to groundwater exceeding 100 feet, which led to the conclusion that the residual contamination did not pose a threat. The results of the additional sampling were submitted in an addendum to the closure certification report (Trident, 1996c). The conclusions presented in the closure certification report remained the same (Trident, 1996c).

On January 16, 1997, Ecology and Environment, Inc. (E&E), conducted a deeper soil investigation (E&E, 2002); the investigation report indicates that it was completed in accordance with the scope of work reviewed by the County of San Bernardino. Five borings were installed to a maximum depth of 40 feet bgs. Some of the borings had to be relocated slightly from their planned location due to the presence of underground utilities. Borings SS-1, SS-4, and SS-5 were terminated at 25 feet bgs. Boring SS-2 was terminated at 20 feet bgs, and Boring SS-3 was terminated at 40 feet bgs because there was no field evidence of hydrocarbons (odor, staining, or photoionization detector readings) at those depths. Hydrocarbon impacts to soil were present to approximately 35 feet bgs.

The results of this investigation indicated there was little lateral spreading of hydrocarbons, rather, they migrated vertically to 35 to 40 feet bgs. Consistent with the Trident reports, E&E reported that the sump and surrounding impacted soils were removed to 10 feet bgs. E&E also indicated the excavation backfilled with clean material. E&E concluded that because the depth to groundwater is approximately 130 to 140 feet bgs and annual precipitation is very low, it is highly unlikely that remaining TRPHs will migrate to groundwater. Therefore, no further action was recommended.

The primary sources of contamination at AOC 26 are likely to be incidental spills or leakage at fittings during transfer of the accumulated pipeline liquids, as well as potential leaks through the bottom of the sump. The quantity of pipeline liquids released from the scrubber sump is unknown; however, as documented in the Trident and E&E reports (Trident, 1996b; E&E, 2002), releases from the sump occurred because contamination was

present in and below the excavation. The primary source medium at AOC 26 is subsurface soil. Residual contamination is present to approximately 35 feet bgs.

2.8.2 Summary of Previous Soil Characterization

Sampling at AOC 26 included the soil stockpiled from the excavation, the sludge in the bottom of the sump, two sets of confirmation samples, and two rounds of sampling designed to further characterize residual contamination. Sample results for AOC 26 are included in Tables 8 and 9 and are further discussed below. The historical data for AOC 26 are all Category 3 because laboratory quality control backup information was not included in the report.

The stockpile samples were analyzed for CAM 17 metals and eight toxicity characteristic leaching procedure (TCLP) (leachable) metals, TPH, and BTEX. In addition to these parameters, the sludge sample was also analyzed for PCBs. Arsenic, barium, total chromium, cobalt, copper, lead, molybdenum, nickel, vanadium, and zinc were detected in the CAM 17 metals analysis. None of the detected concentrations exceeded the commercial screening levels. Total chromium, copper, lead, molybdenum, and zinc were detected at concentrations exceeding their respective BTVs. Total chromium was detected at a concentration of 139 mg/kg compared with the BTV of 39.8 mg/kg, lead was detected at a concentration of 81 mg/kg compared with a BTV of 8.39 mg/kg, and molybdenum was detected at a concentration of 12 mg/kg compared with a BTV of 1.37 mg/kg. Copper (19 mg/kg) and zinc (64 mg/kg) only barely exceeded their BTVs (16.8 mg/kg, and 58 mg/kg, respectively). Barium was the only soluble metal detected; it was detected at a concentration of 1.8 milligrams per liter (mg/L) compared with the TCLP of 100 mg/L. Soluble arsenic, cadmium, total chromium, lead, mercury, selenium, and silver were all nondetect at detection limits ranging from 0.02 mg/L (mercury) to 0.5 mg/L (lead).

Only low concentrations of BTEX compounds were detected. Benzene was detected at 0.008 mg/kg, ethylbenzene was detected at 0.04 mg/kg, toluene was detected at 0.17 mg/kg, and total xylenes were detected at 0.52 mg/kg. TPH-gasoline was detected at 12 mg/kg, and TPH-diesel was detected at 2,500 mg/kg. The laboratory data reports for the sludge sample are not available; the text of the report indicates that PCBs were nondetect; the detection limit was not provided (Trident, 1996b).

At the request of San Bernardino County, the stockpiled soils were subsequently analyzed for soluble hexavalent chromium, total chromium, and lead using the Waste Extraction Test. Soluble hexavalent chromium was nondetect; soluble total chromium and soluble lead were detected at concentrations of 1.3 mg/L, and 0.63 mg/L, respectively, which are well below the applicable soluble threshold limit concentrations of 560 mg/L and 5 mg/L, respectively. A fish bioassay was also conducted, and the soil sample passed the fish bioassay (Trident, 1996c).

Based on the results of the soil stockpile and sludge testing, “oil” (that is, TPH) was the only constituent of concern; confirmation samples were consequently analyzed for TRPH only (using USEPA Method 418.1) (Trident, 1996c). The test results from the initial round of confirmation sampling indicated that TRPH concentrations in the four samples ranged from 8,400 mg/kg to 15,000 mg/kg, and additional excavation was performed to 10 feet bgs. Four additional confirmation samples were collected; TRPH concentrations ranged from 2,000 mg/kg to 12,000 mg/kg.

As discussed above, because further excavation would not have been safe, an attempt was then made to characterize the remaining soil; however, the rocky soil greatly limited the depth that could be achieved for these supplemental samples. Samples from the southern portion of the excavation were collected at 10.5 (two locations), 10.8, and 11.0 feet bgs. These samples contained TRPH at 1,300 mg/kg (SS-SW-Comp, a composite sample), 780 mg/kg (SS-SE-10.5), 570 mg/kg (SS-SE-10.8), and 400 mg/kg (SS-S-11.0), respectively. Only three samples (SS-NW-10.0, SS-N-10.4, and SS-NE-10) were obtained from the northern side of the excavation at 10.0 and 10.4 feet bgs. These three samples contained TRPH concentrations of 3,700 mg/kg (SS-N-10.4), 15,000 mg/kg (SS-NE-10), and 15,000 mg/kg (SS-NW-10.0). There was no visible discoloration of the soil.

At the request of San Bernardino County, additional sidewall sampling was performed. Four sidewall samples (SSWN, SSWE, SSWS, and SSWW) were collected and analyzed for TRPH. The TRPH results were 3,700 mg/kg (SSWN), 1,800 mg/kg (SSWE), 3,100 mg/kg (SSWS), and 9,100 mg/kg (SSWW). Also at the request of the County, metals analyses were performed on the three high-TRPH concentration samples from the bottom and sidewalls of

the excavation. The analyses were performed on samples SS-NE-10 and SS-NE-10.5 from the bottom of the excavation and from SS-WW (collected at 8 feet bgs on the sidewall of the excavation). TRPH concentrations in these samples ranged from 6,700 mg/kg to 15,000 mg/kg. The samples were analyzed for total chromium, lead, and hexavalent chromium. Hexavalent chromium was nondetect in all three samples, and total chromium concentrations ranged from 14 to 22 mg/kg (all below the BTV of 39.8 mg/kg). The sample with the highest detected TRPH concentration (SS-NE-10.5) also contained a detectable concentration of lead (12 mg/kg). The detected lead concentration slightly exceeded the BTV for lead (8.39 mg/kg).

The E&E investigation included five borings, sampled every 5 feet (E&E, 2002). Twenty samples were collected and submitted for analysis for TRPH using USEPA Method 418.1. Detection limits ranged from 20 to 23 mg/kg. Borings SS-2 and SS-3 were installed within the footprint of the excavation, and borings SS-1, SS-4, and SS-5 were installed near the excavation. No hydrocarbons were detected in borings SS-4 and SS-5, located northeast and southwest of the former scrubber sump, respectively. The concentrations in SS-1 ranged from 29 to 78 mg/kg; the deepest sample (from 20 feet bgs) had a concentration of 38 mg/kg. Boring SS-2, located in the southern third of the former excavation, showed elevated concentrations of TRPH in the samples collected at 15 feet and 20 feet bgs (8,600 and 8,800 mg/kg, respectively); no samples were collected below 20 feet bgs from this boring. Elevated concentrations of TPH were detected between 20 feet and 35 feet bgs at Boring SS-3. Concentrations in these samples ranged from 2,800 to 9,700 mg/kg. TRPH was nondetect (less than 22 mg/kg) in the sample collected at 40 feet bgs.

2.8.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 26 are Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, and PCBs.

2.9 AOC 27 – MW-24 Bench

During employee interviews conducted by PG&E in late 2009 and early 2010, a former PG&E Topock Compressor Station employee indicated the area north of the compressor station and south of I-40, informally known as the MW-24 bench (named because monitoring well MW-24 is located in this area), was used as a waste disposal area. Prior to the construction of Interstate 40, this area was contiguous with AOC 14 – Railroad Debris Site. Figure 22 shows the location of AOC-27. In March 2011, DTSC identified potential burn waste in the eastern edge of the road cut on the road from AOC 27 to Bat Cave Wash and directed PG&E in a March 24, 2011, email to collect samples of the waste material. Figure 23 includes a photograph of the potential burn waste within the road cut. The e-mail also directed PG&E to define the lateral and vertical extents of waste and any associated contamination observed in the in situ pilot study trench. The proposed investigation program for AOC 27 is provided in Appendix A, Subappendix C11, of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.9.1 Description and History

Miscellaneous construction debris is present in AOC 27. In January 2008, during trenching activities in AOC 27 associated with installation of a control panel related to the upland in situ pilot test, debris consisting mostly of treated wood, concrete, and scrap steel/tin were encountered at a depth of approximately 3 feet bgs. Figure 24 includes photographs of the debris encountered. DTSC and the United States Department of the Interior were notified of this discovery in an e-mail dated January 12, 2008. Three samples of the debris and two soil samples were subsequently collected.

The primary source of contamination at AOC 27 is debris disposal. The primary release mechanisms are direct releases of contaminated particulates or leaching of contaminants from the debris and/or burned material. Primary source media consist of surface, shallow, and subsurface soils. Contaminants released from debris and burn material located in AOC 27 also could have been transported to the lower portions of the unit and potentially to AOC 1 (Bat Cave Wash) through surface runoff.

2.9.2 Summary of Previous Soil Characterization

The results for the two soil samples and three debris samples are described below.

Soil Data. Soil samples were collected from approximately 3 feet bgs at two locations (24soil-01 and 24soil-02) within the upland in situ pilot study trench in AOC 27, as shown on Figure 22. The samples were not collected following sample collection and handling protocols outlined in the PG&E Program Quality Assurance Project Plan and were analyzed for metals, VOCs, SVOCs, PAHs, TPH (soil samples only), and pH. Three debris samples were collected at locations 24debris-01, 24debris-02, and 24debris-03 and were analyzed for metals, pH, and PAHs. VOCs and SVOCs other than PAHs were not detected. Because the soil samples were not collected following the standard sample collection procedures, these data are considered Category 3.

Eighteen constituents, including three calculated quantities (total low-molecular-weight PAHs, total high-molecular-weight PAHs, benzo[a]pyrene equivalents), were detected in soil samples collected in AOC 27. The detected constituents included the following:

- Twelve metals (arsenic, barium, cadmium, total chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc)
- Two PAHs (fluoranthene and phenanthrene)
- Total low-molecular-weight PAHs and total high-molecular-weight PAHs
- Benzo(a)pyrene equivalents
- TPH-diesel

Fifteen of the constituents detected in soil samples collected at AOC 27 (arsenic, barium, cadmium, total chromium, cobalt, copper, molybdenum, nickel, vanadium, zinc, fluoranthene, phenanthrene, TPH-diesel, total low-molecular-weight PAHs, and total high-molecular-weight PAHs) were detected at concentrations below their respective interim screening levels. Three constituents were detected one or more times at concentrations exceeding the interim screening levels, including lead, selenium, and the calculated quantity benzo(a)pyrene equivalents. Lead and selenium were detected in both soil samples collected at AOC 27. The maximum detected concentration of lead was 8.7 mg/kg, which is just above the BTV (8.39 mg/kg), as shown in Table 10. The maximum detected concentration of selenium was 6.2 mg/kg, which exceeds the interim screening level (1.47 mg/kg) (BTV).

Calculated benzo(a)pyrene equivalents for both soil sample locations are 290 mg/kg, which exceeds the interim screening level (38 mg/kg) (residential CHHSL). Carcinogenic PAHs were not detected above interim screening levels at these sample locations. Consistent with the *Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil* (ARCADIS, 2009), half of the reporting limits for those PAHs not detected above the reporting limits were used to calculate the benzo(a)pyrene equivalents. Therefore, the calculated benzo(a)pyrene equivalents are conservative values.

Debris Data. Fourteen metals were detected in one or more of the three debris samples: antimony, arsenic, barium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc. No PAHs were detected in the debris samples; however, detection limits were elevated. Of those compounds detected, antimony (1.38 mg/kg, 3.8 mg/kg) total chromium (190 mg/kg), copper (17 mg/kg), lead (66 mg/kg, 830 mg/kg), molybdenum (1.5 mg/kg), nickel (100 mg/kg), selenium (8 mg/kg, 8.9 mg/kg), vanadium (120 mg/kg), and zinc (170 mg/kg) were detected above their respective interim screening levels, as shown in Table 10.

2.9.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 27 are PAHs, VOCs, SVOCs, Title 22 metals, hexavalent chromium, PCBs, TPH, pesticides, dioxins/furans, and pH.

2.10 AOC 28 – Pipeline Drip Legs

Four drip legs (two each on the 300A and 300B main gas pipelines) have been added as new AOCs (AOC 28a through AOC 28d) at the request of DTSC during comment resolution on the *Final Soil RFI/RI Work Plan*. AOC 28 includes AOC 28a: 300A Pipeline Drip 1 (Off-set Drip East of Compressor Station), AOC 28b: 300A Pipeline Drip 2

(East of Compressor Station), AOC 28c: 300B Pipeline Drip East of Compressor Station, and AOC 28d: 300B Drip in Bat Cave Wash. The location of each of the drip legs is shown on Figure 25 and photographs of the drip legs are shown in Figure 26. Three of the drip legs are on the 300A and 300B pipelines to the east of the compressor station, and one drip leg for the 300B pipeline is on the 300B pipeline west of the compressor station in Bat Cave Wash. The proposed investigation program for AOC 28 is provided in Appendix A, Subappendix C12 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.10.1 Description and History

A drip leg is typically a separate section of pipe connected to and located below the main gas pipeline. The drip leg collects pipeline liquids by gravity. It is connected to a valve used to drain the pipeline liquids to a fixed or portable tank. The drip legs on the east side of the compressor station consist of a dog-leg drip on the 300B pipeline, an offset drip on the 300A pipeline, and a bottom drip associated with a raised section of pipe on the 300A pipeline. The 300B dog-leg drip was formerly connected to the 300B Pipeline Liquids Tank, which was investigated separately as UA 2. The drip leg on the 300B pipeline in Bat Cave Wash is also a bottom tap. Drip legs are also referred to by their location on the pipeline, as measured in miles from the start of the PG&E-owned pipeline, which is at the state line. AOC 28a is therefore MP 0.13A, AOC28b is MP 0.24A, AOC 28c is MP 0.21B, and AOC 28d is MP 0.55B.

All drip legs are currently drained to portable tanks on a monthly basis. A historical procedure for draining pipeline drips confirms this frequency (PG&E, 1989c). It is possible that some spillage could occur or may have historically occurred during the transfer process (for example, if the hose from the valve is not connected properly to the portable tank). All potential releases at the drip legs would be surface releases, and the releases would be confined to a very small area in the immediate vicinity of the drip legs. Since the early 1980s, PG&E has been conducting annual PCB testing on the collected pipeline liquids from the incoming 300A and 300B transmission pipelines. No PCBs have been detected coming into the compressor station through those pipelines. As described in RFI/RI Volume 1, a portion of the Transwestern Gas Pipeline that is offsite and to the east of the facility was contaminated with PCBs in the 1990s. After PG&E discovered the presence of PCBs in some pipeline liquids from Transwestern at Topock in the late 1990s, PG&E installed protective equipment and cleaned portions of the pipeline system to remove PCB contamination. Subsequently, PG&E implemented a monthly PCB monitoring program along the entire downstream Line 300 gas pipeline system. Since the initiation of this testing protocol, only low levels of PCBs have been detected in the downstream pipelines.

The primary sources of contamination in AOC 28 consisted of potential historical or current spills while transferring the contents of the drip legs to the portable tanks. Any constituents released would have been released in liquid form and released to surface soil. Surface soil is the primary source medium.

2.10.2 Summary of Previous Soil Characterization

Soil sampling has not occurred in AOC 28 to assess the drip legs specifically; however, opportunistic soil samples have been collected at two locations (AOC28-OS1 and AOC28-OS2) near AOC 28a and AOC 28c, respectively, as shown on Figure 25. Opportunistic samples were collected at 0 to 0.5, 2.5 to 3, 5.5 to 6, and 9 to 9.5 feet bgs and were analyzed for PAHs, VOCs, SVOCs, TPHs, PCBs, and pH. In addition, three soil samples collected at various depths were analyzed for one or more metals based on X-ray fluorescence screening. Sample AOC28-OS1 at 9 to 9.5 feet bgs was analyzed for hexavalent chromium, total chromium, and molybdenum. Sample AOC-OS2 at 2.5 to 3 feet bgs was analyzed for hexavalent chromium only. Sample AOC-OS2 at 8.5 to 9 feet bgs was analyzed for the full Title 22 suite of metals and hexavalent chromium. Laboratory analytical results for the eight opportunistic samples are presented in Tables 11 through 14.

No data were collected at AOC 28b and AOC 28d; however, four borings previously have been advanced near AOC 28d in Bat Cave Wash: AOC1-T2a is approximately 80 feet to the south, AOC1-T2b is approximately 70 feet to the southeast, AOC1-T2e is approximately 30 feet to the north, and SS-4 is approximately 20 feet to the east. Soil samples were collected at 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs from AOC1-T2a, AOC1-T2b and at AOC1-T2e, and at 1, 3, 6, and 10 feet bgs from SSB-6. AOC1-T2a, AOC1-T2b, and AOC1-T2e were analyzed for TPH and PAHs. TPH-motor-oil was the only TPH constituent detected, with a maximum concentration of 40.9 mg/kg compared with the ESL of 1,800 mg/kg. Fluorene was the only detected PAH, with a concentration of 5.8 micrograms per

kilogram (µg/kg) in AOC1-T2a compared with the interim screening level of 2,300,000 µg/kg. AOC1-T2b was also analyzed for PCBs and pesticides; no PCBs or pesticides were detected. These data are not considered representative of AOC28d since they were collected 20 feet or more away from the AOC.

Nineteen constituents, including metals, TPH, and three calculated quantities (benzo[a]pyrene equivalents, total low-molecular-weight PAHs, and total high-molecular-weight PAHs) were detected in one or more locations near AOC 28. VOCs, TPH-gasoline, SVOCs other than PAHs, and PCBs were not reported above laboratory limits in the opportunistic soil samples collected near AOC 28. Seventeen of the 19 detected constituents and calculated quantities (arsenic, barium, total chromium, cobalt, lead, nickel, vanadium, TPH-diesel, TPH-motor oil, benzo[a]anthracene, benzo[b]fluoranthene, chrysene, naphthalene, pyrene, benzo[a]pyrene equivalents, total low-molecular-weight PAHs, and total high-molecular-weight PAHs) were detected at concentrations below their respective interim screening levels.

Two constituents (molybdenum and zinc) were detected one or more times at concentrations exceeding interim screening levels. Molybdenum was detected in two of two samples analyzed, at concentrations of 3.7 and 5 mg/kg, respectively, which are above the BTV (1.37 mg/kg). Zinc was only analyzed in one soil sample collected at 8.5 to 9 feet bgs and had a detected concentration of 70 mg/kg, which exceeds BTV (58 mg/kg).

2.10.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 28 are TPH, PAHs, and PCBs.

2.11 AOC 29 – Interim Measure No. 3 Treatment Plant

AOC 29 was incorporated into the RFI/RI at the request of DTSC during comment resolution on the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013). Investigation of AOC 29 will be conducted as part of the decommissioning and removal activities for this area, as proposed in the forthcoming *Interim Measures No. 3 (IM-3) Decommissioning, Removal, and Restoration Work Plan* and as part of the baseline sampling during the Topock groundwater remedy system installation, as proposed in the forthcoming *Groundwater Remedy Implementation – Baseline Sampling and Analysis Plan.*

2.11.1 Description and History

PG&E began implementing an interim measure to hydraulically control groundwater contamination in March 2004. The interim measure is intended to function until the final Topock groundwater remedy is put into operation. The initial stage of the interim measure involved pumping, transporting, and disposing of groundwater from the MW-20 Bench (AOC 30, IM-2). Batch treatment of groundwater was added to the MW-20 Bench in July 2004. The IM-3 treatment plant was constructed to replace IM-2 because space and treatment capacity limitations precluded management of higher groundwater flows at the MW-20 Bench.

The IM-3 treatment plant began treating groundwater in July 2005, and it has been in continuous operation since that time. In early September 2005, IM-2 was turned off, and in 2009, it was decommissioned and the MW-20 Bench site was reconfigured to support continued operation of the IM-3 treatment system. Brine from the IM-3 treatment plant is pumped down to the MW-20 Bench area for storage prior to offloading to trucks. As part of the decommissioning of IM-2and reconfiguration of the MW-20 Bench site, the IM-3 brine (reverse osmosis concentrate) storage and loading facilities were relocated and upgraded on the MW-20 Bench (CH2M HILL, 2007c). IM-3 and the associated soil data are described in more detail below, and detailed information regarding the MW-20 Bench (AOC 30) is provided in Section 13 of this document.

The primary sources of contamination at AOC 29 are likely to have been incidental spills; these spills were appropriately addressed at the time they occurred, as described above. The primary source medium at AOC 30 is soil.

DOI and DTSC have selected the final groundwater remedy (Final Remedy) (DOI, 2010; DTSC, 2011), and AOC 29 will not be a part of the selected Final Remedy; therefore, the IM-3 treatment plant and other parts of IM-3 will be decommissioned and removed after DOI and DTSC determine that the Final Remedy is operating properly and successfully. Because AOC 29 is an operating facility, it will be investigated and closed following decommissioning

of IM-3. Proposed sampling at IM-3 will be presented in the forthcoming *Interim Measures 3 Decommissioning, Removal, and Restoration Work Plan*.

IM-3 Treatment Plant. AOC 29 consists of the entire IM-3 groundwater treatment plant, including equipment, pipelines, valves, instrumentation, utilities, all infrastructure, sunshade, mobile warehouse units, trailer, treatment plant foundation and secondary containment areas, underground pipelines and utilities within the footprint of the treatment plant fence line, and the security fence and gate. The IM-3 treatment plant was established and is operated under modern waste management laws and has been under regulatory agency supervision its entire operating duration. Figure 27 shows the layout of the IM-3 treatment plant and Figure 28 provides photographs of the treatment plant.

The groundwater treatment system is a continuous, multistep process that involves three functions: (1) reducing hexavalent chromium to the less soluble trivalent form, (2) precipitating trivalent chromium and removing precipitated solids by clarification and microfiltration, and (3) lowering the naturally occurring total dissolved solids (TDS) concentration using reverse osmosis. All treatment facilities are located within secondary containment (CH2M HILL, 2011a). Treated groundwater is returned to the aquifer through an injection system consisting of two injection wells. As noted above, the brine produced from the reverse osmosis system is pumped to brine storage tanks on the MW-20 Bench and then transported to an appropriate offsite facility using tanker trucks. Precipitated solids, also known as sludge, are stored in 8-cubic yard phase separator bins within secondary containment on the eastern side of the IM-3 facility as shown on Figure 27. The phase separators are removed from containment after being sealed for transport, placed on the gravel adjacent to the containment and then loaded on transportation trucks. The generated sludge is characterized quarterly as part of the DOI Waste Discharge Applicable or Relevant and Appropriate Requirements and is reported quarterly to DOI and the Water Board. The sludge is tested for antimony, arsenic, barium, beryllium, cadmium, total chromium, hexavalent chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc. Typically, the following constituents are detected above reporting limits within the following ranges (all ranges are approximate): antimony (30 to 60 mg/kg), barium (30 to 70 mg/kg), cadmium (4 to 7 mg/kg), total chromium (2,300 to 4,500 mg/kg), hexavalent chromium (25 to 50 mg/kg), copper (5 to 20 mg/kg), fluoride (20 to 60 mg/kg), mercury (0.1 to 0.2 mg/kg), nickel (10 to 30 mg/kg), vanadium (25 to 50 mg/kg) and zinc (25 to 40 mg/kg).

Chemicals currently stored at the facility include groundwater treatment chemicals, as well as miscellaneous maintenance-related materials, including small quantities of lubricants and paint. All flammable liquids are stored in a flammable liquids cabinet. Treatment chemicals consist of ferrous chloride, sodium hydroxide, hydrochloric acid, polymer, and antiscalant.

None of the aboveground components of the existing IM-3 system located within the footprint of the existing IM-3 treatment plant building or within the IM-3 treatment plant fence line will be reused in their current locations as part of the Final Remedy. The IM-3 treatment plant will be decommissioned in phases. The first phase will consist of transferring the facility into “lay-by” status, which will involve securing the facility and making it inoperable through lock-out/tag-out of equipment and blind-flanging of certain pipelines.

Actual facility removal will begin upon authorization by DTSC, with concurrence from DOI. The facility will be removed in five primary steps: (1) preparing and demarcating the site and isolating utilities; (2) decontaminating identified system components; (3) removing (demolishing or recovering) identified IM-3 system; (4) characterizing waste; and (5) properly handling, transporting, and disposing of waste streams.

Incidental Spills. In accordance with regulatory requirements and best management practices, all spills associated with IM-3 are recorded and evaluated to determine if changes in procedures or other corrective actions are required to prevent similar incidents in the future. A summary of all incidental spills at the IM-3 treatment plant are summarized in Table 15. All spills were cleaned up promptly. Spill event notification and reporting follows guidelines outlined in the IM-3 Emergency Notification Binder (CH2M HILL 2008).

2.11.2 Summary of Previous Soil Characterization

Characterization sampling has not occurred at AOC 29. Only limited sampling to assess background conditions has been conducted at AOC 29.. Eight soil samples from two background sample locations were collected at this unit.

Samples were collected at 0 to 0.5, 2 to 3, 5 to 6, and 9 to 10 feet bgs. The samples were collected as part of the soil background investigation to develop Topock site-specific background threshold values for the Soil RFI/RI (CH2M HILL, 2009b). All eight samples were analyzed for Title 22 metals, hexavalent chromium, and CLP inorganics. The sample results are presented in Tables 16 and 17. The two surface soil samples were also analyzed for PAHs and pesticides; no PAHs or pesticides were detected (Table 18). Eleven metals were detected in the eight soil samples (arsenic, barium, total chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc). The only constituent detected above its interim screening level was selenium. Selenium was detected above its background threshold concentration (1.47 mg/kg) in two samples, BKG-15 at 2 to 3 feet bgs (1.8 mg/kg) and BKG-15 at 9 to 10 feet bgs (2.0 mg/kg). All other samples were non-detect for selenium, with a detection limit of 1 mg/kg.

2.11.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 29 are Title 22 metals, hexavalent chromium, VOCs, SVOCs, PAHs, TPH, pH, ferrous iron.

2.12 AOC 30 – MW-20 Bench

AOC 30, the MW-20 Bench, is located between the National Trails Highway and the Colorado River. AOC 30 is located outside of the compressor station fence line and was part of the floodplain reductive zone in situ pilot test. AOC 30 was incorporated into the RFI/RI at the request of DTSC during comment resolution on the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.12.1 Description and History

The MW-20 Bench is a topographic flat area adjacent to National Trails Highway (which was formerly the original railroad route) approximately 700 feet long and 100 feet wide at its widest point. The profile of the MW-20 Bench appears to be present in the earliest photographs of this area (1936 aerial photograph presented in the *RFI/RI Report Volume 1* [CH2M HILL, 2007a]), and may have been part of the original railroad construction, in the late 1800s. A portion of the MW-20 Bench is currently being used by PG&E for brine storage and loading facilities to support the Interim Measures Number 3 (IM-3) Treatment Plant (Figure 29). Portions of the MW-20 Bench are also periodically used by San Bernardino County, SoCal Gas, and Burlington Northern and Santa Fe Railway as a staging area for storing maintenance materials and equipment. Based on its proximity and topography, it is likely that the bench was also used as a construction staging area during construction of railroad and Interstate 40 bridges across the Colorado River.

PG&E Operational History. PG&E operations on the MW-20 Bench began in 1998 and continue to the present time. Initial PG&E activities at the MW-20 Bench consisted of groundwater monitoring well installation and groundwater monitoring. MW-20 wells (three wells installed to depths of 70, 100, and 130 feet) were installed in 1998 and 1999. Starting in 2004, the MW-20 wells were used as extraction wells to support the Interim Measure Number 2 (IM-2). This operation was eventually replaced by the current extraction well system (extraction wells TW-2D, TW-2S, and TW-3D at MW-20 Bench and PE-1 within the floodplain) constructed between April 2004 and March 2006. Additional groundwater monitoring wells MW-31-60 and MW-31-135 were installed on the MW-20 Bench in April 1999 and March 2004, respectively.

IM-2 operations began in March 2004 and continued through August 2005. During initial IM-2 operations, groundwater was extracted and stored in tanks on the MW-20 Bench. The groundwater extraction system was located within an approximate 10,000-square-foot secured area on the MW-20 Bench, and consisted of six 19,500-gallon storage tanks; piping; secondary containment; a portable generator; operations crew storage and work facilities; and security fencing, as shown on Figure 30. Extracted groundwater contained hexavalent concentrations exceeding the toxicity characteristic threshold concentration for hazardous waste, requiring that the waste be transported offsite for treatment and/or disposal at a licensed hazardous waste treatment facility.

Beginning in July 2004 and continuing until the current groundwater treatment and extraction systems (IM-3) operations began in July 2005, a batch treatment plant operated on the MW-20 Bench. The storage tanks were retrofitted with internal piping and devices (venturi eductors) to ensure proper mixing of the groundwater with reducing and precipitating agents. A clarifier was added to the system, along with a filter, additional system

piping, instrumentation, and controls. All modifications to the system were made within the footprint of the fenced extraction facilities.

The batch treatment consisted of adding small quantities of sulfuric acid and ferrous chloride to the groundwater to convert hexavalent chromium (Cr[VI]) to trivalent chromium (Cr[III]) and subsequent addition of small amounts of sodium hydroxide to raise the pH to a target range of 7.5 to 8.2 to precipitate the iron and chromium as hydrous iron oxide and chromium hydroxide, respectively. Upon confirmation that the treatment goal had been met, the water and precipitated solids were pumped to a clarifier for settling. The water from the clarifier was conveyed to the treated water storage tank, and sludge was removed from the bottom of the clarifier as needed and transferred to a phase separator/tote. The treated water and sludge were disposed of at appropriate facilities off site (CH2M HILL, 2004).

