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APPENDIX A O C 10
POST- SOIL NON-TIME CRITICAL REMOVAL ACTION HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT FOR A O C 10 EXPOSURE AREA

Topock Compressor Station
Needles, California

May 2026

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ACRONYMS AND ABBREVIATIONS

µg/dL	microgram per deciliter
2019 HHERA	2019 Soil Human Health and Ecological Risk Assessment Report
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
AOC	area of concern
AOC 10a	AOC 10 Subarea a
AOC 10b	AOC 10 Subarea b
AOC 10c	AOC 10 Subarea c
AOC 10d	AOC 10 Subarea d
Arcadis	Arcadis U.S., Inc.
BAF	bioaccumulation factor
B(a)PEQ	benzo(a)pyrene equivalent
bgs	below ground surface
BTAG	Biological Technical Assistance Group
BTV	background threshold value
CDI	chronic daily intake
COPC	constituent of potential concern
COPEC	constituent of potential ecological concern
D/F	dioxin/furan
DOI	U.S. Department of the Interior
DTSC	Department of Toxic Substances Control (California)
EC	exposure concentration
EPC	exposure point concentration
ERA	ecological risk assessment
HHERA	human health and ecological risk assessment
HHRA	human health risk assessment
HI	hazard index
HMW	high molecular weight
HQ	hazard quotient
ILCR	incremental lifetime cancer risk

LMW	low molecular weight
LOAEL	lowest-observed adverse effects level
LOE	line of evidence
main report	Post-Soil Non-Time Critical Removal Action Human Health and Ecological Risk Assessment Report
mg/kg	milligram per kilogram
NA	not applicable
ng/kg	nanogram per kilogram
NOAEL	no-observed adverse effects level
NTCRA	non-time-critical removal action
OEHHA	Office of Environmental Health Hazard Assessment
OHV	off-highway vehicle
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PG&E	Pacific Gas and Electric Company
RAWP	Human Health and Ecological Risk Assessment Work Plan
RBRG	risk-based remedial goal
site	Pacific Gas and Electric Company Topock Compressor Station site
SUF	site use factor
SWMU	solid waste management unit
TAA	target action area
TCS	Topock Compressor Station
Technical Memo	Soil Risk Assessment Addendum: Proposed Approach to Update the Human Health and Ecological Risk Assessment after Completion of the 2023 Non-Time-Critical Removal Action
TEQ	toxicity equivalent
TPH	total petroleum hydrocarbon
TRV	toxicity reference value
UA	Undesignated Area
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
WOE	weight of evidence

1 INTRODUCTION

This appendix presents the human health and ecological risk assessment (HHERA) for the Area of Concern (AOC) 10 potential soil exposure area located outside the Topock Compressor Station (TCS) in Needles, California. The risk characterization presented in this Post-NTCRA HHERA evaluates the current conditions in AOC 10 following the completion of the non-time-critical removal action (NTCRA) in 2022 and 2023. Consistent with the approach for the Post-NTCRA HHERA detailed in the January 30, 2024 Soil Risk Assessment Addendum: Proposed Approach to Update the Human Health and Ecological Risk Assessment after Completion of the 2023 Non-Time-Critical Removal Action (Technical Memo; Arcadis U.S., Inc. [Arcadis] 2024) to the U.S. Department of the Interior (DOI) and Department of Toxic Substances Control (California) (DTSC), the updated risk characterization is presented only for risk-driving receptors.

The AOC 10 potential exposure area, shown on Figure AOC10-1.1, is approximately 3 acres in total. Table AOC10-1.1 presents historical sample locations evaluated in the 2019 Soil Human Health and Ecological Risk Assessment Report (2019 HHERA; Arcadis 2019) as well as recent samples collected in 2022 and 2023 as part of the NTCRA, as described in the text that follows. Samples were collected from locations in AOC 10 Subarea b (AOC 10b), Subarea c (AOC 10c), and Subarea d (AOC 10d) (as described in this Post-NTCRA HHERA) and from AOC 10 locations south of the access road to the TCS. In accordance with the final Human Health and Ecological Risk Assessment Work Plan (RAWP) documents (Arcadis 2008, 2009, 2015), this Post-NTCRA HHERA does not include samples related to AOC 10a, which is evaluated as part of the AOC 9 potential soil exposure area (see Appendix AOC 9).

The 2019 HHERA (Arcadis 2019) identified potential risk to three human recreator receptors (campers, hikers, and off-highway vehicle [OHV] riders) associated with potential exposure to dioxin toxicity equivalent (TEQ) and hexavalent chromium at some locations within AOC 10. Potential risk was also identified for one ecological receptor (desert shrew) associated with total chromium and dioxin TEQ at some locations. The 2022 and 2023 NTCRA targeted soil removals in areas where excess risk was identified. The NTCRA soil removal areas in AOC 10 and current in-place sample locations (i.e., historical and NTCRA confirmation samples remaining in place) are shown on Figure AOC 10-1.2.

Details of the NTCRA are presented in Section 2.2.3 of the Post-NTCRA HHERA Report (the “main report”) to which this appendix is attached and are summarized in Section 1.2 as relevant to AOC 10. A summary of the updated human health risk assessment (HHRA) and the ecological risk assessment (ERA) results are also summarized in Sections 5 and 6, respectively, of the main report. This Post-NTCRA HHERA refers to “HHRA” when discussing specific information for assessing risks to human health, “ERA” when discussing specific information for assessing risks to potential ecological receptors, and “HHERA” when discussing topics that are common to both the HHRA and the ERA.

Descriptions of the physical location and characteristics of the AOC 10 potential exposure area and the HHERA methodologies are provided in the main report and the final RAWP documents (Arcadis 2008, 2009, 2015) and are not repeated in this Post-NTCRA HHERA. Detailed discussions of the historical uses and sampling and analysis are presented in the 2019 HHERA (Arcadis 2019).

This Post-NTCRA HHERA summarizes use of the Pacific Gas and Electric Company (PG&E) TCS site (site), data evaluation, potential receptors, potential exposure pathways, and updated results of the HHERA risk characterization for soil in the AOC 10 potential exposure area for risk-driving receptors following completion

of the NTCRA. Tables and figures specific to the AOC 10 potential exposure area HHERA are also presented in this appendix.

1.1 Summary of Site Use

AOC 10, also referred to as the East Ravine, is a small ravine located on the southeast side of the TCS, outside of the fence line (Figure AOC10-1.1). The ravine is 1,600 feet long and runs eastward toward the Colorado River. Portions of the East Ravine are on PG&E property outside the facility fence line, and other portions of the ravine are located on property owned by the Havasu National Wildlife Refuge. The East Ravine is bisected by three berms (one constructed berm and two dirt roads). The constructed berm was built circa the early 1950s. The Southern California Gas Pipeline dirt road was built in the 1950s, and the lower dirt road was built in 1916 and is associated with the old Route 66. The lower dirt road is the only berm that contains a culvert. Because of the berms, surface flow from most of the length of this ravine (west of the lower dirt road that forms the eastern boundary of AOC 10d) does not typically reach the Colorado River. The drainage for this ravine includes runoff from the TCS access road (a curb was installed along the access road in 2006), runoff from the mountains to the south, and runoff from the TCS itself.

The three subareas evaluated in this Post-NTCRA HHERA (10b, 10c, and 10d) are where water and soil collect (either within lower-lying areas along the ravine course or behind berms) within the East Ravine and are shown on Figure AOC10-1.1. AOC 10b, a natural drainage depression in the upper portion of the ravine, is located in a flat area of the ravine. AOC 10c and AOC 10d are depression areas located along the ravine course behind historical or existing berms. Notably, although AOC10 includes steep slopes along the ravine, vertical scouring has not been observed in the ravine bottom. As noted, the subareas of concern are primarily depositional. During recent high runoff conditions that occurred with rainstorm events on August 24 and September 11, 2022, and March 15, 2023, flooding and sediment deposition was observed in the subareas rather than scouring.

Erosion has been occurring on the steep hillside where AOC 9 and AOC 10 TAA1 are located, just below the TCS and above AOC 10. The catchment area for East Ravine is small, so the ravine does not get large amounts of stormwater runoff. As a result and consistent with observations, scouring is not expected in the ravine bottom. Prior to removal of the berm adjacent to AOC 10c (aka: AOC10 TAA2), flow within ravine stopped there, and any transported sediment was deposited. The berm was removed as part of the NTCRA. Following berm removal, flow within ravine is now continuous to AOC 10d, where the next berm (SoCal Gas pipeline berm) is located. Additionally, NTCRA activities included placement of rip rap on the slope at AOC 9 TAA 1 and AOC 10 TAA1 after backfilling to prevent further erosion from occurring in those locations.

In 2008, during a site walk, DTSC personnel observed a layer of white powder material on the floor of the wash in three locations between AOCs 10c and 10d and collected samples from this area (sample locations DTSC-AOC10d-1 through DTSC-AOC10d-3). The material was approximately 1 inch wide, 15 inches long, and 0.25 inch thick and was similar in appearance to the white material in Bat Cave Wash and at AOC 14 (Railroad Debris Site). Samples collected of the powder contained elevated concentrations of calcium, chromium, copper, magnesium, sodium, and zinc. This white powder likely represented a native evaporite deposit. The white powder is no longer present. In 2009, in response to DTSC's request in the conditional approval of the Draft RCRA Facility Investigation/Remedial Investigation Soil Investigation Work Plan Part A (CH2M Hill, Inc. 2006), PG&E mapped the white powder and debris in the East Ravine.

For AOC 10, the primary potential sources of contamination are (1) runoff from the TCS, the access road to the TCS, and AOC 9; (2) discharge from stormwater drain pipes; (3) surface debris disposed of on the slopes of the ravine; and (4) incidental overflows of chromium-containing wastewater via the former trench drain at the top of the station access road. Potential releases would primarily have been in liquid form and would have affected surface soil. Releases from debris, whether consisting of solid particles or dissolved constituents, would also have affected surface soil.

If released, volatile organic compounds in surface soil would be expected to have been degraded by heat and light and are likely no longer present. Potential sources of dioxins and furans in the vicinity of the TCS may include historical industrial activities as well as other sources unrelated to TCS activities (i.e., unauthorized dumping and burning; regional wildfires; combustion of diesel and leaded gas; and exhaust from cars, trucks, and trains) (CH2M 2017).

Surface soil is the primary source medium. From surface soil, contaminants could have migrated to shallow and deeper soil. Shallow soils may act as a secondary source medium to subsurface soil, and subsurface soil may act as a secondary source medium to groundwater. Periodic rainfall and runoff to the East Ravine would have pooled in the drainage depressions identified as AOCs 10b, 10c, and 10d. In these subareas, contaminants could potentially be driven deeper and could potentially reach groundwater.

A secondary source may also include contaminated windblown dust. For AOC 10, windblown dust, either from AOC 9 or from other areas of the East Ravine, could have been deposited in the ravine or on shallow portions of the banks of the ravine. Windblown contamination, if any, is expected to be limited to surface soil. Because of the berms within the East Ravine, surface flow to the Colorado River is not considered a significant potential migration pathway. At least one berm was constructed before development of the station, and another was constructed around the time the station was built. Although a culvert exists in the lower dirt road berm, concentrations of constituents of potential concern (COPCs) east of this road are low, and there are no reports of flow through the culvert (CH2M Hill, Inc. 2013). Hexavalent chromium was not detected, and total chromium was below background levels in a soil sample collected immediately east of the lower dirt road berm.

In the RAWP documents (Arcadis 2008, 2009, 2015), AOC 10a and AOC 9 were grouped as a unique exposure area for the ERA, primarily because these two AOCs are in proximity and, therefore, the same small wildlife populations can be expected to forage across both AOCs. Because AOCs 10b, 10c, and 10d are located farther downstream and either within lower-lying areas along the ravine course or behind berms, these subareas were grouped together as AOC 10 for the ERA. At DTSC's direction in 2017 (DTSC 2017), the same combinations of AOCs identified for the ERA in the RAWP documents were evaluated for the HHRA. These subareas included in the AOC 10 potential exposure area were also evaluated in this Post-NTCRA HHERA.

1.2 Summary of NTCRA in AOC 10

As summarized in the NTCRA Completion Report (Jacobs 2025), the DOI selected a removal action of excavation of contaminated soil and debris at target action areas (TAAs) within the TCS site, located in Needles, California (DOI 2021). PG&E commenced the NTCRA soil removal action on July 25, 2022, according to the DOI-approved Soil NTCRA Work Plan (Jacobs 2022), which incorporated comments from stakeholders, including DOI, U.S. Bureau of Land Management, and tribal stakeholders.

The removal action consisted of the following activities:

- Soil excavation;
- Mechanical separation and size separation of rocks, debris, and soil; and
- Disposal of the contaminated soil and debris in approved and permitted landfills.

Work associated with the NTCRA was completed on May 20, 2024.

In AOC 10, removal activities associated with the NTCRA were completed at three TAAs. The TAAs, extents of the NTCRA removal areas (including step-out locations), and confirmation samples remaining in place are presented on Figure AOC10-1.2. Details of the removal actions, remaining contamination (if any), and confirmation sampling is presented in Section 3 of the NTCRA Completion Report (Jacobs 2025) and summarized briefly for each AOC 10 TAA in the following list.

- AOC10 TAA2: AOC10 TAA2 is located east of TCS in the East Ravine and includes most of the area bounded by AOC 10c. Soils within the TAA are primarily depositional silts and sands from flows within the East Ravine. A cluster of mesquite trees was present in the center of the original TAA. A dam built sometime between 1953 and 1961 was present on the eastern side of the TAA that resulted in TCS discharges and stormwater flows being impounded. Greenish-gray material associated with elevated chromium contamination and a thin white powder layer were present within the TAA (CH2M Hill, Inc. 2009). Historical soil sample results indicate soil contaminated by metals and dioxin/furan (D/F) was present within the TAA, with the greatest contaminant concentrations within 3 feet of the surface. Removal activities at AOC10 TAA2 began in August 2022. The initial excavation removed soil to the extent of the TAA boundary and to a depth of approximately 5 feet below ground surface (bgs), except around the mesquite trees. Step-out excavations continued from September 2022 through May 2023. As step-out excavations progressed upstream of the initial TAA boundary, it became evident that metals and D/F contamination exceeding the numerical removal action goals was present in soil from edge to edge and to depth ranging from approximately 2 to 7 feet bgs within the East Ravine. White powder and discolored soil layers of greenish-gray, orange, and red were encountered at varying thicknesses and depths. The impacts were primarily in the soft sediment within the ravine and were not evident within the hard conglomerate of the East Ravine walls. The potential removal of contaminated soil beneath the mesquite trees, and therefore the mesquite trees themselves, was discussed on several occasions with project stakeholders. Ultimately, DOI mandated removal of the mesquite trees to achieve project remedial action objectives. Soil NTCRA removal activities were completed in May 2023 and included the removal of approximately 8,271 cubic yards of contaminated soil (Section 3.9 of the NTCRA Completion Report [Jacobs 2025]). A total of 94 confirmation soil samples were collected from the excavation floors and sidewalls of AOC10 TAA2 and approved step-out locations. Select backfilling was performed along edges of the excavation to smooth topography and reduce vertical slopes. The only backfill used was from onsite soil generated from remedy construction and TCS projects.
- AOC10 TAA3: AOC10 TAA3 is located east of TCS, adjacent to the intersection of B-Line Road and the access route to the East Ravine. TAA3 consists of a small pile of contaminated soil and debris approximately 1 foot above the surrounding grade that appears to have been placed many years ago. Historical soil sample results indicated contaminated soil was limited to the top 1 foot of soil. Removal activities at AOC10 TAA3 began and concluded in August 2022, resulting in the removal of

approximately 73 cubic yards of contaminated soil (Section 3.10 of the NTCRA Completion Report [Jacobs 2025]). Five confirmation soil samples were collected from AOC10 TAA3 from the excavation sidewalls and floor; additional step-out locations were not warranted. Backfill operations were conducted to fill the small excavation and grade the area as part of the East Ravine access route improvements. Clean onsite material staged at the Soil Processing Yard was used to fill the area.

- AOC10 TAA4: AOC10 TAA4 is located east of TCS downslope of the intersection of B-Line Road and the access route to the East Ravine. Soils within the TAA are primarily depositional silts and sands from flows within the East Ravine impounded by construction of the B-Line Road. A cluster of mesquite trees is present to the southwest of the TAA. The TAA consists of a small area of chromium- and D/F-contaminated soil that is likely the result of impoundment of TCS discharge water in the East Ravine. Historical data indicated a thin white powder layer present at approximately 2 to 3 feet beneath the surface, which coincides with the greatest contaminant concentrations. Soil NTCRA activities at AOC10 TAA4 began in August 2022. The initial excavation removed soil to the extent of the TAA boundary and to a depth of 5 feet bgs before the collection of confirmation soil samples. The historically identified white powder lens (2 to 3 inches thick) was encountered at approximately 2.5 feet bgs throughout the TAA and in the sidewalls of the excavation. Step-out excavations continued from December 2022 through June 2023 to address chromium and D/F contamination exceeding the numerical removal action goals that was present in soil (primarily the white powder lens observed at depths ranging from approximately 1 to 4 feet bgs) well beyond the initial TAA boundary. Soil NTCRA removal activities were completed in June 2023 and included the removal of approximately 910 cubic yards of contaminated soil (Section 3.11 of the NTCRA Completion Report [Jacobs 2025]). Remaining contamination is present on the northern and western side of the mesquite tree cluster, which was preserved based on stakeholder discussions. The white powder is not likely to extend south of the mesquite tree cluster due to the presence of the native conglomerate rock. A total of 40 confirmation soil samples were collected from AOC10 TAA4 at location in the excavation floor and sidewalls within the original TAA boundary and approved step-out locations. Backfill of the TAA and upstream excavations was completed in June 2023 using approved onsite soil known as Dam V soil, which was removed from Havasu National Wildlife Refuge land. Once the Dam V soil was expended, additional approved, clean, onsite material was used.

Soil exceeding the numerical RAGs or debris remain in a few places associated with Soil N T C R A removals as well as a few isolated locations outside of the Soil N T C R A removal areas, because removing it may have presented a hazard to workers, undermined critical infrastructure or utilities (e.g., located beneath active high-voltage electrical line), or encroached upon culturally sensitive areas (e.g., located beneath a mesquite tree). At the AOC 10 potential exposure area, depth-weighted location concentrations exceeding RAGs for hexavalent chromium, total chromium, and dioxin TEQ remain in place. Section 3 of the N T C R A Completion Report (Jacobs 2025) describes the remaining contamination in each target action area and provides a list of individual confirmation samples (i.e., non-depth-weighted) exceeding the RAGs (Table 3-16 of the N T C R A Completion Report). Figure 2-4 and Table 2-1 of the main Report provide the locations and concentrations, respectively, of the depth-weighted historical and confirmation sample concentrations exceeding the RAGs which include the following:

- Hexavalent chromium: AOC10-12, AOC10c-1, AOC10TAA2-CW10a, DTSC-AOC10d-2, and DTSC-AOC10d-3;

- Total chromium: AOC10c-1, DTSC-AOC10d-2, and DTSC-AOC10d-3; and
- Dioxin TEQ: AOC10-11, AOC10-15, AOC10b-1, and AOC10TAA4-CW13 (only for human receptors at depths below surface soil).

2 DATA EVALUATION

This section summarizes the data considered for the AOC 10 potential exposure area Post-NTCRA HHERA and presents the COPCs for human health and constituents of potential ecological concern (COPECs) identified as risk drivers in the 2019 HHERA (Arcadis 2019) as well as non-risk-driving COPCs/COPECs evaluated for AOC 10.

For AOC 10, the 2019 HHERA (Arcadis 2019) identified potential exposure to dioxin TEQ and hexavalent chromium in surface soils (0 to 0.5 foot bgs) and shallow soils (0 to 3 feet bgs) as having risk above de minimus levels (i.e., 1 x 10^{-6} for excess lifetime cancer risk and 1 for noncancer hazard index [HI]; see Section 4) for one or more human recreational receptors. The 2019 HHERA identified total chromium and dioxin TEQ in surface soil (0 to 0.5 foot bgs) as having the potential for unacceptable risk to desert shrew in AOC 10 based on hazard quotients (HQs) greater than 1 and supporting lines of evidence (LOEs) indicating potential for risk (see Section 5).

Consistent with the approach detailed in the January 30, 2024 Technical Memo (Arcadis 2024), the HHRA evaluated post-NTCRA exposures (i.e., considering NTCRA-related excavation and placement of backfill) to hexavalent chromium, total chromium, copper, and dioxin TEQ, and pre-NTCRA exposures for the remaining non-risk-driving COPCs (i.e., exposure point concentrations [EPCs] from the 2019 HHERA [Arcadis 2019]). For the ERA, ecological receptor exposure was evaluated individually for each COPEC; evaluation of COPECs is limited to hexavalent chromium, total chromium, copper, and dioxin TEQ (identified as risk-driving COPECs in one or more site AOCs). Although scouring has not been observed in AOC 10, three scouring scenarios were evaluated (baseline, 2-foot scouring, and 5-foot scouring) in this Post-NTCRA HHERA for consistency with the scenarios evaluated in the 2019 HHERA (Arcadis 2019) and approved RAWP documents (Arcadis 2008, 2009, 2015).

The data evaluation steps for these risk-driving and non-risk-driving COPCs/COPECs are described in the sections that follow. Additionally, some additional data for non-risk-driving COPCs/COPECs were collected on a limited basis as part of the NTCRA and were evaluated as described in the sections that follow.

2.1 Data Evaluation for Risk-Driving COPCs and COPECs

For risk-driving COPCs (hexavalent chromium and dioxin TEQ) and COPECs (total chromium and dioxin TEQ) identified for AOC 10 in the 2019 HHERA (Arcadis 2019), as well as copper (risk-driving COPC or COPEC at some other site exposure areas), all soil sampling locations currently in place (i.e., not excavated as part of the NTCRA) at AOC 10 were evaluated in this Post-NTCRA HHERA. Post-NTCRA HHERA dataset for AOC 10 includes results for in-place samples evaluated in the 2019 HHERA (Arcadis 2019) and in-place NTCRA confirmation samples. It should be noted that additional NTCRA data for other non-risk-driving constituents are discussed in Section 2.3.

All soil sampling locations currently in place at AOC 10 (excluding locations in and around AOC 10a) are presented on Figure AOC10-1.2 and in Table AOC10-1.1. Details of the soil sampling and analysis

conducted as part of the NTCRA are presented in the NTCRA Completion Report (Jacobs 2025); details of the soil sampling and analysis for the remaining samples are described in the RAWP documents (Arcadis 2008, 2009, 2015) and 2019 HHERA (Arcadis 2019). For the baseline, 2-foot scouring, and 5-foot scouring scenarios, soil data from 0 to 10 feet bgs were evaluated in this Post-NTCRA HHERA to account for potential soil exposures for risk-driving receptors (i.e., camper, hiker, OHV rider, and desert shrew) that may occur at surface soils (e.g., 0 to 0.5 foot bgs in the baseline scenario) or shallow soils (e.g., 0 to 3 feet bgs in the baseline scenario). Because potential soil contact does not extend below 10 feet bgs for the scouring scenarios, deeper soil data (i.e., greater than 10 feet bgs) were excluded from the risk evaluation, as noted in Table AOC10.1-1.

Following the steps outlined in Section 3 of the main report, soil data considered usable for the risk assessment were identified and used in the quantitative HHERA. Samples representing soil that was excavated as part of the NTCRA were excluded from the dataset, and current sample top and bottom depths (reflecting excavation and/or placement of fill material) were used (Table AOC10-1.1). The post-NTCRA soil data are presented in Attachment AOC10-A1 and include the following:

- Pre-NTCRA Data: For pre-NTCRA data, the dataset includes results for site risk drivers (i.e., dioxin TEQ, hexavalent chromium, total chromium, and copper) from the 2019 HHERA (Arcadis 2019) where those samples remain in place.
- NTCRA Confirmation Sampling Data: The dataset includes results for site risk drivers (i.e., dioxin TEQ, hexavalent chromium, total chromium, and copper) from confirmation samples that currently remain in place.

2.2 Data Evaluation for Non-Risk-Driving COPCs

As noted above, EPCs for non-risk-driving COPCs used in the 2019 HHERA (Arcadis 2019) were also used in this Post-NTCRA HHERA, as calculated from the pre-NTCRA soil dataset. As discussed in Section 5.5.2 of the main report, use of pre-NTCRA soil data for non-risk-driving COPCs is a conservative approach that is likely to overestimate post-NTCRA concentrations of these COPCs. Thus, the data evaluation steps are as described in detail in Section 3 of the 2019 HHERA. The soil sampling locations for the 2019 HHERA dataset at AOC 10 are presented on Figure AOC10-1.1 and in Table AOC10-1.1 of the 2019 HHERA. The data were evaluated based on methodology described in the RAWP documents (Arcadis 2008, 2009, 2015). It should be noted that for this Post-NTCRA HHERA, only surface soil (0 to 0.5 foot bgs, or equivalent depths in the scouring scenarios) and shallow soil (0 to 3 feet bgs, or equivalent depths in the scouring scenarios) were evaluated.

Within this dataset, some analytical data did not meet data quality criteria; therefore, non-detect results were qualified as rejected with an “R” data qualifier (as discussed in the RFI/RI Report Volume 3 [Jacobs 2024]). This occurred for all polycyclic aromatic hydrocarbons (PAHs) in two samples (AOC10-10-5201 and AOC10-10-5202) and a subset of PAHs in two additional samples (AOC10-10-5200 and AOC10c-6-5241). Additionally, polychlorinated biphenyl (PCB) results were rejected for three samples (AOC10d-9-5243, AOC10d-9-5244, and AOC10d-9-5246).

Data processed for the 2019 HHERA (e.g., calculation of total concentrations for low molecular weight [LMW] and high molecular weight [HMW] PAHs, benzo(a)pyrene equivalent [B(a)PEQ], PCBs, and dioxin TEQs) are described in detail in Section 3 of the 2019 HHERA (Arcadis 2019).

The process for identifying COPCs and COPECs is detailed in Section 3.4 of the 2019 HHERA (Arcadis 2019). COPCs and COPECs were selected for the AOC 10 potential exposure area using soil data encompassing all relevant exposure depths for the HHERA (i.e., 0 to 10 feet bgs for AOC 10) presented in Attachment AOC10-A1 to the 2019 HHERA. Inorganic compounds, LMW PAHs, HMW PAHs, B(a)PEQ, and dioxin TEQ had concentrations above background threshold levels (BTVs) in AOC 10 soil (0 to 10 feet bgs) and, therefore, are included as COPCs and/or COPECs in the baseline, 2-foot scouring, and 5-foot scouring exposure depths evaluated in the HHERA. Carcinogenic PAHs (i.e., benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, chrysene, and indeno(1,2,3-cd)pyrene) associated with B(a)PEQ were also selected as COPCs in the HHRA for the evaluation of the noncancer endpoint for each individual PAH. All other detected organic constituents in AOC 10 potential exposure area soil in the baseline, 2-foot scouring, and 5-foot scouring exposure depths are included as COPCs and/or COPECs in the 2019 HHERA. COPCs and/or COPECs selected for exposure depths and scenarios evaluated in the 2019 HHERA for AOC 10 and relevant to the applicable depths evaluated in this Post-NTCRA HHERA are summarized in Section 3.