During operation, the batch treatment system was inspected daily. Because the treated water and sludge were a bright rust color, potential leaks were easy to detect (CH2M HILL, 2009a). Any leaks/spills identified during operation were addressed immediately; see Spills at the MW-20 Bench section below. Sludge generation rates were estimated at about 625 pounds per week, assuming an influent concentration of 7.5 milligrams per liter (mg/L) of Cr(VI) at 17 gallons per minute of flow (CH2M HILL, 2004).

PG&E stopped treating groundwater at the IM-2 Batch Treatment Facility in August 2005, as required by the U.S. Department of the Interior, Bureau of Land Management (BLM) (PG&E, 2005a), and has fully closed the unit (CH2M HILL, 2009a). During closure of the IM-2 Batch Treatment Facility, some of the features were reconfigured to support the IM-3 treatment system, which is still in operation. The closure of IM-2 occurred in three phases; see below for a detailed discussion of the closure and reconfiguration.

The MW-20 Bench is within the floodplain reductive zone in situ pilot test area. The floodplain reductive zone pilot test was conducted between May 2006 and July 2007 and included several injections of food-grade reagent mixtures to reduce Cr(VI) in groundwater to form stable, insoluble Cr(III). No injections were performed within MW-20 Bench; however, extraction wells TW-2D, TW-2S, and TW-3D on the MW-20 Bench are used to monitor the in situ pilot test.

IM-2 2 Closure and Reconfiguration

Phase 1 of IM-2 Closure. In August and September 2005, the batch treatment system was put into standby mode ("laid-up"). As part of laying up the system, equipment that had been in contact with hazardous waste was flushed with water. This water was stored in containers and transported to and treated in a hazardous waste treatment facility. Some piping was disposed of as hazardous waste in a licensed disposal facility (CH2M HILL, 2009a).

Various other activities were completed during this same time period, as required by Condition 2 of the BLM's June 1, 2005, letter and in accordance with the draft MW-20 Bench Decommissioning Work Plan that was submitted to BLM on August 8, 2005. The activities conducted included the following (PG&E, 2005a):

- Remaining batch treatment chemicals, including ferrous chloride, sodium hydroxide, and polymer, were removed from the site.
- The phase separator containers and sludge were removed from the site.
- Untreated groundwater and treated groundwater were removed from the site.
- Tanks, clarifier, pumps, and piping were flushed with potable water.
- Any potentially hazardous debris from IM operations (e.g., used PVC pipe) was also removed from the site.
- Batch treatment equipment was de-energized.

Phase 2 of IM-2 Closure. By March 2006, PG&E had accomplished the second phase of the decommissioning activities that included the items listed below (PG&E, 2006b):

- Tanks were triple-rinsed and cleaned by pressure-washing.

- Secondary containment was washed down.
- Support facilities (including the field trailer, equipment Conex box, field laboratory, generator, ice machine, and potable water tanks) were removed from the site.
- Batch treatment pumps, piping, and appurtenances were covered and secured in-place.
- Security fencing was modified to reduce the footprint of the secured area on the MW-20 Bench.

Phase 3 of IM-2 Closure. Final decommissioning of the IM-2 Batch Treatment Facility occurred from January 2008 to January 2009. The final activities consisted of the following:

- The white polyethylene tank was removed.
- Temporary structures, such as wood platforms and chemical tote stand, were demolished and removed.
- Piping, conduit, pumps, and ancillary equipment used at the IM-2 facility were removed.
- The six storage tanks and secondary containment berm and liner were removed.

The equipment (e.g., piping and pumps) that had been in contact with the hazardous waste or had visual evidence of such contact was disposed of as hazardous waste at the Kettleman Hills hazardous waste disposal facility (approximately 3.75 tons of material). The remaining 7.97 tons of solid waste material (e.g., containment liners, liner berms, nonhazardous process equipment) that was not in contact with the hazardous groundwater or sludge was stored in dumpsters and disposed of at Mesa Disposal in Mohave County, Arizona. The treatment and storage tanks were leased from DenBeste Transportation; after cleaning, DenBeste removed them from the site (CH2M HILL, 2009).

Visual inspection of the sand base material that was added to the soil surface below the containment liner during initial construction of the facility showed no visible signs of contamination. As discussed below, an earlier spill at the Batch Treatment Facility in 2005 was entirely excavated. Therefore, the sand base material was deemed suitable for reuse (CH2M HILL, 2009).

Following the final deconstruction and visual inspection, five confirmation soil samples were collected from the top 6 inches of the ground surface within the footprint of the former Batch Treatment Facility. The purpose of the confirmation sampling was to verify that no releases occurred from the facility. The threshold concentration for evidence of a release was the conservative total chromium (Cr[T]) clean-up concentration of 31 milligrams per kilogram (mg/kg) developed for the 2005 spill clean-up (CH2M HILL, 2009), rather than the background threshold value (BTV) of 39.8 mg/kg calculated for the Soil RFI/RI. Total chromium concentrations in all five samples were well below the BTV (see Section 2, below).

Closure certification from the County of San Bernardino was issued on September 23, 2009; see Attachment 1.

Reconfiguration for IM-3 Support Facility. The goals of the reconfiguration included reducing the footprint of the facility to the extent possible and improving the safety, reliability, and security of the IM support facilities for brine management and other staging and support functions. The facility was reconfigured to have two areas with separate containment systems: (1) a brine storage and loading area, which was relocated to a portion of the Former IM-2 Batch Plant area, and (2) a waste management area near the existing Valve Vault No. 1. Existing IM-2 facilities that remain on the MW-20 Bench include the extraction well vaults, Valve Vault No. 1, and an electrical vault.

Spills at the MW-20 Bench

Two spills are known to have occurred at the MW-20 Bench, associated with PG&E's operations. The first spill occurred on April 10, 2005, during operation of the IM-2 Batch Treatment Facility system and resulted in the release of clarifier (treatment) sludge consisting of precipitated solids and treated water. The second spill occurred on September 6, 2006, after cessation of the IM-2 system but during operation of the IM-3 brine management facility and consisted of brine from the reverse osmosis system used to reduce the naturally high levels of total dissolved solids in the extracted groundwater.

April 10, 2005, Clarifier Sludge Spill. The clarifier sludge spill occurred on April 10, 2005, while the material was being pumped from the clarifier to the phase separator. An estimated 1,700 to 1,800 gallons were released; an estimated 1,400 to 1,500 gallons were retained on the drip pad beneath the phase separator and were recovered. An estimated 300 gallons of liquid drained onto the ground. The liquid spread laterally to areas surrounding the phase separator, and a portion flowed into an open valve vault excavation. The affected area within the valve vault excavation was limited to the exposed soil between the concrete floor slab and the excavation sidewall along the east side of the excavation. The approximate location of this spill is shown on Figure 30 and photographs of the area are shown in Figure 31. Visual evidence confirmed that no material collected on the concrete floor slab or other areas of the valve vault excavation. Recovered liquid was pumped back into the phase separator and transferred into the excess liquid storage tank. Liquid recovery actions were implemented within 1 hour of the spill.

Soil excavation and confirmation sampling were conducted during several events in April, May, June, and July 2005. Excavation continued until confirmation sample concentrations were below the cleanup threshold of 31 mg/kg total chromium. Excavation and confirmation sampling were completed on July 13, 2005. An estimated total of 130 cubic yards of affected soil were excavated and transported to a permitted offsite disposal facility. The excavation area was backfilled on July 18, 2005 (PG&E, 2005b). The cleanup threshold concentrations were approved by DTSC based on 12 existing background soil samples collected by Ecology and Environment (E&E, 2002) and an additional 10 background soil samples collected by PG&E at the MW-20 Bench on May 25, 2005. The 2005 background sample locations were field located with the DTSC to be outside the footprint of the IM-2 facility and away from IM-3 construction. The ten soil samples were tested for total chromium by United States Environmental Protection Agency Method 6010b (PG&E, 2005c). DTSC selected the maximum concentration detected in the background data set (31.0 mg/kg) as the cleanup threshold (PG&E, 2005b).

A sludge sample was also collected at the time of the spill and analyzed for total and soluble metals (Title 22 metals and hexavalent chromium); results are shown in Table 19. Total metals were elevated relative to site background, as would be expected from a precipitate. None of the detected metals exceed the RCRA TCLP concentration for hazardous waste. Two of the metals, chromium and selenium, exceeded their applicable soluble threshold limit concentration. Chromium was detected at a soluble concentration of 277 mg/L[8] (because the soluble threshold limits concentration [STLC] is less than 560 mg/L, and the TCLP concentration is less than 5 mg/L, the sludge would be classified as a non-RCRA hazardous waste based on its chromium concentration). Selenium was detected at a concentration of 5.99 mg/L, compared with the STLC of 1 mg/L.

September 6, 2006, Reverse Osmosis Brine (Concentrate) Spill. A transfer hose ruptured during transfer of brine from one of the brine tanks to one of the storage tanks on the MW-20 Bench. The tank's secondary containment flooded, and a portion of the brine flowed over the top of the containment berm onto the ground. The affected area outside of the containment area measured approximately 20 feet by 10 feet, and the brine appeared to have penetrated to an approximate depth of 3 inches. Based on this, PG&E estimated that approximately 400 gallons of brine overflowed the containment area. The brine that had overflowed and the brine in the containment area were pumped into an empty baker tank. The "wetted soil" was excavated and approximately 22 yards of soil was transported and disposed of at an offsite facility as nonhazardous waste. After the "wetted soil" was excavated, PG&E collected one soil sample and analyzed it for total chromium and sodium. The concentrations of total chromium and sodium in the confirmation soil samples were 21.5 mg/kg and 848 mg/kg, respectively. The concentrations of total chromium and sodium were below the Topock Background Values (39 mg/kg and 2,070 mg/kg, respectively).

PG&E also collected samples of the spilled brine for analysis for pH, conductivity, hexavalent chromium, and total chromium at the IM-3 laboratory. The concentrations of total chromium and hexavalent chromium in the unfiltered brine were 32 micrograms per liter (µg/L) and 12 µg /L, respectively. The concentrations of total

[8] The STLC for chromium has two thresholds: 560 mg/L soluble chromium result in the material being considered a RCRA hazardous waste. If the STLC soluble chromium concentration is between 5 and 560 mg/L, and the TCLP soluble chromium concentration is less than 5 mg/L, then the material is classified as a non-RCRA hazardous waste.

chromium and hexavalent chromium were below the Topock Background Values (34 µg/L and 32 µg/L, respectively). Conductivity was 34.68 micro-Siemens per centimeter, and pH was 8.10. A statistical summary of brine samples that were collected approximately once a month from July 2005 to January 2013 and analyzed at an offsite laboratory is presented in Table 20.

2.12.2 MW-20 Bench Current Features

The following features are present at MW-20 Bench, as shown on Figure 29:

- Three brine storage tanks and secondary containment that store reverse osmosis concentrate (i.e., brine or high-salinity treated water for offsite disposal)
- Small pump station connected to the tanks to allow transferring of the brine to trucks (labeled as Brine Loading Pump, Off-Spec Transfer Pump, and Drainage Pump)
- A PVC-lined, gravel truck lane
- Valve Vault No. 1, a partially buried building where extraction well pipelines pass through (the building also contains electrical and instrumentation)
- Parking area
- Security fence, gate, lighting, and system
- Other ancillary equipment
- Extraction wells TW-2D, TW-2S, and TW-3D
- Monitoring wells MW-20-070, MW-20-100, MW-20-135, MW-31-060, and MW31-135

2.12.3 Conceptual Site Model

The primary sources of contamination at AOC 30 are likely to have been incidental spills and potential leaks along piping (aboveground and underground) associated with the groundwater interim actions, and storage and construction activities not associated with PG&E The primary source medium at AOC 30 is soil; constituents released to soil could also be released to subsurface soil through infiltration.

2.12.4 Summary of Previous Soil Characterization

Soil samples were collected at AOC 30 as part of background sampling, confirmation sampling following the 2005 spill, and post-IM-2 closure confirmation sampling. Soil samples at AOC 30 were analyzed for metals only. A summary of detected concentrations compared with screening levels is presented in Tables 21 and 22. The historical data for AOC 30 are Category 1.

A total of 31 samples—including the 10 background samples (BG-01 through BG-10, collected May 25, 2005), 16 spill cleanup confirmation soil samples (CS-01 through CS-16, collected between April 21 and July 13, 2005), and five post-closure confirmation samples (Middle, NE Corner, NW Corner, and SW Corner, collected February 2, 2009, were collected at the MW-20 Bench (see Figure 32).

The background samples and post-closure confirmation samples were analyzed for total chromium only; all spill confirmation samples were analyzed for total chromium, and several of them were also analyzed for antimony, arsenic, barium, beryllium, hexavalent chromium, copper, iron, lead, selenium, thallium, vanadium, and zinc. Antimony, beryllium, and hexavalent chromium were not detected in any of the samples analyzed, although the detection limits for antimony were elevated relative to its interim screening level (0.285 mg/kg ecological comparison value). Lead was the only metal detected at a concentration exceeding its interim screening level; it was detected in one sample (CS-12 at 1 to 2 feet bgs) at a concentration of 8.5 mg/kg, just above the BTV of 8.39 mg/kg.

2.12.5 Constituents of Potential Concern

Based on the unit description, history, and previous soil characterization, the COPCs for soil within AOC 30 are Title 22 metals, hexavalent chromium, and sodium.

2.13 AOC 31 – Former Teapot Dome Oil Pit

The former Teapot Dome pit was associated with the Teapot Dome restaurant that was located along old Route 66. The location of the former Teapot Dome oil pit (AOC 31) overlaps with the Perimeter Area investigation as shown on Figure 33. AOC 31 was added as a new AOC at the request of DTSC during comment resolution on the *Final Soil RFI/RI Work Plan*. As described in Section 1.1.4 of the main body of the *Final Soil RFI/RI Work Plan*, investigation of the former Teapot Dome oil pit has been incorporated into the Perimeter Area investigation. The proposed investigation program for AOC 31 is provided in Appendix C of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.13.1 Description and History

AOC 31, the Teapot Dome oil pit, is located on the northeast side of the compressor station, just outside the compressor station fence line. It is located within and overlaps with the Perimeter Area investigation (see Appendix C of the *Final Soil RFI/RI Work Plan*). A former employee indicated that he had been told that the Teapot Dome facility provided automobile oil changes, and that oil from vehicles was dumped into a pit. Potential wastes in this area pre-date the construction of the compressor station.

The primary sources of contamination at AOC 31 are likely to have been discharge of used automobile engine oil into the pit, and incidental spills of new and used oil. The potential type and quantity of any materials released at this unit are unknown. Any constituents released would have been released in liquid form. The primary source media at AOC 31 are shallow and subsurface soil.

2.13.2 Summary of Previous Soil Characterization

No prior sampling has been conducted specifically to evaluate the Teapot Dome oil pit. However, one opportunistic soil sample (PA-OS1, near northern fence line) was collected near AOC 31. The sample was analyzed for metals, PAHs, PCBs, TPH, VOCs, and general chemistry.

PCBs, VOCs, SVOCs other than PAHs, TPH-gasoline, and TPH-motor oil were not detected in PA-OS1. Twelve constituents, including two calculated quantities (total low-molecular PAHs and benzo[a]pyrene equivalents) were detected as PA-OS1. Relevant data are shown in Tables 23 through 27. The detected constituents included the following:

- Eight metals (arsenic, barium, total chromium, cobalt, lead, nickel, vanadium, and zinc).
- One PAHs (2-methyl naphthalene at 5 µg/kg).
- Total low-molecular PAHs, and benzo(a)pyrene equivalents, at 5 µg/kg and 4.4 µg/kg, respectively.
- TPH as diesel (15 mg/kg).

None of the metals exceeded residential CHHSLs or commercial RSLs, and all detected concentrations were also below the BTVs. None of the organic constituents exceeded their respective interim screening levels.

2.13.3 Constituents of Potential Concern

Based on the unit description, history, and previous soil characterization, the COPCs for soil within AOC 31 are Title 22 metals, TPH, SVOCs, and PAHs.

2.14 AOC 32 – Oil Storage Tanks and Waste Oil Sump

AOC 32 is the oil storage tank area (which also contains the waste-oil sump) in the upper yard immediately west of the visitor parking lot. This is an active unit. Associated piping is also located within the containment area. AOC 32 was added as a new AOC at the request of DTSC during comment resolution on the *Final Soil RFI/RI Work Plan*, and the proposed investigation program for AOC 32 is provided in Appendix B24 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.14.1 Description and History

AOC 32 contains five 7,150-gallon-capacity oil storage tanks, the waste-oil sump, and two 150-gallon-capacity lubricating-oil surge tanks (PG&E, 1952). The oil storage tanks and waste-oil sump are part of the original compressor station installation. Four of the five storage tanks contain clean (makeup) oil for the main compressor engines and generator engines. The fifth tank contains waste oil that is removed regularly by a contractor. The

tanks and sump are located within a concrete containment structure. The bottom of the containment structure is located approximately 16 inches below the surrounding grade, and the sides of the containment structure are approximately 5 to 8 inches above the surrounding grade. The bottom of the pipe trench located in the containment structure, along the eastern side, is approximately 1 foot below the bottom of the main portion of the containment structure. The sidewalls of the containment structure are apparent in a station photograph taken between 1954 and 1958 shown in Figure 6; however, it is uncertain if the oil storage area has always had a paved or concrete floor. It appears from the same photo and a 1951 photograph shown in Figure 34 that the tanks were mounted on foundations. Currently, the bottoms of the tanks appear to be set level with the floor of the containment also shown in Figure 34.

The containment structure appears to be in good repair and also appeared to be in good condition during an engineering inspection in 1994. In 1994, a registered civil engineer evaluated the condition of the concrete containment for the oil storage tanks and rated it as being in good to excellent condition, suitable for use as secondary containment. Minor surface cracks were determined to be unlikely to penetrate the concrete. Therefore, the letter concludes that it would be unlikely that an oil spill would penetrate through the containment (Trident, 1996a).

The waste-oil sump receives waste oil from the OWS, pipeline liquids collected from the scrubbers, and formerly received used oil from the scrubber sump. The waste-oil sump consists of a steel tank within a concrete liner; the steel tank was installed into the existing waste-oil sump in 1996 (Trident, 1996a). Prior to the installation of the steel liner in 1996, the waste-oil sump was emptied and cleaned, and the concrete structure was inspected by a registered civil engineer. The concrete was found to be in good condition, with no cracks in the surface of the concrete and no erosion, pitting, or spalling of the concrete, and the condition of the concrete around the pipe penetrations was sound. The concrete tank was determined to be suitable as secondary containment for the new steel tank (Trident, 1996a).

A catch basin is located in the southeast corner of the secondary containment structure. This catch basin is piped to the sump in the pipe trench south of the oil storage tank area. The sump in the pipe trench discharges to the oily water treatment system. In addition, a pipe connection exists from the catch basin to the storm drain line in the area. The valve leading to the storm drain line is closed and locked (chained) shut.

The primary sources of contamination at AOC 32 likely are incidental releases of new and waste oil stored in this area. The potential type and quantity any oil released near this AOC are unknown. The primary source medium at AOC 32 appears to be concrete or asphalt (if releases occurred to outside the secondary containment); oil released in AOC 32 would have been released primarily to concrete, and if the concrete lacked integrity, could have been released to surface soils underlying the concrete. If the bottom of the unit was unpaved or if releases occurred outside the secondary containment in earlier times, then surface soil could also have been a primary source medium.

2.14.2 Summary of Previous Soil Characterization

No samples have been collected in this area.

2.14.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 32 are Title 22 metals, hexavalent chromium, VOCs, TPH, SVOCs, PAHs, and PCBs.

2.15 AOC 33 – Potential Former Burn Area near AOC 17

In response to a 2009 request from DTSC to collect additional information regarding potential burn activities at Topock Compressor Station, PG&E conducted additional interviews with former employees (PG&E, 2009a). To confirm the new anecdotal information about burn activities, additional site walks and interviews were conducted. Newly gathered information was provided to agencies in letters dated August 14, 2009 (PG&E, 2009a), October 15, 2009 (PG&E, 2009b), January 15, 2010 (PG&E 2010a), and January 29, 2010 (PG&E 2010b). A potential new burn area was identified in AOC 17 as a result of the additional interviews. AOC 33 was added as a new AOC at the request of DTSC during comment resolution on the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013). AOC 33 is

fully contained within AOC 17. The proposed investigation program for AOC 32 is provided in Appendix B14 of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.15.1 Description and History

Information provided during the interviews indicated yearly fire-training exercises involving burning diesel oil in a modified drum occurred east of the washrack/steam cleaning area. This area is currently paved. No other information is available regarding this unit. This area is located within the footprint of AOC 17. It will be investigated in conjunction with AOC 17.

The primary source of contamination at AOC 33 is likely to have been diesel fuel that may have spilled from the modified drum. The primary source medium at AOC 33 is surface soil and may also have included pavement if fire-training activities occurred after the area was paved. Surface runoff from AOC 33 to the East Ravine could also have transported COPCs.

2.15.2 Summary of Previous Soil Characterization

No samples have been collected in this area.

2.15.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil within AOC 33 are Title 22 metals, hexavalent chromium, VOCs, TPH, PCBs, SVOCs, PAHs, and dioxins and furans.

2.16 Perimeter Area

The Perimeter Area is defined as the area extending from the facility fence line to the toe of the slope outside of the fence line. This area also contains the location of AOC 31, the former Teapot Dome oil pit, as discussed in Section 2.13, above, as well as the portions of the storm drain lines located outside of the compressor station fence line. The storm drain lines are addressed separately in Section 2.17. The Perimeter Area does not include any areas that are currently defined as being part of an existing unit already included in the RFI/RI. AOCs 4, 9, 10, and 11 and SWMU 1 are all located in part or in their entirety on the slope; investigation in these areas will continue to be implemented as part of the identified AOC or SWMU. The Perimeter Area and the proposed sampling are described in Appendix C of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.16.1 Description and History

The majority of the compressor station is currently bermed or curbed. Current bermed and curbed areas, as well as the areas that have neither berms nor curbs are shown on Figure 2. Some of the areas that are currently bermed with soil are known to be or were likely to have been unbermed in the past. In areas that are currently and/or were historically unbermed, the portions of the Perimeter Area that are topographically lower than the Topock Compressor Station (that is, downslope) could have received stormwater runoff as well as incidental spills from the compressor station. In areas where the ground slopes upward toward the fence line from the interior of the station or where the ground slopes up outside the station, deposition of chemicals through sheet flow would not have occurred. The primary sources of contamination at the Perimeter Area are likely to be historical sheet flow stormwater run-off and potentially incidental spills. The primary source medium at the Perimeter Area is surface soil. Because the Perimeter Area is unpaved, liquids released to this area would have been released to surface soil and infiltrated shallow soil. Depending on the volume of liquid, the flow may have percolated into the soil at the top of the Perimeter Area, or may have flowed over the edge onto the sloped portion of the Perimeter Area. Any flows extending to the bottom of the sloped area would have been captured in the low lying areas. All low areas adjacent to the Perimeter Area are designated RCRA units (SWMU 1, and AOC 1, 4, 9, 10, and 11).

2.16.2 Summary of Previous Soil Characterization

No prior sampling has been conducted specifically to evaluate the Perimeter Area. Several samples were collected at AOC 9 in the vicinity of the fence line. Samples were also collected on the slope at AOCs 4, 9, 10, and 11, and SWMU 1. As discussed above, these areas are already being investigated and are not considered part of the Perimeter Area investigation.

However, soil samples were collected from three locations in the vicinity of the Perimeter Area (sample location BH-69, near southern fence line, sampled during monitoring well installation, and two opportunistic soil sample locations (PA-OS1, near northern fence line, and PA-OS2, near southern fence line) and are considered part of the Perimeter Area investigation. A total of 17 samples were collected from these three locations. The samples were analyzed for metals, PAHs, PCBs, TPH, volatile organic compounds (VOCs), and general chemistry; BH-69 was analyzed for dioxins and furans as well. Laboratory analytical results for these samples are presented in Tables C-1 through C-6 of Appendix C of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

Forty-eight constituents, including one calculated quantity (benzo(a)pyrene equivalents) were detected in the Perimeter Area. The detected constituents included:

- Eighteen metals (aluminum, arsenic, barium, calcium, hexavalent chromium, total chromium, cobalt, copper, iron, lead, magnesium, manganese, molybdenum, nickel, potassium, sodium, vanadium, and zinc).
- Twelve PAHs (2-methyl naphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(ghi)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene).
- Benzo(a)pyrene equivalents.
- TPH as diesel and TPH as motor oil.
- One PCB (Aroclor 1254).
- Dioxins and Furans

None of the PAHs, benzo(a)pyrene equivalents, TPH, or PCBs exceeded their respective interim screening levels. None of the metals exceeded residential regional screening levels or residential CHHSLs. At BH-69, 11 metals (aluminum, calcium, total chromium, copper, lead, magnesium, manganese, nickel, potassium, vanadium, and zinc) were detected at concentrations that exceeded their respective BTVs. Molybdenum exceeded its BTV in the two PA-OS2 samples analyzed for metals.

Dioxins and furans are compared to toxicity equivalents (TEQs), TEQ Human, TEQ Avian, and TEQ Mammals. Pentadioxin (1,2,3,7,8-PeCDD) and 2,3,7,8 tetracholordibenzo (2,3,7,8-TCCD) are the only two dioxins with individual interim screening levels. Dioxins and furans were detected in all three samples collected from BH-69 that were analyzed for dioxins and furans. Dioxin 1,2,3,7,8-PeCDD was detected at 6.6 nanograms per kilogram (ng/kg) at BH-69, which exceeded its residential CHHSL of 4.6 ng/kg. None of the samples exceeded the TEQ Human interim screening level of 50 ng/kg (residential regional screening level). One sample exceeded the TEQ Avian interim screening level of 16 ng/kg (ecological comparison value) (maximum detected concentration of 26 ng/kg). Two samples exceeded the TEQ Mammals interim screening level of 1.6 ng/kg (ecological comparison value) (maximum detected concentration of 47 ng/kg).

2.16.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil in the Perimeter Area are Title 22 metals, hexavalent chromium, TPH, PCBs, SVOCs, and PAHs.

2.17 Storm Drain Investigation

Piping is present throughout the compressor station. In addition to the hazardous waste treatment system piping (AOC 18) described in the *Final RFI/RI Report Volume I* (CH2M HILL 2007a), and the industrial floor drain piping (AOC 20) described in Section 2.2, above, storm drain lines are present throughout the compressor station. Only limited information is available regarding the storm drain lines. Consequently, a five-step investigation program was developed and is described in detail in Appendix D of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013).

2.17.1 Description and History

Written records regarding the storm drain system and locations of storm drain lines (i.e., engineering drawings and updates to drawings) are limited. Available written information is summarized in Table 28. Available written information was supplemented with employee interviews and on-the-ground surveys of outfalls and catch basins.

Sixteen active and inactive storm drain lines have been visually identified outside the fence line; the catch basin associated with inactive Storm Drain Line 15 was removed during the AOC 4 time-critical removal action. Some storm drain lines are visible only at the outfall; portions of the lines leading to other outfalls are visible outside the fence line. Various catch basins leading to the storm drain lines are visible within the compressor station. The 16 identified storm drain outfalls, as well as known (solid line) and inferred (dotted line) storm drain alignments associated with the 16 outfalls are shown on Figure 35. With the exception of Storm Drain Line 15, it is not known whether any of these alignments are inactive.

Some storm drain lines outside the compressor station were buried for their entire run (to the bottom of the slope); others were buried only to the edge of the top slope and are exposed for the remaining run. Exposed drain lines were repaired or replaced when they corroded; covered lines were often repaired or replaced when it became apparent that a leak had developed (this would typically be due to erosion along the line).

Within the compressor station, the majority of the storm drain lines run horizontally across either the lower or upper yard to the perimeter of the station. Two lines appear to run from the upper yard to the lower yard (see Figure 35). Outside the fence line of the compressor station, all storm drain lines are on a steep slope; some storm drain lines terminate on the slope, and some terminate at the bottom of the slope. Lines 3 and 4 appear to terminate near the top of the slope.

Employee interviews indicate that historically, storm drain lines were added when needed (for example, when a storm drain line stopped draining and could not be unplugged). Similar to other abandoned underground utilities within the compressor station, abandoned storm drains were commonly abandoned in place rather than risk the additional hazards associated with removal (CH2M HILL, 2011b).

PG&E conducted a preliminary field review of catch basins to verify the locations and number of catch basins shown on the drawings, and correct information on the most recent drawings. Twenty-nine catch basins and three trench drains were located during the initial review. Trench drains are either purpose-built trenches designed only to catch run-off from a specific area, or may consist of pipe trenches with a stormwater outlet.

During the preliminary review, the catch basins were probed where feasible to evaluate whether accumulated soil material was present within the basin, assess the estimated thickness of the accumulated soil material, where applicable, and determine if the catch basin had a hard bottom. Twenty catch basins and three trench drains were probed. All of these had hard bottoms. The initial probing indicated that accumulated soil material appeared to be present in eight to ten catch basins, and ranged from less than 1 inch to more than 4 inches thick. The storm drain alignments and catch basin locations shown on Figure 35 reflect the information collected during the preliminary field review.

Storm drain lines are both potential sources and potential pathways for contaminant migration. The primary transport pathway associated with the storm drain system would be discharge of contaminants into the storm drains, followed by runoff from the storm drains to areas outside the fence line. Consequently, an important consideration in the storm drain alignment investigation is not only the physical location of the storm drains but the drainage pathways (that is, assessing which storm drains discharge to specific outfalls). The conceptual site model for the storm drain system includes releases of constituents into the storm drains as a result of contaminated soil carried in surface water runoff and/or liquid spills. Contaminants released to storm drains could then be released to surface soils via direct discharge at an outfall, or to the subsurface if the piping is degraded.

Releases to storm drains would have been driven by the highly episodic, limited rainfall events at Topock Compressor Station, and the preferred discharge pathway would have been to the outfall. The episodic nature of flow events would minimize the likelihood of lateral migration along the storm drain bedding material because it would be atypical for runoff to be present in the lines. Finally, hazardous constituents may also be present in soil accumulated in the storm drains during station operations.

2.17.2 Summary of Previous Soil Characterization

No physical investigation has been conducted to specifically target the storm drains. Some soil samples have been collected in the vicinity of or downslope from storm drain outfalls; these soil samples are associated with the

specific RCRA units (SWMU 1, AOC 1, AOC 4, AOC 9, AOC 10, and AOC 11) located downgradient of the outfalls and were evaluated as part of the data gaps evaluation for these units. The proposed sampling plans for these units are addressed in the *Final Soil RFI/RI Work Plan* (CH2M HILL 2013).