2.3 Evaluation of Additional Data

In some cases, NTCRA confirmation samples were also analyzed for other constituents, including a few metals (lead, mercury, molybdenum, and zinc). These data were not included in the Post-NTCRA HHERA exposure estimates. Instead, measured concentrations of in-place confirmation samples were compared to the range of concentrations observed in the 2019 HHERA dataset (Arcadis 2019). This evaluation is presented in Table AOC10-2.1 for the baseline scenario, Table AOC10-2.2 for the 2-foot scouring scenario, and Table AOC10-2.3 for the 5-foot scouring scenario. The maximum concentrations and most of the mean concentrations for the in-place NTCRA confirmation samples for lead, mercury, molybdenum, and zinc were less than the maximum and mean concentrations for these metals in the 2019 HHERA dataset.

This indicates that EPCs evaluated for lead, mercury, molybdenum, and zinc in the Post-NTCRA HHERA based on values calculated for the 2019 HHERA (Arcadis 2019) dataset are likely a conservative estimate of current post-NTCRA exposures in AOC 10. Exclusion of the in-place NTCRA confirmation samples for these constituents is not expected to materially change the risk estimates or conclusions of this Post-NTCRA HHERA.

3 EXPOSURE POINT CONCENTRATIONS

Depth-weighted and area-weighted EPCs for COPCs/COPECs in soil at the AOC 10 potential exposure area were calculated as described in Section 4.2 of the main report. As noted in Section 2, EPCs for dioxin TEQ, hexavalent chromium, total chromium, and copper were calculated from the post-NTCRA dataset. In addition, EPCs from the 2019 HHERA (Arcadis 2019) for remaining non-risk-driving COPCs were used in this Post-NTCRA HHERA to estimate cumulative risk to human receptors. Although flooding and sediment deposition was observed in the subareas of AOC 10 rather than scouring during recent high runoff conditions, two scouring scenarios (i.e., the 2-foot scouring and 5-foot scouring) as well as the baseline (no scouring) scenario were evaluated for the AOC 10 potential exposure area, consistent with the exposure scenarios evaluated in the 2019 HHERA. The evaluated exposure depths are shown in Exhibit AOC 10-3.1. Deeper soil intervals (i.e., subsurface soil) were not evaluated because the risk-driving receptors are potentially exposed only to surface and shallow soil.

Exhibit A O C 10-3.1 Exposure Depths

Baseline Scenario	-	-
Surface soil (0 to 0.5 foot bgs)	Surface soil (2 to 3 feet bgs)	Surface soil (5 to 6 feet bgs)
Shallow soil (0 to 3 feet bgs)	Shallow soil (2 to 6 feet bgs)	Shallow soil (5 to 10 feet bgs)

The depth-weighted data used in the calculation of depth-weighted EPCs for hexavalent chromium, total chromium, copper, and dioxin TEQ are presented in Attachment AOC 10-A2. The summary statistics for these AOC 10 potential exposure area soil depth-weighted datasets and depth-weighted EPCs were calculated in a manner consistent with the RAWP documents (Arcadis 2008, 2009, 2015). In accordance with the RAWP, area-weighted EPCs for the HHRA were evaluated only if depth-weighted EPCs suggested that cumulative cancer risks/noncancer hazards may be significant for any given HHRA exposure scenario (i.e., cumulative cancer risks exceed a 10^{-6} cancer risk level and/or the noncancer HI exceeds 1). Similarly, for the ERA, area-weighted EPCs were evaluated for consistency with the 2019 HHERA but only discussed if depth-weighted EPCs suggested potential risk to ecological receptors (i.e., HQ greater than 1). For the AOC 10 potential exposure area, area-weighted EPCs were deemed necessary for either the HHRA or the ERA and, therefore, were calculated. The area-weighted data used in the calculation of area-weighted EPCs and the Thiessen polygon figures representing the area-weighted EPCs are presented in Attachment AOC 10-A3.[1]

In some cases, the area-weighted EPCs are greater than the depth-weighted EPCs, such as for hexavalent chromium in surface soil for the 2-foot scouring scenario in the AOC 10 potential exposure area. In this case, the depth-weighted EPC for hexavalent chromium (1.128 milligrams per kilogram [mg/kg]) is based on a different upper confidence limit (UCL) method (95% Kaplan–Meier (t) UCL) than the area-weighted EPC (1.7 mg/kg, calculated using the bias-corrected accelerated bootstrap UCL method). Both UCL methods are noted

[1] For Thiessen polygons at AOC 10, concentrations across gaps (e.g., AOC10-XRF-01) were estimated using the closest sample point, as applicable for the constituent.

by ProUCL to produce stable and unbiased UCL estimates that are unlikely to overestimate or underestimate the true expected UCL value (United States Environmental Protection Agency [USEPA] 2022). The difference in the UCL values can be attributed to the effect of area-weighting as well as to the different UCL methods employed.

In accordance with the 2019 HHERA (Arcadis 2019), if the soil dataset contained fewer than four detected values (i.e., concentrations reported above the detection limit) or fewer than eight total observations, the EPC defaulted to the maximum depth-weighted concentration in that dataset.

Tables AOC10-3.1, AOC10-3.2, and AOC10-3.3 present soil summary statistics for constituents measured at the AOC 10 potential exposure area and depth- and area-weighted EPCs for COPCs/COPECs calculated using depth-weighted data from the exposure depths listed previously for AOC 10 for the baseline, 2-foot scouring, and 5-foot scouring scenarios, respectively. It should be noted that the list of constituents shown in Tables AOC10 3.1, AOC10-3.2, and AOC10-3.3 is based on analytes that were detected at least once at the site (including all exposure areas inside or outside the TCS) and measured at AOC 10. These tables also present the basis of the calculated depth- and area-weighted EPCs, including whether the EPC is based on the maximum detected concentration.

4 HUMAN HEALTH RISK ASSESSMENT

This section summarizes the HHRA approach used for this Post-NTCRA HHERA; presents the COPC, EPC, risk, and hazard summary tables; and discusses the results of the risk characterization and uncertainties in the risk assessment for the AOC 10 potential exposure area. Details of the overall HHRA approach are presented in Section 5 of the 2019 HHERA (Arcadis 2019). Dose, exposure concentration (EC), risk, and hazard calculation tables for potential human health receptors at the AOC 10 potential exposure area are presented in Attachments AOC10-B1 and AOC10-B2 for depth- and area-weighted EPCs, respectively.

As stated in the 2019 HHERA (Arcadis 2019), risks/hazards estimated for an individual AOC, Solid Waste Management Unit (SWMU), or undesignated area (UA) potential exposure area such as AOC 10 are not considered representative of the realistic or likely potential exposures for the human populations that could be present in the areas outside the TCS (such as recreational users). Risks/hazards calculated separately for individual AOCs are conservative and likely overestimate site risks/hazards. As described in the RAWP documents (Arcadis 2008, 2009, 2015), these human populations would more likely be exposed randomly, over the course of a lifetime, to soil present in all individual AOC/SWMU/UA potential exposure areas located outside the TCS, rather than have a lifetime of contact limited to the area of a single potential exposure area. Therefore, estimated risks/hazards presented for individual AOC/SWMU/UA potential exposure areas are not believed to be representative of the potential health risks to humans potentially contacting the soil outside the TCS. As stated previously, the Post-NTCRA HHERA provides updated risk estimates for human health and the environment based on potential exposures to current soil conditions in the NTCRA areas. Therefore, updated risk estimates were not performed for the OCS potential exposure area in the Post-NTCRA HHERA It is noted that due to NTCRA soil removal, the potential post-NTCRA soil risks for the OCS are likely lower than estimated in the 2019 HHERA. The HHRA results and conclusions of the 2019 HHERA and of this Post-NTCRA HHERA will be considered for making risk-management decisions for the site in the Corrective Measure Study/Feasibility Study to be prepared for the site.

The estimated risks and hazards associated with a lifetime of contact with soil only in the AOC 10 potential exposure area are presented at the request of the agencies and are not suitable to provide the sole basis of risk management decisions to protect human health.

4.1 Human Health Conceptual Site Model

Following the steps outlined in Section 5.5 of the 2019 HHERA (Arcadis 2019), risks were estimated for potentially complete and significant exposure pathways identified in the human health conceptual site model for risk-driving receptors potentially exposed to COPCs in soil present at the AOC 10 potential exposure area, as identified in the 2019 HHERA. These included incidental ingestion of soil, dermal contact with soil, and inhalation of particulates and volatile organic compound vapors in ambient outdoor air from soil for recreational users (child and/or adult camper, hiker, and OHV rider).

Potential exposure pathways considered incomplete or insignificant were not quantitatively evaluated and are discussed in Section 5.3.1 of the 2019 HHERA (Arcadis 2019).

4.2 Constituents of Potential Concern

COPCs for the AOC 10 potential exposure area were selected in accordance with the RAWP documents (Arcadis 2008, 2009, 2015) and as described in Section 3.4 of the 2019 HHERA (Arcadis 2019). Soil data used in the COPC selection process encompassing all exposure depths for this Post-NTCRA HHERA (i.e., 0 to 10 feet bgs for AOC 10) are presented in Attachment AOC10-A. COPCs for the two exposure depths and three scenarios (i.e., baseline, 2-foot scouring, and 5-foot scouring) evaluated for the AOC 10 HHRA in this Post-NTCRA HHERAare summarized in Tables AOC10-4.1a through AOC10-4.1c for the baseline, 2-foot scouring, and 5-foot scouring scenarios, respectively. COPCs selected for Subsurface I or II soil in the 2019 HHERA are also shown in Table AOC11-4.1, however, only the EPCs for volatile compounds for these depth intervals are used in the estimates of outdoor vapor concentrations in the quantitative HHRA for the evaluation of the outdoor vapor inhalation pathway. The EPCs for COPCs for Subsurface I or II soil were not updated in this this Post-NTCRA HHERAand are the same as presented in the 2019 HHERA.

COPCs included 10 metals (antimony, arsenic, hexavalent chromium, total chromium, copper, lead, manganese, mercury, thallium, and zinc), inorganic compounds (cyanide), PAHs, PCBs, dioxin TEQ, total petroleum hydrocarbon (TPH) as diesel, and TPH as motor oil in surface and shallow soil.

4.3 Exposure Point Concentration Summary

For the potentially complete and significant exposure pathways identified in the conceptual site model, EPCs were calculated as described in Section 4.2 of the main report and presented in Section 3 of this appendix. Depth-weighted data used in the calculation of depth- and area-weighted EPCs are presented in Attachment AOC10-A. The following tables summarize the depth-weighted EPCs for COPCs in soil and estimated outdoor air concentrations associated with dust and vapors and used to estimate risk for the exposure depths and scenarios evaluated in the HHRA:

- Tables AOC10-4.2a and AOC10-4.2b for the two exposure depths in the baseline scenario;
- Tables AOC10-4.3a and AOC10-4.3b for the two exposure depths in the 2-foot scouring scenario; and
- Tables AOC10-4.4a and AOC10-4.4b for the two exposure depths in the 5-foot scouring scenario.

Area-weighted EPCs for COPCs in soil and estimated outdoor air concentrations associated with dust and vapors and used to estimate risk for the exposure depths and scenarios evaluated in the HHRA are summarized in Tables AOC10-4.5a and AOC10-4.5b for the two exposure depths in the 2-foot scouring scenario.

As described in detail in Section 5.3.3 of the 2019 HHERA(Arcadis 2019), surface and shallow soil exposure depths and corresponding EPC datasets for recreational users (child and/or adult camper, hiker, and OHV rider) were used to evaluate potential exposure to COPCs in soil for human receptors.

4.4 Estimation of Dose

The EC and chronic daily intake (CDI) for carcinogenic and noncarcinogenic effects were calculated, as described in Section 5.5.1 of the 2019 HHERA(Arcadis 2019), for COPCs in soil for complete exposure pathways. The calculated EC and CDI values using depth-weighted EPCs for the exposure scenarios evaluated in the HHRA are presented in following Attachment AOC10-B1 tables:

- Tables AOC10-B1.1a through AOC10-B1.1c (carcinogenic effects) and Tables AOC10-B1.2a through AOC10-B1.2c (noncarcinogenic effects) for the baseline scenario;
- Tables AOC10-B1.6a through AOC10-B1.6c (carcinogenic effects) and Tables AOC10-B1.7a through AOC10-B1.7c (noncarcinogenic effects) for the 2-foot scouring scenario; and
- Tables AOC10-B1.11a through AOC10-B1.11c (carcinogenic effects) and Tables AOC10-B1.12a through AOC10-B1.12c (noncarcinogenic effects) for the 5-foot scouring scenario.

The calculated EC and CDI values using area-weighted EPCs for the exposure scenarios evaluated in the HHRA are presented in Tables AOC10-B2.1a through AOC10-B2.1c (carcinogenic effects) and AOC10-B2.2a through AOC10-B2.2c (noncarcinogenic effects) for the 2-foot scouring scenario.

Exposure parameters used in the dose calculations were presented in Table 5-1 of the 2019 HHERA (Arcadis 2019) and are presented in Table 5-1 of the main report.

4.5 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure to a constituent and the potential for adverse health effects. More specifically, the toxicity assessment identifies agency-promulgated or derived toxicity values that can be used to estimate the likelihood of adverse health effects occurring in humans at different exposure levels. The approach for the toxicity assessment was provided in Section 4.5 of the RAWP (Arcadis 2008) and in Section 4.2 of the Final Human Health and Ecological Risk Assessment Work Plan Addendum 2 (Arcadis 2015). In a manner consistent with regulatory risk assessment policy, adverse health effects resulting from potential chemical exposures were evaluated in two categories: carcinogenic effects and noncarcinogenic effects. The hierarchy of sources for the toxicity criteria to be used for this Post-NTCRA HHERA has been updated from the 2019 HHERA (Arcadis 2019) and is compliant with the September 4, 2018, "Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals" rule (Title 22, California Code of Regulations, sections 68400.5, 69020-69022). Toxicity values for carcinogenic and noncarcinogenic effects for COPCs selected and used for the HHRA are described in Section 5.3 of the main report and were used to estimate potential cancer risks and noncancer hazards described in this Post-NTCRA HHERA.

4.6 Human Health Risk Characterization

For potential human receptors, assuming lifetime soil exposure is limited to the AOC 10 potential exposure area, the estimated incremental lifetime cancer risks (ILCRs) and/or noncancer HQs were calculated for each COPC and potentially complete exposure pathway. Estimated cumulative ILCRs (i.e., sum of chemical-specific ILCRs for each exposure depth for a scenario) were calculated and compared to the DTSC point of departure for a risk management decision of 1×10^{-6}. It should be noted that risk management decisions may increase this criterion depending on site-specific conditions. As indicated in the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations 300), cancer risks with between a one in a million and a one hundred in a million probability of occurrence (1×10^{-6} and 1×10^{-4}) fall within a risk management range is generally referred to as the acceptable risk range. Within this estimated cancer risk range, there is flexibility for risk managers in deciding what action, if any, is necessary and appropriate for the protection of human health. Fish and Wildlife's cancer risk threshold level is ten in a million (1×10^{-5}) for soil deeper than 2 feet below ground surface (February 12, 2021 Topock Soil EE/CA Response to Comment Consultation Meeting Agenda). Estimated cumulative noncancer hazards (i.e., HIs) are calculated and

compared to an HI of 1 (DTSC 2015). Chemical exposures that yield HIs of less than or equal to 1 are not expected to result in adverse noncancer health effects (USEPA 1989).

4.6.1 Risk Characterization for Exposure to Soil (Baseline Scenario and Depth-Weighted EPCs)

Table AOC10-4.6a summarizes cumulative ILCRs and HIs estimated for exposure to COPCs in post-NTCRA soil for each potential human receptor at the AOC 10 potential exposure area in the baseline scenario, calculated using depth-weighted EPCs. The dose, EC, ILCR, and HI equations are presented in detail in Section 5.5.1 of the 2019 HHERA (Arcadis 2019). The detailed cancer risk estimates (Tables AOC10-B1.3a through AOC10-B1.3c) and noncancer hazard calculations (Tables AOC10-B1.4a through AOC10-B1.4c) are presented in Attachment AOC10-B.

Risk and hazard estimates for the baseline scenario are summarized in Exhibit AOC 10-4.1 and discussed in this section. Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated cumulative HIs for recreational users (camper, hiker, and OHV rider) potentially exposed to COPCs in AOC 10 potential exposure area soil at surface and shallow depths are at or below the de minimis level of 1. The depth-weighted estimated cumulative ILCRs for the recreational users (camper, hiker, and OHV rider) exposed to COPCs in surface and shallow soils are above the point of departure for risk management decisions of 1×10^{-6}, but below 1 × 10-5, which is well within the risk management range of 1×10^{-6} and 1×10^{-4}, attributed to background concentrations of arsenic in soil. The cumulative ILCRs for the camper (surface and shallow soil), hiker (shallow soil) and OHV rider (surface and shallow soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for risk management decisions of 1×10^{-6}.

Exhibit AOC10-4.1 Baseline Depth-Weighted Estimated Cumulative Incremental Lifetime Cancer Risk and Hazard Index for the AOC10 Potential Exposure Area for Recreational Users

Potential Receptor	Exposure Depth	Cumulative ILCR	ILCR Drivers	HI	HI Drivers
Camper	Surface	2E-06	Arsenic (2E-06)	0.6	NA
Camper	Shallow	2E-06	Arsenic (2E-06)	0.7	NA
Hiker	Surface	5E-06	Arsenic (4E-06)	1	NA
Hiker	Shallow	4E-06	Arsenic (4E-06)	1	NA
OHV rider	Surface	3E-06	Arsenic (2E-06)	0.3	NA
OHV rider	Shallow	3E-06	Arsenic (2E-06)	0.3	NA

Notes:
1. ILCR and HI drivers are presented only for estimated cumulative ILCRs above 1×10^{-6} and estimated HIs above 1.
NA = not applicable

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated cumulative ILCRs for the camper, hiker, and OHV rider potentially exposed to COPCs in surface and shallow soil under the baseline scenario are above the point of departure for risk management decisions of 1×10^{-6}, but well within the risk management range of 1×10^{-6} and 1×10^{-4}. The depth-weighted estimated cumulative ILCRs are also below the Fish and Wildlife's cancer risk threshold level of 1×10^{-5} for soil deeper than 2 feet below ground surface (February 12, 2021 Topock Soil EE/CA Response to Comment Consultation Meeting Agenda). For these receptors, risk estimates above de minimis levels are primarily attributed to arsenic in soil via the soil ingestion pathway (Tables AOC10-B1.3a through AOC10-B1.3b in Attachment AOC10-B).

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated HIs for the camper, hiker, and OHV rider (Tables AOC10-B1.4a and AOC10-B1.4b in Attachment AOC10-B) potentially exposed to COPCs in surface and shallow soil under the baseline scenario are at or below an HI of 1.

Substantial proportions of both estimated risks and hazards above *de minimis* levels are attributable to background concentrations of arsenic in soil. Specifically, the majority of the ILCRs for arsenic for the camper (1.6×10^{-6} of 2×10^{-6} or approximately 80%), hiker (3.1×10^{-6} of 4×10^{-6} or approximately 78%), and OHV rider (1.7×10^{-6} of 2×10^{-6} or approximately 85%) is attributed to background concentrations of arsenic in soil. Furthermore, the majority of the HI for arsenic for the hiker (0.82 of 1 or approximately 82%) is attributed to background concentrations of arsenic in soil. The cumulative ILCRs for the camper (surface and shallow soil), hiker (shallow soil) and OHV rider (surface and shallow soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for risk management decisions of 1×10^{-6}. As presented in the 2019 HHERA (Arcadis 2019), estimated ILCRs for arsenic for the camper, hiker, and OHV rider using the area-weighted EPCs for arsenic in surface and shallow soils are the same using the depth-weighted EPCs. Therefore, an area-weighted EPC baseline scenario risk evaluation is not presented in this Post-NTCRA HHERA, as the risk conclusions for the camper, hiker, and OHV rider would not change using area-weighted EPCs for arsenic.

The depth-weighted EPCs for lead in surface and shallow soil at the AOC 10 potential exposure area under the baseline scenario are not expected to result in an increase in blood lead levels above the Office of Environmental Health Hazard Assessment (OEHHA) benchmark value of 1 microgram per deciliter (µg/dL) for child recreational users (Tables AOC10-B1.5a through AOC10-B1.5f in Attachment AOC10-B).

4.6.2 Risk Characterization for Exposure to Soil (2-Foot Scouring Scenario and Depth-Weighted EPCs)

In accordance with the RAWP (Arcadis 2008), and as a highly conservative approach to potential future conditions, scouring scenarios are being considered for this Post-NTCRA HHERA. This section presents estimated risks and hazards associated with potential soil contact for the AOC 10 potential exposure area assuming that the top 2 feet of soil have been removed due to natural scouring events. The evaluated soil exposure depths were still designated as surface and shallow, with the surface assumed to be 2 feet below current topography. EPCs for the 2-foot scouring scenario are provided in Table AOC10-3.2.

Table AOC10-4.6b summarizes the cumulative ILCRs and HIs estimated for exposure to soil for each potential human receptor at the AOC 10 potential exposure area in the 2-foot scouring scenario, calculated using depth-weighted EPCs. The dose, EC, ILCR, and HI equations are presented in detail in Section 5.5.1 of the 2019 HHERA (Arcadis 2019). The detailed cancer risk estimates (Tables AOC10-B1.8a through AOC10-

B1.8c) and noncancer hazard calculations (Tables AOC10-B1.9a through AOC10-B1.9c) are presented in Attachment AOC10-B1.

Risk and hazard estimates for the 2-foot scouring scenario are summarized in Exhibit AOC 10-4.2 and discussed in this section. Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated cumulative HIs for each recreational users potentially exposed to COPCs in AOC 10 potential exposure area soil at surface and shallow soil depths are below 1, except for the hiker for shallow soil. Assuming lifetime soil contact for the camper, hiker, and OHV rider is limited to the AOC 10 potential exposure area, cumulative ILCR estimates for potential contact with soil COPCs are above de minimis levels but below 1×10^{-5}, which is well within the acceptable risk management range. The cumulative ILCRs for the camper (surface and shallow soil) and OHV rider (surface soil), and the cumulative HI for the hiker (shallow soil) excluding contribution from background arsenic concentrations, would be at or below the point of departure for risk management decisions of 1×10^{-6} and 1, respectively.

Exhibit AOC10-4.2 2-Foot Scouring Depth-Weighted Estimated Cumulative Incremental Lifetime Cancer Risk and Hazard Index for the AOC10 Potential Exposure Area for Recreational Users

Potential Receptor	Exposure Depth	Cumulative ILCR	ILCR Drivers	HI	HI Drivers
Camper	Surface	2E-06	Arsenic (2E-06)	0.7	NA
Camper	Shallow	3E-06	Arsenic (2E-06) TEQ for humans (1E-06)	0.8	NA
Hiker	Surface	5E-06	Arsenic (3E-06) TEQ for humans (1E-06)	1	NA
Hiker	Shallow	6E-06	Arsenic (3E-06) TEQ for humans (2E-06)	2	Arsenic (0.9)
OHV rider	Surface	3E-06	Arsenic (2E-06)	0.3	NA
OHV rider	Shallow	4E-06	Arsenic (2E-06) TEQ for humans (1E-06)	0.3	NA

Note:
1. ILCR and HI drivers are presented only for estimated cumulative ILCRs above 1×10^{-6} and estimated HIs above 1.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated cumulative ILCRs for the camper, hiker, and OHV rider potentially exposed to COPCs in surface and shallow soil under the 2-foot scouring scenario are above the point of departure for risk management decisions of 1 × 10-6, but well within the risk management range of 1×10^{-6} and 1×10^{-4}. The depth-weighted estimated cumulative ILCRs are also below the Fish and Wildlife's cancer risk threshold level of 1×10^{-5} for soil deeper

than 2 feet below ground surface (February 12, 2021 Topock Soil EE/CA Response to Comment Consultation Meeting Agenda). For these receptors, risk estimates above de minimis levels are primarily attributed to arsenic and/or dioxin TEQ in soil via the soil ingestion pathway (Tables AOC10-B1.8a through AOC10-B1.8c in Attachment AOC10-B).

Substantial proportions of the estimated risks above de minimis levels are attributable to background levels of arsenic in soil. Specifically, the majority of the ILCRs for arsenic for the camper (1.6×10^{-6} of 2×10^{-6} or approximately 80%), hiker (3.1×10^{-6} of 3×10^{-6} or approximately 100%), and OHV rider (1.7×10^{-6} of 2×10^{-6} or approximately 85%) is attributed to background concentrations of arsenic in soil. The cumulative ILCRs for the camper (surface and shallow soil) and OHV rider (surface soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for risk management decisions of 1×10^{-6}.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated cumulative HIs for the camper, hiker, and OHV rider (Tables AOC10-B1.9a through AOC10-B1.9c in Attachment AOC10-B) potentially exposed to COPCs in surface and shallow soil under the 2-foot scouring scenario are at or below an HI of 1, except for the hiker for shallow soil. The majority of the HI for arsenic for the hiker (0.8 of 0.9 or approximately 88%) is attributed to background concentrations of arsenic in soil. The cumulative HI for the hiker (shallow soil) excluding contribution from background arsenic concentrations would be at the point of departure for a risk management decision of 1. The depth-weighted EPCs for lead in surface and shallow soil at the AOC 10 potential exposure area under the 2-foot scouring scenario are not expected to result in an increase in blood lead levels above the OEHHA benchmark value of 1 µg/dL for child recreational users (Tables AOC10-B1.10a through AOC10-B1.10f in Attachment AOC10-B).

4.6.3 Risk Characterization for Exposure to Soil (2-Foot Scouring Scenario and Area-Weighted EPCs)

Table AOC10-4.7 summarizes the cumulative ILCRs and HIs estimated for exposure to COPCs in post-NTCRA soil for each potential human receptor at the AOC 10 potential exposure area in the 2-foot scouring scenario, calculated using area-weighted EPCs for receptors where the depth-weighted estimated cumulative ILCRs or HIs were above 1×10^{-6} or 1, respectively. Therefore, area-weighted cumulative ILCRs and HIs were estimated for the camper, hiker, and OHV rider. The dose, EC, ILCR, and HI equations are presented in detail in Section 5.5.1 of the 2019 HHERA(Arcadis 2019). The detailed cancer risk estimates (Tables AOC 10-B2.8a through AOC10-B2.8c) and noncancer hazard calculations (Tables AOC10-B2.9a through AOC10-B2.9c) are presented in Attachment AOC10-B.

For the 2-foot scouring scenario, the area-weighted estimated cumulative ILCRs and HIs for each receptor selected for evaluation are summarized in Exhibit AOC 10-4.3 and discussed in this section. In general, the area-weighted approach resulted in a reduction in the risk or hazard estimate ranging from 1.2 to 1,5 times lower than the depth-weighted estimates.