2.17.3 Constituents of Potential Concern

Based on the unit description, history, previous soil characterization, and discussions with DTSC and DOI, the COPCs for soil samples associated with the Storm Drain Investigation are Title 22 metals, hexavalent chromium, TPH, PCBs, and PAHs.

2.18 TCS Well #4 (within AOC 1)

The *RFI/RI Volume 1 Report* presented information (in Section 4.1.1.2) regarding a TCS employee who reported that he was personally responsible for welding a cap onto an approximately 12-inch-diameter vertical pipe located in Bat Cave Wash. The pipe reportedly looked like a regular well casing. The casing only extended a small amount above the ground, and the area where the pipe was located was later covered by an additional 18 to 24 inches of soil. Prior to welding the cap, the pipe had been covered with a wooden cover and gravel, and there were no materials of any kind visible in the pipe (Russell, 2006b).

During recent file reviews of historical Topock documents, a work order was found with hand written notes showing 650 feet of steel pipe extending from a “water treatment chamber” at the former sludge drying bed area to an “abandoned water well” in the bottom of the wash. The date of the work order is March 12, 1964, and the date completed is shown as November 1, 1964 (PG&E, 1964). The work order is included in Appendix B. The discovery of the work order and the previous report from the plant employee of an abandoned well in Bat Cave Wash prompted additional historical file reviews. The description of the Sludge Dying Beds (SWMU-5) in RFI Volume 1 also states that a single-step wastewater treatment pond was constructed in one of the former sludge drying beds in 1964, which is consistent with the date and the scope of work described on this work order. In addition to the work order, two large format blueprints, dated 1956 and 1957, showing topography around the Topock site were located. These blueprints show a well, referred to as “Well #4”, in the bottom of Bat Cave Wash. Photographs from 1951 (See Figure 36) indicate a temporary water supply well existed in the vicinity of Well 4 and, therefore, may be the same well. Based on this new information, a surface geophysical survey was performed on April 2, 3, and 4, 2013, in the suspected area of the old well (TCS Well #4). The survey identified a linear arrangement of weak anomalies (identified as a “possible pipeline or buried cable alignment”) extending down Bat Cave Wash and terminating at a feature identified as “suspected shallowly buried metal debris”. The location of the northern end of this linear feature is very close to 650 feet from the sludge drying bed, along the estimated route that the pipe was shown to take on the work order. It was inferred that this location corresponds to the location of “Well #4.”

A pothole was installed July 30, 2013, to positively locate the well. The capped well was found at approximately 4 feet bgs. A steel pipe leading into the well was also confirmed at approximately 7 feet bgs. This horizontal pipe was approximately 3 inches in diameter, was wrapped or covered with a tarlike material, and entered the side of the well via a welded intersection. Once the well location was confirmed, the pothole was backfilled using the same material removed.

The well was uncovered again on September 11, 2013, to assess the downhole condition of the well and gather information needed to prepare a well decommissioning plan. Two photos showing the excavation and top of TCS well #4 are presented on Figure 37. Two soil samples were collected from the excavation around the well and a PVC extension was added to the well casing so it extended to the surface. The excavation area was backfilled to grade with originally excavated material and a downhole video log was performed. This initial video log encountered an obstruction in the well at approximately 59 feet bgs. During the week of March 24, 2014, a rotosonic drill rig was used to clear the obstruction, which was determined to be unconsolidated fill material. The well casing was cleared of the fill material to a depth of approximately 158 feet bgs, where a hard bottom was encountered. On April 1, 2014, a second downhole video log was performed. During the second video log, it was determined that he well had filled back in with unconsolidated material to a depth of approximate 127 feet bgs.

2.18.1 Summary of Previous Soil Characterization

Results of the two soil samples collected on September 11, 2013, as part of the decommissioning process for TCS Well #4 located in the bottom of Bat Cave Wash are presented on Table 29. The location TCS Well #4 within Bat Cave Wash is shown on Figure 38. The well is located within AOC 1.

Sample "Old Well BCW-1", was collected closest to TCS Well #4, at about 7 feet bgs, where the steel pipe enters the side of the well casing. This sample was analyzed for Title 22 metals (including hexavalent chromium), pH, PAHs, PCBs, SVOCs, TPH, VOCs, and dioxin and furans. Sample "Old Well BCW-2", was collected about 4 feet west of the well at about 4 to 5 feet bgs. This sample was analyzed for Title 22 metals (including hexavalent chromium) and dioxin and furans.

PCBs, VOCs, SVOCs, PAHs, TPH-gasoline, and TPH-diesel were not detected. The detected constituents included the following:

- Twelve metals (arsenic, barium, hexavalent chromium, total chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc).
- TPH as motor oil.
- Dioxin and furans

Total chromium, hexavalent chromium, molybdenum, and zinc were detected in both samples above background concentrations. The sample results were also slightly above the interim screening levels for arsenic, copper, lead, selenium, and vanadium. Total chromium and hexavalent chromium were detected above residential CHHSL screening levels in both samples. Dioxin and furans were detected above the TEQs for Humans, Avian, and Mammals in both samples.

2.18.2 Constituents of Potential Concern

COPCs for AOC 1 are Title 22 metals, hexavalent chromium, TPH, VOCs, SVOCs, and PAHs. Additional characterization in the area around TCS well #4 will also include dioxins and furans.

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Tables

TABLE 1

Summary of RCRA Facility Investigation/Remedial Investigation Units

PG&E Topock Compressor Station, Needles, California

New Units Included in Volume 1 Addendum
SWMU 11 - Former Sulfuric Acid Tanks
AOC 20 - Industrial Floor Drains
AOC 21 - Round Depression near Sludge Drying Bed
AOC 22 - Unidentified Three-Sided Structure
AOC 23 - Former Water Conditioning Building
AOC 24 - Stained Area Associated With and Former API Oil/Water Separator
AOC 25 - Compressor and Generator Engine Basements
AOC 26 - Former Scrubber Oil Sump
AOC 27 - MW-24 Bench
AOC 28 - Pipeline Drip Legs
AOC 29 - Interim Measure No. 3 Treatment Plant[a]
AOC 30 - MW-20 Bench[a]
AOC 31 - Former Teapot Dome Oil Pit
AOC 32 - Oil Storage Tanks and Waste Oil Sump
AOC 33 - Potential Former Burn Area Near AOC 17
Other New Areas Included in Volume 1 Addendum
Perimeter Area
Storm Drain Investigation
Units Included in Original RFI/RI Volume 1 Requiring Further Investigation
SWMU 1 – Former Percolation Bed
SWMU 2 – Inactive Injection Well (PGE-08)
SWMU 5 – Sludge Drying Beds
SWMU 6 – Chromate Reduction Tank
SWMU 8 – Process Pump Tank
SWMU 9 – Transfer Sump
AOC 1 – Area Around Former Percolation Bed
AOC 4 – Debris Ravine
AOC 5 – Cooling Tower A
AOC 6 – Cooling Tower B
AOC 7 – Hazardous Materials Storage Area
AOC 8 – Paint Lockers
AOC 9 – Southeast Fence Line (Outside Visitor Parking Area)
AOC 10 – East Ravine
AOC 11 - Topographic Low Areas
AOC 12 – Fill Area
AOC 13 – Unpaved Areas within the Compressor Station
AOC 14 – Railroad Debris Area
AOC 15 – Auxiliary Jacket Water Cooling Pumps
AOC 16 – Sandblast Shelter

TABLE 1

Summary of RCRA Facility Investigation/Remedial Investigation Units

PG&E Topock Compressor Station, Needles, California

AOC 17 – Onsite Septic System
AOC 18 – Combined Hazardous Waste Transference Pipelines
AOC 19 – Former Cooling Liquid Mixing Area and Former Hotwell
UA-1 – Potential Pipe Disposal Area
UA-2 – Former 300B Pipeline Liquids Tank
OWTS Unit 4.3 – Oil/Water Holding Tank
OWTS Unit 4.4 – Oil/Water Separator
OWTS Unit 4.5 – Portable Waste Oil Storage Tank
Closed Units – No Investigation Required
SWMU 3 – PG&E Abandoned Well No. 6
SWMU 4 – PG&E Abandoned Well No. 7
SWMU 7 – Precipitation Tank
SWMU 10 – Old Evaporation Ponds
AOC 2 – Area Around Inactive Injection Well PGE-8
AOC 3 – Area Around PG&E Inactive Wells No. 6 and No. 7 (PGE-06 and PGE-07)
OWTS Unit 4.6 – Waste Oil Storage Tank

[a] These units will be investigated upon closure of IM facilities and for AOC 30, upon closure of the groundwater remedy.

Note that the names of some of these units have been modified slightly to more accurately describe the unit.

Table 2
Sample Results: Metals
Area of Concern 24 – Stained Area and Former Oil/Water Separator
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Metals (mg/kg)																	
Commercial Screening Level [1]:				**380**	**0.24**	**63,000**	**190**	**500**	**37**	**1,400**	**300**	**38,000**	**320**	**180**	**4,800**	**16,000**	**4,800**	**4,800**	**63**	**5,200**	**100,000**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Antimony**	**Arsenic [4]**	**Barium**	**Beryllium**	**Cadmium**	**Chromium, Hexavalent**	**Chromium, total**	**Cobalt**	**Copper**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Thallium**	**Vanadium**	**Zinc**
Category1																					
AOC24-OS1	12/14/11	0 - 0.5	N	ND (2.1)	3.8	190	ND (1)	ND (1)	**1.2**	30	5.1	9.3	**8.4**	ND (0.1)	ND (1)	9.7	ND (1)	ND (1)	ND (2.1J)	29	33
	12/14/11	1 - 2	N	ND (2.1)	3.3	200	ND (1)	ND (1)	0.76	26	5.8	9.6	7.8	ND (0.11)	ND (1)	11	ND (1)	ND (1)	ND (2.1)	31	36
AOC24-OS2	12/14/11	0 - 0.5	N	ND (2.1)	2.3	91	ND (1)	ND (1)	ND (0.41)	20	7.1	8	**17**	ND (0.1)	ND (1)	13	ND (1)	ND (1)	ND (2.1)	30	32
	12/14/11	1 - 2	N	ND (2.1)	3.4	170	ND (1)	ND (1)	ND (0.42)	16	4	6.9	6.4	ND (0.1)	ND (1)	7.8	ND (1)	ND (1)	ND (2.1)	25	27

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.
2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.
3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.
4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.
Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.
NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
RWQCB = California Regional Water Quality Control Board
CHHSL = California human health screening levels
-- = not analyzed
FD = Field Duplicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
mg/kg = milligrams per kilogram
N = Primary Sample
ND = not detected at the listed reporting limit

Table 3
Sample Results: Contract Laboratory Program Inorganics
Area of Concern 24 – Stained Area and Former Oil/Water Separator
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Commercial Screening Level [1]:				**990,000**	**NE**	**20,000**	**720,000**	**NE**	**23,000**	**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**16,400**	**66,500**	**NE**	**NE**	**12,100**	**402**	**4,400**	**2,070**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Cyanide**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**
Category1											
AOC24-OS1	12/14/11	0 - 0.5	N	7,600	31,000	ND (0.25)	14,000	6,300	260 J	1,600	1,100

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

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

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

Table 4
Sample Results: Polycyclic Aromatic Hydrocarbons
Area of Concern 24 – Stained Area and Former Oil/Water Separator
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																		
Commercial Screening Level [1]				**99,000**	**4,100,000**	**33,000,000**	**17,000,000**	**170,000,000**	**1,300**	**130**	**1,300**	**17,000,000**	**1,300**	**13,000**	**380**	**22,000,000**	**22,000,000**	**1,300**	**18,000**	**17,000,000**	**17,000,000**	**130**
RWQCB Environmental Screening Level [2]				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**1-Methyl naphthalene**	**2-Methyl naphthalene**	**Acenaph- thene**	**Acenaph- thylene**	**Anthracene**	**Benzo(a)- anthracene**	**Benzo(a)- pyrene**	**Benzo(b)- fluor anthene**	**Benzo- (ghi)- perylene**	**Benzo(k)- fluor anthene**	**Chrysene**	**Dibenzo- (a,h)- anthracene**	**Fluoranthene**	**Fluorene**	**Indeno(1,2,3- cd)pyrene**	**Naph- thalene**	**Phen- anthrene**	**Pyrene**	**B(a)P Equivalent**
Category1																						
AOC24-OS1	12/14/11	0 - 0.5	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	12	10	26	5.2	10	17	ND (5.2)	26	ND (5.2)	ND (5.2)	ND (5.2)	8.3	24	16
	12/14/11	1 - 2	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	45	44	100	17	28	50	5.2	85	ND (5.2)	18	ND (5.2)	33	76	65
AOC24-OS2	12/14/11	0 - 0.5	N	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (4.5)
	12/14/11	1 - 2	N	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	ND (5.2)	14	ND (5.2)	30	6.6	8.3	13	ND (5.2)	24	ND (5.2)	5.9	ND (5.2)	ND (5.2)	23	9.4

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

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

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

Calculations:

BaP equivalent = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all PAHs are nondetect, the final qualifier code is U.

-- = not analyzed

µg/kg = micrograms per kilogram

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

N = Primary Sample

ND = not detected at the listed reporting limit

Table 5
Sample Results: Total Petroleum Hydrocarbons
Area of Concern 24 – Stained Area and Former Oil/Water Separator
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)	
Commercial Screening Level [1]:				**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**540**	**1,800**
Background [3]:				**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as diesel**	**TPH as motor oil**
Category1					
AOC24-OS1	12/14/11	0 - 0.5	N	77	430
	12/14/11	1 - 2	N	39	200
AOC24-OS2	12/14/11	0 - 0.5	N	ND (10)	ND (10)
	12/14/11	1 - 2	N	ND (10)	32

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

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

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

TPH = Total Petroleum Hydrocarbon

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

Table 6
Sample Results: Polychlorinated Biphenyls
Area of Concern 24 – Stained Area and Former Oil/Water Separator
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
Commercial Screening Level [1]:				**21,000**	**540**	**540**	**740**	**740**	**740**	**740**	**740**	**740**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]:				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**
Category1												
AOC24-OS1	12/14/11	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	12/14/11	1 - 2	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	30	ND (17)	ND (17)	ND (17)
AOC24-OS2	12/14/11	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	12/14/11	1 - 2	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)

Notes:

1 Commercial screening level - commercial USEPA regional screening levels

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

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

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

µg/kg = micrograms per kilogram

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

N = Primary Sample

ND = not detected at the listed reporting limit

Table 7
Sample Results: Pesticides
Area of Concern 24 – Stained Area and Former Oil/Water Separator
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Pesticides (µg/kg)																				
Commercial Screening Level [1]				**9,000**	**6,300**	**6,300**	**130**	**270**	**1,700**	**960**	**270**	**130**	**3,700,000**	**3,700,000**	**3,700,000**	**230,000**	**230,000**	**230,000**	**2,000**	**1,700**	**520**	**190**	**3,800,000**	**1,800**
RWQCB Environmental Screening Level [2]				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background [3]				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	4,4-DDD	4,4-DDE	4,4-DDT	Aldrin	alpha-BHC	alpha-Chlordane	beta-BHC	delta-BHC	Dieldrin	Endo sulfan I	Endo sulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC	gamma-Chlordane	Heptachlor	Heptachlor Epoxide	Methoxy chlor	Toxaphene
Category1																								
AOC24-OS1	12/14/11	0 - 0.5	N	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	ND (1)	1.7	ND (1)	ND (1)	ND (2.1)	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	1.6 J	ND (1)	ND (1)	ND (5.2)	ND (52)
	12/14/11	1 - 2	N	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2.1)	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	---	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.2)	ND (52)
AOC24-OS2	12/14/11	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	---	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.1)	ND (51)
	12/14/11	1 - 2	N	ND (2.1)	ND (2.1)	ND (2.1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2.1)	ND (1)	ND (2.1)	ND (2.1)	ND (2.1)	ND (2.1)	---	ND (1)	ND (1)	ND (1)	ND (1)	ND (5.2)	ND (52)

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.
2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.
3 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.
Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.
NE = not established
USEPA = United States Environmental Protection Agency
DTSC = California Department of Toxic Substances Control
RWQCB = California Regional Water Quality Control Board
CHHSL = California human health screening levels
-- = not analyzed
µg/kg = micrograms per kilogram
FD = Field Duplicate
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
N = Primary Sample
ND = not detected at the listed reporting limit

Table 8
Sample Results: Metals
Area of Concern 26 – Former Scrubber Sump
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Metals (mg/kg)		
Commercial Screening Level [1]:				**37**	**NE**	**320**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**	**NE**
Background [3]:				**0.83**	**NE**	**8.39**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Hexavalent Chromium**	**Chromium**	**Lead**
Category3						
SS-NE	09/05/96	10	N	ND (1)	22	ND (5)
	09/05/96	10.5	N	ND (1)	14	**12**
SSWW	09/05/96	8	N	ND (1)	15	ND (5)

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

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

4 Commercial screening level is below background value; therefore, arsenic results are only screened against the background value.

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

Table 9
Sample Results: Total Petroleum Hydrocarbons
Area of Concern 26 – Former Scrubber Sump
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)	
Commercial Screening Level [1]:				**NE**	**NE**
RWQCB Environmental Screening Level [2]:				**NE**	**NE**
Background [3]:				**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Total Petroleum Hydrocarbons**	**Total Recoverable Hydrocarbons**
Category3					
SS1	01/16/97	5	N	---	78
	01/16/97	13	N	---	45
	01/16/97	15	N	---	29
	01/16/97	20	N	---	38
SS2	01/16/97	15	N	---	8,600
	01/16/97	20	N	---	8,800
SS3	01/16/97	15	N	---	390
	01/16/97	20	N	---	2,800
	01/16/97	27	N	---	9,700
	01/16/97	30	N	---	8,200
	01/16/97	35	N	---	8,100
	01/16/97	40	N	---	ND (22)
SS4	01/16/97	5	N	---	ND (21)
	01/16/97	10	N	---	ND (23)
	01/16/97	15	N	---	ND (21)
	01/16/97	20	N	---	ND (22)
SS5	01/16/97	5	N	---	ND (21)
	01/16/97	10	N	---	ND (21)
	01/16/97	15	N	---	ND (20)
	01/16/97	20	N	---	ND (22)
SS-N-10.4	09/05/96	10.4	N	3,700	---
SS-NE	09/05/96	10	N	6,700	---
	09/05/96	10.5	N	15,000	---
SS-NW-10.0	09/05/96	10	N	5,700	---
SS-S-11.0	09/05/96	11	N	400	---
SS-SE-10.5	09/05/96	10.5	N	780	---
SS-SE-10.8	09/05/96	10.8	N	570	---
SS-SW-Comp	09/05/96	10.5	N	1,300	---
SSWE	09/05/96	9	N	1,800	---
SSWN	09/05/96	9	N	3,700	---
SSWS	09/05/96	8.5	N	3,100	---
SSWW	09/05/96	8	N	9,100	---

Notes:

1 Commercial screening level - commercial DTSC CHHSL. If the commercial DTSC CHHSL is not established, the USEPA regional screening level is used.

2 RWQCB. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

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

Results greater than or equal to the Background value are bolded. Results greater than or equal to the Commercial Screening level or RWQCB ESL are circled.

NE = not established

USEPA = United States Environmental Protection Agency

DTSC = California Department of Toxic Substances Control

RWQCB = California Regional Water Quality Control Board

CHHSL = California human health screening levels

TPH = Total Petroleum Hydrocarbon

-- = not analyzed

FD = Field Duplicate

ft bgs = feet below ground surface

J = concentration or reporting limit estimated by laboratory or data validation

mg/kg = milligrams per kilogram

N = Primary Sample

ND = not detected at the listed reporting limit

Table 10
Sample Results: Metals
AOC 27 - MW 24 Bench
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**0.29**	**280**	**23**	**3,100**	**150**	**10**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**17**	**NE**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**139.6**	**36.3**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Hexavalent	Chromium, total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
24debris-01	01/18/08	Unknown	N	1.3	4.1	89	ND (0.1)	0.49	0.43	9.6	2.9	17	66	ND (0.1) *	0.42	7.3	8	ND (0.25)	ND (1)	16	26
24debris-02	01/18/08	Unknown	N	3.8	0.89	43	ND (0.1)	ND (0.1)	ND (0.4)	190	0.7	3.9	830	ND (0.1) *	0.56	1.4	8.9	ND (0.25)	ND (1)	1.9	170
24debris-03	01/18/08	Unknown	N	ND (0.4) *	4.6	45	ND (0.1)	0.74	ND (0.4)	16	2.7	5.1	20	ND (0.1) *	1.5	100	6.6	ND (0.25)	ND (1)	120	41
24soil-01	01/31/08	Unknown	N	ND (0.4) *	3.1	130	ND (0.1)	0.71	ND (0.4)	15	3.5	7.2	6.4	ND (0.1) *	0.63	6.8	6.2	ND (0.25)	ND (1)	17	16
24soil-02	01/31/08	Unknown	N	ND (0.4) *	2.9	89	ND (0.1)	0.3	ND (0.4)	15	3.4	9.1	8.7	ND (0.1) *	0.7	7.2	1.4	ND (0.25)	ND (1)	18	17

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

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

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

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 11
Sample Results: Metals
Area of Concern 28 - Drip Legs
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**0.29**	**280**	**23**	**3,100**	**150**	**10**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**17**	**NE**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**139.6**	**36.3**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Hexavalent	Chromium, total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
AOC28-OS1	04/06/11	9 - 9.5	N	---	---	---	---	---	ND (0.41) J	17	---	---	---	---	3.7	---	---	---	---	---	---
AOC28-OS2	04/06/11	2.5 - 3	N	---	---	---	---	---	ND (0.4) J	---	---	---	---	---	---	---	---	---	---	---	---
	04/06/11	8.5 - 9	N	ND (2.1) J*	9.3	240	ND (1) J*	ND (1) J	ND (0.41) J	24	9.1	ND (10)	7.2	ND (0.1) J*	5	17	ND (1) J	ND (1)	ND (2.1) J	45	70

1 Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.
2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.
3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.
4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.
5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 12
Sample Results: Polycyclic Aromatic Hydrocarbons
Area of Concern 28 - Drip Legs
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**3,400,000**	**1,700,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**3,400,000**	**1,700,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	1-Methyl naphthalene	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (ghi) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	PAH Low molecular weight	PAH High molecular weight	B(a)P Equivalent
AOC28-OS1	04/06/11	0 - 0.5	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (50)	ND (5)	ND (5)	ND	ND	ND (4.4)
	04/06/11	2.5 - 3	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (8.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	04/06/11	5.5 - 6	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (6.9)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	04/06/11	9 - 9.5	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	8.8	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	37	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.8)	ND (5.1)	20	ND	66	5.4
AOC28-OS2	04/06/11	0 - 0.5	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	6	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (50)	5.7	ND (5)	ND (5)	5.7	6	7
	04/06/11	2.5 - 3	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (6.6)	ND (5)	ND (5)	ND	ND	ND (4.4)
	04/06/11	5.5 - 6	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (7.8)	ND (5)	ND (5)	ND	ND	ND (4.4)
	04/06/11	8.5 - 9	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (6)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)

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

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

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

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 13
Sample Results: VOCs, SVOCs, TPHs, and pH
Area of Concern 28 - Drip Legs
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			General Chemistry
Interim Screening Level[1] :				**540**	**540**	**1,800**	**NE**
Residential Regional Screening Levels[2] :				**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**
Ecological Comparison Values[5] :				**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**0**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as diesel**	**TPH as gasoline**	**TPH as motor oil**	**pH**
AOC28-OS1	04/06/11	0 - 0.5	N	32	---	150	8.9
	04/06/11	2.5 - 3	N	16	ND (1.1)	15	8.8
	04/06/11	5.5 - 6	N	17	ND (1.3)	34	8.1
	04/06/11	9 - 9.5	N	160	ND (1.2)	700	9.8
AOC28-OS2	04/06/11	0 - 0.5	N	ND (10)	---	ND (10)	8.4
	04/06/11	2.5 - 3	N	17	ND (1.3)	37	8.2
	04/06/11	5.5 - 6	N	ND (10)	ND (1.8)	ND (10)	8.4
	04/06/11	8.5 - 9	N	12	ND (1.2)	39	8.1

1 For SVOCs, interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used. For TPHs, interim screening level is the Regional Water Quality Control Board environmental screening level.

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

4 Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

5 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28 and ARCADIS. 2009. Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil". July 1.

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

Results greater than the interim screening level are circled.

Only detected VOCs and SVOCs are presented.

SVOCs	semivolatile organic compounds
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 14
Sample Results: Polychlorinated Biphenyls
Area of Concern 28 - Drip Legs
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)						
Interim Screening Level[1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**
Residential Regional Screening Levels[2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**
Residential DTSC CHHSL[3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**
AOC28-OS1	04/06/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	04/06/11	2.5 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	04/06/11	5.5 - 6	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	04/06/11	9 - 9.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
AOC28-OS2	04/06/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	04/06/11	2.5 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	04/06/11	5.5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	04/06/11	8.5 - 9	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)

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

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

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

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE 15

Summary of Incidental Spills – Area of Concern 29 – Interim Measure No. 3

PG&E Topock Compressor Station, Needles, California

Date	Description	Response
7/17/2007	Approximately 100 milligrams of hydraulic fluid dripped from Allied Waste regular trash transport truck onto the gravel on IM-3 approaching the plant and adjacent to the trash dumpster located in the northern area of IM-3.	Picked-up the wetted rocks and put them in our oily solids disposal container. Alerted Allied Waste of leaking transport truck; IM-3 will not allow their "old" truck onsite in the future.
1/26/2008	Approximately .5 gallon of hydrochloric acid was released to the gravel outside of secondary containment during a chemical transfer operation. The release occurred while hooking up the transfer hose from one tote to another tote; the operator accidentally opened the valve. The tote was located on the east side of IM-3.	Operator immediately closed the valve limiting the amount of chemical lost. The spill was neutralized and the gravel/soil was removed and disposed of in a phase separator. Consider modifications to plant operations so chemical transfers are less frequent and/or conducted over physical barrier.
2/2/2008	Approximately 2 gallons of sodium hydroxide were released inside the IM-3 containment while transferring from the 250-gallon tote to a 55-gallon drum. During the pumping phase of the transfer, the discharge hose came loose from the pump, causing the release.	The discharge nipple on the pump is smooth with only one hose clamp on the discharge hose. We have installed two clamps on the hose and it is now secure. Re-engineer the pump discharge to accept a barbed fitting and band the hose in place.
3/22/2008	Approximately 20 milliliters of ferrous chloride spilled during a chemical transfer operation. The ferrous chloride dripped from a tote between secondary containment and splash containment. Approximately 10 milliliters splashed onto the gravel but did not migrate beyond the gravel surface. The other 10 milliliters was captured in the splash containment.	Cleaned up from ferrous chloride splash containment and removed the affected rocks. All material was disposed of into a phase separator. Instead of transferring chemicals from one tote to another tote, IM-3 will transfer the process feed hose from the near empty tote to a full tote. The chemical pump will be stopped, the process hose removed from the tote, the empty tote removed and replaced with a full tote, the process hose reattached to the full tote, and the chemical process pump restarted.
9/30/2008	A pinhole leak in piping carrying treated effluent (before final treatment via reverse osmosis) released approximately 1 to 5 gallons of the treated effluent to the gravel adjacent to the IM-3 facility near the microfilter.	CRRWQCB notified. Gravel and wet soil was removed from the ground and placed in a phase separator which recycles water back thru the IM-3 facility so all of the released liquid returned to the IM-3 treatment system or disposed along with sludge. The pinhole leak was repaired and the facility resumed operation.
9/30/2008	An overflow of the IM-3 septic tank occurred when the toiler flush handle was stuck in the open position, resulting in an excessive freshwater discharge to the septic tank that escaped through an overflow/vent line. Approximately 5 to 100 gallons of freshwater were discharged to the soil in the northwest corner of the IM-3 facility.	CRRWQCB notified. Wet soil was treated with 17 gallons of dilute bleach (50% mixture) in accordance with County of San Bernardino Department of Health Services recommendations. Repaired the flush handle, added check of toilet to facility inspection checklist (completed every 4 hours).
12/17/2008	Failure of a flange joint in the treated water discharge line caused approximately 400 gallons of treated water to be released onto PG&E-owned property into the gravel area adjacent to the treated water storage tank within the IM-3 treatment plant.	DTSC, DOI, and CRRWQCB notified. Failed CPVC valve was corrected within minutes of the release, and release was contained on-site. Hand-dug a small sump in the gravel area, and used a small submersible pump to pump the water into the process drain tank (for return into the IM-3 treatment system). Water was pumped from this location until tests showed that the salinity of the water was less than a comparable location (wetted due to rain) outside of the zone affected by the spill. The discharge manifold was repaired. Operation of the treatment plant halted to wait for the glue to fully cure in the repaired joint on the manifold. Longer cure time to be used in the future.

TABLE 15

Summary of Incidental Spills – Area of Concern 29 – Interim Measure No. 3

PG&E Topock Compressor Station, Needles, California

Date	Description	Response
1/29/2009	Water leaked from microfilter no. 5 module on the west bank. Approximately 24 gallons were released outside of the secondary containment onto the gravel adjacent to the IM-3 facility near the microfilter.	CRRWQCB notified. Removed the wetted portion of the gravel/soil surface adjacent to the containment. Placed the gravel/soil in a phase separator so all of the released liquid will be returned to the IM-3 treatment system or will be disposed along with sludge. All tubing on the microfilter was replaced and a splash guard was extended around the modules on the microfilter.
5/5/2009	A small leak in plastic tubing conveying treated water brine was discovered. Although most of the leaking water was captured within the containment structure, approximately 2 gallons of the brine escaped the containment structure and was released onto the adjacent gravel surface adjacent to the reverse osmosis unit at the IM-3 facility.	CRRWQCB notified. Removed the wetted portion of the gravel surface adjacent to the containment. Placed the gravel in a phase separator so all of the released liquid will be returned to the IM-3 treatment system or will be disposed along with sludge. A plastic barricade was installed next to the tubing to prevent any future leakage from escaping containment in this location.
7/19/2009	Approximately 10 gallons of ferrous chloride leaked at a pressure gage. All of the ferrous chloride stayed within hazardous materials secondary containment.	Leak stopped by turning the inline valve off to the gage. Cleaned up released ferrous chloride and disposed of the absorbent materials used for clean-up into hazardous waste phase separator. The failed gage was replaced.
3/26/2010	The secondary reverse-osmosis high-pressure pump discharge hose coupling bolt failed causing a release of reverse-osmosis concentrate that spilled onto IM-3 floor. Nothing spilled outside IM-3 secondary containment.	Spill was cleaned up and liquid sent back through IM-3 for treatment. The stainless bolt broke with no apparent cause, system pressures and flows were normal. Repairs were made.