Exhibit AOC10-4.3 2-Foot Scouring Area-Weighted Estimated Cumulative Incremental Lifetime Cancer Risk and Hazard Index for the AOC10 Potential Exposure Area for Recreational Users

Potential Receptor	Exposure Depth	Cumulative ILCR	ILCR Drivers	HI	HI Drivers
Camper	Surface	2E-06	Arsenic (2E-06)	0.7	NA

Potential Receptor	Exposure Depth	Cumulative ILCR	ILCR Drivers	HI	HI Drivers
Camper	Shallow	2E-06	Arsenic (2E-06)	0.7	NA
Hiker	Surface	5E-06	Arsenic (3E-06) TEQ for humans (1E-06) hexavalent chromium (3E-07)	1	NA
Hiker	Shallow	5E-06	Arsenic (3E-06) TEQ for humans (1E-06) hexavalent chromium (2E-07)	1	NA
OHV rider	Surface	3E-06	Arsenic (2E-06) TEQ for humans (6E-07) hexavalent chromium (6E-07)	0.3	NA
OHV rider	Shallow	3E-06	Arsenic (2E-06) TEQ for humans (6E-07) hexavalent chromium (4E-07)	0.3	NA

Note:
1. ILCR and HI drivers are presented only for estimated cumulative ILCRs above 1×10^{-6} and estimated HIs above 1.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the area-weighted estimated cumulative ILCRs for the camper, hiker, and OHV rider potentially exposed to COPCs in surface and shallow soil under the 2-foot scouring scenario are above the point of departure for risk management decisions of 1×10^{-6}, but below 1×10^{-5}, which is well within the risk management range of 1×10^{-6} and 1×10^{-4}. For these receptors, risk estimates above de minimis levels are primarily attributed to arsenic, hexavalent chromium, and/or dioxin TEQ in soil via the soil ingestion pathway. As previously noted, approximately 80%, 100%, and 85% of the ILCRs for the camper, hiker, and OHV rider, respectively, are attributed to background concentrations of arsenic in soil. The cumulative ILCRs for the camper (surface and shallow soil) and OHV rider (surface and shallow soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for a risk management decisions of 1×10^{-6}.

As demonstrated by comparing the ILCR values, the area-weighted estimated cumulative ILCRs for the camper, hiker, and OHV rider are approximately 1.2 to 1.5 times lower than the depth-weighted cumulative ILCRs for certain exposure depths. Considering the substantial contribution of background arsenic in soil to the estimated cumulative ILCRs for the camper, hiker, and OHV rider (Tables AOC10-B2.8a through AOC 10-B2.8c in Attachment AOC10-B) potentially exposed to COPCs in surface and shallow soil under the 2-foot scouring scenario, it is likely that incremental risks for site-related COPCs in soil, accounting for spatial bias in the EPCs, are well below 1×10^{-5} and within the lower end of the risk management range of 1×10^{-6} and 1×10^{-4}.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the area-weighted estimated cumulative HIs for the camper, hiker, and OHV rider potentially exposed to COPCs in surface and shallow soil at the AOC 10 potential exposure area under the 2-foot scouring scenario (Tables AOC10-B2.9a through AOC10-B2.9c in Attachment AOC10-B) are at or below 1. The area-weighted EPCs for lead in surface and shallow soil at the AOC 10 potential exposure area under the 2-foot scouring scenario are not expected to

result in an increase in blood lead levels above the OEHHA benchmark value of 1 µg/dL for child recreational users (Tables AOC10-B2.10a through AOC10-B2.10f in Attachment AOC10-B).

4.6.4 Risk Characterization for Exposure to Soil (5-Foot Scouring Scenario and Depth-Weighted EPCs)

In accordance with the RAWP (Arcadis 2008), and as a highly conservative approach to potential future conditions, scouring scenarios are being considered for this Post-NTCRA HHERA. This section presents estimated risks and hazards associated with potential soil contact for the AOC 10 potential exposure area assuming that the top 5 feet of soil have been removed due to natural scouring events. The evaluated soil exposure depths were designated as surface and shallow, with the surface assumed to be 5 feet below current topography. EPCs for the scouring scenario are provided in Table AOC10-3.3.

Table AOC10-4.6c summarizes the cumulative ILCRs and HIs estimated for exposure to COPCs in post-NTCRA soil for each potential human receptor at the AOC 10 potential exposure area in the 5-foot scouring scenario, calculated using depth-weighted EPCs. The dose, EC, ILCR, and HI equations are presented in detail in Section 5.5.1 of the 2019 HHERA (Arcadis 2019). The detailed cancer risk estimates (Tables AOC 10-B1.13a through AOC10-B1.13c) and noncancer hazard calculations (Tables AOC10-B1.14a through AOC 10-B1.14c) are presented in Attachment AOC10-B.

As summarized in Exhibit AOC 10-4.4 and discussed in this section, for the 5-foot scouring scenario, the depth-weighted estimated cumulative HIs for the camper, hiker, and OHV rider potentially exposed to COPCs in AOC 10 potential exposure area soil at surface and shallow depths at or below 1. Assuming lifetime soil contact for the camper, hiker, and OHV rider is limited to the AOC 10 potential exposure area, cumulative ILCR estimates for potential contact with soil COPCs are above de minimis levels but below 1×10^{-5}, which is well within the acceptable risk management range.

Exhibit AOC10-4.4 5-Foot Scouring Depth-Weighted Estimated Cumulative Incremental Lifetime Cancer Risk and Hazard Index for the AOC10 Potential Exposure Area for Recreational Users

Potential Receptor	Exposure Depth	Cumulative ILCR	ILCR Drivers	HI	HI Drivers
Camper	Surface	3E-06	Arsenic (2E-06) TEQ for humans (5E-07)	0.6	NA
Camper	Shallow	2E-06	Arsenic (2E-06)	0.6	NA
Hiker	Surface	5E-06	Arsenic (4E-06) TEQ for humans (1E-06)	1	NA
Hiker	Shallow	5E-06	Arsenic (4E-06) TEQ for humans (5E-07)	1	NA

Potential Receptor	Exposure Depth	Cumulative ILCR	ILCR Drivers	HI	HI Drivers
OHV rider	Surface	3E-06	Arsenic (2E-06) TEQ for humans (5E-07) hexavalent chromium (2E-07)	0.3	NA
OHV rider	Shallow	3E-06	Arsenic (2E-06) TEQ for humans (2E-07) hexavalent chromium (1E-07)	0.2	NA

Note:
1. ILCR and HI drivers are presented only for estimated cumulative ILCRs above 1×10^{-6} and estimated HIs above 1.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated cumulative ILCRs for the camper, hiker, and OHV rider potentially exposed to COPCs in surface and shallow soil under the 5-foot scouring scenario (Tables AOC10-B1.13a through AOC10-B1.13c, respectively, in Attachment AOC10-B) are above the point of departure for risk management decisions of 1×10^{-6}, but below 1×10^{-5}, which is well within the risk management range of 1×10^{-6} and 1×10^{-4}. For these receptors, risk estimates above de minimis levels are primarily attributed to arsenic, dioxin TEQ, and/or hexavalent chromium in soil via the soil ingestion pathway. As previously noted, approximately 80%, 78%, and 85% of the ILCRs for arsenic for the camper, hiker, and OHV rider, respectively, are attributed to background concentrations of arsenic in soil. Therefore, cumulative ILCRs under the 5-foot scouring scenario for the camper, hiker, and OHV rider potentially exposed to COPCs in AOC 10 potential exposure area soil attributed to incremental site-related concentrations of COPCs in soil above background concentrations are likely well below 1×10^{-5} and within the lower end of the risk management range of 1×10^{-6} and 1×10^{-4}. The cumulative ILCRs for the camper (surface and shallow soil) and OHV rider (surface and shallow soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for a risk management decision of 0.000001. As presented in the 2019 HHERA (Arcadis 2019), estimated ILCRs for arsenic for the camper, hiker, and OHV rider using the area-weighted EPCs for arsenic in surface and shallow soils are the same as those using the depth-weighted EPCs. Therefore, an area-weighted EPC 5-foot scouring scenario risk evaluation is not presented in this Post- NTCRA HHERA, as the risk conclusions for the camper, hiker, and OHV rider would not change using area-weighted EPCs for arsenic.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth-weighted estimated cumulative HIs for the camper, hiker, and OHV rider (Tables AOC10-B1.14a through AOC10-B1.14c in Attachment AOC10-B) potentially exposed to COPCs in surface and shallow soil under the 5-foot scouring scenario are at or below 1. The depth-weighted EPCs for lead in surface and shallow soil at the AOC 10 potential exposure area under the 5-foot scouring scenario are not expected to result in an increase in blood lead levels above the OEHHA benchmark value of 1 µg/dL for child recreational users (Tables AOC10-B1.15a through AOC10-B1.15f in Attachment AOC10-B).

4.6.5 Uncertainties in the Risk Assessment

This risk assessment includes several uncertainties that warrant discussion. Many of the assumptions used in this risk assessment regarding the representativeness of the sampling data, potential human exposures, fate and transport modeling, and chemical toxicity are conservative, follow agency guidance, and reflect a 90th or 95th percentile value rather than a typical or average value. The use of several conservative exposure assumptions and toxicity estimates can introduce considerable uncertainty into the risk assessment. By using

conservative exposure assumptions or toxicity estimates, the assessment can develop a significant conservative bias that may result in the calculation of significantly higher estimates for cancer risks or noncancer hazards than are actually posed by the chemicals present in soil. These uncertainties are discussed in detail in Section 5.6 of the 2019 HHERA (Arcadis 2019). Uncertainties applicable only to the risk assessment for the AOC 10 potential exposure area are discussed in this section.

Additional uncertainties for the AOC 10 potential exposure area include the use of the maximum depth-weighted soil concentration as the EPC. The maximum depth-weighted soil concentration was used for COPCs when the estimated UCL was greater than the maximum concentration or when the soil dataset contained fewer than four detected values (i.e., concentrations reported above the detection limit) or fewer than eight total observations as shown in Tables AOC10-3.1, AOC10-3.2, and AOC10-3.3 for the baseline, 2-foot scouring, and 5-foot scouring scenarios, respectively.

Dioxin TEQ was the only COPC for which the maximum depth-weighted concentration was used as the EPC due to the calculated UCL being greater than the maximum concentration. The maximum depth-weighted dioxin TEQ concentration was used in surface soil for the 5-foot scouring scenario. The use of the maximum depth-weighted concentration did not materially affect the results of the risk assessment for dioxin TEQ, which was determined to be a risk driver for scenarios and depth intervals where either the UCL or the maximum concentration was used.

For the AOC 10 potential exposure area in the baseline scenario, the maximum depth-weighted concentration was used as the EPC for the following COPCs:

- Surface soil: PAHs (1-methylnaphthalene, 2-methylnaphthalene, anthracene, and naphthalene) and TPH as diesel; and
- Shallow soil: metals (antimony, cadmium, and thallium), PAHs (1-methylnaphthalene, 2-methylnaphthalene, and naphthalene), and TPH as diesel.

For the AOC 10 potential exposure area in the 2-foot scouring scenario, the maximum depth-weighted concentration was used as the EPC for the following COPCs:

- Surface soil: metals (antimony, cadmium, and thallium), PAHs (1-methylnaphthalene, 2-methylnaphthalene, and anthracene), total PCBs, and TPH as diesel; and
- Shallow soil: metals (antimony, cadmium, and thallium), PAHs (1-methylnaphthalene, 2methylnaphthalene, and anthracene), and total PCBs.

For the AOC 10 potential exposure area in the 5-foot scouring scenario, the maximum depth-weighted concentration was used as the EPC for the following COPCs:

- Surface soil: PAHs (benzo(a)anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and phenanthrene), total PCBs, and TPH as diesel; and
- Shallow soil: PAHs (dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene), total PCBs, and TPH as diesel.

The use of the maximum depth-weighted soil concentration as the EPC for the COPCs listed in this section may not appropriately represent exposures and resulting risks/hazards. This approach to estimating EPCs does not materially impact the results of the HHRA because the AOC 10 potential exposure area COPCs with low detection frequency and/or fewer than eight observations are not risk drivers at the site.

- This baseline risk assessment assumes that contact with soil is not limited by the presence of engineering or institutional controls in the future. The potential health risks estimated for recreational users do not account for

potential vegetative covering, unsuitable topography (e.g. steep slopes) and backfill material cover placed during or after completion of NTCRA activities outside the TCS that would reduce exposure below that assumed in this analysis. In addition, as recommended by DOI (Arcadis 2015), it is assumed that each of the recreational activities could take place at any location on federal land. However, specific locations may be preferred for certain activities, while other locations may be less attractive or may have limited recreational options. AOC 10, also referred to as the East Ravine, is a small ravine located on the southeast side of the TCS, outside of the fence line (Figure AOC 10-1.1). The ravine is 1,600 feet long and runs eastward toward the Colorado River. Portions of the East Ravine are on PG&E property outside the facility fence line, and other portions of the ravine are located on property owned by the Havasu National Wildlife Refuge. The East Ravine is bisected by three berms (one constructed berm and two dirt roads). AOC 10 potential exposure area may have limited accessibility and may be less attractive or limited for certain recreational activities. As such, the estimated risks are likely overestimated.

5 ECOLOGICAL RISK ASSESSMENT

This section briefly summarizes the ERA approach evaluated in this Post-NTCRA HHERA presents the COPECs, EPCs, dose, and risk tables for the post-NTCRA AOC 10 ERA; and characterizes potential risk to ecological receptors exposed to COPECs in soil currently present at the AOC 10 potential exposure area. Details of the overall post-NTCRA ERA approach are presented in Section 6 of the main report. Supporting tables for the AOC 10 ERA based on risk calculations conducted using depth-weighted and area-weighted EPCs are presented in Attachment AOC10-C and described in this section.

Ecological risks were not calculated using maximum depth-weighted concentrations because they would be considered overly conservative and would generally be used for screening level purposes. Maximum concentrations were not used for making risk management decisions for the NTCRA at the AOC 10 potential exposure area and were not evaluated in the ERA.

5.1 Ecological Conceptual Site Model

In the 2019 HHERA (Arcadis 2019), risks were estimated for potentially complete and significant exposure pathways identified for a suite of potential ecological receptors exposed to COPECs in soil at the AOC 10 potential exposure area. These included plants, invertebrates, and small home-range receptors (Merriam's kangaroo rat, desert shrew, cactus wren, and Gambel's quail). Potential large home-range receptors (desert kit fox, red-tailed hawk, and Nelson's desert bighorn sheep) were evaluated for larger potential exposure areas (combined AOCs/investigation areas). These larger exposure areas included (1) all AOCs outside the TCS, and (2) the AOCs outside the TCS excluding Bat Cave Wash and AOC 4. Semi-quantitative and qualitative evaluations for special-status species were also conducted, as described in the 2019 HHERA.

The 2019 HHERA (Arcadis 2019) concluded that potential risk to ecological receptors, including special-status species, in AOC 10 and the larger exposure area relevant to large home-range receptors was limited to desert shrew potentially exposed to total chromium and dioxin TEQ in surface soil. Therefore, this Post-NTCRA HHERA presents risk estimates for desert shrew and total chromium and dioxin TEQ in surface soil that reflect current conditions in AOC 10 following soil remediation associated with the NTCRA. For transparency and consistency, risk estimates for hexavalent chromium and copper were also included to evaluate post-NTCRA conditions because these constituents were identified as a risk driver for some other site AOCs.

The exposure assumptions for desert shrew, which are consistent with the 2019 HHERA (Arcadis 2019), are as follows: desert shrew—representative of insectivorous small mammal populations—exposed only to surface soil (incidental and through biota uptake).

5.2 Constituents of Potential Ecological Concern

Consistent with the approach for the Post-NTCRA HHERA detailed in the January 30, 2024 Technical Memo (Arcadis 2024), updated risk estimates are only presented for risk-driving receptors and COPECs. For AOC 10, this includes desert shrew and total chromium and dioxin TEQ. Risk estimates for desert shrew are also provided for hexavalent chromium and copper to evaluate post-NTCRA conditions.

5.3 Exposure Point Concentration Summary

Soil EPCs were calculated as described in Section 4.2 of the main report and presented in Section 3 of this Post-NTCRA HHERA. For the AOC 10 potential exposure area, risks to the desert shrew were estimated using depth-weighted and area-weighted EPCs. Depth-weighted data used in the calculation of depth-weighted EPCs are presented in Attachment AOC10-A2. Area-weighted data used in the calculation of area-weighted EPCs are presented in Attachment AOC10-A3.

Biota tissue (i.e., terrestrial invertebrate) EPCs were calculated from the soil EPCs using soil-to-biota uptake relationships (i.e., bioaccumulation factors [BAFs]) for invertebrates, as described in Section 6.4.3 of the main report. As described in Section 6.4.2 of the main report, the surface soil (e.g., 0 to 0.5 foot bgs) depth interval was selected to represent exposure to soil and biota tissue for the risk calculations for desert shrew. For dioxin TEQ, the BAFs selected in the RAWP (Arcadis 2008) are based on uptake of a single congener: 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). Because of the uncertainty associated with use of a single congener-based BAF (e.g., differences in congener uptake due to differences in their structure and physico-chemical properties are ignored), dioxin TEQ uptake was also estimated using two congener-specific approaches: congener-specific BAFs for soil invertebrates from USEPA (1999) and congener-specific BAFs for soil invertebrates from Fagervold et al. (2010), as discussed in the Section 6.4.3.2 of the main report.

For the 2-foot scouring and 5-foot scouring scenarios, desert shrew exposures were estimated using the equivalent surface soils evaluated in those scenarios.

Depth-weighted soil EPCs and biota tissue EPCs calculated from depth-weighted soil EPCs are presented in Table AOC10-5.1 for the baseline scenario, 2-foot scouring, and 5-foot scouring scenarios. Table AOC10-5.2 presents the area-weighted soil EPCs and biota tissue EPCs calculated from area-weighted soil EPCs for the baseline, 2-foot scouring and 5-foot scouring scenarios. The alternate congener-specific BAFs and resulting biota tissue EPCs are presented in Table AOC10-5.3.

Risk calculations based on the depth-weighted UCLs and area-weighted UCLs for each COPEC are provided. As mentioned previously in this section, using the maximum depth-weighted concentrations results in overly conservative risks and is not considered for evaluation of post-NTCRA exposures.

5.4 Estimation of Exposure Dose

Potential exposures for wildlife (i.e., desert shrew) are quantified as doses (e.g., in units of mg/kg body weight per day). Exposure doses for COPECs in soil and potentially complete pathways were calculated using the equations as described in Section 6.4.3 of the main report. The exposure parameters selected to evaluate wildlife in this ERA include upper bound values from literature (e.g., ingestion rates) or were assumed (e.g., 100% of one type of diet), which may result in conservative estimates of exposure dose and potential overestimation of actual exposure at the site.

For desert shrew, doses were calculated using the exposure parameters and equations presented in Section 6.4.3 of the main report and depth-weighted soil and biota tissue EPCs for COPECs at the AOC 10 potential exposure area, as presented in Table AOC10-5.1. Area-weighted soil and biota tissue EPCs, as presented in Table AOC10-5.2, were used for the area-weighted risk evaluations. Alternate congener-specific BAFs and resulting biota tissue EPCs are presented in Table AOC10-5.3.

Dose calculations using depth-weighted EPCs for desert shrew potentially exposed to COPECs via ingestion of soil and biota tissue for the baseline, 2-foot scouring, and 5-foot scouring scenarios are presented in Attachment AOC10-C. Dose calculations using area-weighted EPCs for desert shrew potentially exposed to COPECs via ingestion of soil and biota tissue for the baseline scenario, 2-foot scouring, and 5-foot scouring scenarios are also presented in Attachment AOC10-C.

5.5 Effects Assessment

Dose-based toxicity reference values (TRVs) for wildlife for COPECs were used to estimate risks to desert shrew potentially exposed to COPECs in soil and biota tissue at the AOC 10 potential exposure area. A range of risks to desert shrew was estimated using the TRVs based on a no-observed adverse effects level (NOAEL) and based on a lowest-observed adverse effects level (LOAEL). For hexavalent chromium, total chromium, and copper, the NOAEL- and LOAEL-based TRVs used in this Post-NTCRA HHERA are the selected TRVs from the RAWP documents (Arcadis 2008, 2009, 2015).

For dioxin TEQ, the selected mammalian TRVs in the RAWP documents (Arcadis 2008, 2009, 2015) are from Toxicological Benchmarks for Wildlife from Oak Ridge National Laboratory (Sample et al. 1996). However, as described in Section 6.5 of the main report, an alternate set of mammalian TRVs were evaluated. Following the approach used by USEPA in developing TRVs for the ecological soil screening levels (USEPA 2008), alternate dioxin TEQ TRVs were developed for mammals based the geometric mean of the reproduction and growth endpoints for the NOAEL and LOAEL effect levels, respectively. These alternate TRVs for dioxin TEQ, presented in Section 6.5 of the main report, were used to estimate potential risk to desert shrew in this Post-NTCRA HHERA.

The LOAEL-based TRVs used in this Post-NTCRA HHERA are the same as the TRVs used to develop ecological risk-based remedial goals (RBRGs) in the 2019 HHERA (Arcadis 2019); RAGs selected based on RBRGs were then used to define the extent of NTCRA soil removals.

Although other additional sets of TRVs (i.e., Navy/Biological Technical Assistance Group [BTAG] TRVs [DTSC 2002, 2009]) were also evaluated in the 2019 HHERA (Arcadis 2019), BTAG TRVs are not available for hexavalent chromium, total chromium, or dioxin TEQ and they were ultimately not used for making remedial decisions. BTAG TRVs were not evaluated in this Post-NTCRA HHERA.

Wildlife TRVs used for RBRG development are presented in Table 6-4 of the main report.

5.6 Ecological Risk Characterization

The risk characterization integrates the results of the exposure assessment and effects assessment and is subject to uncertainties in both of those efforts. Risk characterization includes two major components: risk estimation and risk description. As presented in the tables and discussed in this section, risk estimates (HQs) involved the integration of exposure profiles with the exposure-effects information. For each potential receptor and COPEC, risk descriptions including various LOEs and uncertainties (including HQs), supporting statistical and site use information, and the direction of uncertainty in the risk estimates, are discussed in this section for interpreting the risk results and identifying potential unacceptable risk to ecological receptors. Uncertainties specific to the AOC 10 potential exposure area are discussed in context with the risk characterization results presented in this section. Generic uncertainties in the ERA are discussed in Section 6.7 of the main report.

The 2019 HHERA (Arcadis 2019) concluded that potential risk to ecological receptors, including special-status species, in AOC 10 and the larger exposure areas relevant to large home-range receptors was limited to desert shrew potentially exposed to total chromium and dioxin TEQ in surface soil. Therefore, this Post-NTCRA HHERA presents risk estimates for desert shrew and dioxin TEQ in surface soil that reflect current conditions in AOC 10 potential exposure area following soil remediation associated with the NTCRA. Risk estimates for hexavalent chromium and copper as well as risk estimates for all three scouring scenarios (baseline, 2-foot scouring, 5-foot scouring) are also included to evaluate post-NTCRA conditions.

For desert shrew, a range of HQs was calculated using NOAEL- and LOAEL-based TRVs in this Post-NTCRA HHERA (see Section 5.5). HQs based on LOAEL-based TRVs are referred to as "LOAEL-based HQs." HQs based on NOAEL-based TRVs are referred to as "NOAEL-based HQs." As noted above, the 2019 HHERA (Arcadis 2019) did not identify a potential for unacceptable risk to sensitive species, and therefore protection of individual invertivorous small mammals is not warranted. This Post- NTCRA HHERA presents NOAEL-based HQs for completeness; however, LOAEL-based HQs were used to evaluate population-level protection of invertivorous small mammals.

Risk conclusions for populations of desert shrew used the following criteria:

- COPECs with NOAEL-based HQs less than or equal to 1 pose de minimis risk to individuals and populations of wildlife receptors.
- COPECs with a NOAEL-based HQ greater than 1 but a LOAEL-based HQ less than or equal to 1 pose no unacceptable risk to wildlife populations. As described in the RAWP (Arcadis 2008), unacceptable risk to individuals is uncertain because the NOAEL-based TRVs are thresholds with an interval that is an artifact of the dosing study, and the nature and magnitude of the effects, if any, that may occur at exposures between these values are unknown. Because protection at the individual level is not warranted for desert shrew, COPECs with NOAEL-based HQs greater than 1 and LOAEL-based HQs less than 1 were not further evaluated approach using a weight-of-evidence (WOE) approach.
- COPECs with LOAEL-based HQs greater than 1 indicate unacceptable risk is possible for populations of wildlife receptors. However, these LOAEL-based HQs are based on individual-level effects thresholds and only account for a single LOE. In such cases, a WOE approach was used in reducing uncertainty for characterizing potential risk to wildlife populations at the AOC 10 potential exposure area.

Ultimately, three risk outcomes are possible for desert shrew based on the LOAEL-based HQs greater than 1 and WOE: (1) unacceptable risk to wildlife populations is possible (i.e., indicated by sufficient and strong supporting LOEs), (2) unacceptable risk to wildlife populations is unlikely (i.e., indicated by sufficient and strong LOEs supporting a conclusion of no unacceptable risk), or (3) unacceptable risk to wildlife populations is uncertain (i.e., indicated by insufficient LOEs). The results of individual LOE evaluations were evaluated collectively to derive an overall WOE conclusion. Key uncertainties were considered along with the strength, relevance, and other qualities of the LOEs in reaching the WOE conclusions. In this post-NTCRA ERA, the additional LOEs were evaluated and discussed when LOAEL-based HQs greater than 1 were estimated.

For the AOC 10 potential exposure area, evaluations were completed for the following scenarios:

- Baseline scenario using depth-weighted EPCs;
- Baseline scenario using area-weighted EPCs;

- 2-foot scouring scenario using depth-weighted EPCs;
- 2-foot scouring scenario using area-weighted EPCs;
- 5-foot scouring scenario using depth-weighted EPCs; and
- 5-foot scouring scenario using area-weighted EPCs.

In these evaluations, risk calculations were completed for hexavalent chromium, total chromium, copper, and dioxin TEQ, as presented in Table AOC10-5.4 using depth-weighted EPCs, in Table AOC10-5.5 using area-weighted EPCs, and in Table AOC10-5.6 using depth-weighted EPCs and refined BAFs for dioxin TEQ. Risk results were discussed in the evaluations using area-weighted EPCs only if the depth-weighted EPC evaluation indicated potential for unacceptable risk to desert shrew populations. For example, COPECs with LOAEL-based HQs greater than 1 based on the depth-weighted EPCs were discussed in the area-weighted EPC evaluations. If any COPECs were identified with LOAEL-based HQs greater than 1 in the area-weighted EPC evaluations that had HQs less than 1 in the depth-weighted evaluations, these results were also discussed in the area-weighted EPC evaluation.

At the conclusion of each scenario (baseline, 2-foot scouring, and 5-foot scouring) evaluation, risk conclusions were based on whether COPECs remain for which unacceptable population-level risk was predicted using LOAEL-based HQs calculated from the most refined exposure and effects assumptions and LOE supporting the conclusion of unacceptable risk.

5.6.1 Desert Shrew Risk Characterization Using Depth-Weighted EPCs

Desert shrew is an invertivorous small mammal that could potentially be exposed to COPECs in surface soil (0 to 0.5 foot bgs) directly and through its diet. Risk estimates for desert shrew for the baseline, 2-foot scouring, and 5-foot scouring scenarios using depth-weighted EPCs, and site use factor (SUF) of 1, and TRVs used for RBRG development are summarized in this section and presented in Table AOC10-5.4.

Site-specific SUFs were not evaluated for desert shrew. Based on the AOC10 potential exposure area and home ranges for desert shrew, the site-specific SUF was estimated as 1 (i.e., home range is less than or equal to the size of the potential exposure area). Therefore, the risk results would be the same as when calculated using a generic SUF of 1.

Detailed dose and risk calculations are presented in Attachment AOC10-C. COPECs evaluated in this scenario include total chromium and dioxin TEQ in soil. Hexavalent chromium and copper were also evaluated to determine potential risks associated with post-NTCRA conditions.

5.6.1.1 Baseline Scenario

In the baseline scenario for desert shrew, only the NOAEL-based HQ for dioxin TEQ is greater than 1. The LOAEL-based HQ is less than 1, indicating no unacceptable risk to populations of desert shrew.

For hexavalent chromium, total chromium, and copper in the baseline scenario, the NOAEL- and LOAEL-based HQs are less than 1, indicating de minimis risk to individuals and populations of invertivorous small mammals.

5.6.1.2 2-Foot Scouring Scenario

In the 2-foot scouring scenario for desert shrew, LOAEL-based HQs are greater than 1 only for dioxin TEQ; potential risk for constituents evaluated in this ERA is characterized as follows.

- For dioxin TEQ, the NOAEL- and LOAEL-based HQs are greater than 1. As described in Section 6.7.4 of the main report, the uptake factors selected for dioxins at this site likely overestimate exposure and risk for this COPEC. Conservative assumptions were used to estimate the HQs, including use of BAFs based on uptake of a single congener (2,3,7,8-TCDD) to earthworms, and a diet assumed to consist entirely of earthworms. which is unlikely given the desert habitat present at the site. As discussed in Section 6.5 of the main report, the alternate LOAEL-based TRV is based on the geometric mean of reproduction and growth LOAELs for rodents and is considered a robust estimate of toxicity to small mammals. Dioxin TEQ was detected at 13 of 15 locations in surface soil (2 to 3 feet bgs for the 2-foot scouring scenario), with nine of these locations having depth-weighted concentrations above background (BTV was 5.58 nanograms per kilogram [ng/kg]). Three locations (AOC10-11, AOC10b-1, and AOC10TAA4-CW13) have depth-weighted dioxin TEQ concentrations greater than 10 times the BTV (ranging from 150 to 210 ng/kg). These three locations are present in different areas of the AOC 10 potential exposure area (Figure AOC10-1.2). AOC10TAA4-CW13 is located in TAA4 (eastern section of AOC10d) under the mesquite grove that was preserved based on consultation with the Tribes. AOC10-11 is located east of AOC10b in the upstream step-out excavation area west of TAA2. AOC10b-1 is located further up the ravine in the upstream step-out excavation area west of AOC10b. Dioxin TEQ concentrations in the remaining surface soil samples range from 0.2 to 19 ng/kg, and the dioxin TEQ EPC for AOC10 is 125.7 ng/kg, which is below the RBRG of 190 mg/kg. Based on the dispersed nature of these dioxin TEQ locations, it is likely that desert shrew would primarily be exposed to lower soil concentrations in their habitat and only a few individuals could be substantially exposed to elevated concentrations. Additionally, based on the depth of these samples, potential for shrew exposure is hypothetical and may occur only if overlying soil is removed at these locations. Although the LOAEL HQ exceeds 1, additional LOEs include low HQs, conservative dietary and uptake assumptions, the hypothetical nature of exposures to soil at depth, and spatially dispersed nature of the highest remaining dioxin TEQ concentrations. Based on the LOAEL-based HQ and additional LOEs, unacceptable risk to populations of desert shrew is considered unlikely based on the assumptions in this scenario.

- For hexavalent chromium, total chromium, and copper at the AOC 10 potential exposure area, the NOAEL- and LOAEL-based HQs are less than 1, indicating de minimis risk to individuals and populations of invertivorous small mammals.

Based on the risk estimates and potential uncertainties associated with the 2-foot scouring scenario risk to invertivorous small mammals from exposure to dioxin TEQ, area-weighted EPCs were also evaluated as discussed in Section 5.6.2.

5.6.1.3 5-Foot Scouring Scenario

In the 5-foot scouring scenario for desert shrew, LOAEL-based HQs are greater than 1 only for dioxin TEQ; potential risk for constituents evaluated in this ERA is characterized as follows.

- For dioxin TEQ, the NOAEL- and LOAEL-based HQs for dioxin TEQ are greater than 1. As described above in the 2-foot scouring scenario, the uptake factors selected for dioxins at the site likely overestimate exposure and risk for this COPEC. As a result, the HQs are considered to be overestimated. As described in Section 6.5 of the main report, the alternate dioxin TEQ TRV is considered to provide a robust estimate of toxicity to small mammals. Dioxin TEQ is detected at all of the five locations in surface soil (5 to 6 feet bgs in the 5-foot scouring scenario), with only one of these locations (100 ng/kg at AOC10-26) having a depth-weighted concentration above background (BTV was 5.58 ng/kg). Due to the limited number of samples in place for this scenario, the maximum depth-weighted concentration was used as the EPC, which likely overestimates exposure. Using the mean depth-weighted concentration for the surface soil dataset (21.35 ng/kg) results in a LOAEL-based HQ less than 1 and a low NOAEL-based HQ. Based on the depth of this sample and exposures evaluated in the 5-foot scouring scenario, potential for shrew exposure is hypothetical and may occur only if overlying soil is removed at this location. As noted in Section 1.1, scouring in AOC 10 has not been observed; instead, the subareas and TAAs are depositional, and shrew exposure to soils evaluated in this scenario is unlikely. Although the LOAEL-based HQ is greater than 1, additional LOEs include EPCs based on the maximum depth-weighted concentration, conservative dietary and uptake assumptions, infrequent detections at elevated concentrations relative to background, and the hypothetical nature of exposure to the highest remaining dioxin TEQ concentrations. Based on the LOAEL-based HQ and additional LOEs, unacceptable risk to populations of shrew is considered unlikely in this scenario.

For hexavalent chromium, total chromium, and copper at the AOC 10 potential exposure area, the NOAEL- and LOAEL-based HQs are less than 1, indicating de minimis risk to individuals and populations of invertivorous small mammals.

Based on the risk estimates and potential uncertainties associated with the 5-foot scouring scenario risk to invertivorous small mammals from exposure to dioxin TEQ, area-weighted EPCs were also evaluated as discussed in Section 5.6.2.

5.6.2 Desert Shrew Risk Characterization Using Area-Weighted EPCs

Based on the risk characterization using depth-weighted EPCs (Section 5.6.1), risks to the desert shrew were characterized from dioxin TEQ using area-weighted EPCs for the 2-foot scouring and 5-foot scouring scenarios. No unacceptable risk to desert shrew populations was indicated for dioxin TEQ in the baseline scenario, total chromium, hexavalent chromium, and copper; however, for completeness, HQs are presented for these COPECs using area-weighted EPCs.

Potential risks to desert shrew from COPECs listed in this section and characterized for the baseline, 2-foot scouring, and 5-foot scouring scenarios using area-weighted EPCs, a SUF of 1, selected BAFs, and the TRVs used for RBRG development are presented in Table AOC10-5.5.

Detailed dose and risk calculations for desert shrew are presented in Attachment AOC10-C.

5.6.2.1 Baseline Scenario

In the baseline scenario using area-weighted EPCs, the magnitudes of the HQs were reduced from the analysis using depth-weighted EPCs. Both the NOAEL-based HQ and LOAEL-based HQs are less than or equal to 1 for dioxin TEQ, indicating de minimis risk to individuals and populations of invertivorous small mammals at the AOC 10 potential exposure area.

Similar to the evaluation using depth-weighted EPCs, for hexavalent chromium, total chromium, and copper, the NOAEL- and LOAEL-based HQs using area-weighted EPCs are also less than 1 indicating de minimis risk to individuals and populations of invertivorous small mammals from exposure to these constituents at the AOC10 potential exposure area.

5.6.2.2 2-Foot Scouring Scenario

In the 2-foot scouring scenario using area-weighted EPCs, the magnitude of the LOAEL-based HQ for dioxin TEQ was reduced from that of the depth-weighted EPC analysis but is still greater than 1 using an area-weighted EPC. However, the uncertainties and additional LOEs, as discussed above in Section 5.6.1.2, also apply in this scenario and support the conclusion that unacceptable risk to desert shrew populations in this scenario is unlikely.

Similar to the evaluation using depth-weighted EPCs, for hexavalent chromium, total chromium, and copper, the NOAEL- and LOAEL-based HQs using area-weighted EPCs are also less than 1 indicating de minimis risk to individuals and populations of invertivorous small mammals from exposure to these constituents at the AOC10 potential exposure area.

5.6.2.3 5-Foot Scouring Scenario

In the 5-foot scouring scenario using area-weighted EPCs, the magnitude of the LOAEL-based HQ for dioxin TEQ using area-weighted EPC is the same as that of the depth-weighted EPC analysis (i.e., based on the maximum detection due to the small dataset) and the HQ exceeds 1. The uncertainties and additional LOEs, as discussed above in Section 5.6.1.3, also apply in this scenario and indicate that unacceptable risk to desert shrew populations in this scenario is unlikely.

Similar to the evaluation using depth-weighted EPCs, for hexavalent chromium, total chromium, and copper, the NOAEL- and LOAEL-based HQs using area-weighted EPCs are also less than 1 indicating de minimis risk to individuals and populations of invertivorous small mammals from exposure to these constituents at the AOC10 potential exposure area.

5.6.3 Desert Shrew Characterization Using Congener-Specific Bioaccumulation Factors for Dioxin TEQ

Based on the risk characterization using area-weighted EPCs (Section 5.6.2), risks were characterized for dioxin TEQ using alternate BAFs (i.e., BAFs used for RBRG development in the 2019 HHERA[Arcadis 2019]). Consistent with the 2019 HHERA, depth-weighted EPCs were used in this evaluation. Risk estimates

for total chromium, hexavalent chromium, and copper are de minimis (Section 5.6.2), and risk estimates for these constituents were not refined further in this section.

As discussed in Section 6.4.3.2 of the main report and summarized above in Section 5.3, the BAFs used for RBRG development in the 2019 HHERA (Arcadis 2019) are based on congener-specific uptake from soil to biota, rather than on the assumption that all dioxin congener uptake is equivalent to the soil-to-biota uptake of 2,3,7,8-TCDD. Two sets of congener-specific uptake factors were evaluated: congener-specific uptake factors available from USEPA (1999) as well as congener-specific uptake factors from Fagervold et al. (2010). These are described in Section 6.4.3.2 of the main report. The congener-specific uptake factors and estimated biota tissue EPCs for dioxin TEQ in AOC 10 in this post-NTCRA ERA are presented in Table AOC10-5.3.

Potential risks to desert shrew for dioxin TEQ characterized for the baseline, 2-foot scouring, and 5-foot scouring scenarios using depth-weighted EPCs, a SUF of 1, congener-specific BAFs, and the alternate TRVs used for RBRG development are presented in Table AOC10-5.6. Using congener-specific BAFs from USEPA (1999) and Fagervold et al. (2010), the LOAEL-based HQs are less than 1 for all scenarios. These risk estimates are described below.

- For the baseline and 5-foot scouring scenarios, all NOAEL- and LOAEL-based HQs are less than 1 indicating de minimis risk to individuals and populations of invertivorous small mammals from potential exposure at the AOC 10 potential exposure area. It should be noted that both sets of congener-specific BAFs (i.e., USEPA 1999 and Fagervold et al. 2010) result in the same conclusion of de minimis risk.
- For the 2-foot scouring scenario, LOAEL-based HQs are less than 1 when calculated using Fagervold et al. (2010) and USEPA (1999) congener-specific BAFs, indicating that no unacceptable risk is expected for desert shrew populations.

Detailed dose and risk calculations for desert shrew are presented in Attachment AOC10-C.

5.6.4 Risk Conclusions for Desert Shrew

The 2019 HHERA (Arcadis 2019) concluded that potential risk to ecological receptors, including special-status species, in AOC 10 and the larger potential exposure areas relevant to large home-range receptors was limited to desert shrew potentially exposed to total chromium and dioxin TEQ in surface soil. This Post-NTCRA HHERA presents risk estimates for desert shrew and total chromium and dioxin TEQ in surface soil that reflect current conditions in the AOC 10 potential exposure area following soil remediation associated with the NTCRA. Risk estimates for hexavalent chromium and copper (identified as potential risk drivers at other investigations areas at the site in the 2019 HHERA) as well as risk estimates for all three scouring scenarios (baseline, 2-foot scouring, and 5-foot scouring) are also included to evaluate post-NTCRA conditions. Risk conclusions are presented in the following list.

- For dioxin TEQ, risk conclusions are based on LOAEL-based HQs estimated in the most refined exposure scenario (Section 5.6.3) using assumptions used for RBRG development (i.e., a SUF of 1, congener-specific BAFs, and alternate TRVs) and depth-weighted EPCs. Using these assumptions, the LOAEL-based HQs are less than 1 for the baseline, 2-foot scouring, and 5-foot scouring scenarios using both sets of congener-specific BAFs (i.e., Fagervold et al. 2010 and USEPA 1999). These HQs

indicate that no unacceptable risk is expected for populations of invertivorous small mammals. Risk is de minimis in the baseline and 5-foot scouring scenarios.

- For hexavalent chromium, total chromium, and copper, risk conclusions are based on HQs estimated in the most refined scenario (Section 5.6.2) using the assumptions used for RBRG development (i.e., a SUF of 1, selected BAFs, and selected TRVs) and area-weighted EPCs. The NOAEL- and LOAEL-based HQs are less than 1 for the baseline, 2-foot scouring, and 5-foot scouring scenarios indicating de minimis risk to individuals and populations of invertivorous small mammals at the AOC 10 potential exposure area. The HQs calculated using depth-weighted EPCs and resulting risk conclusions are the same.

In conclusion, no unacceptable risk to wildlife receptor populations is identified at the AOC 10 potential exposure area. For desert shrew, the conclusions are based on post-NTCRA conditions as evaluated in this Post- NTCRA HHERA and summarized previously. For the remaining ecological receptors, the conclusions are based on pre-NTCRA conditions as evaluated in the 2019 HHERA (Arcadis 2019).

6 SUMMARY AND CONCLUSIONS FOR THE HHERA

Potential cumulative cancer risks and noncancer hazards for human receptors were estimated in this Post-NTCRA HHERA, as presented in Section 4. For ecological receptors, potential risks were estimated for desert shrew, as presented in Section 5. Uncertainties related to the HHRA and ERAs at the site in general were discussed in detail in Sections 5.6 and 6.7 of the 2019 HHERA (Arcadis 2019) and are summarized in Sections 5.5 and 6.7 of the main report. Uncertainties specific to the evaluation of post-NTCRA conditions in the AOC 10 potential exposure area are discussed in this appendix. The approach for the Post-NTCRA HHERA is detailed in the January 30, 2024 Technical Memo (Arcadis 2024) to DOI and DTSC, which specified that updated risk characterization would be presented only for risk-driving receptors.

Although scouring has not been observed in AOC 10, three scenarios were evaluated: (1) baseline, (2) 2-foot scouring, and (3) 5-foot scouring, consistent with the scenarios evaluated in the 2019 HHERA (Arcadis 2019). For each evaluation, risks were estimated for various potential receptors using depth-weighted EPCs and, in some cases, area-weighted EPCs. For desert shrew, additional refinements to the soil-to-invertebrate uptake factors were also evaluated in a manner consistent with the approach used for RBRG development in the 2019 HHERA (Arcadis 2019).

At the AOC 10 potential exposure area, the COPCs evaluated for this Post-NTCRA HHERA included metals (antimony, arsenic, hexavalent chromium, total chromium, copper, lead, manganese, mercury, thallium, and zinc), inorganic compounds (cyanide), HMW and LMW PAHs, PAHs, PCBs, TPH as diesel, TPH as motor oil, and dioxins and furans. COPECs evaluated for this Post-NTCRA HHERA include only total chromium and dioxin TEQ based on unacceptable risk estimated for desert shrew in the 2019 HHERA (Arcadis 2019). However, risk estimates for hexavalent chromium and copper were also estimated to reflect current conditions in AOC 10 following soil remediation associated with the NTCRA. A summary of these results and conclusions regarding potential risk associated with exposure to these COPCs/COPECs in soil at the AOC 10 potential exposure area based on the risk/hazard estimates and uncertainties inherent in the risk assessment process are presented in this section.

6.1 Summary and Conclusions for the HHRA

The cumulative ILCRs and HIs associated with potential exposure to COPCs in post-NTCRA soil at the AOC 10 potential exposure area using depth- and area-weighted EPCs under baseline (non-scouring), 2-foot scouring, and 5-foot scouring scenarios were estimated. Assuming lifetime soil contact is limited to the AOC 10 potential exposure area for the camper, hiker, and OVH rider evaluated, the estimated potential ILCR and HI results under the baseline, 2-foot scouring, and 5-foot scouring scenarios are summarized in this section and in Exhibits AOC 10-6.1 through AOC 10-6.3.

BASELINE SCENARIO

Exhibit AOC 10-6.1 provides the results from the baseline scenario.

Exhibit AOC 10-6.1 Baseline Scenario Estimated Cumulative Incremental Lifetime Cancer Risk and Hazard Index for the AOC 10 Potential Exposure Area

Potential Receptor	Exposure Depth	Cumulative ILCR Depth-Weighted	Cumulative ILCR Area-Weighted	HI—Depth-Weighted	HI—Area-Weighted
Camper	Surface	2×10^{-6} (Arsenic)	Not calculated	Less than or equal to 1	Not calculated
Camper	Shallow	2×10^{-6} (Arsenic)	Not calculated	Less than or equal to 1	Not calculated
Hiker	Surface	5×10^{-6} (Arsenic)	Not calculated	Less than or equal to 1	Not calculated
Hiker	Shallow	4×10^{-6} (Arsenic)	Not calculated	Less than or equal to 1	Not calculated
OHV rider	Surface	3×10^{-6} (Arsenic)	Not calculated	Less than or equal to 1	Not calculated
OHV rider	Shallow	3×10^{-6} (Arsenic)	Not calculated	Less than or equal to 1	Not calculated

Note:
not calculated = area-weighted estimate not calculated because although the depth-weighted estimate for the receptor was above de minimis levels, a substantial portion of estimate is attributed to background arsenic concentrations in soil

Depth-weighted potential exposures that are below or at de minimis levels include the following:

- **HI less than or equal to 1 for all soil depths**—camper, hiker, and OHV rider; and
- **ILCR less than or equal to 1×10^{-6}**—none.

Potential exposures above de minimis levels of HI greater than 1 and/or within the risk management range of 1×10^{-6} and 1×10^{-4} include the following:

- **ILCR greater than 1×10^{-6} and less than or equal to 5×10^{-6}**—camper (surface and shallow), hiker (surface and shallow), and OHV rider (surface and shallow);
- **ILCR greater than 5×10^{-6} and less than or equal to 1×10^{-5}**—none; and
- **ILCR greater than 1×10^{-5} and less than or equal to 1×10^{-4}**—none.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area for the baseline scenario, the depth-weighted estimated risks and hazards above de minimis levels for the camper, hiker, and OHV rider are due to contribution from background arsenic concentration in soil. The cumulative ILCRs for the camper (surface and shallow soil), hiker (shallow soil) and OHV rider (surface and shallow soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for risk management decisions of 1×10^{-6}. As presented in the 2019 HHERA (Arcadis 2019), estimated ILCRs for arsenic for the camper, hiker, and OHV rider using the area-weighted EPCs for arsenic in surface and shallow soils are the same using the depth-weighted EPCs. Therefore, an area-weighted EPC baseline scenario risk evaluation is not presented in this Post-NTCRA HHERA, as the risk conclusions for the camper, hiker, and OHV rider would not be changed using area-weighted EPCs for arsenic.

2-FOOT SCOURING SCENARIO

During the HHRA, two potential scouring scenarios due to heavy storm runoff were evaluated for the AOC 10 potential exposure area—2-foot scouring and 5-foot scouring. Exhibit AOC 10-6.2 provides the results from the 2-foot scouring scenario.

Exhibit AOC 10-6.2 2-Foot Scouring Scenario Estimated Cumulative Incremental Lifetime Cancer Risk and Hazard Index for the AOC 10 Potential Exposure Area

Potential Receptor	Exposure Depth	Cumulative ILCR Depth-Weighted	Cumulative ILCR Area-Weighted	HI—Depth-Weighted	HI—Area-Weighted
Camper	Surface	2×10^{-6} (Arsenic)	2×10^{-6} (Arsenic)	Less than or equal to 1	Less than or equal to 1
Camper	Shallow	3×10^{-6} (Arsenic and dioxin TEQ)	2×10^{-6} (Arsenic)	Less than or equal to 1	Less than or equal to 1
Hiker	Surface	5×10^{-6} (Arsenic and dioxin TEQ)	5×10^{-6} (Arsenic, dioxin TEQ, and hexavalent chromium)	Less than or equal to 1	Less than or equal to 1
Hiker	Shallow	6×10^{-6} (Arsenic and dioxin TEQ)	5×10^{-6} (Arsenic, dioxin TEQ, and hexavalent chromium)	2 (Arsenic)	Less than or equal to 1
OHV rider	Surface	3×10^{-6} (Arsenic)	3×10^{-6} (Arsenic, dioxin TEQ, and hexavalent chromium)	Less than or equal to 1	Less than or equal to 1
OHV rider	Shallow	4×10^{-6} (Arsenic and dioxin TEQ)	3×10^{-6} (Arsenic, dioxin TEQ, and hexavalent chromium)	Less than or equal to 1	Less than or equal to 1

Depth-Weighted 2-Foot Scouring Scenario

Potential exposures that are below or at de minimis levels include the following:

- **HI less than or equal to 1—**camper (surface and shallow), hiker (surface), and OHV rider (surface and shallow); and
- **ILCR less than or equal to 1×10^{-6}**—none.

Potential exposures that are above de minimis levels of HI greater than 1 and/or within the risk management range of 1×10^{-6} and 1×10^{-4} include the following:

- **HI greater than 1 and less than or equal to 3**—hiker (shallow);
- **ILCR greater than 1×10^{-6} and less than or equal to 5×10^{-6}**—camper (surface and shallow), hiker (surface), and OHV rider (surface and shallow);

- **ILCR greater than 5 x 10^{-6} and less than or equal to 1 x 10^{-5}** – hiker (shallow); and
- **ILCR greater than 1 × 10^{-5} and less than or equal to 1 × 10^{-4}**—none.

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area for the 2-foot scouring scenario, the depth-weighted estimated risks and hazards above de minimis levels for the camper, hiker, and OHV rider are due to arsenic and dioxin TEQ. Therefore, potential risks and hazards for these receptors were evaluated using area-weighted EPCs and are provided in this section.

Area-Weighted 2-Foot Scouring Scenario

Potential exposures that are below or at de minimis levels include the following:

- **HI less than or equal to 1 for all soil depths**—camper, hiker, and OHV rider; and
- **ILCR less than or equal to 1 × 10^{-6} for all soil depths**—none.

Potential exposures that are above de minimis levels of HI greater than 1 and/or within the risk management range of 1 × 10^{-6} and 1 × 10^{-4} include the following:

- **ILCR greater than 1 × 10^{-6} and less than or equal to 5 × 10^{-6}**—camper (surface and shallow), hiker (surface and shallow), and OHV rider (surface and shallow);
- **ILCR greater than 5 x 10^{-6} and less than or equal to 1 x 10^{-5}** —none; and
- **ILCR greater than 1 × 10^{-5} and less than or equal to 1 × 10^{-4}**—none.

5-FOOT SCOURING SCENARIO

Exhibit AOC 10-6.3 provides the results for the 5-foot scouring scenario.

Exhibit AOC 10-6.3 5-Foot Scouring Scenario Estimated Cumulative Incremental Lifetime Cancer Risk and Hazard Index for the AOC 10 Potential Exposure Area

Potential Receptor	Exposure Depth	Cumulative ILCR Depth-Weighted	Cumulative ILCR Area-Weighted	HI—Depth-Weighted	HI—Area-Weighted
Camper	Surface	3 x 10^{-6} (Arsenic and dioxin TEQ)	Not calculated	Less than or equal to 1	Not calculated
Camper	Shallow	2 x 10^{-6} (Arsenic)	Not calculated	Less than or equal to 1	Not calculated
Hiker	Surface	5 x 10^{-6} (Arsenic and dioxin TEQ)	Not calculated	Less than or equal to 1	Not calculated
Hiker	Shallow	5 x 10^{-6} (Arsenic and dioxin TEQ)	Not calculated	Less than or equal to 1	Not calculated
OHV rider	Surface	3 x 10^{-6} (Arsenic, dioxin TEQ, and hexavalent chromium)	Not calculated	Less than or equal to 1	Not calculated

Potential Receptor	Exposure Depth	Cumulative ILCR Depth-Weighted	Cumulative ILCR Area-Weighted	HI—Depth-Weighted	HI—Area-Weighted
OHV rider	Shallow	3×10^{-6} (Arsenic, dioxin TEQ, and hexavalent chromium)	Not calculated	Less than or equal to 1	Not calculated

Note:
not calculated = area-weighted estimate not calculated because, although the depth-weighted estimate for the receptor was above de minimis levels, a substantial portion of estimate is attributed to background arsenic concentrations in soil

Depth-weighted potential exposures that are below or at de minimis levels include the following:

- **HI less than or equal to 1 for all soil depths**—camper, hiker, and OHV rider; and
- **ILCR less than or equal to 1×10^{-6}**—none.

Potential exposures that are above de minimis levels of HI greater than 1 and/or within the risk management range of 1×10^{-6} and 1×10^{-4} include the following:

- **ILCR greater than 1×10^{-6} and less than or equal to 5×10^{-6}**—camper (surface and shallow), hiker (surface and shallow), and OHV rider (surface and shallow);
- **ILCR greater than 5×10^{-6} and less than or equal to 1×10^{-5}**—none; and
- **ILCR greater than 1×10^{-5} and less than or equal to 1×10^{-4}**—none.