IM-3 = Interim Measures Number 3.

Table 16
Sample Results: Metals
Area of Concern 29 - Interim Measures No. 3 Treatment Plant
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**0.29**	**280**	**23**	**3,100**	**150**	**10**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**17**	**NE**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**139.6**	**36.3**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Hexavalent	Chromium, total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
BKG-15	09/20/08	0 - 0.5	N	ND (2) *	4.8	160	ND (1) *	ND (1)	ND (0.404)	10	4.2	5.4	5.2	ND (0.1) *	ND (1)	7.5	ND (1)	ND (1)	ND (2)	22	24
	09/20/08	2 - 3	N	ND (2) *	1.8	120	ND (1) *	ND (1)	ND (0.408)	15	7.6	9.1	2.4	ND (0.1) *	1	11	1.8	ND (1)	ND (2)	33	34
	09/20/08	5 - 6	N	ND (2) *	2.6	180	ND (1) *	ND (1)	ND (0.407)	21	8.5	8.9	2.7	ND (0.1) *	1.3	12	ND (1)	ND (1)	ND (2)	33	39
	09/20/08	9 - 10	N	ND (2) *	2.6	100	ND (2) *	ND (1)	ND (0.409)	26	12	12	2.6	ND (0.1) *	ND (2) *	16	2	ND (2)	ND (4.1) *	40	47
BKG-16	09/23/08	0 - 0.5	N	ND (2) *	5.3	160	ND (2) *	ND (1)	ND (0.435)	12	5.4	10	6.5	ND (0.1) *	ND (2) *	9.4	ND (1)	ND (2)	ND (4) *	22	35
	09/23/08	2 - 3	N	ND (2.1) *	4.4	210	ND (1) *	ND (1)	ND (0.407)	15	6.7	8.5	4	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2.1)	30	34
	09/23/08	5 - 6	N	ND (2) *	2.4	130	ND (1) *	ND (1)	ND (0.406)	14	6.3	6.8	2.7	ND (0.1) *	1.2	10	ND (1)	ND (1)	ND (2)	29	33
	09/23/08	9 - 10	N	ND (2) *	2.5	130	ND (1) *	ND (1)	ND (0.41)	16	8.8	11	2.4	ND (0.1) *	ND (1)	10	ND (1)	ND (1)	ND (2)	32	40

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.
[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.
[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.
[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.
[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.
Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 17
Sample Results: Contract Laboratory Program Inorganics
Area of Concern 29 - Interim Measures No. 3 Treatment Plant
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)						
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**
BKG-15	09/20/08	0 - 0.5	N	5,200	20,000	11,000	5,100	210	1,100	290
	09/20/08	2 - 3	N	8,100	14,000	18,000	6,200	260	2,500	380
	09/20/08	5 - 6	N	10,000	15,000	20,000	7,300	300	4,100	850
	09/20/08	9 - 10	N	12,000	34,000	22,000	8,300	340	3,300	890
BKG-16	09/23/08	0 - 0.5	N	8,400	33,000	14,000	8,100	290	2,700	ND (240)
	09/23/08	2 - 3	N	8,700	28,000	16,000	7,000	260	2,700	ND (700)
	09/23/08	5 - 6	N	7,800	17,000	16,000	6,000	240	2,800	ND (1,100)
	09/23/08	9 - 10	N	9,700	13,000	19,000	7,000	290	3,900	ND (850)

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

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 18
Sample Results: Pesticides
Area of Concern 29 - Interim Measures No. 3 Treatment Plant
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Pesticides (µg/kg)																					
Interim Screening Level [1] :				**2.1**	**2.1**	**2.1**	**33**	**77**	**430**	**270**	**77**	**5**	**370,000**	**370,000**	**370,000**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**53**	**340,000**	**460**
Residential Regional Screening Levels [2] :				**2,000**	**1,400**	**1,700**	**29**	**77**	**1,600**	**270**	**77**	**30**	**370,000**	**370,000**	**370,000**	**18,000**	**18,000**	**18,000**	**520**	**1,600**	**110**	**53**	**310,000**	**440**
Residential DTSC CHHSL [3] :				**2,300**	**1,600**	**1,600**	**33**	**NE**	**430**	**NE**	**NE**	**35**	**NE**	**NE**	**NE**	**21,000**	**21,000**	**21,000**	**500**	**430**	**130**	**NE**	**340,000**	**460**
Ecological Comparison Values [4] :				**2.1**	**2.1**	**2.1**	**NE**	**NE**	**470**	**NE**	**NE**	**5**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**470**	**NE**	**NE**	**NE**	**NE**
Background [5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**4,4-DDD**	**4,4-DDE**	**4,4-DDT**	**Aldrin**	**alpha-BHC**	**alpha-Chlordane**	**beta-BHC**	**delta-BHC**	**Dieldrin**	**Endo sulfan I**	**Endo sulfan II**	**Endosulfan sulfate**	**Endrin**	**Endrin aldehyde**	**Endrin ketone**	**gamma-BHC**	**gamma-Chlordane**	**Heptachlor**	**Heptachlor Epoxide**	**Methoxy chlor**	**Toxaphene**
BKG-15	09/20/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)
BKG-16	09/23/08	0 - 0.5	N	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (1)	ND (2)	ND (1)	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)	ND (1)	ND (1)	ND (1)	ND (1)	ND (5)	ND (50)

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

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison values for Additional Chemicals in Soil." July 1.

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

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE 19

Sludge Analytical Results – Area of Concern 30 – MW-20 Bench[a]

Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1

		TTLC in mg/kg		TCLP in mg/L		STLC in mg/L	
Analyte	**Method**	**Sludge Results**	**TTLC Value**	**Sludge Results**	**TCLP Value**	**Sludge Results**	**STLC Value**
Antimony	6010B	11.6	500	---	NE	3.06	15
Arsenic	6010B	10.7	500	ND (0.125)	5	0.719	5
Barium	6010B	6.47	10000	0.139	100	0.473	100
Beryllium	6010B	7.97	75	---	NE	0.656	0.75
Cadmium	6010B	ND (0.777)	100	ND (0.125)	1	ND (0.125)	1
Chromium (total)	6010B	3,810	2500	0.174	5	277	5
Chromium, Hexavalent	7199	230 J	500	---	NE	---	5
Cobalt	6010B	ND (0.454)	8000	---	NE	ND (0.025)	80
Copper	6010B	3.88	2500	---	NE	ND (0.372)	25
Iron	6010B	27,600	---	---	---	2,110	---
Lead	6010B	2.33	1000	ND (0.05	5	ND (0.447)	5
Mercury	6010B	ND (0.04)	20	ND (0.001)	0.2	ND (0.001)	0.2
Molybdenum	6010B	ND (0.908)	3500	---	NE	ND (1)	350
Nickel	6010B	ND (0.908)	2000	---	NE	0.081	20
Selenium	6010B	50.4	100	ND (0.125)	1	5.99	1
Silver	6010B	ND (0.454)	500	ND (0.025)	5	ND (0.025)	5
Thallium	6010B	ND (1.36)	700	---	NE	0.199	7
Vanadium	6010B	8.53	2400	---	NE	0.47	24
Zinc	6010B	24.4	5000	---	NE	ND (1.45)	250

[a] Sludge sample was collected from phase separator container on April 20, 2005

ft bgs= feet below ground surface.
mg/kg - milligrams per kilogram.
ND = not detected at the reporting limit.

TABLE 20
Statistical Summary of Brine Data – Area of Concern 30 – MW-20 Bench
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1

Analyte	Number of samples	Lowest Reported Concentration [a]	Highest Reported Concentration [a]	Lowest Reported Detection [b]	Highest Reported Detection [b]	Mean or Average detection	Units
Alkalinity	3	227	450	227	450	371	mg/L
Aluminum	2	ND (52)	ND (200)	NA	NA	ND	µg/L
Ammonia-N	4	ND (0.5)	0.51	0.51	0.51	0.51	mg/L
Antimony	58	ND (2)	ND (10.4)	3.5	6.4	4.3	µg/L
Arsenic	59	0.4	36.5	0.4	36.5	5.58 [c]	µg/L
Barium	60	ND (10)	ND (300)	16.4	190	90.7	µg/L
Beryllium	58	ND (0.5)	ND (10.4)	2	6.7	4.35	µg/L
Boron	2	1890	2500	1890	2500	2195	µg/L
Cadmium	58	ND (1)	11	5.48	11	8.24	µg/L
Calcium	5	851000	1130000	851000	1130000	914600	µg/L
Chloride	4	9590	11200	9590	11200	10372.5	mg/L
Chromium	75	ND (1)	29.7	1.02	29.7	4.67	µg/L
Hexavalent Chromium	75	ND (0.2)	6.8	2	6.8	2.94	µg/L
Cobalt	58	ND (5)	ND (10.4)	5.25	8.57	6.4	µg/L
Color	1	2	2	2	2	2	Color units
Copper	58	ND (5)	375	5.3	375	70.5	µg/L
EC	58	1210	61800	1210	61800	36519	µmhos/cm
Fluoride	60	ND (0.5)	30.1	1.04	30.1	12.5	mg/L
Iron	5	ND (20)	ND (500)	NA	NA	ND	µg/L
Lead	58	ND (1)	38.2	2.4	38.2	16.2	µg/L
Magnesium	5	63300	110000	63300	110000	87680	µg/L
Manganese	16	10.7	ND (500)	10.7	256	80.0	µg/L
Mercury	58	ND (0.4)	ND (4)	0.28	0.54	0.41	µg/L
Molybdenum	58	ND (10)	224	16.5	224	90.8	µg/L
Nickel	58	4.8	61	4.8	61	22.5	µg/L
Nitrate-N	5	11	17.8	11	17.8	14.3	mg/L
Nitrite-N	3	ND (0.005)	0.0298	0.0153	0.0298	0.0225	mg/L
pH	59	7.26	8.09	7.26	8.09	7.87	pH
Potassium	5	70900	128000	70900	128000	102480	µg/L
Selenium	58	ND (5)	46.4	5.76	46.4	20.8	µg/L
Silver	58	ND (5)	63.8	5.7	63.8	14.6	µg/L
Sodium	5	5500000	6960000	5500000	6960000	6140000	µg/L
Soluble Silica	3	35.5	67.4	35.5	67.4	47.6	mg/L

TABLE 20

Statistical Summary of Brine Data – Area of Concern 30 – MW-20 Bench

Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1

Analyte	Number of samples	Lowest Reported Concentration [a]	Highest Reported Concentration [a]	Lowest Reported Detection [b]	Highest Reported Detection [b]	Mean or Average detection	Units
Strontium	4	20800	33300	20800	33300	26575	µg/L
Sulfate	5	2450	2970	2450	2970	2694	mg/L
Thallium	58	1	ND (15)	1	6	3.3	µg/L
Total Dissolved Solids	78	804	51400	804	51400	25209	mg/L
Total Organic Carbon	8	1.13	4.8	1.13	4.8	2.0	mg/L
Total Phosphorous-P	2	1.08	1.19	1.08	1.19	1.13	mg/L
Total Suspended Solids	1	11.3	11.3	11.3	11.3	11.3	mg/L
Turbidity	2	ND (0.1)	ND (0.1)			ND	NTU
Vanadium	58	ND (5)	1150	5.62	1150	96.7 [d]	µg/L
Zinc	58	ND (10)	124	11	124	37.0	µg/L

Notes:

µg/L - micrograms per liter
mg/L – milligrams per liter
ND – not detected at the reporting limits
NTU – Nephelometric Turbidity Unit
µmhos/cm - micromhos per centimeter

[a] The Lowest Reported Concentration and Highest Reported Concentration values include the lowest and highest results, respectively, based on either the detected value or the reporting limits of the analyte.

[b] The Lowest Reported Detection and Highest Reported Detection only include results in which the analyte was detected above the reporting limit.

[c] All results after July 2006 have been below 3 µg/L

[d] The average detection is 30.5 µg/L, if you remove the one anomalous 1150 µg/L value.

Table 21
Sample Results: Metals
Area of Concern 30 - MW-20 Bench
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**0.29**	**280**	**23**	**3,100**	**150**	**10**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**17**	**NE**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**139.6**	**36.3**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location [6]	**Date**	**Depth (ft bgs)**	**Sample Type**	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Hexavalent	Chromium, total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
BG01	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	ND (13.9)	---	---	---	---	---	---	---	---	---	---	---
BG02	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	31	---	---	---	---	---	---	---	---	---	---	---
BG03	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	15.8	---	---	---	---	---	---	---	---	---	---	---
BG04	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	25	---	---	---	---	---	---	---	---	---	---	---
BG05	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	21.1	---	---	---	---	---	---	---	---	---	---	---
BG06	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	ND (9.69)	---	---	---	---	---	---	---	---	---	---	---
BG07	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	ND (13.8)	---	---	---	---	---	---	---	---	---	---	---
BG08	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	ND (12.4)	---	---	---	---	---	---	---	---	---	---	---
BG09	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	15	---	---	---	---	---	---	---	---	---	---	---
BG10	05/25/05 [6]	0 - 1	N	---	---	---	---	---	---	ND (11.2)	---	---	---	---	---	---	---	---	---	---	---
	05/25/05 [6]	0 - 1	FD	---	---	---	---	---	---	ND (13.5)	---	---	---	---	---	---	---	---	---	---	---
CS01	04/21/05 [6]	0 - 1	N	---	---	---	---	---	ND (0.42)	23	---	---	---	---	---	---	0.82	---	---	---	---
CS02	04/21/05 [6]	0 - 1	N	---	---	---	---	---	ND (0.42)	14	---	---	---	---	---	---	0.96	---	---	---	---
CS03	04/21/05 [6]	5 - 6	N	---	---	---	---	---	ND (0.41)	17	---	---	---	---	---	---	0.67	---	---	---	---
CS04	04/28/05 [6]	7 - 8	N	ND (6.4) *	6.2	290	ND (0.53)	---	ND (0.43)	16	---	8.8	3.9	---	---	---	ND (0.53)	---	---	27	22
CS05	04/30/05 [6]	1 - 2	N	ND (6.2) J*	6.4	81	ND (0.52)	---	ND (0.41)	15 J	---	10	7.4	---	---	---	1.3	---	---	32 J	23
CS06	07/05/05 [6]	6 - 7	N	---	---	---	---	---	---	15 J	---	---	---	---	---	---	---	---	---	---	---
CS07	07/05/05 [6]	6 - 7	N	---	---	---	---	---	---	19	---	---	---	---	---	---	---	---	---	---	---
CS08	07/13/05 [6]	9 - 10	N	---	---	---	---	---	---	23 J	---	---	---	---	---	---	---	---	---	---	---
CS09	04/21/05 [6]	0 - 1	N	---	---	---	---	---	ND (0.41)	19	---	---	---	---	---	---	0.79	---	---	---	---
CS10	07/05/05 [6]	3 - 4	N	---	---	---	---	---	---	21	---	---	---	---	---	---	---	---	---	---	---
CS11	04/30/05 [6]	1 - 2	N	ND (6.2) *	6.1	170	ND (0.52)	---	ND (0.42)	27	---	8.5	6.1	---	---	---	0.69	---	---	31	24
CS12	04/30/05 [6]	1 - 2	N	ND (6.2) *	6.2	110	ND (0.52)	---	ND (0.41)	22	---	9.9	8.5	---	---	---	0.98	---	---	31	26
CS13	04/21/05 [6]	5 - 6	N	---	---	---	---	---	ND (0.41)	11	---	---	---	---	---	---	0.78	---	---	---	---
	04/21/05 [6]	5 - 6	FD	ND (6.3) *	4.4	130	ND (0.52)	ND (0.52)	ND (0.42)	29	ND (5.2)	8.4	16	ND (0.1) *	ND (4.2) *	8.1	0.97	ND (1)	ND (1)	22	27
CS14	04/28/05 [6]	6 - 7	N	ND (6.3) J*	5.9	47	ND (0.52)	---	ND (0.42)	20	---	11	3	---	---	---	0.54	---	---	26	22
CS15	07/05/05 [6]	3 - 4	N	---	---	---	---	---	---	25	---	---	---	---	---	---	---	---	---	---	---
CS16	07/08/05 [6]	6 - 7	N	---	---	---	---	---	---	27	---	---	---	---	---	---	---	---	---	---	---
Middle	02/12/09 [6]	0 - 0.5	N	---	---	---	---	---	---	15	---	---	---	---	---	---	---	---	---	---	---
NE Corner	02/12/09 [6]	0 - 0.5	N	---	---	---	---	---	---	15	---	---	---	---	---	---	---	---	---	---	---
NW Corner	02/12/09 [6]	0 - 0.5	N	---	---	---	---	---	---	18	---	---	---	---	---	---	---	---	---	---	---
SE Corner	02/12/09 [6]	0 - 0.5	N	---	---	---	---	---	---	10	---	---	---	---	---	---	---	---	---	---	---
SW Corner	02/12/09 [6]	0 - 0.5	N	---	---	---	---	---	---	18	---	---	---	---	---	---	---	---	---	---	---
TS-1	01/28/02 [6]	1	N	---	---	---	---	---	ND (0.02)	7.7	---	5	---	---	---	4.5	---	---	---	---	19.1
TS-1A	02/12/02 [6]	0	N	---	---	---	---	---	ND (0.02)	11.8	---	13.7	---	---	---	6.8	---	---	---	---	33.4

Table 21
Sample Results: Metals
Area of Concern 30 - MW-20 Bench
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**0.29**	**280**	**23**	**3,100**	**150**	**10**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**17**	**NE**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**139.6**	**36.3**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location [6]	**Date**	**Depth (ft bgs)**	**Sample Type**	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Hexavalent	Chromium, total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
TS-2	01/28/02 [6]	0	N	---	---	---	---	---	0.021	12.8	---	9.8	---	---	---	6.8	---	---	---	---	28.9
TS-2A	02/12/02 [6]	0	N	---	---	---	---	---	ND (0.02)	12.3	---	14.9	---	---	---	7.8	---	---	---	---	34.7
TS-3	01/28/02 [6]	0.5	N	---	---	---	---	---	0.021	15.4	---	10.2	---	---	---	7.2	---	---	---	---	36.2
TS-3A	02/12/02 [6]	0	N	---	---	---	---	---	ND (0.02)	12.4	---	14.6	---	---	---	6.9	---	---	---	---	56.7
TS-4	01/28/02 [6]	0	N	---	---	---	---	---	ND (0.02)	21.8	---	12.2	---	---	---	13.7	---	---	---	---	35.7
TS-4A	02/12/02 [6]	0	N	---	---	---	---	---	ND (0.02)	10.2	---	8.8	---	---	---	6.5	---	---	---	---	22.2
TS-5	01/28/02 [6]	0	N	---	---	---	---	---	ND (0.02)	14.3	---	8.1	---	---	---	6.8	---	---	---	---	29.9
TS-5A	02/12/02 [6]	0	N	---	---	---	---	---	ND (0.02)	11.8	---	13.7	---	---	---	7.3	---	---	---	---	29.5
TS-6	01/28/02 [6]	0	N	---	---	---	---	---	ND (0.02)	10	---	7.2	---	---	---	6.2	---	---	---	---	28
TS-6A	02/12/02 [6]	0	N	---	---	---	---	---	ND (0.02)	15.6	---	13.9	---	---	---	8.8	---	---	---	---	45.3

[1] Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.
[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.
[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.
[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.
[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.
[6] Sample locations starting with TS are background soil samples collected by Ecology and Environment.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 22

Sample Results: Contract Laboratory Program Inorganics
Area of Concern 30 - MW-20 Bench
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)
Interim Screening Level[1] :				**55,000**
Residential Regional Screening Levels[2] :				**55,000**
Residential DTSC CHHSL[3] :				**NE**
Ecological Comparison Values[4] :				**NE**
Background[5] :				**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Iron**
CS01	04/21/05	0 - 1	N	13,000
CS02	04/21/05	0 - 1	N	12,000
CS03	04/21/05	5 - 6	N	13,000
CS09	04/21/05	0 - 1	N	12,000
CS13	04/21/05	5 - 6	N	7,200
	04/21/05	5 - 6	FD	9,900

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

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

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

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 23
Sample Results: Metals
AOC 31 - Former Teapot Dome Oil Pit
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Metals (mg/kg)																	
Interim Screening Level [1]:				**0.285**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**0.0125**	**1.37**	**27.3**	**1.47**	**5.15**	**2.32**	**52.2**	**58**
Residential Regional Screening Levels [2]:				**31**	**0.062**	**15,000**	**160**	**70**	**0.29**	**280**	**23**	**3,100**	**150**	**10**	**390**	**1,500**	**390**	**390**	**5.1**	**390**	**23,000**
Residential DTSC CHHSL [3]:				**30**	**0.07**	**5,200**	**16**	**39**	**17**	**NE**	**660**	**3,000**	**80**	**18**	**380**	**1,600**	**380**	**380**	**5**	**530**	**23,000**
Ecological Comparison Values [4]:				**0.285**	**11.4**	**330**	**23.3**	**0.0151**	**139.6**	**36.3**	**13**	**20.6**	**0.0166**	**0.0125**	**2.25**	**0.607**	**0.177**	**5.15**	**2.32**	**13.9**	**0.164**
Background [5]:				**NE**	**11**	**410**	**0.672**	**1.1**	**0.83**	**39.8**	**12.7**	**16.8**	**8.39**	**NE**	**1.37**	**27.3**	**1.47**	**NE**	**NE**	**52.2**	**58**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium, Hexavalent	Chromium, total	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
BH-69	03/18/11	0 - 0.5	N	ND (2.1) *	3.1	140	ND (1) *	ND (1)	0.72	58	12	20	9.6	ND (0.1) *	ND (1)	35	ND (1)	ND (1)	ND (2.1)	50	73
	03/18/11	2 - 3	N	ND (2.2) *	2.7	89	ND (1.1) *	ND (1.1) *	ND (0.45)	49	11	14	7.4	ND (0.11) *	ND (1.1)	33	ND (1.1)	ND (1.1)	ND (2.2)	45	61
	05/31/11	5 - 6	N	ND (2) *	1.7	250	ND (1) *	ND (1)	ND (0.41)	63	11	29	3.9	ND (0.1) *	1	46	ND (1)	ND (1)	ND (2)	55	49
	05/31/11	9 - 10	N	ND (2.1) *	2.2	150	ND (1) *	ND (1)	ND (0.42)	57	12	25	4.3	ND (0.1) *	ND (1)	45	ND (1)	ND (1)	ND (2.1)	59	53
	05/31/11	14 - 15	N	ND (2) *	1.9	170	ND (1) *	ND (1)	ND (0.41)	45	10	42	4	ND (0.1) *	ND (1)	42	ND (1)	ND (1)	ND (2)	58	48
	05/31/11	19 - 20	N	ND (2) *	1.6	280	ND (1) *	ND (1)	ND (0.41)	55	12	32	4.2	ND (0.1) *	ND (1)	43	ND (1)	ND (1)	ND (2)	57	49
	05/31/11	29 - 30	N	ND (2) *	1.9	120	ND (1) *	ND (1)	ND (0.4)	57	11	46	3.6	ND (0.1) *	ND (1)	50	ND (1)	ND (1)	ND (2)	74	50
	05/31/11	39 - 40	N	ND (2.1) *	2.8	170	ND (1.1) *	ND (1.1) *	ND (0.43)	48	8.4	21	4.1	ND (0.11) *	ND (1.1)	35	ND (1.1)	ND (1.1)	ND (2.1)	59	42
PA-OS1	04/06/11	9 - 9.5	N	ND (2) *	2.4	22	ND (1) *	ND (1)	ND (0.4) J	2.9	1.7	ND (2)	2.3	ND (0.1) J*	ND (1)	4.2	ND (1)	ND (1)	ND (2)	9.2	6.9
PA-OS2	04/06/11	0 - 0.5	N	ND (2) *	5.5	200	ND (1) *	ND (1)	ND (0.4) J	35	12	16	4.9	ND (0.1) J*	5.2	26	ND (1)	ND (1)	ND (2)	46	39
	04/06/11	11.5 - 12	N	ND (2) *	3.7	100	ND (1) *	ND (1)	ND (0.4) J	24	5.6	10	3.3	ND (0.1) J*	2.9	19	ND (1)	ND (1)	ND (2)	25	25

1 Interim screening level is background value. If background value is not available then the lesser of the DTSC residential CHHSL or the ecological comparison value is used. If CHHSL is not available, it is the lesser of the USEPA residential regional screening level or the ecological comparison value.
2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.
3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.
4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.
5 CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 24
Sample Results: Contract Laboratory Program Inorganics
AOC 31 - Former Teapot Dome Oil Pit
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Contract Laboratory Program (CLP) Inorganics (mg/kg)							
Interim Screening Level[1] :				**16,400**	**66,500**	**55,000**	**12,100**	**402**	**4,400**	**2,070**	**0.9**
Residential Regional Screening Levels[2] :				**77,000**	**NE**	**55,000**	**NE**	**1,800**	**NE**	**NE**	**1,600**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**220**	**NE**	**NE**	**0.9**
Background[5] :				**16,400**	**66,500**	**NE**	**12,100**	**402**	**4,400**	**2,070**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aluminum**	**Calcium**	**Iron**	**Magnesium**	**Manganese**	**Potassium**	**Sodium**	**Cyanide**
BH-69	03/18/11	2 - 3	N	17,000	28,000	23,000	12,000	360	3,800	1,700	---
	05/31/11	5 - 6	N	20,000	62,000	30,000	16,000	520	3,400	1,500	ND (0.26)
	05/31/11	9 - 10	N	20,000	40,000	31,000	16,000	420	4,000	1,700	ND (0.26)
	05/31/11	14 - 15	N	19,000	71,000	29,000	15,000	430	3,400	1,500	ND (0.26)
	05/31/11	19 - 20	N	20,000	67,000	31,000	15,000	440	3,600	1,500	ND (0.26)
	05/31/11	29 - 30	N	19,000	30,000	32,000	16,000	410	5,500	1,000	ND (0.25)
	05/31/11	39 - 40	N	16,000	34,000	26,000	13,000	320	4,500	1,100	ND (0.27)

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

[2] USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

[3] California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil" November 2004 (January 2005 Revision). January.

[4] ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil". May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil." July 1.

[5] CH2M HILL. 2009. "Final Soil Background Technical Memorandum at Pacific Gas and Electric Company Topock Compressor Station, Needles, California." May.

Results greater than or equal to the interim screening level are circled; however, if the interim screening level is equal to the background value, only results greater than the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 25
Sample Results: Polycyclic Aromatic Hydrocarbons
AOC 31 - Former Teapot Dome Oil Pit
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

				Polycyclic Aromatic Hydrocarbons (µg/kg)																				
Interim Screening Level[1] :				**22,000**	**310,000**	**3,400,000**	**1,700,000**	**17,000,000**	**380**	**38**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**10,000**	**1,160**	**38**
Residential Regional Screening Levels[2] :				**22,000**	**310,000**	**3,400,000**	**1,700,000**	**17,000,000**	**380**	**15**	**380**	**1,700,000**	**380**	**3,800**	**110**	**2,300,000**	**2,300,000**	**380**	**3,600**	**1,700,000**	**1,700,000**	**NE**	**NE**	**15**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**38**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**10,000**	**1,160**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	1-Methyl naphthalene	2-Methyl naphthalene	Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) anthracene	Benzo (a) pyrene	Benzo (b) fluoranthene	Benzo (ghi) perylene	Benzo (k) fluoranthene	Chrysene	Dibenzo (a,h) anthracene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	PAH Low molecular weight	PAH High molecular weight	B(a)P Equivalent
BH-69	03/18/11	0 - 0.5	N	ND (5.2)	6.3 J	ND (5.2)	ND (5.2)	ND (5.2)	12	17	29	17	10	19	ND (5.2)	350	ND (5.2)	15	ND (5.2)	9.4	28	16	500	25
	03/18/11	2 - 3	N	ND (5.6)	10 J	ND (5.6)	ND (5.6)	ND (5.6)	7.4	10	20	12	7.4	12	ND (5.6)	20	ND (5.6)	10	5.6	6.3	18	22	120	16
	05/31/11	5 - 6	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	05/31/11	9 - 10	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.4)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
	05/31/11	14 - 15	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.3)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	05/31/11	19 - 20	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	05/31/11	29 - 30	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (6.4)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	05/31/11	39 - 40	N	ND (5.3)	ND (53)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (5.3)	ND (6)	ND (5.3)	ND (5.3)	ND	ND	ND (4.6)
PA-OS1	04/06/11	0 - 0.5	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (50)	ND (5)	ND	ND	ND (4.4)
	04/06/11	2.5 - 3	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5.5)	ND (5)	ND (5)	ND	ND	ND (4.4)
	04/06/11	5.5 - 6	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5.7)	ND (5)	ND (5)	ND	ND	ND (4.4)
	04/06/11	9 - 9.5	N	ND (5)	5	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (6.1)	ND (5)	ND (5)	5	ND	4.4
PA-OS2	04/06/11	0 - 0.5	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	04/06/11	2.5 - 3	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	04/06/11	5.5 - 6	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (50)	ND (5)	ND (5)	ND	ND	ND (4.4)
	04/06/11	9.5 - 10	N	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (5.1)	ND (51)	ND (5.1)	ND (5.1)	ND	ND	ND (4.5)
	04/06/11	11.5 - 12	N	ND (5)	ND (50)	ND (5)	ND (5)	ND (5)	5	ND (5)	ND (5)	ND (5)	ND (5)	20	ND (5)	ND (5)	ND (5)	ND (5)	ND (50)	ND (5)	10	ND	35	4.8

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

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28.

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

Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 26
Sample Results: Total Petroleum Hydrocarbons and General Chemistry
AOC 31 - Former Teapot Dome Oil Pit
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Total Petroleum Hydrocarbons (mg/kg)			General Chemistry (mg/kg)	
Interim Screening Level[1] :				**540**	**540**	**1,800**	**NE**	**NE**
Residential Regional Screening Levels[2] :				**NE**	**NE**	**NE**	**NE**	**NE**
Residential DTSC CHHSL[3] :				**NE**	**NE**	**NE**	**NE**	**NE**
RWQCB Environmental Screening Levels [4] :				**540**	**540**	**1,800**	**NE**	**NE**
Ecological Comparison Values[5] :				**NE**	**NE**	**NE**	**NE**	**NE**
Background[6] :				**NE**	**NE**	**NE**	**0**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**TPH as diesel**	**TPH as gasoline**	**TPH as motor oil**	**pH**	**Total organic carbon**
BH-69	03/18/11	0 - 0.5	N	83	ND (1)	150	9	7,700
	03/18/11	2 - 3	N	14	ND (1)	33	9.1	4,900
	05/31/11	5 - 6	N	ND (10)	ND (1)	ND (10)	9.7	18,000
	05/31/11	9 - 10	N	ND (10)	ND (1.1)	ND (10)	9.6	10,000
	05/31/11	14 - 15	N	ND (10)	ND (1.1)	ND (10)	9.6	8,300
	05/31/11	19 - 20	N	ND (10)	ND (0.91)	ND (10)	9.4	6,600
	05/31/11	29 - 30	N	ND (10)	ND (1)	ND (10)	9.7	6,700
	05/31/11	39 - 40	N	ND (11)	ND (0.9)	ND (11)	9.8	7,900
PA-OS1	04/06/11	0 - 0.5	N	15	---	ND (10)	7.8	---
	04/06/11	2.5 - 3	N	14	ND (1.7)	ND (10)	7.9	---
	04/06/11	5.5 - 6	N	ND (10)	ND (1.4)	ND (10)	8.2	---
	04/06/11	9 - 9.5	N	ND (10)	ND (1.1)	ND (10)	8.7	---
PA-OS2	04/06/11	0 - 0.5	N	---	---	---	8.3	---
	04/06/11	2.5 - 3	N	---	---	---	7.9	---
	04/06/11	5.5 - 6	N	---	---	---	8	---
	04/06/11	9.5 - 10	N	---	---	---	8.8	---
	04/06/11	11.5 - 12	N	---	---	---	8.1	---

1 For SVOCs, interim screening level is DTSC residential CHHSL. If CHHSL is not available, the USEPA residential regional screening level is used. If an ecological comparison value has been calculated, then the lowest between the ecological comparison value or the CHHSL/regional screening level is used. For TPHs, interim screening level is the Regional Water Quality Control Board environmental screening level.

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites". http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, November 2004 (January 2005 Revision)". January.

4 Water Board. 2008. "Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater" (Table K-1). May 27.

5 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil. May 28 and ARCADIS. 2009. Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Detected Chemicals in Soil". July 1.

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

Results greater than the interim screening level are circled.

Only detected VOCs and SVOCs are presented.

Table 26
Sample Results: Total Petroleum Hydrocarbons and General Chemistry
AOC 31 - Former Teapot Dome Oil Pit
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

SVOCs	semivolatile organic compounds
TPH	total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
Water Board	Regional Water Quality Control Board
NE	not established
mg/kg	milligrams per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

Table 27
Sample Results: PCBs
AOC 31 - Former Teapot Dome Oil Pit
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California

				Polychlorinated biphenyls (µg/kg)								
Interim Screening Level[1] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**
Residential Regional Screening Levels[2] :				**3,900**	**140**	**140**	**220**	**220**	**220**	**220**	**220**	**220**
Residential DTSC CHHSL[3] :				**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**
Ecological Comparison Values[4] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Background[5] :				**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**	**NE**
Location	**Date**	**Depth (ft bgs)**	**Sample Type**	**Aroclor 1016**	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**	**Aroclor 1262**	**Aroclor 1268**
BH-69	03/18/11	0 - 0.5	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	67	ND (17)	ND (17)	ND (17)
	03/18/11	2 - 3	N	ND (18)	ND (37)	ND (18)	ND (18)	ND (18)	51	ND (18)	ND (18)	ND (18)
	05/31/11	5 - 6	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	05/31/11	9 - 10	N	ND (17)	ND (35)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	05/31/11	14 - 15	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	05/31/11	19 - 20	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	05/31/11	29 - 30	N	ND (17)	ND (34)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)
	05/31/11	39 - 40	N	ND (18)	ND (35)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)	ND (18)
PA-OS1	04/06/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/06/11	2.5 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/06/11	5.5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/06/11	9 - 9.5	N	ND (16)	ND (33)	ND (16)	ND (16)	ND (16)	ND (16)	ND (16)	---	---
PA-OS2	04/06/11	0 - 0.5	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/06/11	2.5 - 3	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	18	ND (17)	---	---
	04/06/11	5.5 - 6	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/06/11	9.5 - 10	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	ND (17)	ND (17)	---	---
	04/06/11	11.5 - 12	N	ND (17)	ND (33)	ND (17)	ND (17)	ND (17)	48	ND (17)	---	---

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

2 USEPA. 2009. "Regional Screening Levels for Chemical Contaminants at Superfund Sites." http://epaprgs.ornl.govchemicals/index.shtml. December.

3 California EPA, Office of Environmental Health Hazard Assessment. 2005. "Human Exposure Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil." November 2004 (January 2005 Revision). January.

4 ARCADIS. 2008. "Technical Memorandum 3: Ecological Comparison Values for Metals and Polycyclic Aromatic Hydrocarbons in Soil." May 28. ARCADIS. 2009. "Topock Compression Station - Final Technical Memorandum 4: Ecological Comparison Values for Additional Dectected Chemicals in Soil." July 1.

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

Table 27
Sample Results: PCBs
AOC 31 - Former Teapot Dome Oil Pit
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
Pacific Gas and Electric Company Topock Compressor Station Needles, California
Results greater than or equal to the interim screening level are circled.

*	Reporting limits greater than or equal to the interim screening level.
USEPA	United States Environmental Protection Agency
DTSC	California Department of Toxic Substances Control
CHHSL	California human health screening levels
NE	not established
µg/kg	micrograms per kilogram
ft bgs	feet below ground surface
N	primary sample
FD	field duplicate
---	not analyzed
ND	not detected at the listed reporting limit
J	concentration or reporting limit estimated by laboratory or data validation

TABLE 28
Available Written Records of Compressor Station Storm Drain Alignments and Construction Details
PG&E Topock Compressor Station, Needles, California

Author	Drawing No.	Date	Notes
Bechtel	181280, Revision 0	3/9/1951	Water Drawoff Basin,[1] Topock Compressor Station
Bechtel	181317	04/23/1951	Detail of Floor Drains Compressor Building
Unknown	282653, No Revision no.	February 1957	Control Surface Ground Erosion, Topock Compressor Station
PG&E (Base map from 1951 likely by Bechtel)	481785, Revision 22	12/11/67	Sewers and Drains Topock Compressor Station
PG&E (Base map from 1951 likely by Bechtel)	481785, Revision 27	3/29/91	Sewers and Drains Topock Compressor Station
PG&E (Base map from 1951 likely by Bechtel)	481785, Revision 29	9/17/93	Sewers and Drains Topock Compressor Station
PG&E (Base map from 1951 likely by Bechtel)	482629, Revision 5	Revision 5 undated; previous revision 8/18/88	Sewers, Domestic, Utility &and Fire Water System, Topock Compressor Station
TA Engineering Co. Inc.	387706, Revision 3	3/29/91	Elementary-Mechanical Drain & and Sewer Systems Topock Compressor Station Gas Operations

[1] Catch basin

TABLE 29
Soil Sample Results: TCS Well #4, Bat Cave Wash
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

Analyte	Interim Screening Level	Units	Location: / Sample Date: / Depth (ft bgs):	Old Well-BCW-1 [a] 9/11/2013 7-8	Old Well-BCW-2 [a] 9/11/2013 4-5
Dioxins and Furans					
1,2,3,4,6,7,8-HpCDD	--	ng/kg		7,000	8,300 J
1,2,3,4,6,7,8-HpCDF	--	ng/kg		ND (1.2)	ND (1.9J)
1,2,3,4,7,8,9-HpCDF	--	ng/kg		170	170 J
1,2,3,4,7,8-HxCDD	--	ng/kg		21	50 J
1,2,3,4,7,8-HxCDF	--	ng/kg		64	110 J
1,2,3,6,7,8-HxCDD	--	ng/kg		200	380 J
1,2,3,6,7,8-HxCDF	--	ng/kg		ND (280)	ND (450J)
1,2,3,7,8,9-HxCDD	--	ng/kg		40	97 J
1,2,3,7,8,9-HxCDF	--	ng/kg		ND (2)	ND (5.6J)
2,3,4,6,7,8-HxCDF	--	ng/kg		ND (4,000)	63 J
OCDD	--	ng/kg		53,000	100,000 J
OCDF	--	ng/kg		8,400	11,000 J
1,2,3,7,8-PeCDD	4.6	ng/kg		8.8 J	18 J
1,2,3,7,8-PeCDF	--	ng/kg		ND (0.42)	ND (2.4J)
2,3,4,7,8-PeCDF	--	ng/kg		ND (4.8)	ND (10J)
2,3,7,8-TCDD	4.6	ng/kg		ND (0.17)	ND (0.23J)
2,3,7,8-TCDF	--	ng/kg		0.46 J	1.6 J
TEQ Human	50	ng/kg		350	230
TEQ Avian	16	ng/kg		250	100
TEQ Mammals	1.6	ng/kg		350	230
General Chemistry					
Moisture	--	%		10.9 J	5.4
pH	--	pH units		8.2	--
Metals					
Antimony	0.285	mg/kg		ND (2.2J)	ND (2.1)
Arsenic	11	mg/kg		4.8	19
Barium	410	mg/kg		130	130
Beryllium	0.672	mg/kg		ND (1.1J)	ND (1)
Cadmium	1.1	mg/kg		ND (1.1J)	ND (1)
Chromium, total	39.8	mg/kg		4,200	4,400
Cobalt	12.7	mg/kg		7	7.2
Copper	16.8	mg/kg		14	23
Chromium, Hexavalent	0.83	mg/kg		80	73
Lead	8.39	mg/kg		12 J	10
Mercury	0.0125	mg/kg		ND (0.11)	ND (0.11)
Molybdenum	1.37	mg/kg		18	6.7

TABLE 29
Soil Sample Results: TCS Well #4, Bat Cave Wash
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

Analyte	Interim Screening Level	Units	Location: / Sample Date: / Depth (ft bgs):	Old Well-BCW-1 [a] 9/11/2013 7-8	Old Well-BCW-2 [a] 9/11/2013 4-5
Metals					
Nickel	27.3	mg/kg		11	12
Selenium	1.47	mg/kg		2.1	ND (1)
Silver	5.15	mg/kg		ND (1.1J)	ND (1)
Thallium	2.32	mg/kg		ND (2.2)	ND (2.1)
Vanadium	52.2	mg/kg		37 J	61
Zinc	58	mg/kg		190	150
Polyaromatic Hydrocarbons					
1-Methyl naphthalene	22,000	µg/kg		ND (5.6)	--
2-Methyl naphthalene	310,000	µg/kg		ND (5.6)	--
Acenaphthene	3,400,000	µg/kg		ND (5.6)	--
Acenaphthylene	1,700,000	µg/kg		ND (5.6)	--
Anthracene	17,000,000	µg/kg		ND (5.6)	--
Benzo (ghi) perylene	1,700,000	µg/kg		ND (5.6)	--
Benzo (a) anthracene	380	µg/kg		ND (5.6)	--
Benzo (a) pyrene	38	µg/kg		ND (5.6)	--
Benzo (b) fluoranthene	380	µg/kg		ND (5.6)	--
Benzo (k) fluoranthene	380	µg/kg		ND (5.6)	--
Chrysene	3,800	µg/kg		ND (5.6)	--
Dibenzo (a,h) anthracene	110	µg/kg		ND (5.6)	--
Fluoranthene	2,300,000	µg/kg		ND (5.6)	--
Fluorene	2,300,000	µg/kg		ND (5.6)	--
Indeno (1,2,3-cd) pyrene	380	µg/kg		ND (5.6)	--
Naphthalene	3,600	µg/kg		ND (5.6)	--
Phenanthrene	1,700,000	µg/kg		ND (5.6)	--
Pyrene	1,700,000	µg/kg		ND (5.6)	--
B(a)P Equivalent	38	µg/kg		ND (4.9)	--
PAH High molecular weight	1,160	µg/kg		ND	--
PAH Low molecular weight	10,000	µg/kg		ND	--
Polychlorinated Biphenyls					
Aroclor 1016	3,900	µg/kg		ND (18)	--
Aroclor 1221	140	µg/kg		ND (37)	--
Aroclor 1232	140	µg/kg		ND (18)	--
Aroclor 1242	220	µg/kg		ND (18)	--
Aroclor 1248	220	µg/kg		ND (18)	--
Aroclor 1254	220	µg/kg		ND (18)	--
Aroclor 1260	220	µg/kg		ND (18)	--

TABLE 29
Soil Sample Results: TCS Well #4, Bat Cave Wash
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

Analyte	Interim Screening Level	Units	Location: / Sample Date: / Depth (ft bgs):	Old Well-BCW-1 [a] 9/11/2013 7-8	Old Well-BCW-2 [a] 9/11/2013 4-5
Semivolatile Organic Compounds					
2,4,5-Trichlorophenol	6,100,000	µg/kg		ND (370)	--
2,4,6-Trichlorophenol	6,900	µg/kg		ND (370)	--
2,4-Dichlorophenol	180,000	µg/kg		ND (1,800)	--
2,4-Dimethylphenol	1,200,000	µg/kg		ND (370)	--
2,4-Dinitrophenol	120,000	µg/kg		ND (1,800)	--
2,4-Dinitrotoluene	1,600	µg/kg		ND (370)	--
2,6-Dinitrotoluene	61,000	µg/kg		ND (370)	--
2-Chloro naphthalene	6,300,000	µg/kg		ND (370)	--
2-Chlorophenol	63,000	µg/kg		ND (370)	--
2-Methylphenol	3,100,000	µg/kg		ND (370)	--
2-Nitroaniline	183,000	µg/kg		ND (1,800)	--
2-Nitrophenol	--	µg/kg		ND (370)	--
3,3-Dichlorobenzidene	1,100	µg/kg		ND (730)	--
3-Nitroaniline	18,000	µg/kg		ND (1,800)	--
4,6-Dinitro-2-methylphenol	6,100	µg/kg		ND (1,800)	--
4-Bromophenyl phenyl ether	--	µg/kg		ND (370)	--
4-Chloro-3-methylphenol	6,100,000	µg/kg		ND (730)	--
4-Chloroaniline	2,400	µg/kg		ND (730)	--
4-Chlorophenyl phenyl ether	--	µg/kg		ND (370)	--
4-Methylphenol	500	µg/kg		ND (370)	--
4-Nitroaniline	24,000	µg/kg		ND (1,800)	--
4-Nitrophenol	--	µg/kg		ND (1,800)	--
Benzoic acid	240,000,000	µg/kg		ND (1,800)	--
Benzyl alcohol	6,100,000	µg/kg		ND (730)	--
bis (2-chloroethoxy) methane	180,000	µg/kg		ND (370)	--
bis (2-chloroethyl) ether	210	µg/kg		ND (370)	--
bis (2-chloroisopropyl) ether	4,600	µg/kg		ND (370)	--
bis (2-ethylhexyl) phthalate	2,870	µg/kg		ND (370)	--
Butylbenzylphthalate	260,000	µg/kg		ND (370)	--
Dibenzofuran	150,000	µg/kg		ND (370)	--
Diethyl phthalate	49,000,000	µg/kg		ND (370)	--
Dimethyl phthalate	100,000,000	µg/kg		ND (370)	--
Di-n-butyl phthalate	46.9	µg/kg		ND (370)	--
Di-n-octyl phthalate	2,400,000	µg/kg		ND (370)	--
Hexachlorobenzene	300	µg/kg		ND (370)	--
Hexachloroethane	35,000	µg/kg		ND (370)	--

TABLE 29
Soil Sample Results: TCS Well #4, Bat Cave Wash
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

Analyte	Interim Screening Level	Units	Location: / Sample Date: / Depth (ft bgs):	Old Well-BCW-1 [a] 9/11/2013 7-8	Old Well-BCW-2 [a] 9/11/2013 4-5
Semivolatile Organic Compounds					
Isophorone	510,000	µg/kg		ND (370)	--
Nitrobenzene	4,800	µg/kg		ND (370)	--
N-nitrosodiphenylamine	99,000	µg/kg		ND (370)	--
n-Nitroso-di-n-propylamine	69	µg/kg		ND (370)	--
Pentachlorophenol	2,490	µg/kg		ND (1,800)	--
Phenol	18,000,000	µg/kg		ND (370)	--
Total Petroleum Hydrocarbons					
TPH as diesel	540	mg/kg		ND (11)	--
TPH as gasoline	540	mg/kg		ND (2.1)	--
TPH as motor oil	1,800	mg/kg		20	--
Volatile Organic Compounds					
1,1,1,2-Tetrachloroethane	1,900	µg/kg		ND (10)	--
1,1,1-Trichloroethane	8,700,000	µg/kg		ND (10)	--
1,1,2,2-Tetrachloroethane	560	µg/kg		ND (10)	--
1,1,2-Trichloroethane	1,100	µg/kg		ND (10)	--
1,1,2-Trichlorotrifluoroethane (Freon 113)	43,000,000	µg/kg		ND (10)	--
1,1-Dichloroethane	3,300	µg/kg		ND (10)	--
1,1-Dichloroethene	240,000	µg/kg		ND (10)	--
1,1-Dichloropropene	1,700	µg/kg		ND (10)	--
1,2,3-Trichlorobenzene	49,000	µg/kg		ND (10)	--
1,2,3-Trichloropropane	5	µg/kg		ND (10)	--
1,2,4-Trichlorobenzene	22,000	µg/kg		ND (10)	--
1,2,4-Trimethylbenzene	62,000	µg/kg		ND (10)	--
1,2-Dibromoethane	34	µg/kg		ND (10)	--
1,2-Dibromo-3-chloropropane	5.4	µg/kg		ND (10)	--
1,2-Dichlorobenzene	1,900,000	µg/kg		ND (10)	--
1,2-Dichloroethane	430	µg/kg		ND (10)	--
1,2-Dichloropropane	890	µg/kg		ND (10)	--
1,3,5-Trimethylbenzene	780,000	µg/kg		ND (10)	--
1,3-Dichlorobenzene	530,000	µg/kg		ND (10)	--
1,3-Dichloropropane	1,600,000	µg/kg		ND (10)	--
1,4-Dichlorobenzene	2,400	µg/kg		ND (10)	--
2,2-Dichloropropane	890	µg/kg		ND (10)	--
2-Chlorotoluene	160,000	µg/kg		ND (10)	--
4-Isopropyltoluene	2,100,000	µg/kg		ND (10)	--
Acetone	61,000,000	µg/kg		ND (100)	--

TABLE 29
Soil Sample Results: TCS Well #4, Bat Cave Wash
Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1
PG&E Topock Compressor Station, Needles, California

Analyte	Interim Screening Level	Units	Location: / Sample Date: / Depth (ft bgs):	Old Well-BCW-1 [a] 9/11/2013 7-8	Old Well-BCW-2 [a] 9/11/2013 4-5
Volatile Organic Compounds					
Acrolein	150	µg/kg		ND (200)	--
Acrylonitrile	55	µg/kg		ND (100)	--
Benzene	1,100	µg/kg		ND (10)	--
Bromobenzene	300,000	µg/kg		ND (10)	--
Bromodichloromethane	270	µg/kg		ND (10)	--
Bromomethane	7,300	µg/kg		ND (10)	--
Bromochloromethane	270	µg/kg		ND (10)	--
Bromoform	61,000	µg/kg		ND (10)	--
Carbon disulfide	820,000	µg/kg		ND (10)	--
Carbon tetrachloride	250	µg/kg		ND (10)	--
Chlorobenzene	290,000	µg/kg		ND (10)	--
Chloroethane	15,000,000	µg/kg		ND (10)	--
Chloro methane	120,000	µg/kg		ND (10)	--
Chloroform	290	µg/kg		ND (10)	--
cis-1,2-Dichloroethene	780,000	µg/kg		ND (10)	--
cis-1,3-Dichloropropene	1,700	µg/kg		ND (10)	--
Dibromochloromethane	680	µg/kg		ND (10)	--
Dibromomethane	25,000	µg/kg		ND (10)	--
Dichlorodifluoromethane	180,000	µg/kg		ND (10)	--
Ethyl- benzene	5,400	µg/kg		ND (10)	--
Hexachlorobutadiene	6,200	µg/kg		ND (10)	--
Isopropylbenzene	2,100,000	µg/kg		ND (10)	--
Methyl ethyl ketone	28,000,000	µg/kg		ND (100)	--
Methyl isobutyl ketone	5,300,000	µg/kg		ND (100)	--
Methyl tert-butyl ether (MTBE)	43,000	µg/kg		ND (10)	--
Methylene chloride	11,000	µg/kg		ND (10)	--
N-Butylbenzene	240,000	µg/kg		ND (10)	--
N-Propylbenzene	240,000	µg/kg		ND (10)	--
p-Chlorotoluene	5,500,000	µg/kg		ND (10)	--
sec-Butylbenzene	220,000	µg/kg		ND (10)	--
Styrene	6,300,000	µg/kg		ND (10)	--
tert-Butylbenzene	390,000	µg/kg		ND (10)	--
Tetrachloroethene	550	µg/kg		ND (10)	--
Toluene	5,000,000	µg/kg		ND (10)	--
trans-1,2-Dichloroethene	150,000	µg/kg		ND (10)	--
trans-1,3-Dichloropropene	1,700	µg/kg		ND (10)	--

TABLE 29

Soil Sample Results: TCS Well #4, Bat Cave Wash

Addendum to RCRA Facility Investigation/Remedial Investigation Report Volume 1

PG&E Topock Compressor Station, Needles, California

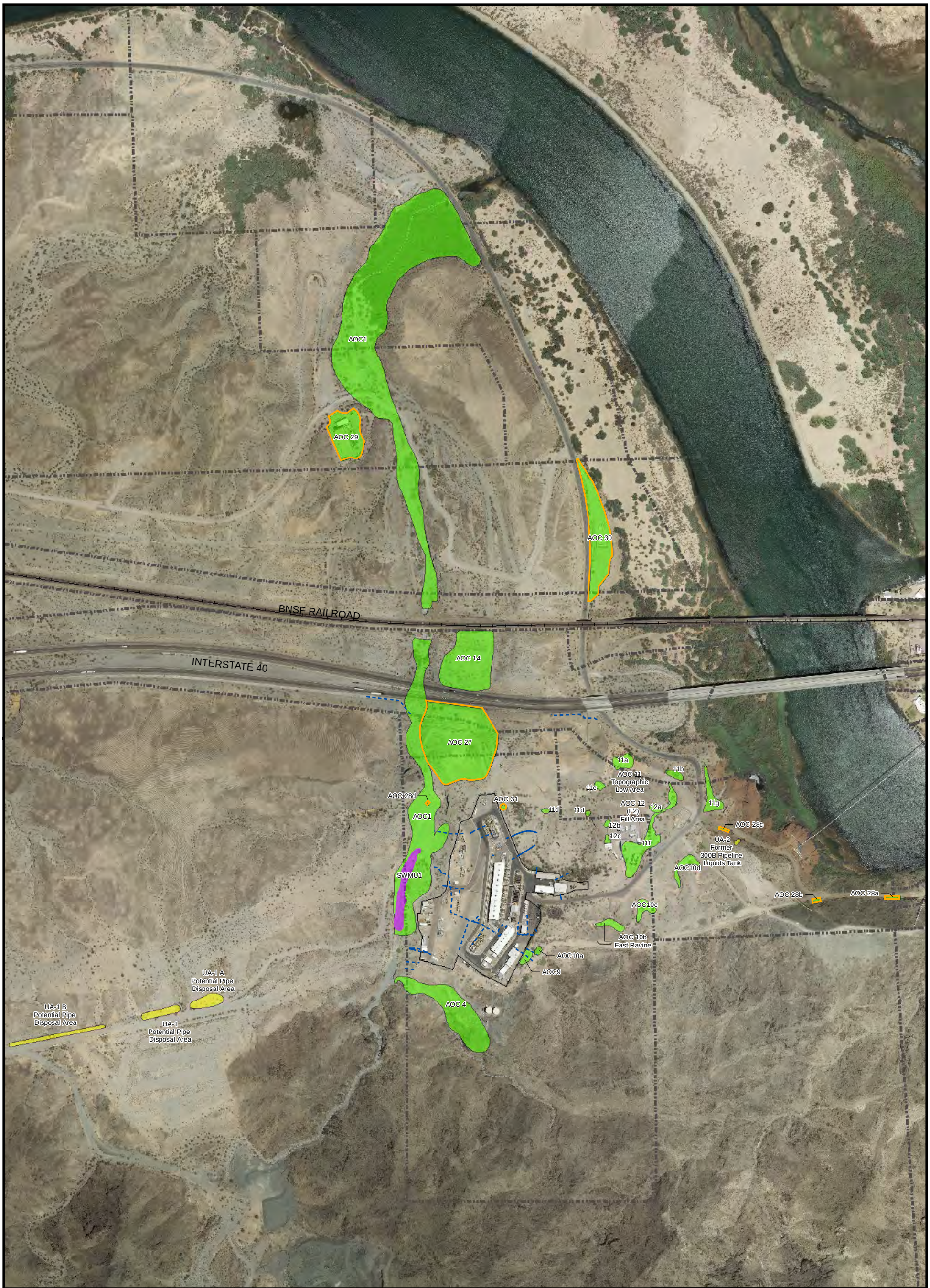
Analyte	Interim Screening Level	Units	Location: / Sample Date: / Depth (ft bgs):	Old Well-BCW-1 [a] 9/11/2013 7-8	Old Well-BCW-2 [a] 9/11/2013 4-5
Volatile Organic Compounds					
Trichloroethene	2,800	µg/kg		ND (10)	--
Trichlorofluoromethane (Freon 11)	790,000	µg/kg		ND (10)	--
Vinyl chloride	60	µg/kg		ND (10)	--
Xylene, m,p-	3,400,000	µg/kg		ND (10)	--
Xylene, o-	3,800,000	µg/kg		ND (10)	--
Xylenes, total	630,000	µg/kg		ND (10)	--

Notes:

[a] – Samples were collected from the excavation around TCS Well #4, from the backhoe bucket.

Calculations:
Teq = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is ND.
TeqBird = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is ND.
TeqMammals = Sum of Result x TEF, 1/2 reporting limit used for nondetects. If all Dioxins and Furans are nondetect, the final qualifier code is ND.
-- = not analyzed
ft bgs = feet below ground surface
J = concentration or reporting limit estimated by laboratory or data validation
mg/kg = milligrams per kilogram
ND = not detected at the listed reporting limit
ng/kg = nanograms per kilogram
TPH = Total Petroleum Hydrocarbon
µg/kg = micrograms per kilogram

Figures



LEGEND

- New Units Included in Volume 1 Addendum
- Area of Concern (AOC)
- Solid Waste Management Unit (SWMU)
- Other Area
- Site Fence Boundary
- Stormwater Piping Below Ground
- Stormwater Piping Above Ground

N

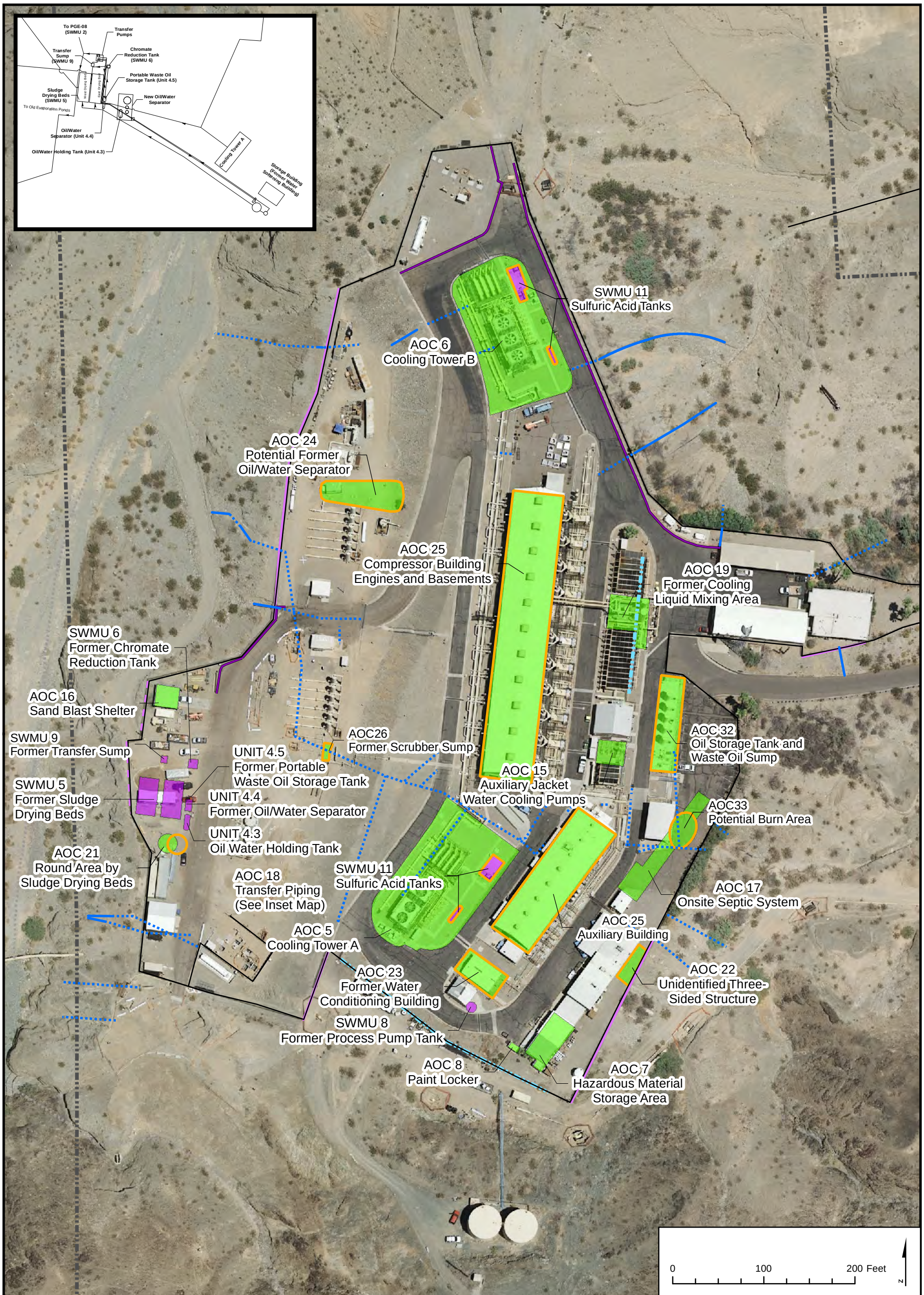
0 400 800 Feet

FIGURE 1
SOLID WASTE MANAGEMENT UNITS, AREAS OF CONCERN, AND OTHER UNDESIGNATED AREAS OUTSIDE THE COMPRESSOR STATION FENCE LINE

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

Path: D:\Projects\Topock\MapFiles\2013\RCRA\ALL_SWMU_AOC_Locs11X17Outside.mxd



LEGEND

- Stormwater Piping Above Ground (Approximate Location)
- Stormwater Piping Below Ground (Approximate Location)
- Site Fence Boundary
- Berm
- Curb
- Partial Berm
- Retaining Wall
- New Units Included in Volume 1 Addendum
- Area of Concern (AOC)
- Solid Waste Management Unit (SWMU)

Notes:

1) AOC 13 is not depicted on this figure. It consists of the unpaved areas within the compressor station.
2) AOC 20 is not depicted on this figure. It consists of industrial floor drains within the compressor station.
3) Boundaries of all SWMUs, AOCs, and Other Areas are approximate.
4) The Perimeter Area (PA) and Storm Drains (SD) outside of and along the periphery of the Compressor Station fence line are being investigated as part of the Soil RFI/RI Investigation. If constituents exceed background or applicable screening levels in these areas, the specific areas will be assigned to applicable RFI/RI AOCs.