Under the 5-foot scouring scenario, the depth-weighted estimated risks and hazards above de minimis levels for the camper, hiker, and OHV rider are due to arsenic, hexavalent chromium, and/or dioxin TEQ. The cumulative ILCRs for the camper (surface and shallow soil) and OHV rider (surface and shallow soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for risk management decisions of 1×10^{-6}. As presented in the 2019 HHERA (Arcadis 2019), estimated ILCRs for arsenic for the camper, hiker, and OHV rider using the area-weighted EPCs for arsenic in surface and shallow soils are the same as those using the depth-weighted EPCs. Therefore, an area-weighted EPC risk evaluation for the 5-foot scouring scenario is not presented in this Post-NTCRA HHERA because the risk conclusions for the camper, hiker, and OHV rider would not be changed using area-weighted EPCs for arsenic.

OVERALL SUMMARY

Assuming lifetime soil contact is limited to the AOC 10 potential exposure area, the depth- and/or area-weighted estimated cumulative HIs for the camper, hiker, and OHV rider under the baseline and scouring exposure scenarios are at or below 1, except for the hiker for shallow soil under 2-foot scouring scenario. The depth-weighted estimated HI for the hiker exposed to shallow soil under the 2-foot scouring scenario is slightly above 1. The majority of the estimated HI for the hiker (0.82 of 1 or approximately 82%) is attributed to background concentrations of arsenic in soil. In addition, the area-weighted estimated HI for the hiker exposed to shallow soil under the 2-foot scouring scenario scenario is equal to 1. Considering the substantial contribution of background arsenic in soil to the estimated cumulative HI for the receptors potentially exposed to AOC 10 potential exposure area soil under the 2-foot scouring scenario scenario, it is likely that incremental hazards for site-related COPCs in soil are well below an HI of 1. In general, the

area-weighted approach resulted in a reduction in the risk or hazard estimates ranging from 1.2 to 1.5 times lower than the depth-weighted estimates.

The depth- and/or area-weighted estimated cumulative ILCRs for the camper, hiker, and OHV rider under the baseline, 2-foot scouring, and 5-foot scouring scenarios are above the point of departure for risk management decisions of 1×10^{-6} but are at or below 5×10^{-6}, except for the depth-weight estimated cumulative ILCR for the hiker under the 2-foot scouring scenario for shallow soil. The depth-weighted estimated cumulative ILCR for the hiker under the 2-foot scouring scenario is above the point of departure for a risk management decision of 1×10^{-6} but is below 1×10^{-5}.

For the 2-foot scouring scenario, the area-weighted approach resulted in a reduction in the risk or hazard estimate ranging from 1.2 to 1.5 times lower than that of the depth-weighted estimate. However, use of the area-weighted approach does not change the overall conclusions of the HHRA for the AOC 10 potential exposure area evaluations for the 2-foot scouring scenario.

Under the baseline and 5-foot scouring scenarios, the depth-weighted estimated risks and hazards above de minimis levels for the camper, hiker, and OHV rider are due to arsenic (i.e., primarily from background concentrations in soil), hexavalent chromium, and/or dioxin TEQ. For the baseline and 5-foot scouring scenarios, the cumulative ILCRs for the camper (surface and shallow soil) and OHV rider (surface and shallow soil) excluding contribution from background arsenic concentrations would be at or below the point of departure for risk management decisions of 1×10^{-6}. As presented in the 2019 HHERA (Arcadis 2019), estimated ILCRs for arsenic for the camper, hiker, and OHV rider using the area-weighted EPCs for arsenic in surface and shallow soils are the same as those using the depth-weighted EPCs. Therefore, an area-weighted EPC risk evaluations for the baseline and 5-foot scouring scenarios are not presented in this Post-NTCRA HHERA because the risk conclusions for the camper, hiker, and OHV rider would not be changed using area-weighted EPCs for arsenic.

As summarized above, the depth-weighted 2-foot scouring and 5-foot scouring ILCRs for the camper, hiker, and OHV rider are slightly higher for shallow soil than the depth-weighted baseline ILCRs for surface soil, which suggests that the impacts for the risk drivers (arsenic, hexavalent chromium, and dioxin TEQ) are primarily within the 2 to 5 feet bgs interval for the AOC 10 potential exposure area. As summarized in Section 1.1, although AOC 10 includes steep slopes along the ravine, scouring has not been observed. As noted, the subareas of concern are primarily depositional. During recent high runoff conditions that occurred with rainstorm events on August 24 and September 11, 2022, and March 15, 2023, flooding and sediment deposition was observed in the subareas rather than scouring. Therefore, risk estimates presented in the HHRA for the hypothetical 2-foot scouring and 5-foot scouring scenarios are not representative of actual exposure to soil in AOC 10 for the camper, hiker, and OHV rider.

As previously stated, soil exceeding the numerical RAGs or debris remain in a few places associated with Soil NTCRA removals as well as a few isolated locations outside of the Soil NTCRA removal areas, because removing it may have presented a hazard to workers, undermined critical infrastructure or utilities (e.g., located beneath active high-voltage electrical line), or encroached upon culturally sensitive areas (e.g., located beneath a mesquite tree). At the AOC 10 potential exposure area, depth-weighted location concentrations exceeding RAGs for hexavalent chromium, total chromium, and dioxin TEQ remain in place. Section 3 of the NTCRA Completion Report (Jacobs 2025) describes the remaining contamination in each target action area and provides a list of individual confirmation samples (i.e., non-depth-weighted)

exceeding the RAGs (Table 3-16 of the N T C R A Completion Report). Figure 2-4 and Table 2-1 of the main Report provides the locations and concentrations, respectively, of the depth-weighted historical and confirmation sample concentrations exceeding the RAGs which and includes the following:

- Hexavalent chromium: AOC10-12, AOC10c-1, AOC10TAA2-CW10a, DTSC-AOC10d-2, and DTSC-AOC10d-3;
- Total chromium: AOC10c-1, DTSC-AOC10d-2, and DTSC-AOC10d-3; and
- Dioxin TEQ: AOC10-11, AOC10-15, AOC10b-1, and AOC10TAA4-CW13.

Futhermore, erosion has been occurring on the steep hillside where AOC 9 and AOC 10 TAA1 are located, just below the TCS and above AOC 10. The catchment area for East Ravine is small, so the ravine does not get large amounts of stormwater runoff. As a result and consistent with observations, scouring is not expected in the ravine bottom. Prior to removal of the berm adjacent to AOC 10c (aka: AOC10 TAA2), flow within ravine stopped there, and any transported sediment was deposited. The berm was removed as part of the N T C R A. Following berm removal, flow within ravine is now continuous to AOC 10d, where the next berm (SoCal Gas pipeline berm) is located. Additionally, NTCRA activities included placement of rip rap on the slope at AOC 9 TAA1 and AOC 10 TAA1 after backfilling to prevent further erosion from occurring in those locations. As such, potential exposure to residual COPC concentrations above RAGs is unlikely and risks presented for the scouring scenarios are likely overestimated.

The depth- and/or area-weighted EPCs for lead in AOC 10 potential exposure area soil at all exposure depths under the baseline, 2-foot scouring, and 5-foot scouring scenarios are not expected to result in an increase in blood lead levels above the OEHHA benchmark value of 1 µg/dL in the child recreational user.

Risks/hazards estimated for an individual AOC/SWMU/UA potential exposure area such as the AOC 10 potential exposure area are not considered representative of the realistic or likely potential exposures for the human populations that could be present in the areas outside the TCS (such as recreational users). Risks/hazards calculated separately for individual AOCs are conservative and likely overestimate site risks/hazards. As described in the RAWP documents (Arcadis 2008, 2009, 2015), these human populations would more likely be exposed randomly, over the course of a lifetime, to soil present in all individual AOC/SWMU/UA potential exposure areas located outside the TCS rather than have a lifetime of contact limited to the area of a single potential exposure area. Therefore, estimated risks/hazards presented for individual AOC/SWMU/UA potential exposure areas are not believed to be representative of the potential health risks to humans potentially contacting the soil outside the TCS. As stated previously, the Post-NTCRA HHERA provides updated risk estimates for human health and the environment based on potential exposures to current soil conditions in the N T C R A areas. Therefore, updated risk estimates were not performed for the OCS potential exposure area in the Post-NTCRA HHERA. It is noted that due to N T C R A soil removal, the potential post-N T C R A soil risks for the OCS are likely lower than estimated in the 2019 HHERA. The HHRA results and conclusions of the 2019 HHERA and of this Post-NTCRA HHERA will be considered for making risk-management decisions for the site in the Corrective Measure Study/Feasibility Study to be prepared for the site.

6.2 Summary and Conclusions for the ERA

At the AOC 10 potential exposure area, total chromium, and dioxin TEQ were identified as potential risk-driving COPECs based on unacceptable risk estimated for desert shrew in the 2019 HHERA (Arcadis 2019). Risk estimates for other COPECs (hexavalent chromium and copper), which were identified as potential risk drivers at other investigation areas at the site in the 2019 HHERA, are also included to evaluate post-NTCRA conditions. Three scouring scenarios (baseline, 2-foot scouring, and 5-foot scouring) were evaluated for AOC 10 in this post-NTCRA ERA, consistent with the scenarios evaluated in the 2019 HHERA. Updated risk estimates for the potential risk-driving COPECs are presented only for desert shrew. The 2019 HHERA did not identify a potential for unacceptable risk to sensitive species, and therefore protection of individual invertivorous small mammals is not warranted. This Post-NTCRA HHERA presents NOAEL-based HQs for completeness; however, only the LOAEL-based HQs were used to evaluate population-level protection of invertivorous small mammals.

Risks were evaluated using depth-weighted and area-weighted EPCs, as well as refined BAFs based on congener-specific soil-to-biota uptake for dioxin TEQ. HQs are summarized in Table AOC 10-6.1. Risk conclusions for desert shrew populations were based on the following criteria:

- COPECs with NOAEL-based HQs less than or equal to 1 pose de minimis risk to wildlife receptors.
- COPECs with NOAEL-based HQs greater than 1 but LOAEL-based HQs less than or equal to 1 pose no unacceptable risks to wildlife populations; however, the potential for unacceptable risk to individuals is uncertain based on the HQ. Because protection at the individual level is not warranted for desert shrew, COPECs with NOAEL-based HQs greater than 1 and LOAEL-based HQs less than 1 were not further evaluated using a WOE approach.
- COPECs with LOAEL-based HQs greater than 1 pose possible unacceptable risk to populations of wildlife receptors based on the HQ LOEs. In such cases, a WOE approach was used in reducing the uncertainty for characterizing potential risk to wildlife populations at the AOC 10 potential exposure area.

The risk estimates (HQs) represent one LOE for risk characterization. A qualitative WOE approach, incorporating other LOEs and uncertainties was used to characterize risk to wildlife populations at the AOC 10 potential exposure area. Alternate congener-specific BAFs and alternate TRVs demonstrating the magnitude of the risk overestimation are evaluated together in Sections 5.6.3. These alternate BAFs and TRVs are based on the current understanding of uptake and toxicity of TEQ mixtures and represent key LOEs considered for dioxin TEQ.

For COPECs with LOAEL HQs greater than 1 using the most refined exposure and effects assumptions, a WOE assessment was used to draw risk conclusions for the AOC 10 potential exposure area.

Overall, no unacceptable risk to populations of invertivorous small mammals (e.g., desert shrew) exposed to risk-driving COPECs in soil is expected. Conclusions for COPECs (i.e., total chromium and dioxin TEQ), as well as other NTCRA-related constituents (i.e., hexavalent chromium and copper) for the baseline, 2-foot scouring, and 5-foot scouring scenario evaluations for the AOC 10 potential exposure area are presented in Section 5.6.4 and summarized in the following list and Exhibit AOC 10-6.4.

- For dioxin TEQ:

  - Baseline: NOAEL- and LOAEL-based HQs are less than or equal to 1 indicating de minimis risk to individuals and populations of invertivorous small mammals;
  - 2-foot scouring scenario: LOAEL-based HQs are less than 1 using both sets of congener-specific BAFs and indicate no unacceptable risk to populations of invertivorous small mammals; and
  - 5-foot scouring scenario: NOAEL- and LOAEL-based HQs are less than or equal to 1 indicating de minimis *risk* to individuals and populations of invertivorous small mammals.
- For total chromium, hexavalent chromium, and copper in the baseline, 2-foot scouring, and 5-foot scouring scenarios, NOAEL- and LOAEL-based HQs are less than or equal to 1 indicating de minimis risk to individuals and populations of invertivorous small mammals.

In conclusion, no unacceptable risk to wildlife receptor populations is identified at the AOC 10 potential exposure area. For desert shrew, the conclusions are based on post-NTCRA conditions as evaluated in this Post-NTCRA HHERA. For the remaining ecological receptors, the conclusions are based on pre-NTCRA conditions as evaluated in the 2019 HHERA (Arcadis 2019).

Exhibit AOC10-6.4 Potential for Unacceptable Risk to Desert Shrew at the AOC 10 Exposure Area

Scenario	Dioxin TEQ	Total Chromium	Hexavalent Chromium	Copper
Baseline	None for wildlife populations	None for wildlife populations	None for wildlife populations	None for wildlife populations
2-foot scouring	None for wildlife populations	None for wildlife populations	None for wildlife populations	None for wildlife populations
5-foot scouring	None for wildlife populations	None for wildlife populations	None for wildlife populations	None for wildlife populations

7 REFERENCES

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TABLES

Table AOC10-1.1
Samples and Sampling Locations Included in the AOC 10 Potential Exposure Area

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

SampleID	Sample Date	Location ID	RFI Area	Original Upper Depth (ft bgs)	Original Lower Depth (ft bgs)	Used for EPCs (2019 HHERA)?	Used for EPCs (2019 H H E R A)?	Original Baseline (ft bgs)	Original Scouring 2 ft	Original Scouring 5 ft	Excavation Status	Excavation Depth (ft)	Backfill Depth (ft)	Current Upper Depth (ft bgs)	Current Baseline (ft bgs)	Current Scouring 2 ft	Current Scouring 5 ft	Sample Source (2019 H H E R A, N T C R A, or R F I Addition)	Used for Post-N T C R A H H E R A EPCs?[b]
AOC10-1-5001	10/2/2008	AOC10-1	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-1-5002	10/2/2008	AOC10-1	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-1-5003	10/2/2008	AOC10-1	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-1-5004	10/2/2008	AOC10-1	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	0	0	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-10-5202	1/22/2016	AOC10-10	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	3	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-10-5204	1/22/2016	AOC10-10	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	3	0	6	7	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-10-5203	1/22/2016	AOC10-10	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	3	0	6	7	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-10-5200	1/22/2016	AOC10-10	AOC10	0	1	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-10-5201	1/22/2016	AOC10-10	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-11-5208	1/22/2016	AOC10-11	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	4	0	1	2	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-11-5209	1/22/2016	AOC10-11	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	4	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-11-5205	1/22/2016	AOC10-11	AOC10	0	1	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-11-5207	1/22/2016	AOC10-11	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-12-5212	1/22/2016	AOC10-12	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-12-5213	1/22/2016	AOC10-12	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-12-5210	1/22/2016	AOC10-12	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-12-5211	1/22/2016	AOC10-12	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-13-5214	12/3/2015	AOC10-13	AOC10	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-13-5215	12/3/2015	AOC10-13	AOC10	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-14-5216	12/3/2015	AOC10-14	AOC10	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-15-5219	12/15/2015	AOC10-15	AOC10	2	3	Yes	0-03	S2-03		In Place	2	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-15-5220	12/15/2015	AOC10-15	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	2	0	3	4	NE	02-06 ft	NE	2019 HHERA	Yes
AOC10-15-5221	12/15/2015	AOC10-15	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	2	0	7	8	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-15-5217	12/15/2015	AOC10-15	AOC10	0	1	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-15-5218	12/15/2015	AOC10-15	AOC10	0	1	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-16-5224	12/15/2015	AOC10-16	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	3	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-16-5225	12/15/2015	AOC10-16	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	3	0	6	7	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-16-5222	12/15/2015	AOC10-16	AOC10	0	1	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-16-5223	12/15/2015	AOC10-16	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-17-5226	12/3/2015	AOC10-17	AOC10	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-19-5262	2/24/2016	AOC10-19	AOC10	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-19-5263	2/24/2016	AOC10-19	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-19-5265	2/24/2016	AOC10-19	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-2-5005	10/2/2008	AOC10-2	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-2-5006	10/2/2008	AOC10-2	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-2-5007	10/2/2008	AOC10-2	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-2-5008	10/2/2008	AOC10-2	AOC10	7	8	Yes	0-10	S2-10	S5-10	In Place	0	0	7	8	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-24-5261	3/7/2016	AOC10-24	AOC10	0	1	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-24-5262	3/7/2016	AOC10-24	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-25-5267	1/8/2017	AOC10-25	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-25-5268	1/8/2017	AOC10-25	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-25-5269	1/8/2017	AOC10-25	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-25-5270	1/8/2017	AOC10-25	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	0	0	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-25-5266	1/8/2017	AOC10-25	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-26-5274	2/21/2017	AOC10-26	AOC10	4.5	5	Yes	0-06	S2-06	S5-06	In Place	5	5	4.5	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-26-5271	2/21/2017	AOC10-26	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-26-5273	2/21/2017	AOC10-26	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-26-Debris	2/21/2017	AOC10-26	AOC10	2.5	2.7	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10-27-5275	1/4/2017	AOC10-27	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-27-5276	1/4/2017	AOC10-27	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-27-5277	1/4/2017	AOC10-27	AOC10	4	5	Yes	0-06	S2-06	S5-06	In Place	0	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-3-5009	9/19/2008	AOC10-3	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-3-5011	9/19/2008	AOC10-3	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-3-5012	9/19/2008	AOC10-3	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-3-5013	9/19/2008	AOC10-3	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	0	0	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-3-5010	9/19/2008	AOC10-3	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-4-5014	9/19/2008	AOC10-4	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-4-5015	9/19/2008	AOC10-4	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-4-5016	9/19/2008	AOC10-4	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes

Table AOC10-1.1
Samples and Sampling Locations Included in the AOC 10 Potential Exposure Area

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

SampleID	Sample Date	Location ID	RFI Area	Original Upper Depth (ft bgs)	Original Lower Depth (ft bgs)	Used for EPCs (2019 HHERA)?	Used for EPCs (2019 H H E R A)?	Original Baseline (ft bgs)	Original Scouring 2 ft	Original Scouring 5 ft	Excavation Status	Excavation Depth (ft)	Backfill Depth (ft)	Current Upper Depth (ft bgs)	Current Baseline (ft bgs)	Current Scouring 2 ft	Current Scouring 5 ft	Sample Source (2019 H H E R A, N T C R A, or R F I Addition)	Used for Post-N T C R A H H E R A EPCs?[b]
AOC10-4-5017	9/19/2008	AOC10-4	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	0	0	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10-5-5018	9/19/2008	AOC10-5	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-5-5019	9/19/2008	AOC10-5	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-5-5020	9/19/2008	AOC10-5	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-5-5021	9/19/2008	AOC10-5	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-6-5023	9/20/2008	AOC10-6	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-6-5024	9/20/2008	AOC10-6	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-7-5027	9/20/2008	AOC10-7	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-7-5028	9/20/2008	AOC10-7	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10-7-5029	9/20/2008	AOC10-7	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10-8-5031	8/22/2008	AOC10-8	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-8-5033	8/22/2008	AOC10-8	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-9-5229	12/7/2015	AOC10-9	AOC10	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-9-5230	12/7/2015	AOC10-9	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10b-1-5043	9/30/2008	AOC10b-1	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	4	0	1	2	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10b-1-5044	9/30/2008	AOC10b-1	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	4	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10b-1-5040	9/30/2008	AOC10b-1	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10b-1-5041	9/30/2008	AOC10b-1	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10b-2-5047	9/30/2008	AOC10b-2	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	2	0	3	4	NE	02-06 ft	NE	2019 HHERA	Yes
AOC10b-2-5048	9/30/2008	AOC10b-2	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	2	0	7	8	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10b-2-5045	9/30/2008	AOC10b-2	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10b-2-5046	9/30/2008	AOC10b-2	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10b-3-5051	10/1/2008	AOC10b-3	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10b-3-5053	10/1/2008	AOC10b-3	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10b-3-5052	10/1/2008	AOC10b-3	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10b-3-5049	9/30/2008	AOC10b-3	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10b-3-5050	10/1/2008	AOC10b-3	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10b-4-5054	9/30/2008	AOC10b-4	AOC10	0	0.5	Yes	0-0.5			In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10b-4-5055	9/30/2008	AOC10b-4	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10b-4-5056	9/30/2008	AOC10b-4	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10b-4-5057	9/30/2008	AOC10b-4	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	0	0	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10c-1-5060	10/1/2008	AOC10c-1	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10c-1-5061	10/1/2008	AOC10c-1	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10c-1-5058	10/1/2008	AOC10c-1	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-1-5059	10/1/2008	AOC10c-1	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-2-5065	10/1/2008	AOC10c-2	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10c-2-5066	10/1/2008	AOC10c-2	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10c-2-5062	10/1/2008	AOC10c-2	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-2-5064	10/1/2008	AOC10c-2	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-2-5063	10/1/2008	AOC10c-2	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-3-5070	10/2/2008	AOC10c-3	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10c-3-5071	10/2/2008	AOC10c-3	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10c-3-5067	10/2/2008	AOC10c-3	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-3-5068	10/2/2008	AOC10c-3	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-4-5074	10/1/2008	AOC10c-4	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10c-4-5075	10/1/2008	AOC10c-4	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10c-4-5072	10/1/2008	AOC10c-4	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-4-5073	10/1/2008	AOC10c-4	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-5-5078	10/1/2008	AOC10c-5	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10c-5-5079	10/1/2008	AOC10c-5	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	0	4	5	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10c-5-5076	10/1/2008	AOC10c-5	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-5-5077	10/1/2008	AOC10c-5	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10c-6-5241	1/21/2016	AOC10c-6	AOC10	14	15	Yes			S5-15	In Place	5	0	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10d-1-5082	9/18/2008	AOC10d-1	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	2	2	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10d-1-5084	9/18/2008	AOC10d-1	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	2	2	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10d-1-5080	9/18/2008	AOC10d-1	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-1-5081	9/18/2008	AOC10d-1	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-2-5087	9/17/2008	AOC10d-2	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	3	3	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10d-2-5088	9/17/2008	AOC10d-2	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	3	3	9	10	NE	NE	05-10 ft	2019 HHERA	Yes

Table AOC10-1.1
Samples and Sampling Locations Included in the AOC 10 Potential Exposure Area

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

SampleID	Sample Date	Location ID	RFI Area	Original Upper Depth (ft bgs)	Original Lower Depth (ft bgs)	Used for EPCs (2019 HHERA)?	Used for EPCs (2019 H H E R A)?	Original Baseline (ft bgs)	Original Scouring 2 ft	Original Scouring 5 ft	Excavation Status	Excavation Depth (ft)	Backfill Depth (ft)	Current Upper Depth (ft bgs)	Current Baseline (ft bgs)	Current Scouring 2 ft	Current Scouring 5 ft	Sample Source (2019 H H E R A, N T C R A, or R F I Addition)	Used for Post-N T C R A H H E R A EPCs?[b]
AOC10d-2-5085	9/17/2008	AOC10d-2	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-2-5086	9/17/2008	AOC10d-2	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-3-5091	9/18/2008	AOC10d-3	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	3	3	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10d-3-5093	9/18/2008	AOC10d-3	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	3	3	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10d-3-5092	9/18/2008	AOC10d-3	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	3	3	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10d-3-5089	9/17/2008	AOC10d-3	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-3-5090	9/18/2008	AOC10d-3	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-4-5096	9/18/2008	AOC10d-4	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	5	5	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10d-4-5097	9/18/2008	AOC10d-4	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	5	5	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10d-4-5094	9/18/2008	AOC10d-4	AOC10	0	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-4-5095	9/18/2008	AOC10d-4	AOC10	2	3	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
AOC10d-9-5243	12/15/2015	AOC10d-9	AOC10	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10d-9-5244	12/15/2015	AOC10d-9	AOC10	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
AOC10d-9-5245	12/15/2015	AOC10d-9	AOC10	5	6	Yes	0-06	S2-06	S5-06	In Place	0	0	5	6	NE	02-06 ft	05-06, 05-10 ft	2019 HHERA	Yes
AOC10d-9-5246	12/15/2015	AOC10d-9	AOC10	9	10	Yes	0-10	S2-10	S5-10	In Place	0	0	9	10	NE	NE	05-10 ft	2019 HHERA	Yes
300a-31-1021	4/6/2011	AOC10-OS4	AOC10	6.5	7	Yes	0-10	S2-10	S5-10	In Place	0	0	6.5	7	NE	NE	05-10 ft	2019 HHERA	Yes
AOC10TAA2-CF10-2	12/2/2022	AOC10TAA2-CF10	AOC10	2	2.5	No	--	--	--	In Place	2	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF11-3.5	12/5/2022	AOC10TAA2-CF11	AOC10	3.5	4	No	--	--	--	In Place	3.5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF12-4	12/21/2022	AOC10TAA2-CF12	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF13-4	12/21/2022	AOC10TAA2-CF13	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF14a-6	3/8/2023	AOC10TAA2-CF14a	AOC10	6	6.5	No	--	--	--	In Place	6	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF15a-1	4/19/2023	AOC10TAA2-CF15a	AOC10	1	1.5	No	--	--	--	In Place	1	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF16-5	1/10/2023	AOC10TAA2-CF16	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF17-6	2/24/2023	AOC10TAA2-CF17	AOC10	6	6.5	No	--	--	--	In Place	6	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF18-7	3/6/2023	AOC10TAA2-CF18	AOC10	7	7.5	No	--	--	--	In Place	7	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF19-5	3/7/2023	AOC10TAA2-CF19	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF20-5	3/8/2023	AOC10TAA2-CF20	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF21-5	3/9/2023	AOC10TAA2-CF21	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF22a-3	5/1/2023	AOC10TAA2-CF22a	AOC10	3	3.5	No	--	--	--	In Place	3	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF22a-3FD	5/1/2023	AOC10TAA2-CF22a	AOC10	3	3.5	No	--	--	--	In Place	3	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF23-0	4/14/2023	AOC10TAA2-CF23	AOC10	0	0.5	No	--	--	--	In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF24-0	4/14/2023	AOC10TAA2-CF24	AOC10	0	0.5	No	--	--	--	In Place	0	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF3-5	11/9/2022	AOC10TAA2-CF3	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF4a-1	4/19/2023	AOC10TAA2-CF4a	AOC10	1	1.5	No	--	--	--	In Place	1	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF5-5	11/9/2022	AOC10TAA2-CF5	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF6-5	11/9/2022	AOC10TAA2-CF6	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF7a-1	4/19/2023	AOC10TAA2-CF7a	AOC10	1	1.5	No	--	--	--	In Place	1	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CF8a-5	3/15/2023	AOC10TAA2-CF8a	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW10a-5	4/19/2023	AOC10TAA2-CW10a	AOC10	5	5.5	No	--	--	--	In Place	5	2	2	2.5	0-03 ft	02-03, 02-06 ft	NE	NTCRA	Yes
AOC10TAA2-CW11-4	10/5/2022	AOC10TAA2-CW11	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW12b-5	5/1/2023	AOC10TAA2-CW12b	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW16a-4	11/30/2022	AOC10TAA2-CW16a	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW16a-FD-4	11/30/2022	AOC10TAA2-CW16a	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW17-4	11/30/2022	AOC10TAA2-CW17	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW18a-5	5/1/2023	AOC10TAA2-CW18a	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW21a-3	3/6/2023	AOC10TAA2-CW21a	AOC10	3	3.5	No	--	--	--	In Place	3	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW22a-3	3/6/2023	AOC10TAA2-CW22a	AOC10	3	3.5	No	--	--	--	In Place	3	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW24-2	12/21/2022	AOC10TAA2-CW24	AOC10	2	2.5	No	--	--	--	In Place	2	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW25a-3	1/10/2023	AOC10TAA2-CW25a	AOC10	3	3.5	No	--	--	--	In Place	3	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW26a-2	5/16/2023	AOC10TAA2-CW26a	AOC10	2	2.5	No	--	--	--	In Place	2	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW26a-2FD	5/16/2023	AOC10TAA2-CW26a	AOC10	2	2.5	No	--	--	--	In Place	2	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW27-2	12/21/2022	AOC10TAA2-CW27	AOC10	2	2.5	No	--	--	--	In Place	2	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW28a-3	2/24/2023	AOC10TAA2-CW28a	AOC10	3	3.5	No	--	--	--	In Place	3	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW29a-4	3/6/2023	AOC10TAA2-CW29a	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW2a-4	9/27/2022	AOC10TAA2-CW2a	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW30a-5	4/19/2023	AOC10TAA2-CW30a	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW30a-5FD	4/19/2023	AOC10TAA2-CW30a	AOC10	5	5.5	No	--	--	--	In Place	5	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW31-4	1/10/2023	AOC10TAA2-CW31	AOC10	4	4.5	No	--	--	--	In Place	4	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW32-2	1/10/2023	AOC10TAA2-CW32	AOC10	2	2.5	No	--	--	--	In Place	2	0	0	0.5	0-005, 0-03 ft	NE	NE	NTCRA	Yes

Table AOC10-1.1
Samples and Sampling Locations Included in the AOC 10 Potential Exposure Area

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

SampleID	Sample Date	Location ID	RFI Area	Original Upper Depth (ft bgs)	Original Lower Depth (ft bgs)	Used for EPCs (2019 HHERA)?	Used for EPCs (2019 H H E R A)?	Original Baseline (ft bgs)	Original Scouring 2 ft	Original Scouring 5 ft	Excavation Status	Excavation Depth (ft)	Backfill Depth (ft)	Current Upper Depth (ft bgs)	Current Baseline (ft bgs)	Current Scouring 2 ft	Current Scouring 5 ft	Sample Source (2019 H H E R A, N T C R A, or R F I Addition)	Used for Post-N T C R A H H E R A EPCs?[b]
AOC10TAA2-CW33-2FD	1/10/2023	AOC10TAA2-CW33	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW34-3	2/24/2023	AOC10TAA2-CW34	AOC10	3	3,5	No	--	--	--	In Place	3	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW35-3	3/8/2023	AOC10TAA2-CW35	AOC10	3	3,5	No	--	--	--	In Place	3	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW35-3FD	3/8/2023	AOC10TAA2-CW35	AOC10	3	3,5	No	--	--	--	In Place	3	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW36-2	3/8/2023	AOC10TAA2-CW36	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW37-3	3/9/2023	AOC10TAA2-CW37	AOC10	3	3,5	No	--	--	--	In Place	3	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW38-4	3/10/2023	AOC10TAA2-CW38	AOC10	4	4,5	No	--	--	--	In Place	4	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW39-2	3/10/2023	AOC10TAA2-CW39	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW40-6	3/10/2023	AOC10TAA2-CW40	AOC10	6	6,5	No	--	--	--	In Place	6	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW41-2	3/15/2023	AOC10TAA2-CW41	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW41-2FD	3/15/2023	AOC10TAA2-CW41	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW7-4	9/27/2022	AOC10TAA2-CW7	AOC10	4	4,5	No	--	--	--	In Place	4	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW7-4FD	9/27/2022	AOC10TAA2-CW7	AOC10	4	4,5	No	--	--	--	In Place	4	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW8-4	9/27/2022	AOC10TAA2-CW8	AOC10	4	4,5	No	--	--	--	In Place	4	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA2-CW9-5	10/5/2022	AOC10TAA2-CW9	AOC10	5	5,5	No	--	--	--	In Place	5	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA3-CF1-2	8/11/2022	AOC10TAA3-CF1	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA3-CW1-1	8/11/2022	AOC10TAA3-CW1	AOC10	1	1,5	No	--	--	--	In Place	1	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA3-CW2-2	8/11/2022	AOC10TAA3-CW2	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA3-CW3-2	8/11/2022	AOC10TAA3-CW3	AOC10	2	2,5	No	--	--	--	In Place	2	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA3-CW4-1	8/11/2022	AOC10TAA3-CW4	AOC10	1	1,5	No	--	--	--	In Place	1	0	0	0,5	0-005, 0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CF2a-7	4/13/2023	AOC10TAA4-CF2a	AOC10	7	7,5	No	--	--	--	In Place	7	7	7	7,5	NE	NE	05-10 ft	NTCRA	Yes
AOC10TAA4-CF4-3	12/15/2022	AOC10TAA4-CF4	AOC10	3	3,5	No	--	--	--	In Place	3	3	3	3,5	NE	02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CF6-2	5/22/2023	AOC10TAA4-CF6	AOC10	2	2,5	No	--	--	--	In Place	2	2	2	2,5	0-03 ft	02-03, 02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CF7-2	5/19/2023	AOC10TAA4-CF7	AOC10	2	2,5	No	--	--	--	In Place	2	2	2	2,5	0-03 ft	02-03, 02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW10-3	12/14/2022	AOC10TAA4-CW10	AOC10	3	3,5	No	--	--	--	In Place	3	3	3	3,5	NE	02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW11-3	12/14/2022	AOC10TAA4-CW11	AOC10	3	3,5	No	--	--	--	In Place	3	3	3	3,5	NE	02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW12b-1	4/13/2023	AOC10TAA4-CW12b	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW12b-1FD	4/13/2023	AOC10TAA4-CW12b	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW13-2	12/15/2022	AOC10TAA4-CW13	AOC10	2	2,5	No	--	--	--	In Place	2	2	2	2,5	0-03 ft	02-03, 02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW14-1	12/15/2022	AOC10TAA4-CW14	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW15-1	12/15/2022	AOC10TAA4-CW15	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW16C-2	6/14/2023	AOC10TAA4-CW16c	AOC10	2	2,5	No	--	--	--	In Place	2	2	2	2,5	0-03 ft	02-03, 02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW17a-1	4/13/2023	AOC10TAA4-CW17a	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW18-1	5/22/2023	AOC10TAA4-CW18	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW19-4	5/22/2023	AOC10TAA4-CW19	AOC10	4	4,5	No	--	--	--	In Place	4	4	4	4,5	NE	02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW20-1	5/22/2023	AOC10TAA4-CW20	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW21-1	5/22/2023	AOC10TAA4-CW21	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10TAA4-CW6-3	12/6/2022	AOC10TAA4-CW6	AOC10	3	3,5	No	--	--	--	In Place	3	3	3	3,5	NE	02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW7-2	12/14/2022	AOC10TAA4-CW7	AOC10	2	2,5	No	--	--	--	In Place	2	2	2	2,5	0-03 ft	02-03, 02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW8-2	12/14/2022	AOC10TAA4-CW8	AOC10	2	2,5	No	--	--	--	In Place	2	2	2	2,5	0-03 ft	02-03, 02-06 ft	NE	NTCRA	Yes
AOC10TAA4-CW9-1	12/14/2022	AOC10TAA4-CW9	AOC10	1	1,5	No	--	--	--	In Place	1	1	1	1,5	0-03 ft	NE	NE	NTCRA	Yes
AOC10-XRF-01-5098	8/25/2008	AOC10-XRF-01	AOC10	0	0,5	Yes	0-0.5			In Place	0	0	0	0,5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-XRF-02-5099	8/25/2008	AOC10-XRF-02	AOC10	0	0,5	Yes	0-0.5			In Place	0	0	0	0,5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-XRF-03-5100	8/25/2008	AOC10-XRF-03	AOC10	0	0,5	Yes	0-0.5			In Place	0	0	0	0,5	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
AOC10-XRF-10-5107	9/21/2008	AOC10-XRF-10	AOC10	3	4	Yes	0-06	S2-06		In Place	0	0	3	4	NE	02-06 ft	NE	2019 HHERA	Yes
Bank 1	3/7/2003	Bank 1	AOC10	0	0	Yes	0-0.5			In Place	0	0	0	0	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
DTSC-AOC10d-1	1/18/2008	DTSC-AOC10d-1	AOC10	0	0	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
DTSC-AOC10d-2	1/18/2008	DTSC-AOC10d-2	AOC10	0	0	Yes	0-0.5			In Place	0	0	0	0	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
DTSC-AOC10d-3	1/18/2008	DTSC-AOC10d-3	AOC10	0	0	Yes	0-0.5			In Place	0	0	0	0	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
L1-S	2/20/2003	L-1	AOC10	0	0	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L1-2	2/20/2003	L-1	AOC10	2	2	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L2-S	2/20/2003	L-2	AOC10	0	0	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L2-2	2/20/2003	L-2	AOC10	2	2	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L22-2	3/5/2003	L-2-2	AOC10	2	2	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L23-2	3/5/2003	L-2-3	AOC10	2	2	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L3-S	2/20/2003	L-3	AOC10	0	0	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L3-1	2/20/2003	L-3	AOC10	1	1	Yes	0-03			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L3-1.5	2/20/2003	L-3	AOC10	1,5	1,5	Yes	0-03			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
L32-.5	3/5/2003	L-3-2	AOC10	0.5	0.5	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
MW-57-BR-SS01	1/14/2009	MW-57BR	AOC10	3	4	Yes	0-06	S2-06		In Place	0	0	3	4	NE	02-06 ft	NE	2019 HHERA	Yes
MW-175-SS04	1/14/2009	MW-57BR	AOC10	8	9	Yes	0-10	S2-10	S5-10	In Place	0	0	8	9	NE	NE	05-10 ft	2019 HHERA	Yes
MW-57-BR-SS02	1/14/2009	MW-57BR	AOC10	8	9	Yes	0-10	S2-10	S5-10	In Place	0	0	8	9	NE	NE	05-10 ft	2019 HHERA	Yes

Table AOC10-1.1
Samples and Sampling Locations Included in the AOC 10 Potential Exposure Area

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

SampleID	Sample Date	Location ID	RFI Area	Original Upper Depth (ft bgs)	Original Lower Depth (ft bgs)	Used for EPCs (2019 HHERA)?	Used for EPCs (2019 H H E R A)?	Original Baseline (ft bgs)	Original Scouring 2 ft	Original Scouring 5 ft	Excavation Status	Excavation Depth (ft)	Backfill Depth (ft)	Current Upper Depth (ft bgs)	Current Baseline (ft bgs)	Current Scouring 2 ft	Current Scouring 5 ft	Sample Source (2019 H H E R A, N T C R A, or R F I Addition)	Used for Post-N T C R A H H E R A EPCs?[b]
MW-58-BR-SS01	1/29/2009	MW-58BR_S	AOC10	1.5	2	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
PS-21-0	4/13/1999	PS-21	AOC10	0	0	Yes	0-0.5			Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
PS-21-2	4/13/1999	PS-21	AOC10	2	2	Yes	0-03	S2-03		Removed	--	0	NE	NE	NE	NE	NE	2019 HHERA	No, Excavated
SD-5-01	11/10/2015	SD-05	StormDrains	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
SD-5-03	11/10/2015	SD-05	StormDrains	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes
SD-5-01-FD	11/10/2015	SD-05	StormDrains	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
SD-22-01	3/9/2016	SD-22	StormDrains	0	1	Yes	0-0.5			In Place	0	0	0	1	0-005, 0-03 ft	NE	NE	2019 HHERA	Yes
SD-22-03	3/9/2016	SD-22	StormDrains	2	3	Yes	0-03	S2-03		In Place	0	0	2	3	0-03 ft	02-03, 02-06 ft	NE	2019 HHERA	Yes

Note:

[a] Samples evaluated in the 2019 HHERA for the 0 to 10 foot bgs interval for the baseline, 2 foot scouring, and 5 foot scouring for chromium, hexavalent chromium, copper, and dioxin TEQ are included in the table.

[b] Sample locations represent data evaluated in the Post-NTCRA HHERA for the 0 to 3 foot bgs interval in the baseline, 2 foot scouring, and 5 foot scouring scenarios.

Abbreviations:

"--" = not applicable
< = less than
> = greater than
A O C = area of concern
bgs = below ground surface
ft = foot
H H E R A = human health and ecological risk assessment
Depth NA = depth not applicable to the dataset
NE = not evaluated (i.e., sample was excavated or depth interval not applicable to the dataset)
N T C R A = non time critical removal action
R F I = RCRA Facility Investigation

Table AOC10-2.1
Comparison of Soil Data for Non-Risk-Driving Constituents in the 2019 HHERA and NTCRA/RFI Additions for the Baseline (No Scouring) Scenario for AOC 10 (0 to 0.5 foot bgs and 0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category[a]	Constituent	Units	Soil Depth Interval (ft bgs)	Detects	Total Samples	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation
HHERA	Lead	mg/kg	0-0.5	38	38	100	2.7	41	N/A	N/A	14.93	14.93	11.5	99.74	9.987
HHERA	Mercury	mg/kg	0-0.5	0	38	0	N/A	N/A	0.019	0.11	N/A	N/A	N/A	N/A	N/A
HHERA	Molybdenum	mg/kg	0-0.5	7	38	18	1.1	14	1	5.2	4.229	1.628	1.5	24.17	4.917
HHERA	Zinc	mg/kg	0-0.5	44	44	100	14	240	N/A	N/A	72.48	72.48	55.5	2268	47.63
HHERA	Lead	mg/kg	0-3	70	71	99	2	160	5.1	5.1	15.48	15.31	9.95	415.5	20.38
HHERA	Mercury	mg/kg	0-3	2	71	3	0.15	0.33	0.019	0.11	0.24	0.0252	0.24	0.0162	0.127
HHERA	Molybdenum	mg/kg	0-3	17	71	24	1.1	14	1	5.2	3.182	1.56	1.5	12.55	3.543
HHERA	Zinc	mg/kg	0-3	84	84	100	14	300	N/A	N/A	80.92	80.92	57	3983	63.11
NTCRA	Lead	mg/kg	0-0.5	55	55	100	1.8	12	N/A	N/A	4.111	4.111	3.5	3.804	1.95
NTCRA	Mercury	mg/kg	0-0.5	1	55	2	0.19	0.19	0.1	0.11	0.19	0.102	0.19	N/A	N/A
NTCRA	Molybdenum	mg/kg	0-0.5	4	55	7	1.1	7.5	1	1.1	4.125	1.227	3.95	9.149	3.025
NTCRA	Zinc	mg/kg	0-0.5	55	55	100	16	91	N/A	N/A	43.8	43.8	44	123.2	11.1
NTCRA	Lead	mg/kg	0-3	70	70	100	1.8	36	N/A	N/A	5.684	5.684	3.75	30.46	5.519
NTCRA	Mercury	mg/kg	0-3	1	70	1	0.19	0.19	0.1	0.12	0.19	0.101	0.19	N/A	N/A
NTCRA	Molybdenum	mg/kg	0-3	4	70	6	1.1	7.5	1	1.2	4.125	1.179	3.95	9.149	3.025
NTCRA	Zinc	mg/kg	0-3	70	70	100	16	91	N/A	N/A	44.53	44.53	44	108.5	10.42

Notes:

[a] The HHERA dataset is consistent with the 2019 HHERA (Arcadis 2019). The NTCRA dataset consists of 1) data collected as part of the NTCRA and 2) data collected after the submittal of the 2019 HHERA to support the RFI.

Abbreviations:

"--" = not applicable
AOC = area of concern
COPC = constituent of potential concern
COPEC = constituent of potential ecological concern
FOD = frequency of detection, percent
ft bgs = feet below ground surface
KM = Kaplan-Meier
mg/kg = milligrams per kilogram
N/A = not applicable
ND = not detected
PG&E = Pacific Gas and Electric Company
NTCRA = non time critical removal action

References:

Arcadis. 2019. Final Soil Human Health and Ecological Risk Assessment Report, Topock Compressor Station, Needles, California.

Table AOC10-2.2
Comparison of Soil Data for Non-Risk-Driving Constituents in the 2019 HHERA and NTCRA/RFI Additions for the 2-Foot Scouring Scenario for AOC 10 (2 to 3 feet bgs and 2 to 6 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category[a]	Constituent	Units	Soil Depth Interval (ft bgs)	Detects	Total Samples	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation
HHERA	Lead	mg/kg	2-3	32	33	97	2	160	5.1	5.1	16.15	15.76	7.45	804.9	28.37
HHERA	Mercury	mg/kg	2-3	2	33	6	0.15	0.33	0.1	0.11	0.24	0.108	0.24	0.0162	0.127
HHERA	Molybdenum	mg/kg	2-3	10	33	30	1.1	8.2	1	5.1	2.45	1.474	1.45	4.749	2.179
HHERA	Zinc	mg/kg	2-3	38	38	100	21	300	N/A	N/A	86.69	86.69	56.5	5379	73.34
HHERA	Lead	mg/kg	2-6	60	61	98	1.5	160	5.1	5.1	10.87	10.75	5.15	459.1	21.43
HHERA	Mercury	mg/kg	2-6	2	61	3	0.15	0.33	0.1	0.11	0.24	0.105	0.24	0.0162	0.127
HHERA	Molybdenum	mg/kg	2-6	13	61	21	1	8.2	1	5.2	2.431	1.354	1.5	4.017	2.004
HHERA	Zinc	mg/kg	2-6	66	66	100	20	300	N/A	N/A	72.3	72.3	52	3479	58.98
NTCRA	Lead	mg/kg	2-3	7	7	100	3.5	36	N/A	N/A	12.57	12.57	7.1	144.3	12.01
NTCRA	Mercury	mg/kg	2-3	0	7	0	N/A	N/A	0.1	0.12	N/A	N/A	N/A	N/A	N/A
NTCRA	Molybdenum	mg/kg	2-3	0	7	0	N/A	N/A	1	1.2	N/A	N/A	N/A	N/A	N/A
NTCRA	Zinc	mg/kg	2-3	7	7	100	38	62	N/A	N/A	47.43	47.43	46	98.62	9.931
NTCRA	Lead	mg/kg	2-6	12	12	100	2.9	36	N/A	N/A	11.34	11.34	8.55	97.78	9.888
NTCRA	Mercury	mg/kg	2-6	0	12	0	N/A	N/A	0.1	0.12	N/A	N/A	N/A	N/A	N/A
NTCRA	Molybdenum	mg/kg	2-6	0	12	0	N/A	N/A	1	1.2	N/A	N/A	N/A	N/A	N/A
NTCRA	Zinc	mg/kg	2-6	12	12	100	22	130	N/A	N/A	55.42	55.42	49.5	721.4	26.86

Notes:

[a] The HHERA dataset is consistent with the 2019 HHERA (Arcadis 2019). The NTCRA dataset consists of 1) data collected as part of the NTCRA and 2) data collected after the submittal of the 2019 HHERA to support the RFI.

Abbreviations:

"--" = not applicable
AOC = area of concern
COPC = constituent of potential concern
COPEC = constituent of potential ecological concern
FOD = frequency of detection, percent
ft bgs = feet below ground surface
KM = Kaplan-Meier
mg/kg = milligrams per kilogram
N/A = not applicable
ND = not detected
PG&E = Pacific Gas and Electric Company
NTCRA = non time critical removal action

References:

Arcadis. 2019. Final Soil Human Health and Ecological Risk Assessment Report, Topock Compressor Station, Needles, California.

Table AOC10-2.3
Comparison of Soil Data for Non-Risk-Driving Constituents in the 2019 HHERA and NTCRA/RFI Additions for the 5-Foot Scouring Scenario for AOC 10 (5 to 6 feet bgs and 5 to 10 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category[a]	Constituent	Units	Soil Depth Interval (ft bgs)	Detects	Total Samples	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation
HHERA	Lead	mg/kg	5-10	52	52	100	1.5	17	N/A	N/A	4.135	4.135	3.45	6.997	2.645
HHERA	Mercury	mg/kg	5-10	0	52	0	N/A	N/A	0.1	0.11	N/A	N/A	N/A	N/A	N/A
HHERA	Molybdenum	mg/kg	5-10	6	53	11	1	13	1	5.2	3.733	1.335	1.6	22.06	4.697
HHERA	Zinc	mg/kg	5-10	52	52	100	20	160	N/A	N/A	52.13	52.13	47	481.6	21.95
NTCRA	Lead	mg/kg	5-10	1	1	100	3.4	3.4	N/A	N/A	3.4	N/A	3.4	N/A	N/A
NTCRA	Mercury	mg/kg	5-10	0	1	0	N/A	N/A	0.11	0.11	N/A	N/A	N/A	N/A	N/A
NTCRA	Molybdenum	mg/kg	5-10	0	1	0	N/A	N/A	1.1	1.1	N/A	N/A	N/A	N/A	N/A
NTCRA	Zinc	mg/kg	5-10	1	1	100	51	51	N/A	N/A	51	N/A	51	N/A	N/A

Notes:

[a] The HHERA dataset is consistent with the 2019 HHERA (Arcadis 2019). The NTCRA dataset consists of 1) data collected as part of the NTCRA and 2) data collected after the submittal of the 2019 HHERA to support the RFI.

Abbreviations:

"--" = not applicable
AOC = area of concern
COPC = constituent of potential concern
COPEC = constituent of potential ecological concern
FOD = frequency of detection, percent
ft bgs = feet below ground surface
KM = Kaplan-Meier
mg/kg = milligrams per kilogram
N/A = not applicable
ND = not detected
PG&E = Pacific Gas and Electric Company
NTCRA = non time critical removal action

References:

Arcadis. 2019. Final Soil Human Health and Ecological Risk Assessment Report, Topock Compressor Station, Needles, California.

Table AOC10-3.1
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the Baseline (No Scouring) Scenario for AOC 10 (0 to 0,5 foot bgs and 0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Inorganics	Aluminum	mg/kg	0-0.5	10	10	100	4900	18000	NA	NA	8870	8870	8150	13066778	3615	--	--	--	--	--
Inorganics	Antimony	mg/kg	0-0.5	0	38	0	NA	NA	1	2.45	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Arsenic	mg/kg	0-0.5	37	38	97	2.8	11	0.5	0.5	5.335	5.208	4.2	5.577	2.362	X	5.93	95% KM (BCA) UCL	5.85	Bootstrap BCA 95UCL
Inorganics	Barium	mg/kg	0-0.5	38	38	100	69	595	NA	NA	174.7	174.7	130	13783	117.4	--	--	--	--	--
Inorganics	Beryllium	mg/kg	0-0,5	0	38	0	NA	NA	0,5	2,6	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Cadmium	mg/kg	0-0,5	0	38	0	NA	NA	0,5	4,9	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Chromium, hexavalent	mg/kg	0-0.5	49	87	56	0.21	6	0.1	2	1.38	0.826	0.93	1.714	1.309	X	1.081	95% KM Approximate Gamma UCL	0.88	Bootstrap BCA 95UCL
Inorganics	Chromium, total	mg/kg	0-0.5	87	87	100	4.9	243	N/A	N/A	43.13	43.13	32	1889	43.46	X	50.03	95% H-UCL	44.7	Bootstrap BCA 95UCL
Inorganics	Cobalt	mg/kg	0-0.5	35	38	92	2.3	9.8	2.2	2.45	6.197	5.884	6.3	3.494	1.869	--	--	--	--	--
Inorganics	Copper	mg/kg	0-0.5	84	84	100	3.6	66.5	N/A	N/A	17.55	17.55	14	126.8	11.26	X	19.6	95% Student's-t UCL	17.9	Bootstrap BCA 95UCL
Inorganics	Cyanide	mg/kg	0-0.5	1	9	11	0.22	0.22	0.5	2.45	0.22	0.22	0.22	NA	NA	X	0.22	Max Detect	0.22	Max Detect
Inorganics	Iron	mg/kg	0-0,5	13	13	100	8680	28000	NA	NA	15683	15683	15000	25543056	5054	--	--	--	--	--
Inorganics	Lead	mg/kg	0-0.5	38	38	100	2.7	41	NA	NA	14.93	14.93	11.5	99.74	9.987	X	18.1	95% Adjusted Gamma UCL	18.1	Bootstrap BCA 95UCL
Inorganics	Manganese	mg/kg	0-0.5	10	10	100	160	1300	NA	NA	375	375	265	114117	337.8	X	625	95% Adjusted Gamma UCL	548	Bootstrap BCA 95UCL
Inorganics	Mercury	mg/kg	0-0.5	0	38	0	NA	NA	0.0095	0.055	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Molybdenum	mg/kg	0-0.5	7	38	18	1.1	14	0.5	2.6	4.229	1.202	1.5	24.17	4.917	X	2.35	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.53	Bootstrap BCA 95UCL
Inorganics	Nickel	mg/kg	0-0,5	41	44	93	4.3	23	2.2	2.45	14.38	13.55	15	19.47	4.412	--	--	--	--	--
Inorganics	Selenium	mg/kg	0-0,5	3	38	8	1.1	9.1	0.5	2.45	4.033	0.784	1.9	19.41	4.406	X	9.1	Max Detect	9.1	Max Detect
Inorganics	Silver	mg/kg	0-0,5	0	38	0	NA	NA	0.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Thallium	mg/kg	0-0,5	0	38	0	NA	NA	1	5	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Vanadium	mg/kg	0-0,5	38	38	100	12	52	NA	NA	28.03	28.03	28.5	73.96	8.6	--	--	--	--	--
Inorganics	Zinc	mg/kg	0-0,5	44	44	100	14	240	NA	NA	72.48	72.48	55.5	2268	47.63	X	86.5	95% H-UCL	79	Bootstrap BCA 95UCL
Volatile Organic Compounds	1,2,4-Trimethylbenzene	µg/kg	0-0,5	0	1	0	NA	NA	2,85	2,85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	1,3,5-Trimethylbenzene	µg/kg	0-0,5	0	1	0	NA	NA	2,85	2,85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Acetone	µg/kg	0-0,5	0	1	0	NA	NA	28,5	28,5	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Bromomethane	µg/kg	0-0,5	0	1	0	NA	NA	2,85	2,85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloro methane	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloroform	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Ethyl- benzene	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Isopropylbenzene	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl acetate	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl ethyl ketone	µg/kg	0-0,5	0	1	0	NA	NA	28,5	28,5	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methylene chloride	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Butylbenzene	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Propylbenzene	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	sec-Butylbenzene	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Toluene	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, m,p-	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, o-	µg/kg	0-0,5	0	1	0	NA	NA	2.85	2.85	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylenes, total	µg/kg	0-0,5	0	1	0	NA	NA	2,85	2,85	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	4-Methylphenol	µg/kg	0-0,5	0	25	0	NA	NA	165	850	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Bis (2-ethylhexyl) phthalate	µg/kg	0-0,5	0	25	0	NA	NA	165	850	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Butylbenzylphthalate	µg/kg	0-0,5	0	25	0	NA	NA	165	850	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Di-n-butyl phthalate	µg/kg	0-0,5	0	25	0	NA	NA	165	850	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Isophorone	µg/kg	0-0,5	0	25	0	NA	NA	165	850	NA	NA	NA	NA	NA	--	--	--	--	--