FIGURE 2
SOLID WASTE MANAGEMENT UNITS, AREAS OF CONCERN, AND OTHER UNDESIGNATED AREAS INSIDE THE COMPRESSOR STATION FENCE LINE

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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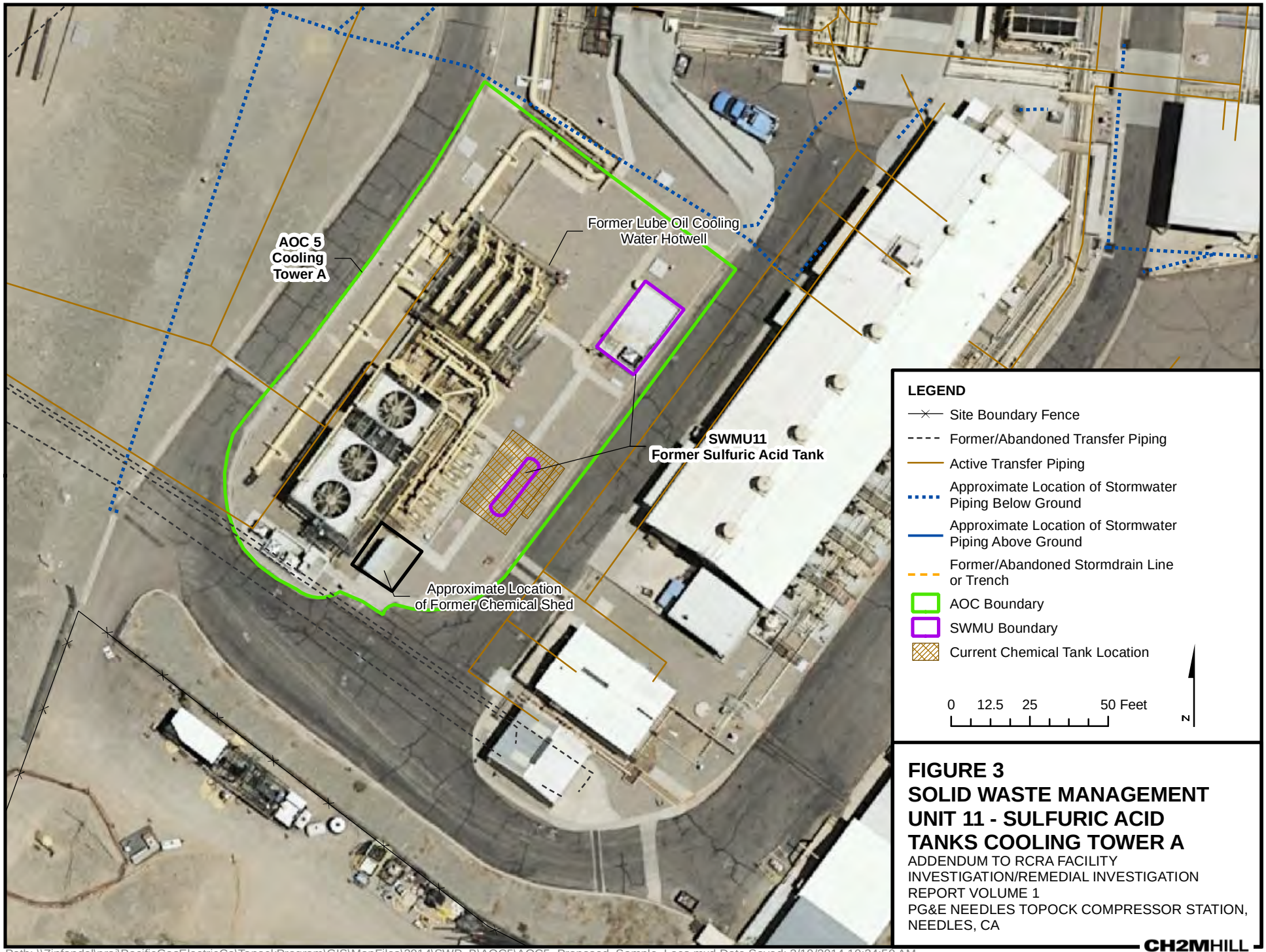

FIGURE 3
SOLID WASTE MANAGEMENT UNIT 11 - SULFURIC ACID TANKS COOLING TOWER A
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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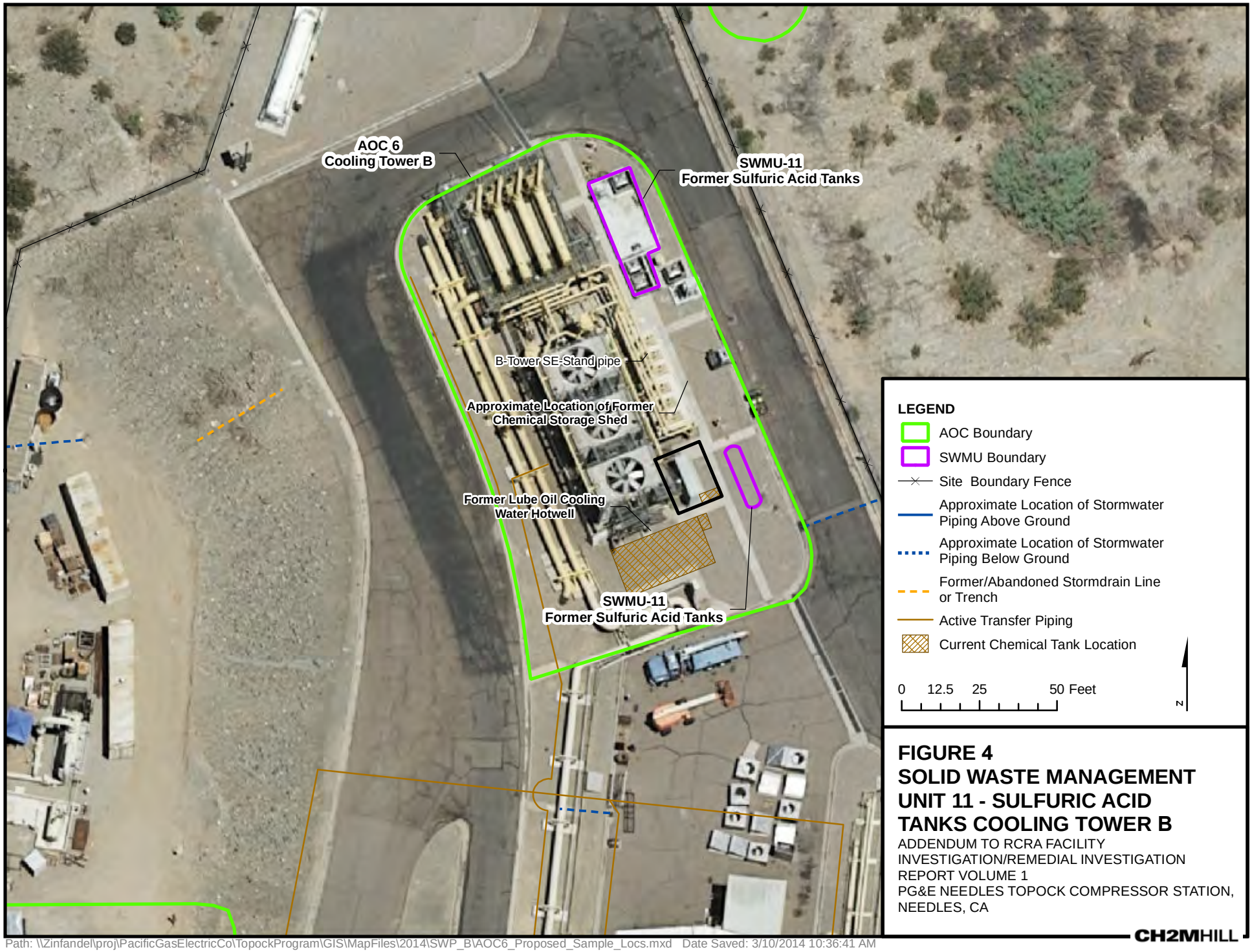

FIGURE 4
SOLID WASTE MANAGEMENT UNIT 11 - SULFURIC ACID TANKS COOLING TOWER B

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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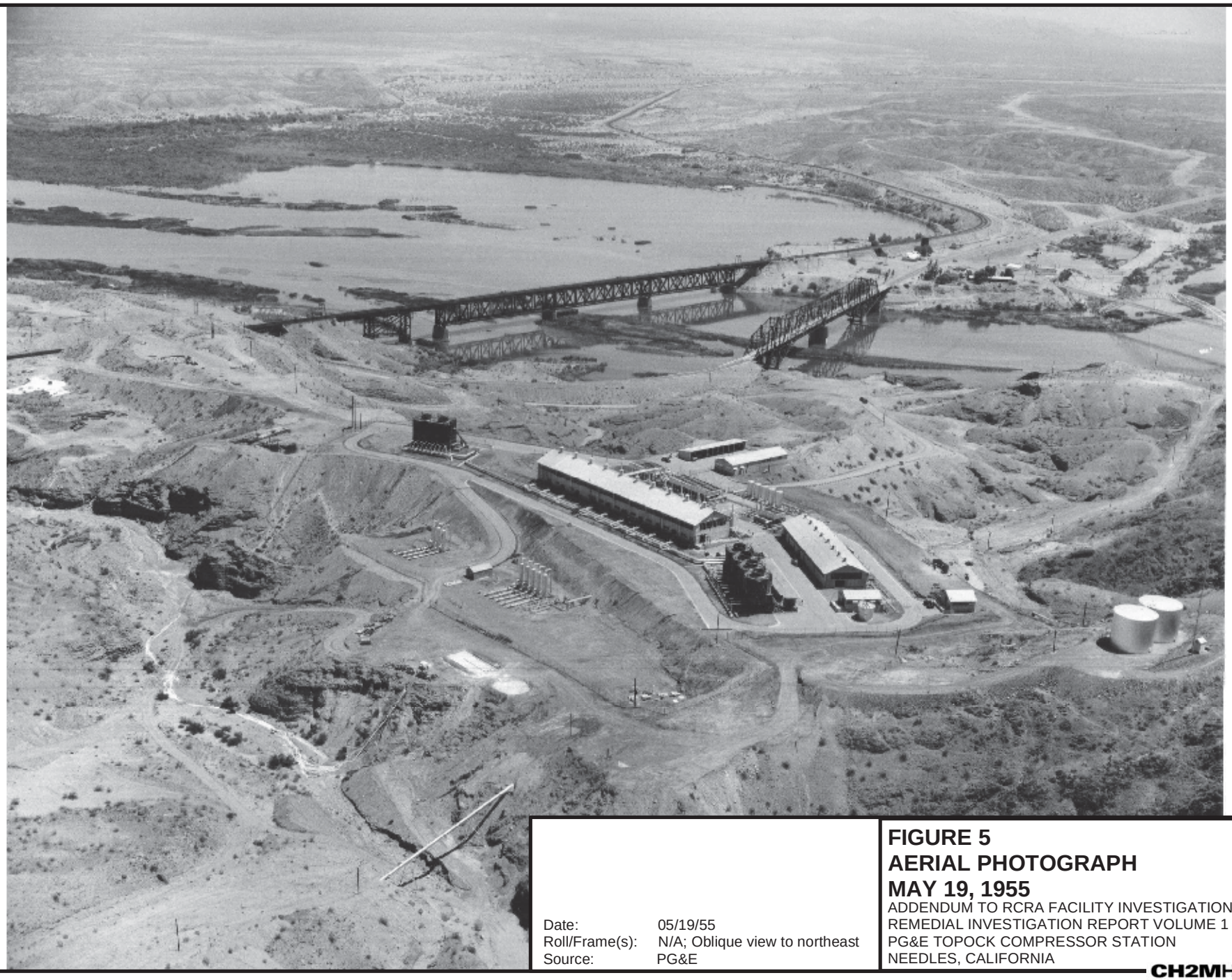

Date: 05/19/55
Roll/Frame(s): N/A; Oblique view to northeast
Source: PG&E

FIGURE 5
AERIAL PHOTOGRAPH
MAY 19, 1955

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CH2MHILL

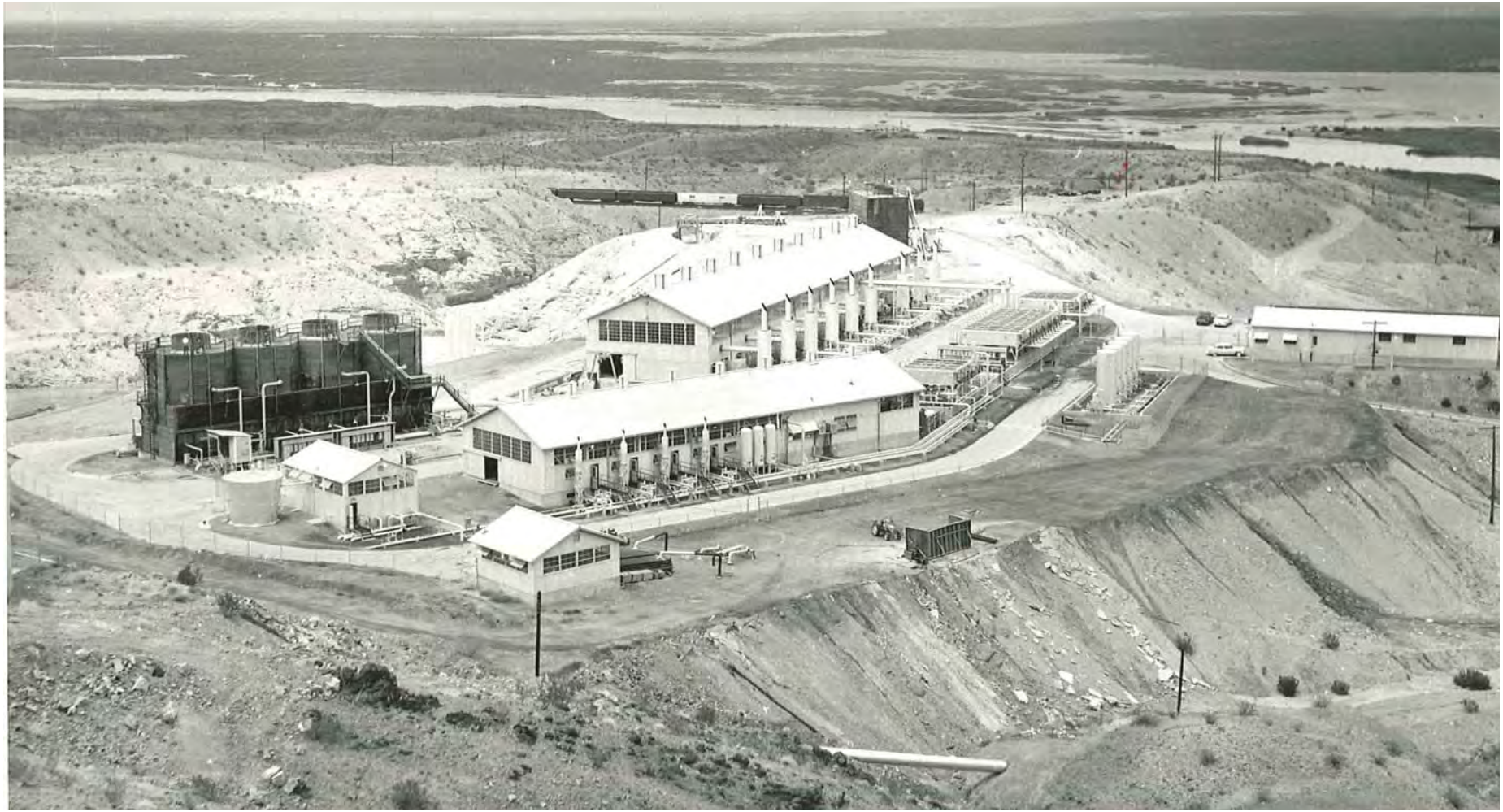

Photo looking northwest toward the Topock Compressor Station. Photo was taken between 1954 and 1958.

FIGURE 6
PHOTO OF THE TOPOCK COMPRESSOR STATION TAKEN BETWEEN 1954 AND 1958

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

ES030614163513BAO_Fig-6_Photo_TopockCompressor_1954-1958.ai_031114_lho

Photo of Cooling Tower B taken looking northwest showing a sulfuric acid tank on the eastern side of the cooling tower.

FIGURE 7
PHOTOGRAPH OF COOLING TOWER B – UNKNOWN DATE

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

ES030614163513BAO_Fig-7_Photo_CoolingTowerB.ai_030614

Photo of Cooling Tower A taken looking southwest showing a sulfuric acid tank on the eastern side of the cooling tower.

FIGURE 8
PHOTOGRAPH OF COOLING TOWER B – DECEMBER 1, 1999

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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ES030614163513BAO_Fig-8_Photo_CoolingTowerB_1999.ai_030614

FIGURE 9
AREA OF CONCERN 20 - INDUSTRIAL FLOOR DRAINS PREVIOUS SOIL SAMPLE LOCATIONS
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

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FIGURE 10
AERIAL PHOTOGRAPH – MAY 19, 1955

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Date: 05/19/55
Roll/Frame(s): N/A; Oblique view to northwest
Source: PG&E

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MXD\2006\RFI_AERIAL_PHOTO_1955C.MXD RFI_FIG_3_15_AERIAL_PHOTO_1955C.PDF 8/9/2006 10:45:53

Aerial photograph taken between 1954 and 1956 as found on an invitation from Needles Chamber of Commerce to a dinner on May 5, 1956 dedicated to PG&E. Oblique view to the east.

FIGURE 11
AERIAL PHOTOGRAPH
BETWEEN 1954 AND 1956

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

ES030614163513BAO_Fig-11_AerialPhoto_1954-1958.ai_031214_lho

Photo to the southwest of the north and south scrubber banks. This photo was taken on June 25, 1954.

FIGURE 12
PHOTOGRAPH OF SCRUBBER AREA – JUNE 25, 1954

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

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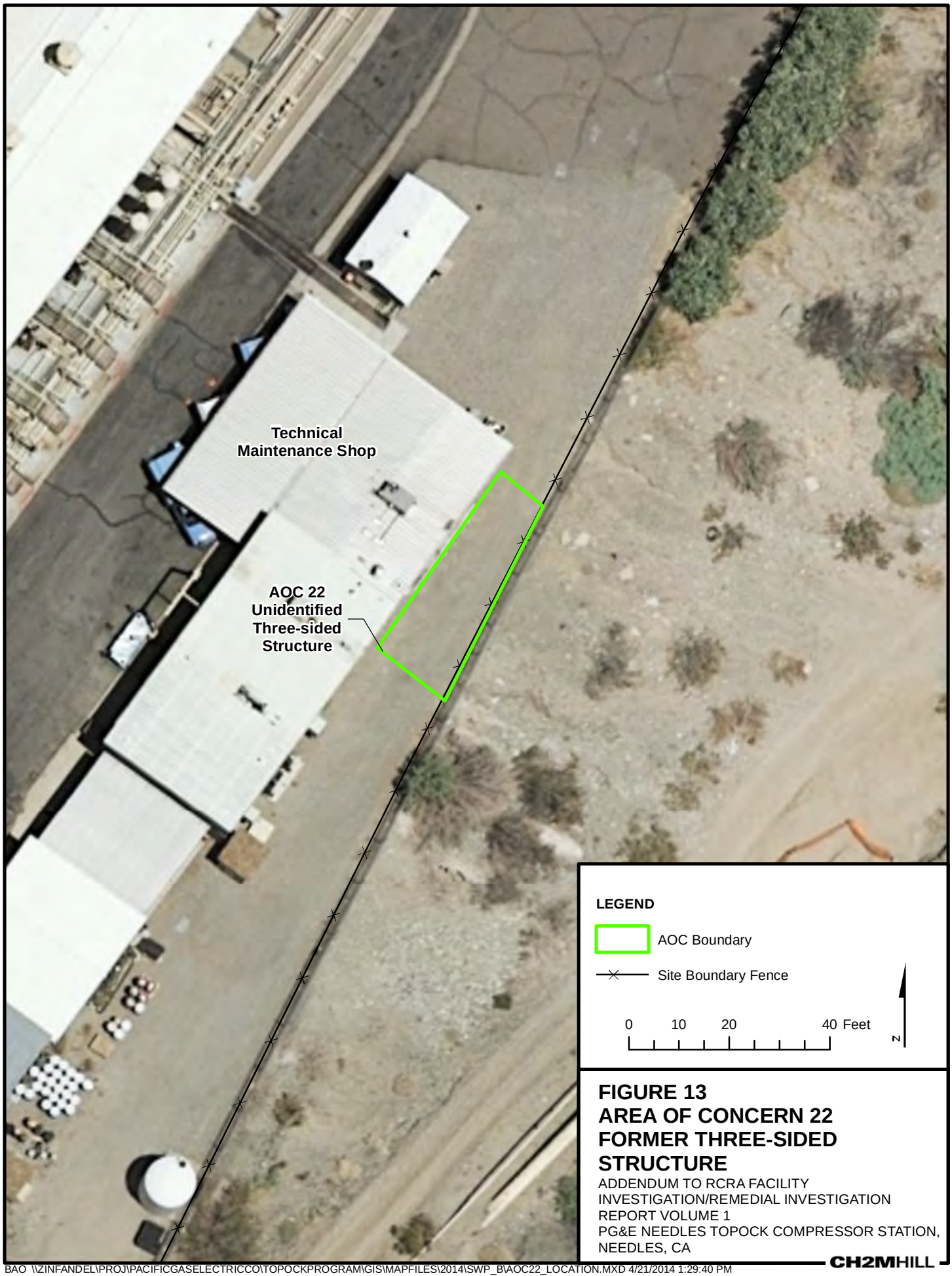

FIGURE 13
AREA OF CONCERN 22
FORMER THREE-SIDED STRUCTURE

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

BAO \\ZINFANDEL\PROJ\PACIFICGASELECTRICCO\TOPOCKPROGRAM\GIS\MAPFILES\2014\SWP_B\AOC22_LOCATION.MXD 4/21/2014 1:29:40 PM

FIGURE 14
AREA OF CONCERN 23
FORMER WATER
CONDITIONING BUILDING

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

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Photo taken to the north during construction of the former water conditioning building. Fabrication of the precipitation tank shown in the foreground. This photo was taken on August 6, 1951.

Photo taken to toward the northwest to document overall compressor station construction progress. The former water conditioning building can be seen in the foreground. This photo was taken on October 12, 1951.

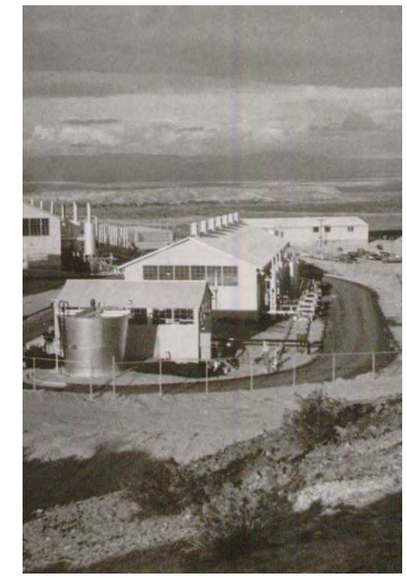

Photo taken to toward the north showing the former water conditioning building. This photo was taken on December 13, 1951.

FIGURE 15
PHOTOGRAPHS OF THE FORMER WATER CONDITIONING BUILDING
ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

ES030614163513BAO_Fig-14_Photo_FmrWaterConditioningBuilding.ai_031214_lho

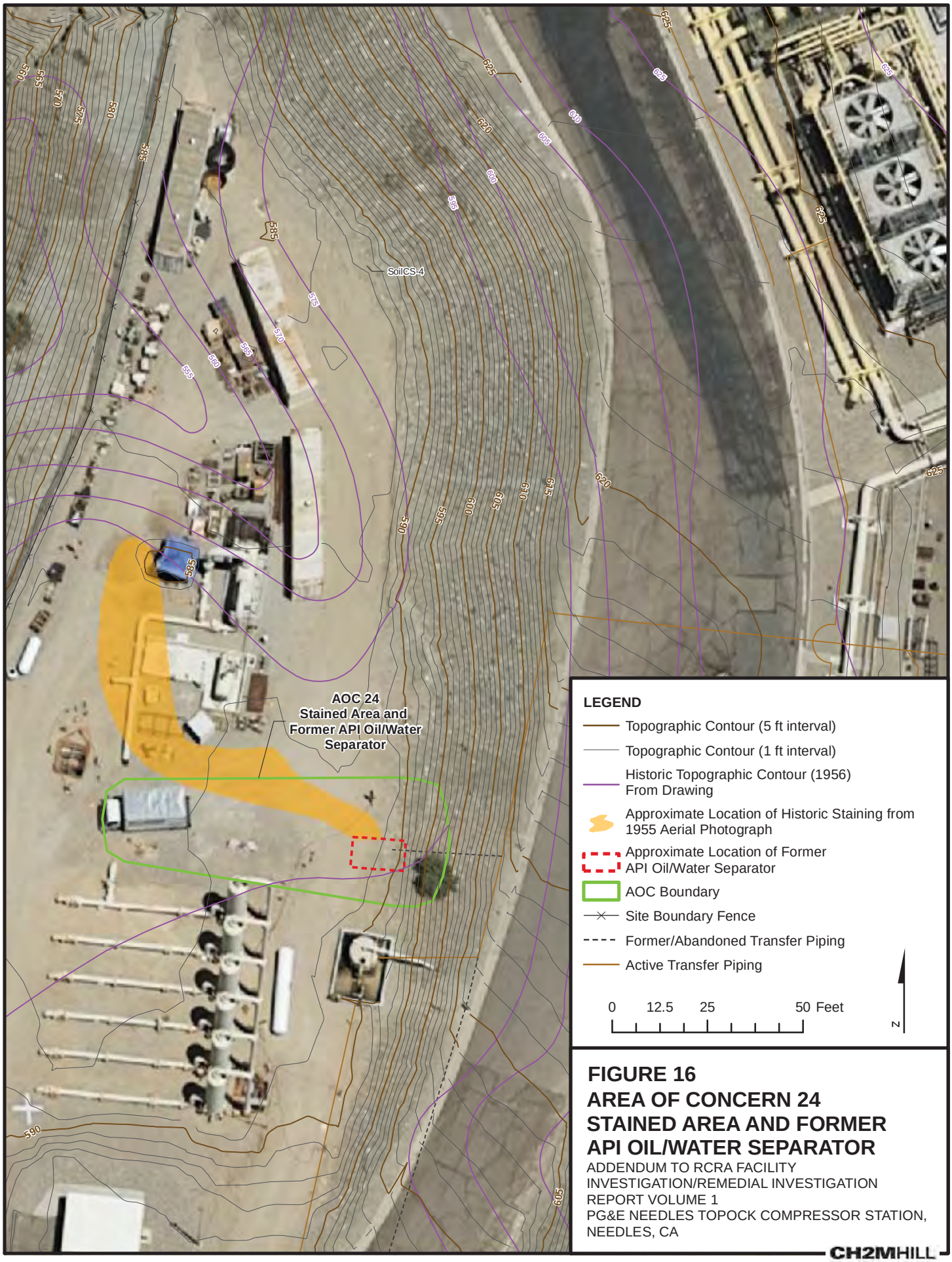

FIGURE 16
AREA OF CONCERN 24
STAINED AREA AND FORMER
API OIL/WATER SEPARATOR

ADDENDUM TO RCRA FACILITY
INVESTIGATION/REMEDIAL INVESTIGATION
REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CA

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Photo taken to the southwest during construction of the northern scrubbers. The former API Oil/Water Separator can be seen in the foreground. This photo was taken on January 26, 1954.

Photo taken to the southwest of the northern scrubbers. The former API Oil/Water Separator can be seen in the foreground. This photo was taken on May 27, 1954.

FIGURE 17
PHOTOGRAPHS OF THE FORMER API OIL/WATER SEPARATOR
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

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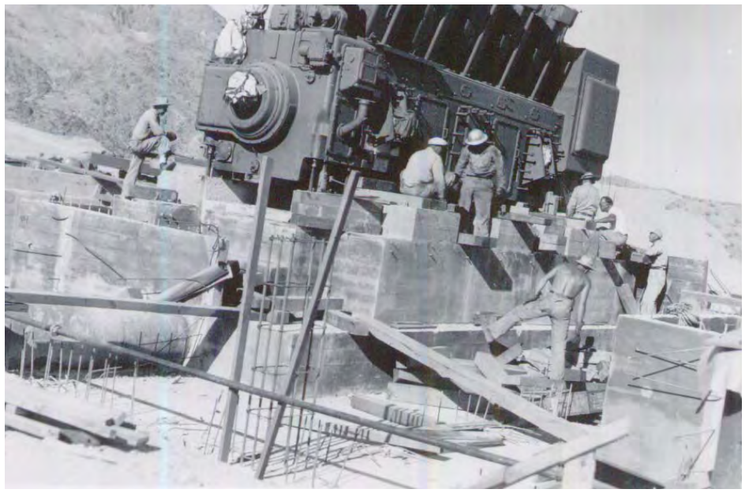

Photo shows the concrete generator engine pedestals prior to generator installation. This photo was taken on April 19, 1951.

Photo shows a side view of a compressor engine including the portion of the concrete pedestal above the compressor building floor. This photo was taken on May 21, 2012.

Photo shows a view into a compressor engine basement. A portion of the concrete compressor engine pedestal below the floor can be seen on the right side of the photo. This photo was taken on July 31, 2006.

FIGURE 18
PHOTOGRAPHS OF COMPRESSOR ENGINE PEDESTALS AND BASEMENTS
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

Photo shows the concrete generator engine pedestals prior to generator installation. This photo was taken on April 19, 1951.

Photo shows a generator engine including the portion of the concrete pedestal above the building floor. A portion of the covered engine basement can be seen in the foreground of the photo. This photo was taken on August 13, 2012.