Table AOC10-3.1
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the Baseline (No Scouring) Scenario for AOC 10 (0 to 0,5 foot bgs and 0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Polycyclic Aromatic Hydrocarbons	PAH low molecular weight	µg/kg	0-0.5	18	35	51	5.4	279	0	0	45.13	23.21	23.5	4487	66.99	X	51.1	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	38.3	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	PAH high molecular weight	µg/kg	0-0.5	26	35	74	13.6	1880	0	0	400.9	297.8	197.5	190371	436.3	X	473	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	352	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	1-Methyl naphthalene	µg/kg	0-0.5	1	34	3	81	81	2.5	2.65	81	4.809	81	NA	NA	X	81	Max Detect	81	Max Detect
Polycyclic Aromatic Hydrocarbons	2-Methyl naphthalene	µg/kg	0-0.5	1	34	3	91	91	2.5	2.65	91	5.103	91	NA	NA	X	91	Max Detect	91	Max Detect
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/kg	0-0.5	0	34	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthylene	µg/kg	0-0.5	0	34	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Anthracene	µg/kg	0-0.5	2	34	6	6.4	7.9	2.5	2.65	7.15	2.774	7.15	1.125	1.061	X	7.9	Max Detect	7.9	Max Detect
Polycyclic Aromatic Hydrocarbons	Benzo (a) anthracene	µg/kg	0-0.5	21	34	62	5.1	140	2.5	2.6	30.3	19.67	20	1081	32.87	X	32.5	95% KM Adjusted Gamma UCL	23.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (a) pyrene	µg/kg	0-0.5	23	34	68	5.2	190	2.5	26	40.85	28.77	23	1991	44.62	X	46.4	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	34.9	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (b) fluoranthene	µg/kg	0-0.5	24	35	69	5.4	250	2.5	26	64.12	45.11	33.5	4542	67.39	X	71.4	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	53	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (ghi) perylene	µg/kg	0-0.5	23	35	66	5.8	110	2.5	26	28.88	20.25	18	705.6	26.56	X	35.8	KM H-UCL	24	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (k) fluoranthene	µg/kg	0-0.5	23	34	68	5.9	120	2.5	26	37.34	26.35	32	988.7	31.44	X	38.7	95% KM Adjusted Gamma UCL	29.7	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Chrysene	µg/kg	0-0.5	24	34	71	7	220	2.5	2.6	50.49	36.37	30	2698	51.94	X	57.2	95% KM Adjusted Gamma UCL	42	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Dibenzo (a,h) anthracene	µg/kg	0-0.5	9	34	26	6	33	2.5	26	16.59	6.412	17	74.17	8.612	X	8.79	95% KM (t) UCL	8.5	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluoranthene	µg/kg	0-0.5	26	35	74	5.2	360	2.5	2.6	73.67	55.37	42	7303	85.46	X	89.5	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	67	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluorene	µg/kg	0-0.5	0	34	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Indeno (1,2,3-cd) pyrene	µg/kg	0-0.5	22	34	65	6.4	120	2.5	26	28.7	19.86	19.5	782.2	27.97	X	30.6	95% KM Adjusted Gamma UCL	23.8	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Naphthalene	µg/kg	0-0.5	1	34	3	18	18	2.5	2.65	18	2.956	18	NA	NA	X	18	Max Detect	18	Max Detect
Polycyclic Aromatic Hydrocarbons	Phenanthrene	µg/kg	0-0.5	18	34	53	5.4	130	2.5	2.6	33.69	19.01	23.5	1123	33.52	X	31.9	95% KM Adjusted Gamma UCL	23.2	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Pyrene	µg/kg	0-0.5	26	35	74	5.2	340	2.5	2.6	67.72	50.95	39	6107	78.15	X	82.1	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	61.5	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	B(a)P equivalent	µg/kg	0-0.5	26	35	74	5.8	280	5.8	58	59.5	45.95	35	3927	62.67	X	70	95% KM Adjusted Gamma UCL	54.2	Bootstrap BCA 95UCL
Pesticides	4,4-DDE	µg/kg	0-0.5	0	9	0	NA	NA	1	1	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	4,4-DDT	µg/kg	0-0.5	0	9	0	NA	NA	1	1	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	Alpha-Chlordane	µg/kg	0-0.5	0	9	0	NA	NA	0.5	0.5	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	Dieldrin	µg/kg	0-0.5	0	9	0	NA	NA	1	1	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	Gamma-Chlordane	µg/kg	0-0.5	0	9	0	NA	NA	0.5	0.5	NA	NA	NA	NA	NA	--	--	--	--	--
Polychlorinated Biphenyls	Total PCBs	µg/kg	0-0.5	7	16	44	36	1010	24	25.5	199.4	100.7	66	128404	358.3	X	379	95% KM (Chebyshev) UCL	219	Bootstrap BCA 95UCL
Dioxins	TEQ Human	ng/kg	0-0.5	62	62	100	0.23	110	N/A	N/A	11.76	11.76	3.2	379	19.47	X	15.88	95% Student's-t UCL	8.05	Bootstrap BCA 95UCL
Dioxins	TEQ Avian	ng/kg	0-0.5	62	62	100	0.3	74	N/A	N/A	6.118	6.118	1.85	114.5	10.7	X	8.388	95% Student's-t UCL	4.81	Bootstrap BCA 95UCL
Dioxins	TEQ Mammals	ng/kg	0-0.5	62	62	100	0.23	110	N/A	N/A	11.76	11.76	3.2	379	19.47	X [e]	15.88	95% Student's-t UCL	8.05	Bootstrap BCA 95UCL
Dioxins	2,3,7,8-TCDD	ng/kg	0-0.5	2	13	15	2.4	4.1	0.027	0.205	3.25	0.523	3.25	1.445	1.202	X	4.1	Max Detect	4.1	Max Detect
Total Petroleum Hydrocarbons	TPH as diesel	mg/kg	0-0.5	1	25	4	13	13	5	5	13	5.32	13	NA	NA	X	13	Max Detect	13	Max Detect
Total Petroleum Hydrocarbons	TPH as motor oil	mg/kg	0-0.5	17	25	68	10.9	79	5	5	27.05	20	20.5	367.2	19.16	X	29.1	95% KM Adjusted Gamma UCL	22.8	Bootstrap BCA 95UCL

Table AOC10-3.1
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the Baseline (No Scouring) Scenario for AOC 10 (0 to 0,5 foot bgs and 0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Miscellaneous	Chloride	mg/kg	0-0.5	2	3	67	5.9	7	2	2	6.45	4.967	6.45	0.605	0.778	X	7	Max Detect	7	Max Detect
Miscellaneous	Sulfate	mg/kg	0-0.5	3	3	100	13.3	27.4	NA	NA	18.8	18.8	15.7	56.91	7.544	X	27.4	Max Detect	27.4	Max Detect
Inorganics	Aluminum	mg/kg	0-3	10	10	100	4900	18000	NA	NA	8870	8870	8150	13066778	3615	--	--	--	--	--
Inorganics	Antimony	mg/kg	0-3	1	40	3	3.5	3.5	1	2.45	3.5	1.063	3.5	NA	NA	X	3.5	Max Detect	3.5	Max Detect
Inorganics	Arsenic	mg/kg	0-3	39	40	98	1.3	9.3	1.05	1.05	5.026	4.927	4.27	4.276	2.068	X	5.6	95% GROS Adjusted Gamma UCL	5.37	Bootstrap BCA 95UCL
Inorganics	Barium	mg/kg	0-3	40	40	100	60.7	595	NA	NA	182.9	182.9	142	12881	113.5	--	--	--	--	--
Inorganics	Beryllium	mg/kg	0-3	0	40	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Cadmium	mg/kg	0-3	1	40	3	1.5	1.5	0.5	4.9	1.5	0.527	1.5	NA	NA	--	--	--	--	--
Inorganics	Chromium, hexavalent	mg/kg	0-3	65	106	61	0.167	7.3	0.1	2	1.294	0.836	0.827	2.003	1.415	X	1.108	KM H-UCL	0.98	Bootstrap BCA 95UCL
Inorganics	Chromium, total	mg/kg	0-3	106	106	100	6.8	243	N/A	N/A	41.44	41.44	31	1596	39.95	X	47.88	95% Student's-t UCL	40.0	Bootstrap BCA 95UCL
Inorganics	Cobalt	mg/kg	0-3	37	40	93	2.8	9.17	2.2	2.45	6.421	6.104	6.7	2.537	1.593	--	--	--	--	--
Inorganics	Copper	mg/kg	0-3	103	103	100	3.6	66.5	N/A	N/A	17.22	17.22	14	106.7	10.33	X	18.91	95% Student's-t UCL	17.0	Bootstrap BCA 95UCL
Inorganics	Cyanide	mg/kg	0-3	1	9	11	0.22	0.22	0.5	2.45	0.22	0.22	0.22	NA	NA	X	0.22	Max Detect	0.22	Max Detect
Inorganics	Iron	mg/kg	0-3	14	14	100	540	28000	NA	NA	14601	14601	14600	39957690	6321	--	--	--	--	--
Inorganics	Lead	mg/kg	0-3	40	40	100	2.67	160	NA	NA	17.42	17.42	11.6	604	24.58	X	22.2	95% Adjusted Gamma UCL	21.6	Bootstrap BCA 95UCL
Inorganics	Manganese	mg/kg	0-3	10	10	100	160	1300	NA	NA	375	375	265	114117	337.8	X	625	95% Adjusted Gamma UCL	547	Bootstrap BCA 95UCL
Inorganics	Mercury	mg/kg	0-3	2	40	5	0.15	0.33	0.0095	0.055	0.24	0.021	0.24	0.0162	0.127	X	0.33	Max Detect	0.33	Max Detect
Inorganics	Molybdenum	mg/kg	0-3	15	40	38	0.7	12.1	0.5	2.55	2.473	1.291	1.3	10.35	3.218	X	2.81	95% KM (Chebyshev) UCL	2.33	Bootstrap BCA 95UCL
Inorganics	Nickel	mg/kg	0-3	45	48	94	5.77	25	2.2	2.45	15.07	14.26	15	17.78	4.217	--	--	--	--	--
Inorganics	Selenium	mg/kg	0-3	3	40	8	1.1	9.1	0.5	2.45	4.033	0.769	1.9	19.41	4.406	X	9.1	Max Detect	9.1	Max Detect
Inorganics	Silver	mg/kg	0-3	0	40	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Thallium	mg/kg	0-3	1	40	3	6.1	6.1	1	5	6.1	1.128	6.1	NA	NA	X	6.1	Max Detect	6.1	Max Detect
Inorganics	Vanadium	mg/kg	0-3	40	40	100	14	49	NA	NA	28.61	28.61	29.85	55.02	7.417	--	--	--	--	--
Inorganics	Zinc	mg/kg	0-3	48	48	100	20.3	300	NA	NA	86.74	86.74	57.15	4162	64.52	X	104	95% H-UCL	90.4	Bootstrap BCA 95UCL
Volatile Organic Compounds	1,2,4-Trimethylbenzene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	1,3,5-Trimethylbenzene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Acetone	µg/kg	0-3	0	12	0	NA	NA	22.5	5500	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Bromomethane	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloro methane	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloroform	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Ethyl- benzene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Isopropylbenzene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl acetate	µg/kg	0-3	0	8	0	NA	NA	2.85	4.45	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl ethyl ketone	µg/kg	0-3	0	21	0	NA	NA	22.5	5500	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methylene chloride	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Butylbenzene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Propylbenzene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	sec-Butylbenzene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Toluene	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, m,p-	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, o-	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylenes, total	µg/kg	0-3	0	21	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	4-Methylphenol	µg/kg	0-3	0	25	0	NA	NA	165	623	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Bis (2-ethylhexyl) phthalate	µg/kg	0-3	0	25	0	NA	NA	165	623	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Butylbenzylphthalate	µg/kg	0-3	0	25	0	NA	NA	165	623	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Di-n-butyl phthalate	µg/kg	0-3	0	25	0	NA	NA	165	623	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Isophorone	µg/kg	0-3	0	25	0	NA	NA	165	623	NA	NA	NA	NA	NA	--	--	--	--	--

Table AOC10-3.1
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the Baseline (No Scouring) Scenario for AOC 10 (0 to 0,5 foot bgs and 0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Polycyclic Aromatic Hydrocarbons	PAH low molecular weight	µg/kg	0-3	19	35	54	3.1	214	0	0	38.87	21.1	17.3	2680	51.77	X	42.2	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	31.9	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	PAH high molecular weight	µg/kg	0-3	26	35	74	9.07	1560	0	0	379.8	282.1	202	191803	438	X	459	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	352	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	1-Methyl naphthalene	µg/kg	0-3	1	34	3	55.9	55.9	2.5	2.65	55.9	4.071	55.9	NA	NA	X	55.9	Max Detect	55.9	Max Detect
Polycyclic Aromatic Hydrocarbons	2-Methyl naphthalene	µg/kg	0-3	1	34	3	62.9	62.9	2.5	2.65	62.9	4.276	62.9	NA	NA	X	62.9	Max Detect	62.9	Max Detect
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/kg	0-3	0	34	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthylene	µg/kg	0-3	0	34	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Anthracene	µg/kg	0-3	4	34	12	4.5	6.12	2.5	2.65	5.415	2.843	5.52	0.654	0.809	X	3.17	95% KM (t) UCL	3.1	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (a) anthracene	µg/kg	0-3	21	34	62	4.25	106	2.5	2.62	31.17	20.21	16.9	1123	33.5	X	33.3	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	24	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (a) pyrene	µg/kg	0-3	23	34	68	4.32	147	2.5	18.2	39.39	27.64	25	1841	42.91	X	44.6	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	34.3	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (b) fluoranthene	µg/kg	0-3	24	35	69	4.45	191	2.5	18.2	57.74	40.63	34.15	3380	58.14	X	63.2	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	48.5	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (ghi) perylene	µg/kg	0-3	23	35	66	5.72	121	2.5	18.2	28.01	19.51	14.9	904.1	30.07	X	30.9	95% KM Adjusted Gamma UCL	26	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (k) fluoranthene	µg/kg	0-3	23	34	68	4.78	156	2.5	18.2	36.15	25.5	22.2	1463	38.25	X	40.5	95% KM Adjusted Gamma UCL	32.5	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Chrysene	µg/kg	0-3	24	34	71	5.52	183	2.5	2.62	49.78	35.88	26.3	2799	52.91	X	57.1	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	43.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Dibenzo (a,h) anthracene	µg/kg	0-3	11	34	32	3.67	33.7	2.5	18.2	14.42	6.45	10.7	101.7	10.09	X	8.84	95% KM (t) UCL	8.71	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluoranthene	µg/kg	0-3	26	35	74	5.2	277	2.5	2.62	70.43	52.96	39.75	6987	83.59	X	86.4	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	65.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluorene	µg/kg	0-3	0	34	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Indeno (1,2,3-cd) pyrene	µg/kg	0-3	22	34	65	5.12	115	2.5	18.2	28.08	19.28	15.55	913	30.22	X	31	95% KM Adjusted Gamma UCL	25.1	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Naphthalene	µg/kg	0-3	1	34	3	12.9	12.9	2.42	2.65	12.9	2.728	12.9	NA	NA	X	12.9	Max Detect	12.9	Max Detect
Polycyclic Aromatic Hydrocarbons	Phenanthrene	µg/kg	0-3	19	34	56	4.45	98	2.5	2.62	31.47	18.69	18.2	911.2	30.19	X	30.3	95% KM Adjusted Gamma UCL	22.8	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Pyrene	µg/kg	0-3	26	35	74	5.2	257	2.5	2.62	65.25	49.12	36.75	5768	75.94	X	79.4	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	60.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	B(a)P equivalent	µg/kg	0-3	26	35	74	5.8	223	5.8	40.7	56.62	43.7	38.5	3770	61.4	X	67.4	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	53.5	Bootstrap BCA 95UCL
Pesticides	4,4-DDE	µg/kg	0-3	0	9	0	NA	NA	1	1	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	4,4-DDT	µg/kg	0-3	0	9	0	NA	NA	1	1	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	Alpha-Chlordane	µg/kg	0-3	0	9	0	NA	NA	0.5	0.5	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	Dieldrin	µg/kg	0-3	0	9	0	NA	NA	1	1	NA	NA	NA	NA	NA	--	--	--	--	--
Pesticides	Gamma-Chlordane	µg/kg	0-3	0	9	0	NA	NA	0.5	0.5	NA	NA	NA	NA	NA	--	--	--	--	--
Polychlorinated Biphenyls	Total PCBs	µg/kg	0-3	7	16	44	32.5	940	24	26	183.1	93.61	60.7	111801	334.4	X	352	95% KM (Chebyshev) UCL	206	Bootstrap BCA 95UCL
Dioxins	TEQ Human	ng/kg	0-3	81	81	100	0.23	210	N/A	N/A	18.77	18.77	4.1	1451	38.09	X	25.82	95% Student's-t UCL	19.1	Bootstrap BCA 95UCL
Dioxins	TEQ Avian	ng/kg	0-3	81	81	100	0.3	150	N/A	N/A	10.87	10.87	3	654.1	25.58	X	15.6	95% Student's-t UCL	11.8	Bootstrap BCA 95UCL
Dioxins	TEQ Mammals	ng/kg	0-3	81	81	100	0.23	210	N/A	N/A	18.77	18.77	4.1	1451	38.09	X	25.82	95% Student's-t UCL	19.1	Bootstrap BCA 95UCL
Dioxins	2,3,7,8-TCDD	ng/kg	0-3	3	13	23	0.21	3.13	0.0385	0.37	1.66	0.416	1.64	2.132	1.46	X	3.13	Max Detect	3.13	Max Detect

Table AOC10-3.1
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the Baseline (No Scouring) Scenario for AOC 10 (0 to 0.5 foot bgs and 0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Total Petroleum Hydrocarbons	TPH as diesel	mg/kg	0-3	2	25	8	13.7	20.6	5	5	17.15	5.972	17.15	23.81	4.879	X	20.6	Max Detect	20.6	Max Detect
Total Petroleum Hydrocarbons	TPH as gasoline	mg/kg	0-3	0	23	0	NA	NA	0.47	0.95	NA	NA	NA	NA	NA	--	--	--	--	--
Total Petroleum Hydrocarbons	TPH as motor oil	mg/kg	0-3	19	25	76	8.43	79.5	5	5	28.58	22.92	22.5	388.5	19.71	X	32.4	95% KM Adjusted Gamma UCL	26.9	Bootstrap BCA 95UCL
Miscellaneous	Chloride	mg/kg	0-3	3	4	75	3.7	7	2	2	5.533	4.65	5.9	2.823	1.68	X	7	Max Detect	7	Max Detect
Miscellaneous	Sulfate	mg/kg	0-3	4	4	100	7.3	27.4	NA	NA	15.93	15.93	14.5	71	8.426	X	27.4	Max Detect	27.4	Max Detect

Notes:

[a] The constituents presented consists of analytes detected at least once at the Topock Compressor Station site and measured in soil in this exposure area. The datasets for chromium (total and hexavalent), copper, and dioxins (TEQ Human, TEQ Mammal, and TEQ Avian) were updated to reflect the non-time critical removal actions outlined in Arcadis (2024).

[b] COPCs selected in the 2019 Soil Risk Assessment (Arcadis 2019) were also evaluated in this Post-NTCRA HHERA; and only risk-driving COPECs were evaluated in this Post-NTCRA HHERA (see footnote e).

[c] If fewer than eight total locations and four total detected concentrations, the maximum depth-weighted concentration was selected as the EPC. Otherwise, the UCL was selected as the EPC.

[d] EPCs and summary statistics were not calculated for some constituents (i.e., dioxin congeners and essential nutrients). Those data, if available, are presented in Attachment A1 of each exposure area-specific appendix in the Soil Human Health and Ecological Risk Assessment Report (Arcadis 2019).

[e] Identifed as a COPEC for the Post-NTCRA HHERA.

Abbreviations:

"--" = not applicable
AOC = area of concern
B(a)P equivalent = benzo(a)pyrene equivalent
BCA = Bias-corrected accelerated bootstrap method
COPC = constituent of potential concern
COPEC = constituent of potential ecological concern
DDE = Dichlorodiphenyldichloroethylene
DDT = Dichlorodiphenyltrichloroethane
EPC = exposure point concentration
FOD = frequency of detection
ft bgs = feet below ground surface
KM = Kaplan-Meier
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
NA = not applicable
ND = not detected
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
PG&E = Pacific Gas and Electric Company
TCDD = Tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
TPH = total petroleum hydrocarbons
UCL = upper confidence limit
X = COPC/COPEC in the exposure depth interval

References:

Arcadis. 2019. Final Soil Human Health and Ecological Risk Assessment Report, Topock Compressor Station, Needles, California.
Arcadis. 2024. Soil Risk Assessment Addendum: Proposed Approach to Update the Human Health and Ecological Risk Assessment after Completion of the 2023 Non-Time Critical Removal Action. January 30.

Table AOC10-3.2
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 2-Foot Scouring Scenario for AOC 10 (2 to 3 feet bgs and 2 to 6 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	C O P C/ C O P E C? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Inorganics	Antimony	mg/kg	2-3	1	33	3	3.5	3.5	1	1.1	3.5	1.076	3.5	NA	NA	X	3.5	Max Detect	3.5	Max Detect
Inorganics	Arsenic	mg/kg	2-3	31	33	94	1.2	8.9	0.5	1.05	4.313	4.082	3.9	3.129	1.769	X	4.79	95% GROS Adjusted Gamma UCL	4.59	Bootstrap BCA 95UCL
Inorganics	Barium	mg/kg	2-3	33	33	100	44	410	NA	NA	169.7	169.7	140	7946	89.14	--	--	--	--	--
Inorganics	Beryllium	mg/kg	2-3	0	33	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Cadmium	mg/kg	2-3	1	33	3	1.5	1.5	0.5	0.55	1.5	0.53	1.5	NA	NA	--	--	--	--	--
Inorganics	Chromium, hexavalent	mg/kg	2-3	11	25	44	0.24	7.3	0.1	0.21	1.265	0.613	0.47	4.312	2.076	X	1.128	95% KM (t) UCL	1.7	Bootstrap BCA 95UCL
Inorganics	Chromium, total	mg/kg	2-3	25	25	100	7.4	73	N/A	N/A	29.78	29.78	27	241.8	15.55	X [e]	35.1	95% Student's-t UCL	36.9	Bootstrap BCA 95UCL
Inorganics	Cobalt	mg/kg	2-3	33	33	100	3	10	NA	NA	6.912	6.912	7	2.775	1.666	--	--	--	--	--
Inorganics	Copper	mg/kg	2-3	25	25	100	5.6	31	N/A	N/A	13.93	13.93	13	30.51	5.523	X	15.82	95% Student's-t UCL	16.4	Bootstrap BCA 95UCL
Inorganics	Lead	mg/kg	2-3	32	33	97	2	160	2.55	2.55	16.15	15.73	7.45	804.9	28.37	X	29.5	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	19.6	Bootstrap BCA 95UCL
Inorganics	Mercury	mg/kg	2-3	2	33	6	0.15	0.33	0.05	0.055	0.24	0.0615	0.24	0.0162	0.127	X	0.33	Max Detect	0.33	Max Detect
Inorganics	Molybdenum	mg/kg	2-3	10	33	30	1.1	8.2	0.5	2.55	2.45	1.105	1.45	4.749	2.179	X	1.29	KM H-UCL	1.66	Bootstrap BCA 95UCL
Inorganics	Nickel	mg/kg	2-3	38	38	100	6.3	26	NA	NA	16.12	16.12	16	22.15	4.707	--	--	--	--	--
Inorganics	Selenium	mg/kg	2-3	0	33	0	NA	NA	0.5	0.7	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Silver	mg/kg	2-3	0	33	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Thallium	mg/kg	2-3	1	33	3	6.1	6.1	1	5	6.1	1.155	6.1	NA	NA	X	6.1	Max Detect	6.1	Max Detect
Inorganics	Vanadium	mg/kg	2-3	33	33	100	16	43	NA	NA	30.03	30.03	31	48.34	6.953	--	--	--	--	--
Inorganics	Zinc	mg/kg	2-3	38	38	100	21	300	NA	NA	86.69	86.69	56.5	5379	73.34	X	139	95% Chebyshev (Mean, Sd) UCL	91.1	Bootstrap BCA 95UCL
Volatile Organic Compounds	1,2,4-Trimethylbenzene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	1,3,5-Trimethylbenzene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Acetone	µg/kg	2-3	0	11	0	NA	NA	22.5	5500	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Bromomethane	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloro methane	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloroform	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Ethyl- benzene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Isopropylbenzene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl acetate	µg/kg	2-3	0	7	0	NA	NA	2.9	4.45	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl ethyl ketone	µg/kg	2-3	0	20	0	NA	NA	22.5	5500	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methylene chloride	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Butylbenzene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Propylbenzene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	sec-Butylbenzene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Toluene	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, m,p-	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, o-	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylenes, total	µg/kg	2-3	0	20	0	NA	NA	2.25	550	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	4-Methylphenol	µg/kg	2-3	0	23	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Bis (2-ethylhexyl) phthalate	µg/kg	2-3	0	23	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Butylbenzylphthalate	µg/kg	2-3	0	23	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Di-n-butyl phthalate	µg/kg	2-3	0	23	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Isophorone	µg/kg	2-3	0	23	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--