FIGURE 19
PHOTOGRAPHS OF THE GENERATOR ENGINE PEDESTALS
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

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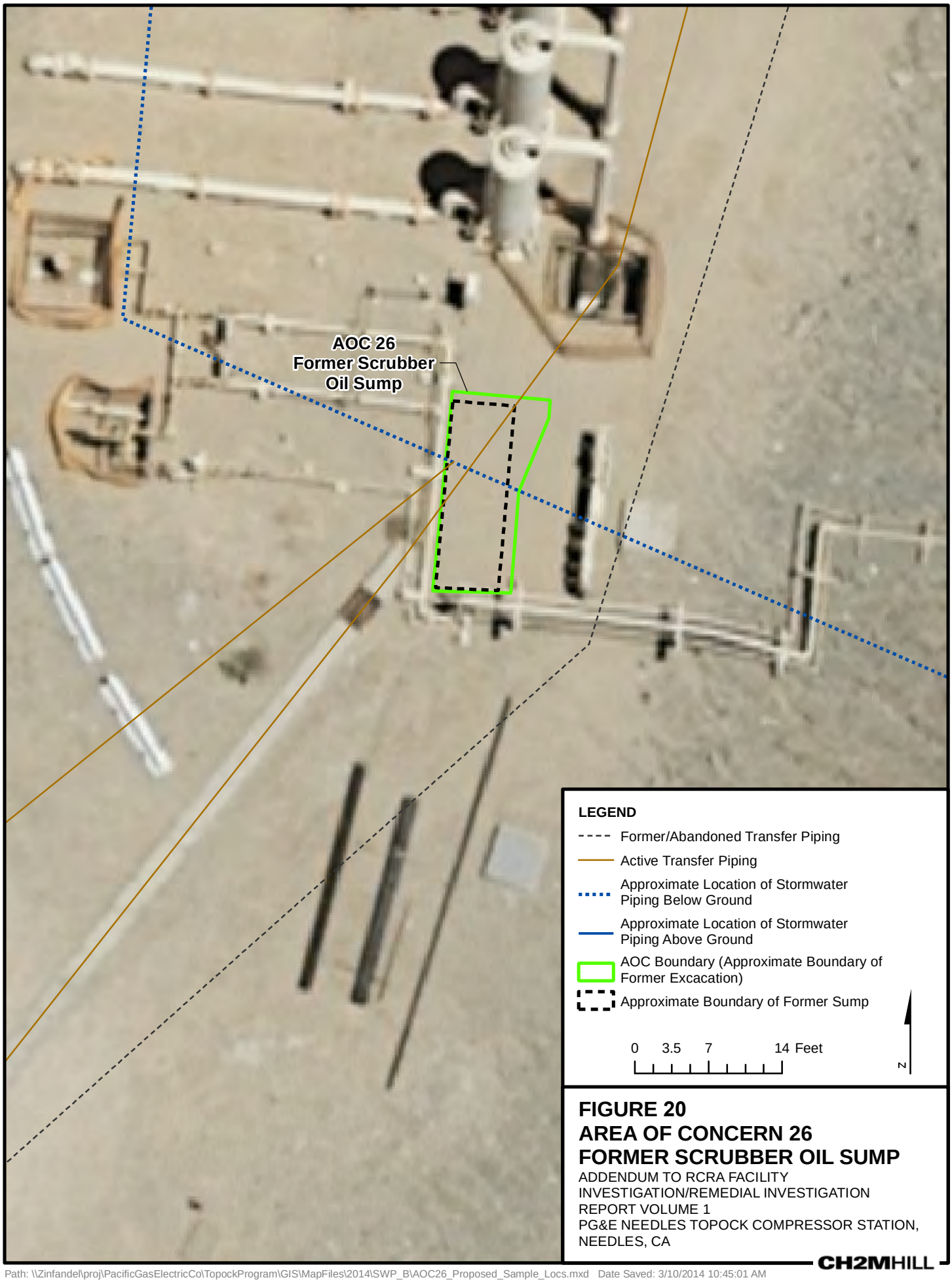

FIGURE 20
AREA OF CONCERN 26
FORMER SCRUBBER OIL SUMP

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

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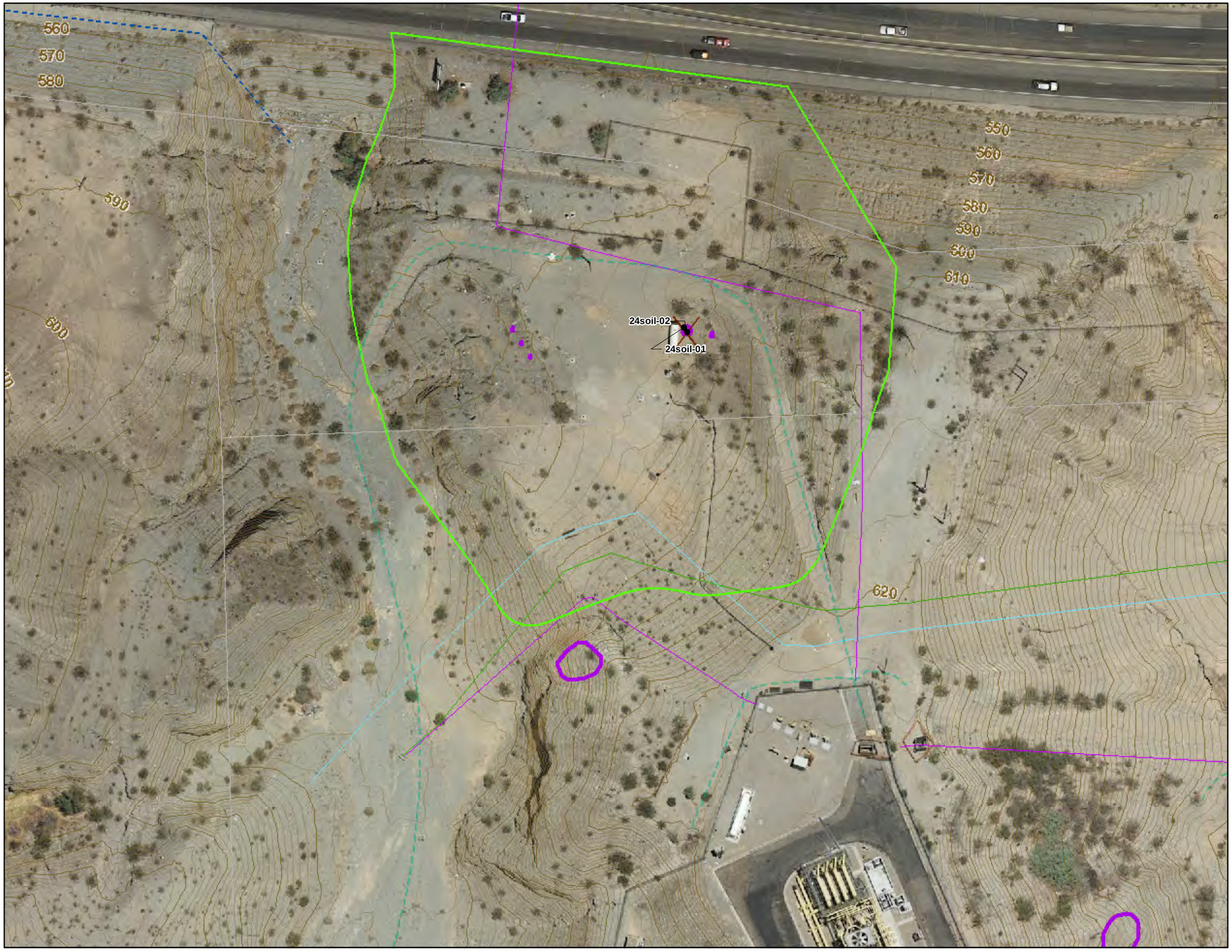
Photo taken to the west shows the former scrubber oil sump. This photo was taken on August 22, 1951.

Photo taken to the southwest shows the former scrubber oil sump. This photo was taken in 1990.

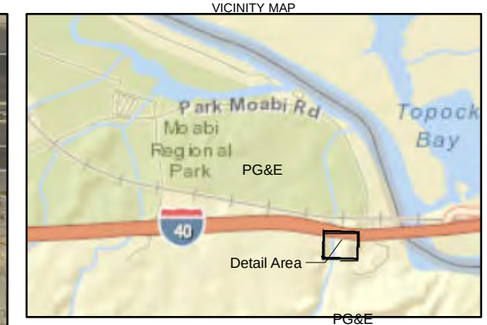
Photo shows the interior of the scrubber oil sump. This photo was taken in 1990.

FIGURE 21
PHOTOGRAPHS OF FORMER SCRUBBER OIL SUMP
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL.



VICINITY MAP



LEGEND

- Soil Boring
- Proposed Trench
- Access Routes
- Property Boundary
- AOC Boundary
- Debris Features
- Transwestern Pipeline
- Mojave Pipeline
- PG&E Pipeline
- SoCal Gas Pipeline
- Stormwater Piping Below Ground

Note:
Topographic contours are shown at 2 foot intervals.

Service Layer Credits: Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

N

0 25 50 100 150
Feet

FIGURE 22
AREA OF CONCERN 27 - MW-24 BENCH
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

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Photo of shows potential burn waste in the eastern edge of the road cut on the road from AOC 27 Bat Cave Wash. This photograph was taken in March 2011.

FIGURE 23
PHOTOGRAPH OF POTENTIAL BURN WASTE - MARCH 2011

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

ES030614163513BAO_Figure-22_BurnArea.psd

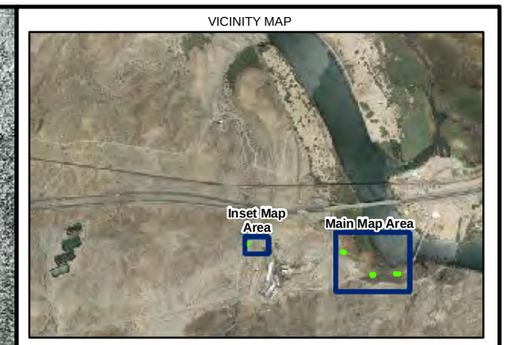
These photos show debris within AOC 27 encountered during trenching activities associated with the groundwater in situ pilot test. The debris, consisting mostly of treated wood, concrete, and scrap metal, was encountered at a depth of approximately 3 feet bgs. These photographs were taken in January 2008.

FIGURE 24
PHOTOGRAPHS OF AREA OF CONCERN 27 DEBRIS

ADDENDUM TO RCRA FACILITY INVESTIGATION/
REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL.

ES030614163513BAO_Figure_24_AOC27Debris.psd



LEGEND

- Existing Opportunistic Soil Sample Location
- AOC Boundary

0 45 90 180 Feet

N

FIGURE 25
AREA OF CONCERN 28 - PIPELINE DRIP LEGS

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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Caption 25a: Photo shows the above ground portion of AOC 28a, the drip leg located at MP 0.13A. This photo was taken in March 2014.

Caption 25b: Photo shows the above ground portion of AOC 28a, the drip leg located at MP 0.24A. This photo was taken in March 2014.

Caption 25c: Photo shows the above ground portion of AOC 28c, the drip leg located at MP 0.21B. This photo was taken in March 2014.

Caption 25d: Photo shows the above ground portion of AOC 28a, the drip leg located at MP 0.55B. This photo was taken in March 2014.

FIGURE 26
PHOTOGRAPHS OF DRIP LEGS
AOC 28a THROUGH 28d

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL.

ES030614163513BAO_Figure_25_DripLegs.psd

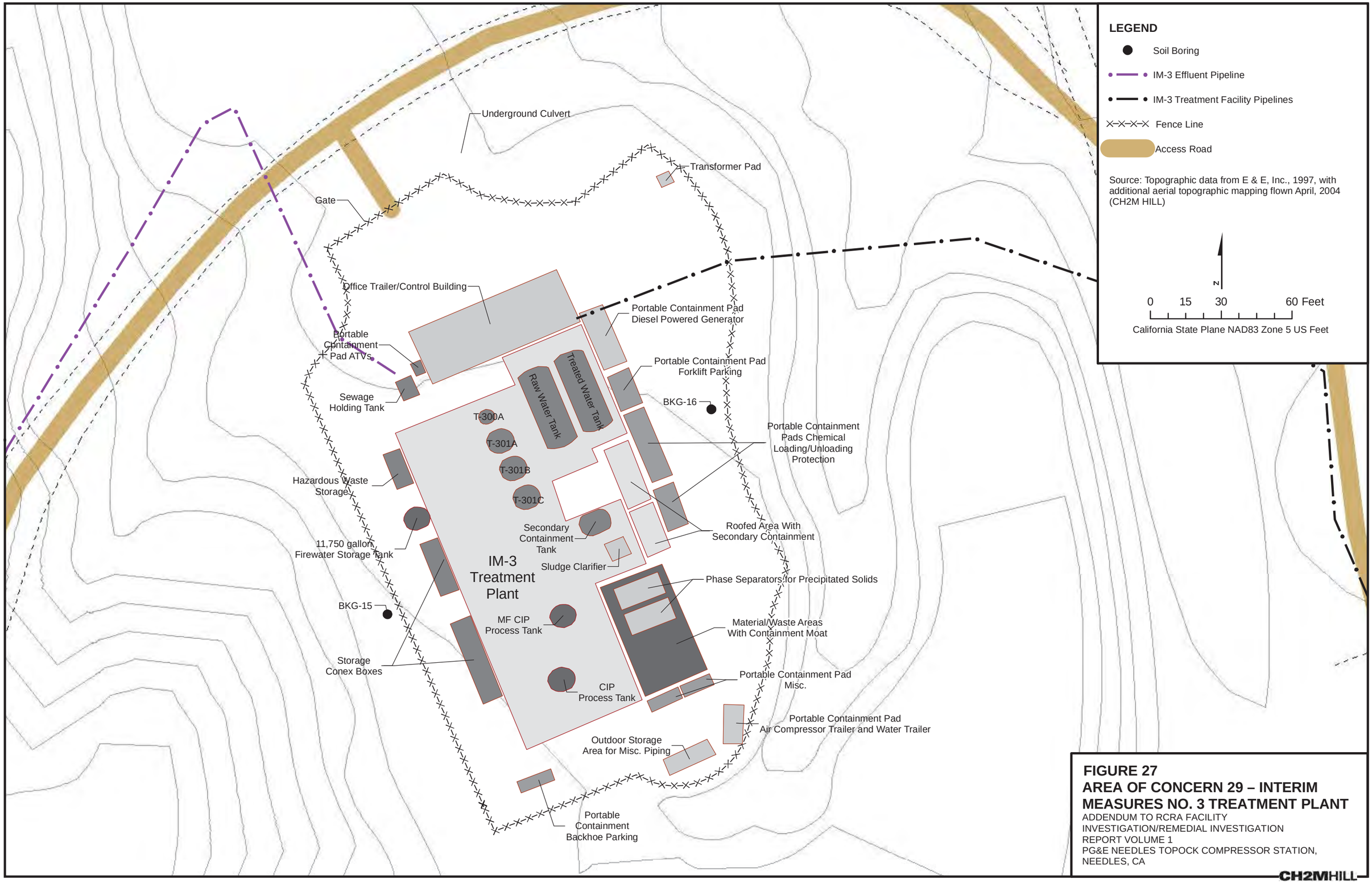

FIGURE 27
AREA OF CONCERN 29 – INTERIM MEASURES NO. 3 TREATMENT PLANT
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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Caption27a: Photo shows the roofed area with secondary containment on the eastern side of the treatment plant. This photo was taken in March 2014.

Caption 27b: Photo shows the material/waste area with a containment moat on the eastern side of the treatment plant. The photo also shows two phase separators in this area. This photo was taken in March 2014.

Caption 27c: Photo shows the hazardous materials storage cabinet on the western side of the treatment plant. This photo was taken in March 2014.

FIGURE 28
PHOTOGRAPHS OF AREA OF CONCERN 29 - INTERIM MEASURES NO. 3 TREATMENT PLANT

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
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LEGEND

- Existing Well
- Contaminated Groundwater Pipeline
- Brine Water Pipeline
- Pipeline Flow Direction
- Waste Management Area

N

0 25 50 100 150 200
Feet

FIGURE 29
AREA OF CONCERN 30 - MW-20 BENCH FACILITY FEATURES
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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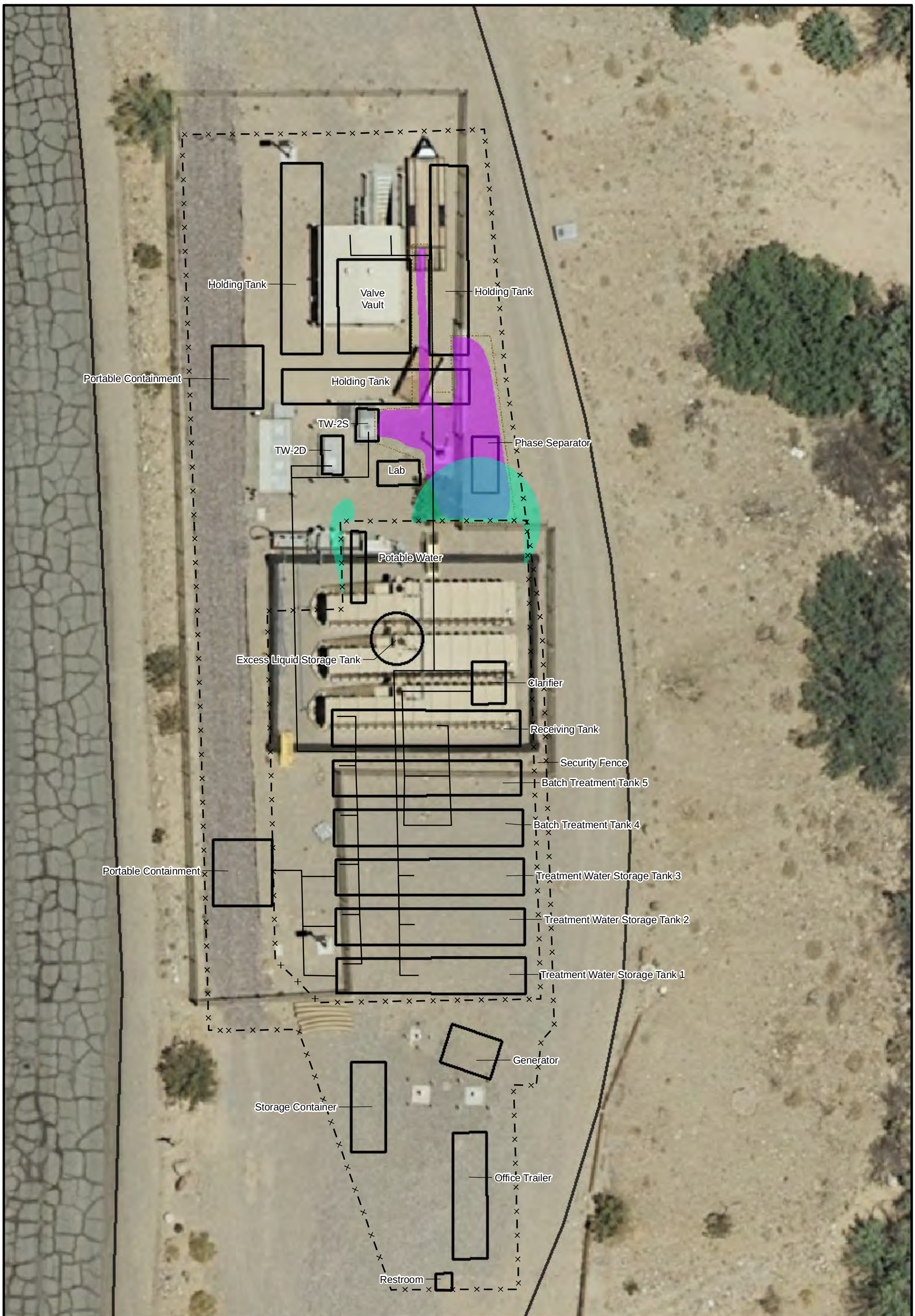

LEGEND

- Treatment System Pipes
- Fence Line
- Spill (September 6, 2006)
- Spill Area (April 10, 2005)
- Excavation and Backfill Area (April 10, 2005)

N

0 25 50
Feet

FIGURE 30
PREVIOUS MW-20 BENCH ALIGNMENT AND SPILL AREAS
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

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Spill Area Looking East towards TW-2S and phase separator container that was overfilled

Spill area looking south towards Batch Plant with phase separators removed.

Soil Removal in Valve Vault No. 1. Excavation on April 28, 2005

Soil Removal in Phase Separator Container Area in April 30, 2005

Soil Removal Activities In Phase Separator Container Area (July 5, 2005)

Final Excavation at Location CS8 (July 13, 2005)

FIGURE 31
PHOTOGRAPHS OF APRIL 2005
CLARIFIER SLUDGE SPILL CLEANUP
ADDENDUM TO RCRA FACILITY
INVESTIGATION/REMEDIAL INVESTIGATION
REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL.

LEGEND

- Sample Location
- AOC 30 (MW-20 Bench)

N

0 25 50 100 150

Feet

FIGURE 32
AREA OF CONCERN 30 - MW-20 BENCH
EXISTING SOIL SAMPLE LOCATIONS

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

CH2MHILL

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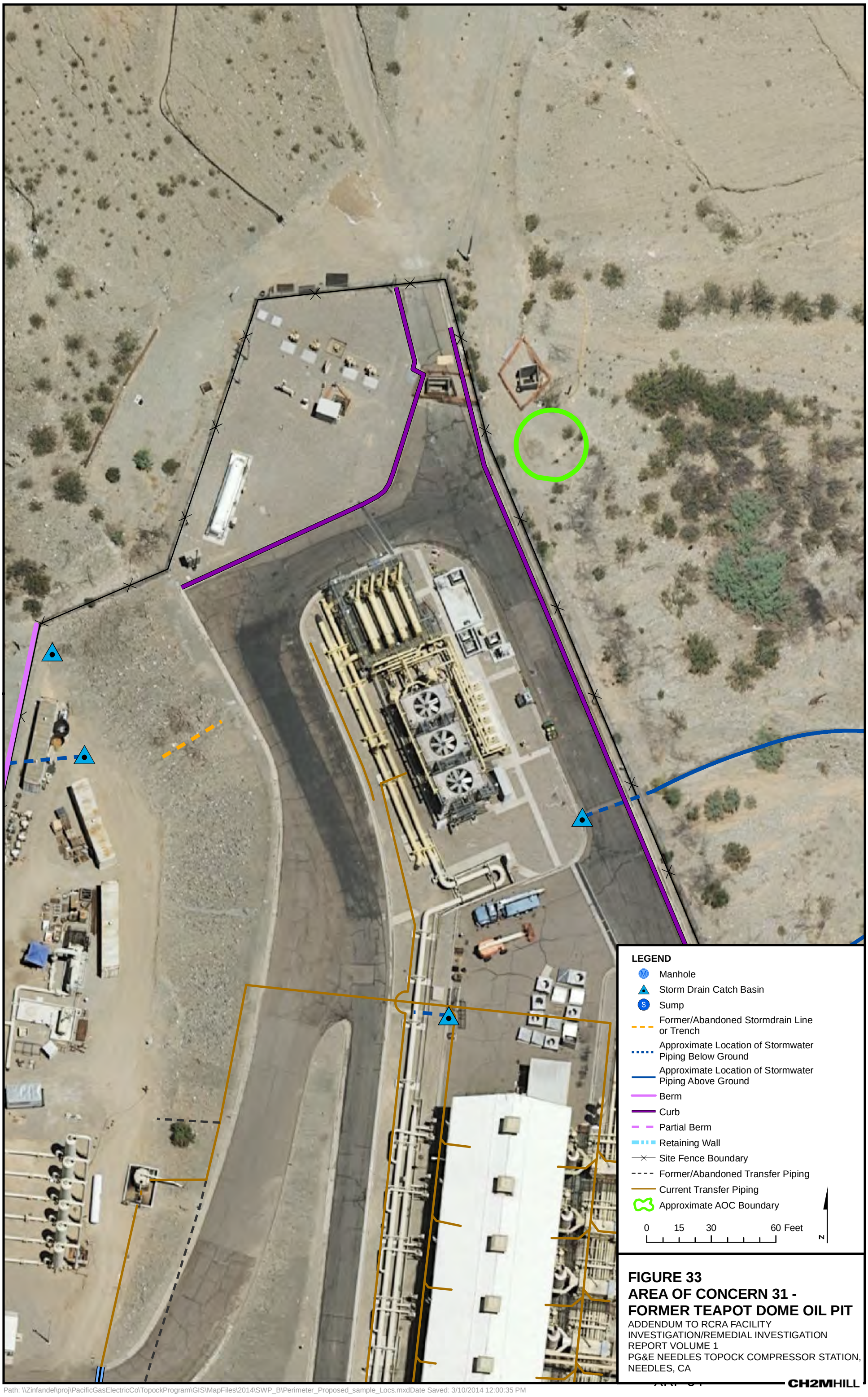

FIGURE 33
AREA OF CONCERN 31 - FORMER TEAPOT DOME OIL PIT
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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Photo shows the foundation of an oil storage tank at installation. This photo was taken on April 17, 1951.

Photo taken to the west shows the oil storage tanks and concrete containment. This photo was taken August 21, 2012.

Photo taken to the south shows the oil storage tanks and concrete containment including the pipe trench on the eastern side. This photo was taken August 21, 2012.

FIGURE 34
PHOTOGRAPHS OF
OIL STORAGE TANKS
ADDENDUM TO RCRA FACILITY
INVESTIGATION/REMEDIAL INVESTIGATION
REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL

FIGURE 35
STORM DRAINS AND STORM DRAIN PIPING
ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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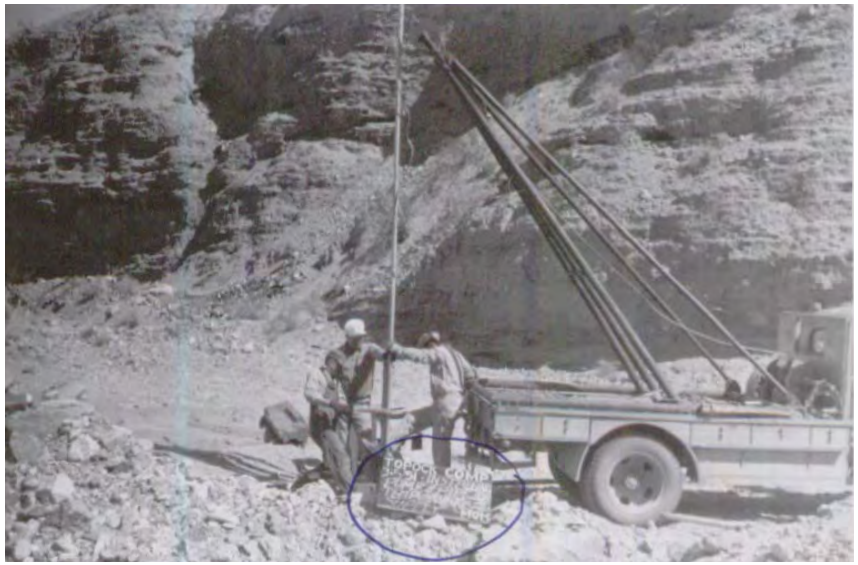


Photos show installation of a temporary water pump in a well believed to be TSC Well #4. Photographs taken on March 5, 1951.

FIGURE 36
PHOTOGRAPHS OF TCS WELL #4
ADDENDUM TO RCRA FACILITY
INVESTIGATION/REMEDIAL INVESTIGATION
REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION,
NEEDLES, CA

CH2MHILL

Photo shows TSC Well #4 during excavation activities in September 2013. This photo was taken looking north.

Photo shows TSC Well #4 during excavation activities in September 2013. This photo was taken looking south.

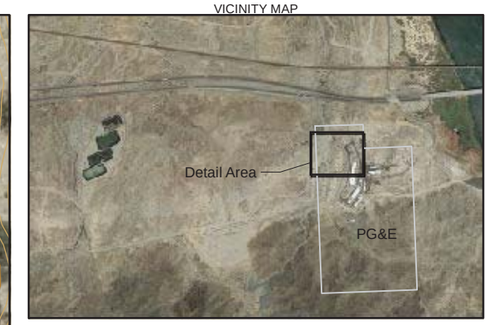
FIGURE 37
PHOTOGRAPHS OF TCS WELL #4 EXCAVATION

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

ES030614163513BAO_Figure_37_TCS#4.psd

VICINITY MAP



LEGEND

- Well Location
- Previous Soil Sample Locations
- Estimated Pipeline Location[1]
- AOC 1 Boundary
- SWMU1 Boundary

Notes:
1. Estimate location of buried 3-inch diameter steel pipe. Estimated via geophysical survey performed on April 2, 3, and 4, 2013
2. Topographic contours shown are in 2 foot intervals.

N

0 120 Feet

FIGURE 38
TCS WELL #4 LOCATION

ADDENDUM TO RCRA FACILITY INVESTIGATION/REMEDIAL INVESTIGATION REPORT VOLUME 1
PG&E NEEDLES TOPOCK COMPRESSOR STATION, NEEDLES, CA

CH2MHILL

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Attachment 1
September 23, 2009, Letter from
San Bernardino County Fire Department

SAN BERNARDINO COUNTY FIRE DEPARTMENT

COUNTY OF SAN BERNARDINO
PUBLIC AND SUPPORT
SERVICES GROUP

OFFICE OF THE FIRE MARSHAL
HAZARDOUS MATERIALS DIVISION
620 South "E" Street • San Bernardino, CA 92415-0153
(909) 386-8401 • Fax (909) 386-8460

PAT A. DENNEN
Fire Chief
County Fire Warden

September 23, 2009

Pacific Gas & Electric Company
P.O. Box 337
Needles, CA 92363

ATTN: CHRIS SMITH

FACILITY: INTERIM MEASURE NO.2 TOPOCK COMPRESSOR STATION – I-40 & PARK MOABI RD., NEEDLES

SUBJECT: CLOSURE OF TREATMENT UNIT OPERATING UNDER CONDITIONAL AUTHORIZATION TIER

Mr. Smith,

This Department is in receipt of the closure documentation submitted on June 4, 2009 and September 21, 2009. Upon review of the documentation received, the facility has removed all hazardous wastes, contaminated equipment and piping and the clarifier that were related to the operation of the treatment unit as required for closure of the unit.

Since the facility is no longer treating hazardous waste at this site, a Tiered Permit is not required and therefore the financial assurance required for operating a unit under the Tiered Permit program is no longer required.

Please note that this cannot be construed as a release of liability for the site or declaration that the site is free from contamination. Should further projects or environmental investigations reveal additional contaminants at the site, you will be responsible and held liable for the investigation and remedial actions.

Should you have any further questions, comments, or concerns, please feel free to contact me at (909) 386-8401 or lheaviside@sbcfire.org.

LESLIE HEAVISIDE, REHS
Hazardous Materials Division, Field Services Section

MARK H. UFFER
County Administrative Officer
NORMAN A. KANOLD
Assistant County Administrator
Public and Support
Services Group

Board of Supervisors
BRAD MITZELFELT ..... First District
PAUL BIANE ..... Second District
NEIL DERRY ..... Third District
GARY C. OVITT ..... Fourth District
JOSIE GONZALES ..... Fifth District

Attachment A
Response to Comments Matrix

Response to Comments on the Draft Addendum to RCRA Facility Investigation/Remedial Investigation Report, Volume 1 dated March 26, 2013
PG&E Topock Compressor Station, Needles, California

Item	Comment Number	Section/ Page	Reference Text	Addendum RCRA FI/RI Comment	PG&E Response Addendum to RCRA FI/RI Comments	DTSC Response to Addendum to RCRA FI/RI Comments	DOI Response to Addendum to RCRA FI/RI Comments	Tribe's Response	Final Comment Resolution
DTSC Comments – From September 10, 2013 e-mail from Aaron Yue/DTSC to Yvonne Meeks/PG&E									
1	DTSC-1	Section 2.0, page 1 (Description of New Units) title	Description of New Units (title)	Please add description of the recently discovered old injection well ("Well 4") located in Bat Cave Wash and the associated waste line attached to it. Describe when the well and pipeline operated and how they connected to facility infrastructure. Conduct additional file review if necessary. This unit will need to be assessed/characterized.	The following write-up has been added to the addendum: "The RFI/RI Volume 1 Report presented information provided by a plant employee who reported that he was personally responsible for welding a cap onto an approximately 12-inch-diameter vertical pipe located in Bat Cave Wash. The pipe apparently looked like a regular well casing. The casing only extended a small amount above the ground, and the area where the pipe was located was later covered by an additional 18 to 24 inches of soil. Prior to welding the cap, the pipe had been covered with a wooden cover and gravel, and there were no materials of any kind visible in the pipe (Russell 2006b). This well casing may be one of the exploratory borings installed in 1950 to evaluate the potential water supply for the proposed Topock Compressor Station (PG&E 1950). During recent file reviews of historical Topock documents, a work order was found that suggested an abandoned injection well is located in Bat Cave Wash. The discovery of the work order and the previous report from the plant employee of an abandoned well in Bat Cave Wash prompted additional historical file reviews at both Hinkley and Topock compressor	As indicated in Keith Sheets' email from 11/13/13, as decommissioning activities are ongoing, the response will need to be updated as additional data are collected. The soil samples collected at the well on September 11, 2013 need to be tabulated and discussed within the document. COPCs should be established. Figures are also needed to locate the 1964 waste pipe run, well, and sample locations on the current site layout. Note: Confirm in the document if the remnants of the tar/asbestos wrapped steel pipe still present on the slope above Bat Cave Wash is the line that led to Well 4. It appears to be the same line based on previous observations.			

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					stations. During the file review at the Hinkley compressor station, topographic maps from the 1950's and a copy of a 1964 work order was found that includes hand written notes showing 650 feet of steel pipe extending from a "water treatment chamber" at the former sludge drying bed area to an "abandoned water well" in the bottom of the wash. The date of the work order is March 12, 1964 and the date completed is shown as November 1, 1964. The description of the Sludge Dying Beds (SWMU-5) in RFI Volume 1 says that a single-step waste water treatment pond was constructed in one of the former sludge drying beds in 1964, which is consistent with the date and the scope of work described on this work order. In addition to the work order, two large format blueprints, dated 1956 and 1957, showing topography around the Topock site were found in the Hinkley files. These blueprints show a well, referred to as "Well #4", in the bottom of Bat Cave Wash. Historic PG&E photographs from 1951 indicate a temporary water supply well existed in the vicinity of Well 4 and, therefore, may be the same well. Based on the available information including the information presented in the work order and				

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					the blueprints, a geophysical survey was performed on April 2, 3, and 4, 2013 in the suspected area of the old well (TCS Well #4). Potholing occurred on July 30, 2013 to positively locate the well. The capped well was found at approximately four feet below ground surface (bgs). Steel pipe leading into the well was also confirmed at approximately seven feet bgs. This horizontal pipe was approximately 3-inches in diameter, was wrapped or covered with tar and entered the side of the well via a welded intersection. Additional potholing occurred on September 11, 2013 to assess the downhole condition of the well and gather information needed to prepare a well decommissioning plan. The well was exposed, the well cap was cut off and then extended to the surface. The excavation area was backfilled to grade with originally excavated material and a downhole video log was performed. The 1951 historic photos strongly suggest that the well encountered was the 1950s era temporary water supply well. The horizontal pipe leading to the well indicates that the temporary water supply well was later converted to Well 4, the 1964 injection well.				

Item	Comment Number	Section/ Page	Reference Text	Addendum RCRA FI/RI Comment	PG&E Response Addendum to RCRA FI/RI Comments	DTSC Response to Addendum to RCRA FI/RI Comments	DOI Response to Addendum to RCRA FI/RI Comments	Tribe's Response	Final Comment Resolution
2	DTSC-2	Section 2.1 , page 1 (SWMU 11 – Former Sulfuric Acid Tanks), third sentence	"Figures B6-2 and B6-3 in Appendix B6 of the *Final Soil RFI/RI Work Plan"*	Please include important figures, such as these, within this document. Keep this a standalone introduction document as much as possible.	The requested figures were added to the addendum.	Comment resolved.			
3	DTSC-3	Section 2.1.1 – page 2 (Description and History), title	"Description and History"	Add historic photos of the units from the different eras.	All available historical photographs of the units were added to the addendum.	Comment resolved pending review of the added figures			
4	DTSC-4	Section 2.2, page 3 (AOC 20 - Industrial Floor Drain), title	"Industrial Floor Drains"	Reference a figure illustrating where the lines are located.	A figure showing the locations of the industrial storm drain lines has been added to the addendum.	Comment resolved.			
5	DTSC-5	Section 2.2.2, page 3 (Summary of Previous Soil Characterization), first sentence	"two samples located"	Include figure showing sample locations.	The requested figure was added to the addendum.	Comment resolved.			
6	DTSC-6	2.3.1, page 4 (Description and History), Paragraph 3, second sentence	"1955 aerial photograph"	Include this photo and others.	The requested aerial photograph was added to the addendum.	Comment resolved.			
7	DTSC-7	2.4 , page 5 (AOC 22 - Unidentified Three-Sided Structure), first sentence	"photographs"	Reference previous figure to be included in the document.	The figure has been added to the addendum.	Comment resolved.			
8	DTSC-8	2.4 , page 5 (AOC 22 - Unidentified Three-Sided Structure), first sentence	"photograph believed to have been taken between 1954 and 1958"	Include this figure. Don't recall seeing it.	DTSC's comment refers to a figure; however, the comment is referencing photographs. The requested photograph has been added to the addendum.	Comment resolved.			

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9	DTSC-9	2.4.1, page 5 (Description and History), second sentence	"Technical Maintenance Shop"	Include a figure showing where it was located based on today's layout	The requested figure has been added to the addendum.	Comment resolved.			
10	DTSC-10	2.4.1, page 5 (Description and History), fifth sentence	"There is no available information on the use of this structure or any materials that may have been stored at this structure or in its vicinity."	Mention that light colored soils are noted around the structure which might be related to unit activities (e.g., sand blasting) and possibly surface deposition or disruption.	Past activities at this unit cannot be deciphered by the light colored soil observed in the May 19, 1955 oblique aerial photograph. Acknowledgement of the lighter colored soil has been added to this section. The following sentence has been added to the first paragraph in Section 2.4.1: "Soil around this former structure, as observed in the May 19, 1955 oblique aerial photograph, appears lighter in color than surrounding soil."	Comment resolved.			
11	DTSC-11	2.5, page 5 (AOC 23 – Former Water Conditioning Building), last sentence	"The proposed investigation program for AOC 23 is provided in Appendix B20 of the Final Soil RFI/RI Work Plan (CH2M HILL, 2013)"	Include historic photographs of the building and current layout figures.	Available historical photographs and requested figures have been added to the addendum.	Comment resolved.			
12	DTSC-12	2.6.1, page 7 (Description and History), first sentence	"May 19, 1955, aerial photographs show a narrow, elongated area of dark staining near a structure located northeast of the north scrubbers in the lower yard of the compressor station."	Include historic and current layout figures.	Requested figures have been added to the addendum.	Comment resolved.			
13	DTSC-13	2.6.1, page 7 (Description and History), third paragraph, fourth sentence	"A section view of the former OWS is shown on Engineering Drawing 481785 (Revision 22)"	Include figure	The referenced engineering drawing was added to the addendum.	Comment resolved.			
14	DTSC-14	2.7.1, page 8 (Description and History), first	"Each compressor engine is mounted on a concrete block; the top of the	Add figures (photo and drawings)	Available photographs and the requested figures have been added to the addendum.	Comment resolved.			

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		paragraph, second sentence	concrete pedestal is above the level of the floor of the building. Each concrete pedestal is surrounded by an open concrete trench. This open area is referred to as the compressor engine basement"						
15	DTSC-15	2.7.1, page 9 (Description and History), second paragraph, second sentence	"For example, historical information (as documented in GM 4597321 [PG&E, 1971]) indicated that oil leakage from the compressor engines was cleaned up by plant staff daily"	Note: Leakage through concrete is not an uncommon finding during environmental investigations.	Comment noted.	Comment noted.			
16	DTSC-16	2.7.1, page 9 (Description and History), third paragraph	"The generators are equipped with basements similar to the compressors; however, the basements are present only on the south and east sides of the generator engines and are shallower than the compressor engine basements (approximately 30 inches deep). The generator engines are also located on pedestals. The pedestals are approximately 42 inches high measured from the bottom of the engine basement."	Add photos and drawings	Available photographs and the requested figures have been added to the addendum.	Comment resolved.			
17	DTSC-17	2.7.1, page 9 (Description and History), sixth paragraph,	"The compressor and generator engine basements were not intended or designed to	Clarify the use of the basements rather than what they were not used for.	The first sentence of the sixth paragraph, Section 2.7.1, page 9 was revised as follows: "The compressor and generator engine basements were	Comment resolved.			

[1] GMs are internal project justification, costing, and tracking documents used by PG&E.

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		second sentence	serve as holding areas for large quantities of liquids."		designed to contain incidental spills and leaks."				
18	DTSC-18	2.8.1, page 10 (Description and History), first paragraph, fifth sentence	" When the northern compartment of the scrubber sump filled up, the pipeline liquids were either transferred to one of the other two compartments or were pumped directly to the waste-oil sump (Trident Environmental Consultants [Trident], 1996b)."	Add historic photo(s) of the sump.	Available historical photographs have been added to the addendum.	Comment resolved.			
19	DTSC-19	2.8.2, page 11 (Summary of Previous Soil Characterization), third paragraph, first sentence	"Only low concentrations of BTEX compounds were detected"	Clarify if these were composite samples.	The referenced benzene, toluene, ethylbenzene, and xylene (BTEX) are for the stockpile samples, which were discrete samples, not composite samples. No changes were made to the text.	Comment resolved.			
20	DTSC-20	2.9, page 12 (AOC 27 – MW-24 Bench), third paragraph, first sentence	"DTSC identified potential burn waste in the eastern edge of the road cut on the road from AOC 27 to Bat Cave Wash and directed PG&E in a March 24, 2011, email to collect samples of the waste material."	Include photos of this area (e.g., sample stakes) and figures identifying the area	The requested photographs and figure have been added to the addendum.	Comment resolved.			
21	DTSC-21	2.9.1, page 13 (Description and History), first paragraph, second sentence	"In January 2008, during trenching activities in AOC 27 associated with installation of a control panel related to the upland in situ pilot test, debris consisting mostly of treated wood, concrete, and scrap steel/tin were encountered at a depth of approximately 3 feet bgs."	Include photos of the debris. Include the photo of the circular object that looks like the bottom of a tank vessel.	The requested photographs have been added to the addendum.	Comment resolved.			

Item	Comment Number	Section/ Page	Reference Text	Addendum RCRA FI/RI Comment	PG&E Response Addendum to RCRA FI/RI Comments	DTSC Response to Addendum to RCRA FI/RI Comments	DOI Response to Addendum to RCRA FI/RI Comments	Tribe's Response	Final Comment Resolution
22	DTSC-22	2.10, page 14 (AOC 28 – Pipeline Drip Legs), fourth paragraph, fourth sentence	"Four drip legs (two each on the 300A and 300B main gas pipelines) have been added as new AOCs (AOC 28a through AOC 28d) at the request of DTSC during comment resolution on the Final Soil RFI/RI Work Plan."	Include photos of each drip leg.	The requested photographs have been added to the addendum.	Comment resolved.			
23	DTSC-23	2.11.1, page 16 (Description and History), first paragraph, second sentence	"Figure 3 shows the layout of the IM-3 treatment plant."	Include photos of IM3 units to supplement Figure 3.	The requested photographs have been added to the addendum.	Comment resolved.			
24	DTSC-24	2.11.1, page 16 (Description and History), fifth paragraph, first sentence	"The groundwater treatment system is a continuous, multistep process that involves three functions: (1) reducing hexavalent chromium to the less soluble trivalent form, (2) precipitating trivalent chromium and removing precipitated solids by clarification and microfiltration, and (3) lowering the naturally occurring total dissolved solids (TDS) concentration using reverse osmosis."	Illustrate where precipitated solids were stored and where waste bins were picked up for transport. Also cite the typical composition of the sludge in this section.	As requested, Figure 3 was updated to include the location of precipitated solids storage. Additionally, text was added to better describe solids handling and composition: "Precipitated solids, also known as sludge, are stored in 8 cubic yard phase separator bins within secondary containment on the eastern side of the IM-3 facility as shown on Figure 3. The phase separators are removed from containment after being sealed for transport, placed on the gravel adjacent to the containment and then loaded on transportation trucks. The generated sludge is characterized quarterly as part of the DOI Waste Discharge Applicable or Relevant and Appropriate Requirements and is reported quarterly to DOI and the Water Board. The sludge is tested for antimony, arsenic, barium, beryllium, cadmium, total chromium, hexavalent	Comment resolved.			

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					chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc. Typically, the following constituents are detected above reporting limits (all ranges are approximate): antimony (30-60 mg/kg), barium (30-70 mg/kg), cadmium (4-7 mg/kg), total chromium (2,300-4,500 mg/kg), hexavalent chromium (25-50 mg/kg), copper (5-20 mg/kg), fluoride (20-60 mg/kg), mercury (0.1 to 0.2 mg/kg), nickel (10-30 mg/kg), vanadium (25-50 mg/kg) and zinc (25-40 mg/kg)."				
25	DTSC-25	2.11.2, page 16 (Summary of Previous Soil Characterization), first paragraph, first sentence	"Only limited sampling has been conducted at AOC 29. Soil sampling at AOC 29 consisted of background sampling at two locations, BKG-15 and BKG-16, located west and east of AOC 29, respectively (see Figure 3)."	Please emphasize that these samples were selected to represent background conditions and not to characterize a unit.	The first sentence of the first paragraph in Section 2.11.2, page 16 was revised as follows: "Characterization sampling has not occurred at AOC 29. Only limited sampling to assess background conditions has been conducted at AOC 29."	Comment resolved.			
26	DTSC-26	2.12.1, page 18 (Description and History), third paragraph, second sentence	"Any leaks/spills identified during operation were addressed immediately; see Section 12.1.3 of this report."	Correct section citation.	The text has been revised as follows: "Any leaks/spills identified during operation were addressed immediately; see Spills at the MW-20 Bench section below."	Comment resolved.			
27	DTSC-27	2.12.1, page 20 (Description and History), second paragraph, fifth sentence	"The liquid spread laterally to areas surrounding the phase separator, and a portion flowed into an open valve vault excavation."	Identify the vault in text and/or locate it on figure 5.	As requested, the vault has been identified in Figure 5.	Comment resolved.			
28	DTSC-28	2.12.1, page 20 (Description and History), second	"Visual evidence confirmed that no material collected on the concrete floor slab	Please include any photos of this release.	Photographs of this release are not available.	Comment noted. DTSC requests that future spills be photographed by PG&E or its		FMIT concurs with DTSC's request.	

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		paragraph, eighth sentence	inside the vault or other areas of the valve vault excavation"			contractors.			
29	DTSC-29	2.12.1, page 20 (Description and History), second paragraph, ninth sentence	"The liquid from the valve vault excavation was also recovered."	Clarify how liquids were removed from the vault, but did not get on the concrete slab floor.	The referenced sentence is an erroneous statement and has been deleted from the addendum.	Comment resolved.			
30	DTSC-30	2.14, page 22 (AOC 31 – Former Teapot Dome Oil Pit), last sentence	"The proposed investigation program for AOC 31 is provided in Appendix C of the *Final Soil RFI/RI Work Plan* (CH2M HILL, 2013)."	Include a location map for the suspected pit area and any historic photos of the Teapot Dome. Introduce Teapot Dome for those unfamiliar with it.	The requested figure detailing the location of the suspected pit area has been added to the addendum. Historical photographs of the oil pit are not available. The following sentence has been added as the first sentence for the first paragraph of Section 2.14, page 22: "The former Teapot Dome pit was associated with the Teapot Dome restaurant that was located along old Route 66."	Include any photos of the Teapot Dome restaurant and include its location on the figure with respect to the former pit.			
31	DTSC-31	2.14.1, page 23 (Description and History), first paragraph, sixth sentence	"The sidewalls of the containment structure are apparent in a station photograph taken between photograph taken between 1954 and 1958; however, it is uncertain if the oil storage area has always had a paved or concrete floor."	Include photo.	The requested photograph has been added to the addendum.	Comment resolved.			
32	DTSC-32	2.14.1, page 23 (Description and History), second paragraph, first sentence	"The containment structure appears to be in good repair and also appeared to be in good condition during an engineering inspection in 1994."	Has PG&E conducted any more recent inspections/evaluation of the unit?	The containment structure has been inspected by Compressor Station Staff on a periodic basis.	Comment noted.			

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FMIT Comments – From September 9, 2013 Letter from Hargis and Associates to Aaron Yue/DTSC									
33	FMIT-1	N/A		The Tribe appreciates the opportunity to provide comments on this soil RFI/RI as it regards the decision process on the soil remedy to be a critical matter in the context of the impacts to its sacred lands as a result of the Topock remedial actions. Notably, pending the ultimate decisions on the need for and type of remedial actions determined necessary for contaminated soil, the damage to this sacred area could be devastating. The scope of this particular addendum supplements findings presented in PG&E's initial RFI/RI report completed in September 2007, which identified various Solid Waste Management Units ("SWMUs"), Areas of Concern ("AOCs"), Oily Water Treatment System Units ("OWTS Units"), and undesignated areas ("UAs"), collectively a total of 35 units. The Addendum further identifies 13 more units to be investigated in addition to the units originally identified. It also states that the investigation of the units identified as AOC 29 and AOC 30 will be conducted separately as part of the decommissioning and removal of the Interim Measures No. 3 facility, and that this plan is separate and under concurrent review.	Comment noted.				
34	FMIT-2	N/A		**LIMITATIONS OF TRC'S REVIEW** With the exception of AOCs 27, 28, and 31, all of the AOCs included in this report are located "within the PG&E fence line" of the Topock Compressor Station. Review of these areas by the Topock Technical Review Committee ("the TRC") has not been authorized to date, according to PG&E's current voluntary arrangement. While the Tribe appreciates PG&E's arrangement for the TRC to participate in the review of soils issues outside the fence line, the constraint that the Tribes cannot avail the TRC of their	PG&E is currently considering Tribe's request to participate in reviewing documents related to soils within the Compressor Station fence line.			FMIT appreciates PG&E's consideration. The Tribe would like to be updated on progress and would participate in discussions with the agencies on this issue.	PG&E is still considering this request and will keep the Tribe posted on progress.

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				technical expertise in matters inside the fence line is limiting. The Tribes' initial appeal for PG&E to allow TRC participation in the soils component of the project we believe was in part based on the complex interrelationship between the soils and groundwater issues. Likewise, there is also a potential relationship between contaminated soil areas inside and outside the Compressor Station fence line that could be considered in terms of investigation. This is evident from the addition of AOCs associated with the storm drains, for example. A rigorous review of the adequacy of the soil investigation work within the fence line is essential because if there are data gaps and/or deficiencies in its conclusions, this may result in inappropriate conclusions with regard to the eventual global risk assessment that would be based on the data. Moreover, the Tribe considers the Site to be part of the overall sacred and traditional cultural property landscape. So, while the Tribes enjoy the assistance of the TRC in the review of soils issues outside the Compressor Station fence line, it would be helpful if PG&E would reconsider its decision not to allow the TRC's assistance inside the fence line.					
35	FMIT-3	N/A		**POTENTIAL RESOURCE VALUE** The document does not address the potential for the subject AOCs with regard to resource value (cultural, spiritual, biological, etc.). This is an important consideration in regard to the next step of field assessment. As mentioned above, even the areas within the Topock Compressor Station fence line are regarded as being within the traditional cultural property landscape that is sacred to the Tribes. Additionally, AOC 27 is a particularly large area outside of the fence line and may have some heightened	Sections 5.2 and 5.3 of the January 2013 Soil RCRA Facility Investigation/Remedial Investigation Work Plan ("RFI/RI Work Plan") address both biological and cultural resources in the area of the soil investigation. The text of Section 1.0 of the RFI Volume 1 Addendum will be revised to reference Sections 5.2 and 5.3 of the RFI/RI Work Plan, stating "*Biological and cultural*			The FMIT suggests replacing the yellow highlighted language with the following to more accurately reflect the Tribal views: *"Tribes have stated that the Topock area contains sacred and ceremonial places and that the area is also contained within a larger geography that is sacred to the FMIT and other tribes."*	The text of Section 1.0 of the RFI Volume 1 Addendum will be revised to include this statement: *"Tribes have stated that the APE contains sacred and ceremonial places and that the APE is also contained within a larger geographic area that is sacred to the FMIT and other tribes."*

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				resource value to the Tribe. Statements regarding the resource value of the project's cultural context and of each area should be incorporated into the document.	*resources in the area of the 15 new units are discussed in Sections 5.2 and 5.3 of the Final Soil RFI/RI Work Plan, which are incorporated herein by reference. Section 5.3 of the Final Soil RFI/RI Work Plan acknowledges that 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 and sets forth that implementation of the work plan will comply with all applicable cultural resource mitigation measures included in the Programmatic Agreement (PA) (BLM 2010) and Cultural and Historic Properties Management Plan (CHPMP),and as they may be amended, including but not limited to tribal monitoring and cultural sensitivity training with invited participation from the Tribes*."			The Tribe also requests the revision be made to the PA and CHPMP section to more accurately reflect those documents.	Also, as discussed at the March 19, 2014 TWG meeting: DOI Response: DOI will ensure that the request will be taken to BLM for discussion at a subsequent CHPMP meeting.
36	FMIT-4	N/A		**RELATIONSHIP TO ADJACENT AREAS** In the revised Soil Work Plan dated January 14, 2013, investigations are described in Appendices C & D for two additional areas: the Perimeter Area (PA) and Storm Drains (SD) outside of and along the periphery of the Compressor Station fence line; however, these areas are not adequately identified in the Addendum. For completeness, these PA and SD areas should at least be noted, for example, on Figure 2.	The following note will be added to Figure 2: "The Perimeter Area (PA) and Storm Drains (SD) outside of and along the periphery of the Compressor Station fence line are being investigated as part of the Soil RFI/RI Investigation. If constituents exceed background or applicable screening levels in these areas, the specific areas will be assigned to applicable RFI/RI AOCs."				

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37	FMIT-5	N/A		**SUBSURFACE INTERFACE** To the extent possible, while minimizing the extent of intrusion, an effort to define the boundaries between historic earthen fill(s) and the original land surface should be made. Cultural resources at or immediately beneath the former land surface that have been buried by such fills could be impacted by investigation sampling, and subsequent remedial actions. Non-invasive methods, such as historic aerial photographic interpretation, remote sensing, and possibly surface geophysics could be employed (for example, at AOC 27) to define the original land surface and lateral extent of fill material. As you are aware, the Tribe has commented previously on this soil investigation including on the soil investigation work plan and on the IM-3 decommissioning plan. In each case, the Tribe has recognized the need for a meaningful balance between the level of characterization and the uncertainties associated with data gaps. Ultimately, the Tribe hopes for a measured, risk-based decision on the need for remedial action in consideration of the potential for profound disturbance of this sacred area.	PG&E is in the process of developing a cut and fill map to assess original land surfaces around the compressor station. A topographic map in the vicinity of the compressor station area dated 1957 is in the process of being georeferenced and digitized. ~~A map using pre- and post-compressor station topographic information.~~ This map will then be compared to existing topography to assess cut/fill thicknesses around the station. Results of this exercise will be shared with the TWG at a future TWG meeting and its usability discussed.			The yellow highlighted section appears to be a sentence fragment.	The yellow highlighted statement should be deleted.
Hualapai Comments – From September 6, 2013 Letter from Hualapai Department of Cultural Resources to Aaron Yue/DTSC									
38	HUALAPAI-1	N/A		In the revised Soil Work Plan of January 14, 2013, investigations are described in Appendices C & D for two additional areas: the Perimeter Area (PA) and Storm Drains (SD) outside of and along the periphery of the Compressor Station fence line; however, these areas are not adequately identified in the subject RFI-RI Addendum. For completeness, these PA and SD areas should at least be noted, for example, on Figure 2.	The following note will be added to Figure 2: "The Perimeter Area (PA) and Storm Drains (SD) outside of and along the periphery of the Compressor Station fence line are being investigated as part of the Soil RFI/RI Investigation. If constituents exceed background or applicable screening levels in these areas, the specific areas will be assigned to applicable			PG&E's response says that the New Investigation Units (Perimeter Area and Storm Drains) will be shown on a map; however, the new investigation units need to be described in the text, not just shown on a map. When the time comes to decide on soil remediation, these new investigation areas will need documentation. In addition	The RFI/RI Volume 1 Addendum will contain a description and history, summary of previous soil characterization, and conceptual site model for the Perimeter Area and Storm Drains.

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					RFI/RI AOCs."			to conceptual models of contaminant source and transport, information such as angle of steep slopes and vertical elevation changes will be useful during discussions. This comment should remain unresolved pending description of the new soil investigation units in the RFI-RI Addendum.	
39	HUALAPAI-2	N/A		For all AOC's, there needs to be a concerted effort to define the boundaries between historic earthen fill(s) and the original land surface. Cultural resources at or immediately beneath the former land surface that have been buried by such fills could be impacted by investigation sampling, and subsequent remedial actions. Non-invasive methods, such as aerial photographic interpretation, remote sensing, and possibly surface geophysics could be employed (for example, at AOC 27) to define the original land surface and lateral extent of fill material.	PG&E is in the process of developing a cut and fill map to assess original land surfaces around the compressor station. A topographic map in the vicinity of the compressor station area dated 1957 is in the process of being georeferenced and digitized. A map using pre- and post-compressor station topographic information. This map will then be compared to existing topography to assess cut/fill thicknesses around the station. Results of this exercise will be shared with the TWG at a future TWG meeting and its usability discussed.			We appreciate that PG&E is developing a map to describe cut/fill thicknesses around the Compressor Station. We would like to request that this map include the entire Area of Potential Effect (APE). Discussions should be held with Tribes and other stakeholders to determine important areas to consider during this mapping exercise. In addition, this mapping work needs to be done prior to initiation of field soil activities. Please note that we would appreciate that results of this exercise be shared with the TWG at a future TWG meeting and its usability discussed prior to the initiation of field soil sampling activities. This comment is resolved pending rewording of the sentence as shown.	As discussed at the March 19, 2014 TWG meeting: At the time of drafting the initial comment response, the exercise of developing a map of cut/fill thicknesses around the station using a 1957 topographic map had not yet been completed. The exercise has been completed, and It was determined that the accuracy and resolution of the older topographic map was insufficient to be helpful in developing this cut/fill map, and is of limited use. The extent of coverage of the topographic map was also limited to topography for the area immediately around the station. Older topographic maps of larger APE area at the resolution that would allow for a cut and fill map covering the APE area to be generated have not been located

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									A more useful tool for understanding the original land surface is the February 28, 2014 Geoarcheological Assessment Report, The Geoarcheological Assessment was undertaken to assess the potential for geologic units within the APE to contain buried archaeological and historical sites. The geoarchaeological study was specifically intended to identify the potential for buried archaeological and historical sites to exist in the Project area. Electronic copies of the 1957 topographic map have been shared with the Tribes and DTSC.
40	HUALAPAI-3	N/A		A number of the AOC's are located on public lands outside of PG&E property and overlap with sections of existing and former alignments of the railway, Route 66, and possibly other roadways. For example, elevated lead and selenium concentrations were noted at AOC 30 (MW-20 Bench) where, historically, railroad operations may have taken place. Soil investigations in AOC 30 would not be occurring if not for the expanded investigations of PG&E's chromium disposal practices. It is important to remain mindful that, in these areas, responsibility for contamination may not fall to PG&E. Regardless of who may ultimately be responsible for potentially non-PG&E related contamination, the pre-existing land	PG&E is in the process of developing a cut and fill map to assess original land surfaces around the compressor station. A topographic map in the vicinity of the compressor station area dated 1957 is in the process of being georeferenced and digitized. A map using pre- and post-compressor station topographic information. This map will then be compared to existing topography to assess cut/fill thicknesses around the station. Results of this exercise will be shared with the TWG at a future			The review comment was not completely addressed. For a full understanding of potential contamination, the sources and causes of soil contamination that are discovered throughout the landscape should be described, whether caused by PG&E, historical railroads, or otherwise. This comment is resolved pending a full description of the sources and causes of soil contamination.	During the March 19, 2014 TWG meeting, it was discussed that identifying all potential sources and causes of contamination, regardless if they were caused by PG&E, is outside of the scope of the Topock RFI/RI project. Dawn Hubbs from the Hualapai Tribe concurred, and stated it is understood that investigating all potentially contaminated areas Is not expected.

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				surface and topography needs to be determined to minimize impacts to cultural resources at or near beneath the original land surface.	TWG meeting and its usability discussed.				She requested that copies of the historical aerial photographs and older topographic maps be shared. The Tribes were told that copies of the historical aerial photographs can be found in an appendix to the Topock RFI/RFI Volume 1 Report, which can be found on the Topock Project website. Copies of the older topographic maps have been shared with the Tribes
41	HUALAPAI-4	N/A		The Soils Work Plan presently divides units of interest across the site into two categories, based on the Compressor Station fence line. The Scope of TRC work is limited to outside of the fence line. We note that, if investigative soils work within the fence line is deficient, then there may be negative consequences when it comes time to complete, or review, a global risk assessment.	PG&E is currently considering Tribe's request to participate in reviewing documents related to soils within the Compressor Station fence line.			We appreciate that PG&E is currently considering Tribe's request for the TRC to participate in reviewing documents related to soils within the Compressor Station fence line. To further support this concern, it is noted that the soil risk assessment will include scouring scenarios, whereby contaminated soils could be transported from inside of the fence line to outside of the fence line. The Tribes view the landscape as a continuum, and would appreciate the TRC to be supported in review of soil activities of the whole sacred area. This comment is resolved.	

Appendix B
PG&E Engineering Drawings
Referenced in this Addendum (on CD only)