Table AOC10-3.2
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 2-Foot Scouring Scenario for AOC 10 (2 to 3 feet bgs and 2 to 6 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	C O P C/ C O P E C? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Polycyclic Aromatic Hydrocarbons	PAH low molecular weight	µg/kg	2-3	10	30	33	9.3	200	0	0	58.57	19.52	35	3440	58.65	X	33.4	95% KM (t) UCL	31.1	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	PAH high molecular weight	µg/kg	2-3	14	30	47	10.6	3060	0	0	618.3	288.5	247	760023	871.8	X	699	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	493	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	1-Methyl naphthalene	µg/kg	2-3	1	30	3	5.8	5.8	2.5	2.65	5.8	2.61	5.8	NA	NA	X	5.8	Max Detect	5.8	Max Detect
Polycyclic Aromatic Hydrocarbons	2-Methyl naphthalene	µg/kg	2-3	1	30	3	6.8	6.8	2.5	2.65	6.8	2.643	6.8	NA	NA	X	6.8	Max Detect	6.8	Max Detect
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/kg	2-3	0	30	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthylene	µg/kg	2-3	0	30	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Anthracene	µg/kg	2-3	3	30	10	5.4	9.8	2.5	2.65	7.867	3.037	8.4	5.053	2.248	X	9.8	Max Detect	9.8	Max Detect
Polycyclic Aromatic Hydrocarbons	Benzo (a) anthracene	µg/kg	2-3	10	30	33	8.4	230	2.5	2.65	66.04	23.68	43.5	6160	78.48	X	56.3	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	35.8	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (a) pyrene	µg/kg	2-3	10	30	33	8.9	290	2.5	25.5	77.79	27.66	45.5	7979	89.32	X	64.9	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	48.1	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (b) fluoranthene	µg/kg	2-3	13	30	43	7.6	370	2.5	2.65	79.62	35.92	43	10436	102.2	X	81	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	61	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (ghi) perylene	µg/kg	2-3	9	30	30	7.7	240	2.5	25.5	59.97	19.82	43	5163	71.86	X	34.8	95% KM (t) UCL	36.8	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (k) fluoranthene	µg/kg	2-3	9	30	30	11	300	2.5	25.5	79.22	25.58	27	9580	97.88	X	45.8	95% KM (t) UCL	48.4	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Chrysene	µg/kg	2-3	13	30	43	5.2	350	2.5	2.65	86.52	38.91	58	10831	104.1	X	84.5	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	58.2	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Dibenzo (a,h) anthracene	µg/kg	2-3	7	30	23	5.8	61	2.5	25.5	22.44	7.216	18	381.1	19.52	X	11.3	95% KM (t) UCL	11.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluoranthene	µg/kg	2-3	14	30	47	5.4	530	2.5	2.65	114.9	54.95	39.5	25411	159.4	X	128	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	89	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluorene	µg/kg	2-3	0	30	0	NA	NA	2.5	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Indeno (1,2,3-cd) pyrene	µg/kg	2-3	9	30	30	7	230	2.5	25.5	58.78	19.45	41	4826	69.47	X	47.4	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	37.1	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Naphthalene	µg/kg	2-3	0	30	0	NA	NA	2.25	2.65	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Phenanthrene	µg/kg	2-3	10	30	33	9.3	190	2.5	2.65	54.93	19.98	35	3023	54.99	X	32.7	95% KM (t) UCL	32.4	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Pyrene	µg/kg	2-3	14	30	47	5.2	500	2.5	2.65	108.2	51.82	43	21244	145.8	X	118	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	82.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	B(a)P equivalent	µg/kg	2-3	14	30	47	5.9	430	5.8	6.1	88.79	44.53	43.5	14464	120.3	X	96.9	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	73	Bootstrap BCA 95UCL
Polychlorinated Biphenyls	Total PCBs	µg/kg	2-3	3	12	25	50	799	25.5	34	311.3	96.96	85	178670	422.7	X	799	Max Detect	799	Max Detect
Dioxins	TEQ Human	ng/kg	2-3	13	15	87	0.2	210	0.35	2.3	50.09	43.45	13	6276	79.22	X	125.7	95% KM Adjusted Gamma UCL	112.2	Bootstrap BCA 95UCL
Dioxins	TEQ Avian	ng/kg	2-3	13	15	87	0.35	150	0.55	3.4	33.79	29.37	5.5	3070	55.41	X	53.43	KM (t) UCL	83.6	Bootstrap BCA 95UCL
Dioxins	TEQ Mammals	ng/kg	2-3	13	15	87	0.2	210	0.35	2.3	50.09	43.45	13	6276	79.22	X [e]	125.7	95% KM Adjusted Gamma UCL	112.2	Bootstrap BCA 95UCL
Dioxins	2,3,7,8-TCDD	ng/kg	2-3	1	13	8	0.22	0.22	0.0355	1.2	0.22	0.056	0.22	NA	NA	X	0.22	Max Detect	0.22	Max Detect
Total Petroleum Hydrocarbons	TPH as diesel	mg/kg	2-3	2	24	8	15	51.8	5	5	33.4	7.367	33.4	677.1	26.02	X	51.8	Max Detect	51.8	Max Detect
Total Petroleum Hydrocarbons	TPH as gasoline	mg/kg	2-3	0	23	0	NA	NA	0.47	0.95	NA	NA	NA	NA	NA	--	--	--	--	--
Total Petroleum Hydrocarbons	TPH as motor oil	mg/kg	2-3	16	24	67	12	207	5	5	42.15	29.77	24.45	2398	48.97	X	49.1	KM H-UCL	47.1	Bootstrap BCA 95UCL

Table AOC10-3.2
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 2-Foot Scouring Scenario for AOC 10 (2 to 3 feet bgs and 2 to 6 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	C O P C/ C O P E C? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Inorganics	Antimony	mg/kg	2-6	1	34	3	3.5	3.5	1	1.3	3.5	1.074	3.5	NA	NA	X	3.5	Max Detect	3.5	Max Detect
Inorganics	Arsenic	mg/kg	2-6	33	34	97	1.3	9.2	1.05	1.05	4.551	4.448	4.2	3.619	1.902	X	5.02	95% KM (t) UCL	4.9	Bootstrap BCA 95UCL
Inorganics	Barium	mg/kg	2-6	34	34	100	75.5	610	NA	NA	181	181	145	11288	106.2	--	--	--	--	--
Inorganics	Beryllium	mg/kg	2-6	0	34	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Cadmium	mg/kg	2-6	1	34	3	1.5	1.5	0.5	0.625	1.5	0.529	1.5	NA	NA	--	--	--	--	--
Inorganics	Chromium, hexavalent	mg/kg	2-6	25	45	56	0.24	8.3	0.08	0.21	1.319	0.769	0.51	4.212	2.052	X	1.183	95% KM (t) UCL	1.1	Bootstrap BCA 95UCL
Inorganics	Chromium, total	mg/kg	2-6	45	45	100	7.43	400	N/A	N/A	42.58	42.58	29	3308	57.52	X	56.99	95% Student's-t UCL	47.5	Bootstrap BCA 95UCL
Inorganics	Cobalt	mg/kg	2-6	34	34	100	3.05	9.98	NA	NA	7.213	7.213	7.19	2.334	1.528	--	--	--	--	--
Inorganics	Copper	mg/kg	2-6	44	44	100	5.65	60	N/A	N/A	15.85	15.85	14	73.19	8.555	X	17.66	95% H-UCL	14.9	Bootstrap BCA 95UCL
Inorganics	Lead	mg/kg	2-6	34	34	100	1.95	160	NA	NA	14.07	14.07	6.565	734.4	27.1	X	18.4	95% H-UCL	20	Bootstrap BCA 95UCL
Inorganics	Mercury	mg/kg	2-6	2	34	6	0.15	0.33	0.05	0.055	0.24	0.0612	0.24	0.0162	0.127	X	0.33	Max Detect	0.33	Max Detect
Inorganics	Molybdenum	mg/kg	2-6	10	34	29	1.08	7.2	0.5	2.55	2.219	1.041	1.215	3.705	1.925	X	2.04	95% KM (Chebyshev) UCL	1.47	Bootstrap BCA 95UCL
Inorganics	Nickel	mg/kg	2-6	39	39	100	6.33	25.8	NA	NA	16.61	16.61	16.5	19.82	4.452	--	--	--	--	--
Inorganics	Selenium	mg/kg	2-6	0	34	0	NA	NA	0.5	0.7	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Silver	mg/kg	2-6	0	34	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Thallium	mg/kg	2-6	1	34	3	6.1	6.1	1	5	6.1	1.15	6.1	NA	NA	X	6.1	Max Detect	6.1	Max Detect
Inorganics	Vanadium	mg/kg	2-6	34	34	100	16.3	43.8	NA	NA	30.81	30.81	32	43.55	6.599	--	--	--	--	--
Inorganics	Zinc	mg/kg	2-6	39	39	100	20.8	300	NA	NA	83.83	83.83	54.3	4960	70.43	X	133	95% Chebyshev (Mean, Sd) UCL	88	Bootstrap BCA 95UCL
Volatile Organic Compounds	1,2,4-Trimethylbenzene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	1,3,5-Trimethylbenzene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Acetone	µg/kg	2-6	0	12	0	NA	NA	21.5	5500	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Bromomethane	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloro methane	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloroform	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Ethyl- benzene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Isopropylbenzene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl acetate	µg/kg	2-6	0	7	0	NA	NA	2.9	4.45	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl ethyl ketone	µg/kg	2-6	0	21	0	NA	NA	21.5	5500	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methylene chloride	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Butylbenzene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Propylbenzene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	sec-Butylbenzene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Toluene	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, m,p-	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, o-	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylenes, total	µg/kg	2-6	0	21	0	NA	NA	2.15	550	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	4-Methylphenol	µg/kg	2-6	0	24	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Bis (2-ethylhexyl) phthalate	µg/kg	2-6	0	24	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Butylbenzylphthalate	µg/kg	2-6	0	24	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Di-n-butyl phthalate	µg/kg	2-6	0	24	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Isophorone	µg/kg	2-6	0	24	0	NA	NA	165	420	NA	NA	NA	NA	NA	--	--	--	--	--

Table AOC10-3.2
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 2-Foot Scouring Scenario for AOC 10 (2 to 3 feet bgs and 2 to 6 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	C O P C/ C O P E C? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Polycyclic Aromatic Hydrocarbons	PAH low molecular weight	µg/kg	2-6	10	31	32	6.98	150	0	0	47.78	15.41	27.5	2132	46.17	X	26.2	95% KM (t) UCL	22.7	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	PAH high molecular weight	µg/kg	2-6	14	31	45	7.95	2310	0	0	481.2	217.3	213	427431	653.8	X	512	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	333	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	1-Methyl naphthalene	µg/kg	2-6	1	31	3	4.99	4.99	2.5	2.63	4.99	2.58	4.99	NA	NA	X	4.99	Max Detect	4.99	Max Detect
Polycyclic Aromatic Hydrocarbons	2-Methyl naphthalene	µg/kg	2-6	1	31	3	5.74	5.74	2.5	2.63	5.74	2.605	5.74	NA	NA	X	5.74	Max Detect	5.74	Max Detect
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/kg	2-6	0	31	0	NA	NA	2.5	2.63	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthylene	µg/kg	2-6	0	31	0	NA	NA	2.5	2.63	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Anthracene	µg/kg	2-6	3	31	10	4.69	7.99	2.5	2.63	6.54	2.891	6.94	2.843	1.686	X	7.99	Max Detect	7.99	Max Detect
Polycyclic Aromatic Hydrocarbons	Benzo (a) anthracene	µg/kg	2-6	10	31	32	8.4	173	2.51	2.63	51.35	18.26	34.4	3411	58.4	X	41.1	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	24.9	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (a) pyrene	µg/kg	2-6	10	31	32	7.31	219	2.51	25.5	60.94	21.44	39.65	4437	66.61	X	47.7	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	31.9	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (b) fluoranthene	µg/kg	2-6	13	31	42	7.6	279	2.51	8.36	62.19	27.55	32.9	5830	76.35	X	59.5	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	40.4	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (ghi) perylene	µg/kg	2-6	9	31	29	6.41	181	2.51	25.5	46.32	15.29	32.9	2888	53.74	X	26.2	95% KM (t) UCL	25.5	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (k) fluoranthene	µg/kg	2-6	9	31	29	8.89	227	2.51	25.5	61.17	19.61	20.9	5437	73.74	X	34.5	95% KM (t) UCL	32.5	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Chrysene	µg/kg	2-6	13	31	42	5.2	264	2.51	2.63	68.89	30.35	44.9	6133	78.31	X	49	95% KM (t) UCL	40.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Dibenzo (a,h) anthracene	µg/kg	2-6	7	31	23	4.99	46.4	2.51	25.5	17.66	6.008	15.4	213.3	14.61	X	9.01	95% KM (t) UCL	8.82	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluoranthene	µg/kg	2-6	14	31	45	4.69	400	2.51	2.63	90.18	42.1	33.2	14466	120.3	X	94.4	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	59.7	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluorene	µg/kg	2-6	0	31	0	NA	NA	2.5	2.63	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Indeno (1,2,3-cd) pyrene	µg/kg	2-6	9	31	29	5.89	173	2.51	25.5	45.34	15	31.4	2684	51.81	X	34.5	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	24.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Naphthalene	µg/kg	2-6	0	31	0	NA	NA	2.15	2.63	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Phenanthrene	µg/kg	2-6	10	31	32	7.61	143	2.51	2.63	45.41	16.35	27.8	1883	43.39	X	26.2	95% KM (t) UCL	23	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Pyrene	µg/kg	2-6	14	31	45	4.54	377	2.51	2.63	85.15	39.83	38.05	12022	109.6	X	87.1	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	55.9	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	B(a)P equivalent	µg/kg	2-6	14	31	45	5.9	325	5.83	18.8	70.71	35.15	38.85	8102	90.01	X	71.8	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	50.9	Bootstrap BCA 95UCL
Polychlorinated Biphenyls	Total PCBs	µg/kg	2-6	3	12	25	50	659	25.5	34	264.7	85.29	85	116930	342	X	659	Max Detect	659	Max Detect
Dioxins	TEQ Human	ng/kg	2-6	21	22	95	0.24	880	2.3	2.3	84.94	81.11	16	36829	191.9	X	242.6	95% KM Adjusted Gamma UCL	117.5	Bootstrap BCA 95UCL
Dioxins	TEQ Avian	ng/kg	2-6	21	22	95	0.373	420	3.4	3.4	48.82	46.65	6.6	9012	94.93	X	118.3	95% KM Adjusted Gamma UCL	74.9	Bootstrap BCA 95UCL
Dioxins	TEQ Mammals	ng/kg	2-6	21	22	95	0.24	880	2.3	2.3	84.94	81.11	16	36829	191.9	X	242.6	95% KM Adjusted Gamma UCL	117.5	Bootstrap BCA 95UCL
Dioxins	2,3,7,8-TCDD	ng/kg	2-6	1	13	8	0.22	0.22	0.0351	1.19	0.22	0.0556	0.22	NA	NA	X	0.22	Max Detect	0.22	Max Detect

Table AOC10-3.2
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 2-Foot Scouring Scenario for AOC 10 (2 to 3 feet bgs and 2 to 6 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	C O P C/ C O P E C? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Total Petroleum Hydrocarbons	TPH as diesel	mg/kg	2-6	4	25	16	6.53	51.8	5	5	20.78	7.525	12.4	435.3	20.86	X	12.6	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	13.1	Bootstrap BCA 95UCL
Total Petroleum Hydrocarbons	TPH as gasoline	mg/kg	2-6	0	24	0	NA	NA	0.478	0.913	NA	NA	NA	NA	NA	--	--	--	--	--
Total Petroleum Hydrocarbons	TPH as motor oil	mg/kg	2-6	16	25	64	12	207	5	5	37.89	26.05	23.8	2288	47.84	X	39.2	KM H-UCL	43.9	Bootstrap BCA 95UCL

Notes:

[a] The constituents presented consists of analytes detected at least once at the Topock Compressor Station site and measured in soil in this exposure area. The datasets for chromium (total and hexavalent), copper, and dioxins (TEQ Human, TEQ Mammal, and TEQ Avian) were updated to reflect the non-time critical removal actions outlined in Arcadis (2024).

[b] COPCs selected in the 2019 Soil Risk Assessment (Arcadis 2019) were also evaluated in this Post-NTCRA HHERA; and only risk-driving COPECs were evaluated in this Post-NTCRA HHERA (see footnote e).

[c] If fewer than eight total locations and four total detected concentrations, the maximum depth-weighted concentration was selected as the EPC. Otherwise, the UCL was selected as the EPC.

[d] EPCs and summary statistics were not calculated for some constituents (i.e., dioxin congeners and essential nutrients). Those data, if available, are presented in Attachment A1 of each exposure area-specific appendix in the Soil Human Health and Ecological Risk Assessment Report (Arcadis 2019).

[e] Identifed as a COPEC for the Post-NTCRA HHERA.

Abbreviations:

"--" = not applicable
AOC = area of concern
B(a)P equivalent = benzo(a)pyrene equivalent
BCA = Bias-corrected accelerated bootstrap method
COPC = constituent of potential concern
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
FOD = frequency of detection
ft bgs = feet below ground surface
KM = Kaplan-Meier
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
NA = not applicable
ND = not detected
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
PG&E = Pacific Gas and Electric Company
TCDD = Tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
TPH = total petroleum hydrocarbons
UCL = upper confidence limit
X = COPC/COPEC in the exposure depth interval

References:

Arcadis. 2019. Final Soil Human Health and Ecological Risk Assessment Report, Topock Compressor Station, Needles, California.
Arcadis. 2024. Soil Risk Assessment Addendum: Proposed Approach to Update the Human Health and Ecological Risk Assessment after Completion of the 2023 Non-Time Critical Removal Action. January 30.

Table AOC10-3.3
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 5-Foot Scouring Scenario for AOC 10 (5 to 6 feet bgs and 5 to 10 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Inorganics	Antimony	mg/kg	5-6	0	27	0	NA	NA	1	2.05	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Arsenic	mg/kg	5-6	27	27	100	2.4	12	NA	NA	5.126	5.126	4.6	5.172	2.274	X	5.87	95% Student's-t UCL	5.97	Bootstrap BCA 95UCL
Inorganics	Barium	mg/kg	5-6	27	27	100	75	1300	NA	NA	204.7	204.7	150	52456	229	--	--	--	--	--
Inorganics	Beryllium	mg/kg	5-6	0	27	0	NA	NA	0.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Cadmium	mg/kg	5-6	0	27	0	NA	NA	0.5	1	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Chromium, hexavalent	mg/kg	5-6	9	23	39	0.42	1.4	0.1	0.21	0.74	0.35	0.66	0.1	0.317	X	0.489	95% KM (t) UCL	0.42	Bootstrap BCA 95UCL
Inorganics	Chromium, total	mg/kg	5-6	23	23	100	7.5	92	N/A	N/A	36.41	36.41	32	369.7	19.23	X	44.64	95% Adjusted Gamma UCL	39.59	Bootstrap BCA 95UCL
Inorganics	Cobalt	mg/kg	5-6	27	27	100	3.2	11	NA	NA	8.23	8.23	8.6	3.802	1.95	--	--	--	--	--
Inorganics	Copper	mg/kg	5-6	23	23	100	5.8	41	N/A	N/A	16.05	16.05	16	50.44	7.102	X	18.6	95% Student's-t UCL	18.44	Bootstrap BCA 95UCL
Inorganics	Lead	mg/kg	5-6	27	27	100	1.5	17	NA	NA	4.778	4.778	4.2	8.539	2.922	X	5.74	95% Adjusted Gamma UCL	5.98	Bootstrap BCA 95UCL
Inorganics	Mercury	mg/kg	5-6	0	27	0	NA	NA	0.05	0.055	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Molybdenum	mg/kg	5-6	3	27	11	1	4.2	0.5	2.6	2.367	0.733	1.9	2.723	1.65	X	4.2	Max Detect	4.2	Max Detect
Inorganics	Nickel	mg/kg	5-6	27	27	100	6.4	28	NA	NA	18.21	18.21	18	26.56	5.153	--	--	--	--	--
Inorganics	Selenium	mg/kg	5-6	0	27	0	NA	NA	0.5	1	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Silver	mg/kg	5-6	0	27	0	NA	NA	0.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Thallium	mg/kg	5-6	0	27	0	NA	NA	1	5	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Vanadium	mg/kg	5-6	27	27	100	16	46	NA	NA	33.26	33.26	31	62.28	7.892	--	--	--	--	--
Inorganics	Zinc	mg/kg	5-6	27	27	100	20	100	NA	NA	52.81	52.81	47	329.4	18.15	X	58.8	95% Student's-t UCL	55.7	Bootstrap BCA 95UCL
Volatile Organic Compounds	1,2,4-Trimethylbenzene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	1,3,5-Trimethylbenzene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Acetone	µg/kg	5-6	0	7	0	NA	NA	20	38.5	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Bromomethane	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloro methane	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloroform	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Ethyl- benzene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Isopropylbenzene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl ethyl ketone	µg/kg	5-6	0	19	0	NA	NA	17.5	48	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methylene chloride	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Butylbenzene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Propylbenzene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	sec-Butylbenzene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Toluene	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, m,p-	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, o-	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylenes, total	µg/kg	5-6	0	19	0	NA	NA	1.75	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	4-Methylphenol	µg/kg	5-6	0	22	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Bis (2-ethylhexyl) phthalate	µg/kg	5-6	0	22	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Butylbenzylphthalate	µg/kg	5-6	0	22	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Di-n-butyl phthalate	µg/kg	5-6	0	22	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Isophorone	µg/kg	5-6	0	22	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--

Table AOC10-3.3
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 5-Foot Scouring Scenario for AOC 10 (5 to 6 feet bgs and 5 to 10 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Polycyclic Aromatic Hydrocarbons	PAH low molecular weight	µg/kg	5-6	3	26	12	7.8	46	0	0	21.27	2.454	10	460	21.45	X	46	Max Detect	46	Max Detect
Polycyclic Aromatic Hydrocarbons	PAH high molecular weight	µg/kg	5-6	5	26	19	33.7	243	0	0	137.1	26.36	143	8869	94.17	X	50.9	95% KM (t) UCL	38.5	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	1-Methyl naphthalene	µg/kg	5-6	0	26	0	NA	NA	2.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	2-Methyl naphthalene	µg/kg	5-6	0	26	0	NA	NA	2.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/kg	5-6	0	26	0	NA	NA	2.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthylene	µg/kg	5-6	0	26	0	NA	NA	2.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Anthracene	µg/kg	5-6	0	26	0	NA	NA	2.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Benzo (a) anthracene	µg/kg	5-6	3	26	12	9.1	23	2.55	2.6	16.7	4.183	18	49.57	7.041	X	23	Max Detect	23	Max Detect
Polycyclic Aromatic Hydrocarbons	Benzo (a) pyrene	µg/kg	5-6	4	26	15	5.2	25	2.55	25.5	12.5	4.208	9.9	85.56	9.25	X	6.2	95% KM (t) UCL	6.86	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (b) fluoranthene	µg/kg	5-6	4	26	15	5.9	24	2.55	25.5	14.23	4.496	13.5	83.47	9.136	X	6.68	95% KM (t) UCL	7.18	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (ghi) perylene	µg/kg	5-6	3	26	12	5.4	17	2.55	25.5	11.47	3.665	12	33.85	5.818	X	17	Max Detect	17	Max Detect
Polycyclic Aromatic Hydrocarbons	Benzo (k) fluoranthene	µg/kg	5-6	3	26	12	6.3	30	2.55	25.5	15.37	4.066	9.8	163.7	12.79	X	30	Max Detect	30	Max Detect
Polycyclic Aromatic Hydrocarbons	Chrysene	µg/kg	5-6	5	26	19	5.4	33	2.55	2.6	18.4	5.598	16	159.8	12.64	X	8.59	95% KM (t) UCL	7.37	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Dibenzo (a,h) anthracene	µg/kg	5-6	1	26	4	7.5	7.5	2.55	25.5	7.5	2.756	7.5	NA	NA	X	7.5	Max Detect	7.5	Max Detect
Polycyclic Aromatic Hydrocarbons	Fluoranthene	µg/kg	5-6	5	26	19	7.9	86	2.55	2.6	33.58	8.517	26	1010	31.78	X	15.1	95% KM (t) UCL	13.3	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluorene	µg/kg	5-6	0	26	0	NA	NA	2.5	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Indeno (1,2,3-cd) pyrene	µg/kg	5-6	2	26	8	12	16	2.55	25.5	14	3.504	14	8	2.828	X	16	Max Detect	16	Max Detect
Polycyclic Aromatic Hydrocarbons	Naphthalene	µg/kg	5-6	0	26	0	NA	NA	1.75	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Phenanthrene	µg/kg	5-6	3	26	12	7.8	46	2.55	2.6	21.27	4.71	10	460	21.45	X	46	Max Detect	46	Max Detect
Polycyclic Aromatic Hydrocarbons	Pyrene	µg/kg	5-6	5	26	19	8.2	73	2.55	2.6	30.38	7.902	24	705.2	26.55	X	13.6	95% KM (t) UCL	12	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	B(a)P equivalent	µg/kg	5-6	5	26	19	9	59	5.9	57	27.5	10.14	21	458.3	21.41	X	14.7	95% KM (t) UCL	14.6	Bootstrap BCA 95UCL
Polychlorinated Biphenyls	Total PCBs	µg/kg	5-6	1	6	17	237	237	25.5	27	237	60.75	237	NA	NA	X	237	Max Detect	237	Max Detect
Dioxins	TEQ Human	ng/kg	5-6	5	5	100	0.36	100	N/A	N/A	21.35	21.35	1.7	1935	43.99	X	100	Max Detect	100.00	Max Detect
Dioxins	TEQ Avian	ng/kg	5-6	5	5	100	0.44	86	N/A	N/A	18.18	18.18	1.6	1438	37.92	X	86	Max Detect	86.00	Max Detect
Dioxins	TEQ Mammals	ng/kg	5-6	5	5	100	0.36	100	N/A	N/A	21.35	21.35	1.7	1935	43.99	X [c]	100	Max Detect	100.00	Max Detect
Dioxins	2,3,7,8-TCDD	ng/kg	5-6	0	11	0	NA	NA	0.0215	1.15	NA	NA	NA	NA	NA	--	--	--	--	--
Total Petroleum Hydrocarbons	TPH as diesel	mg/kg	5-6	2	21	10	11.1	34.2	5	5	22.65	6.681	22.65	266.8	16.33	X	34.2	Max Detect	34.2	Max Detect
Total Petroleum Hydrocarbons	TPH as gasoline	mg/kg	5-6	0	19	0	NA	NA	0.435	0.85	NA	NA	NA	NA	NA	--	--	--	--	--
Total Petroleum Hydrocarbons	TPH as motor oil	mg/kg	5-6	8	21	38	11.5	38.3	5	5	18.93	10.3	14.25	90.63	9.52	X	15.1	95% KM Adjusted Gamma UCL	12.3	Bootstrap BCA 95UCL

Table AOC10-3.3
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 5-Foot Scouring Scenario for AOC 10 (5 to 6 feet bgs and 5 to 10 feet bgs)

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PG&E Topock Compressor Station
Needles, California

Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Inorganics	Antimony	mg/kg	5-10	0	28	0	NA	NA	1	2.05	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Arsenic	mg/kg	5-10	28	28	100	2.4	12	NA	NA	5.346	5.346	4.91	4.831	2.198	X	6.05	95% Student's-t UCL	6.07	Bootstrap BCA 95UCL
Inorganics	Barium	mg/kg	5-10	28	28	100	69.6	1300	NA	NA	194.1	194.1	136.5	50331	224.3	--	--	--	--	--
Inorganics	Beryllium	mg/kg	5-10	0	28	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Cadmium	mg/kg	5-10	0	28	0	NA	NA	0.5	1	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Chromium, hexavalent	mg/kg	5-10	12	31	39	0.39	1.4	0.08	0.21	0.666	0.307	0.61	0.077	0.277	X	0.412	95% KM (t) UCL	0.40	Bootstrap BCA 95UCL
Inorganics	Chromium, total	mg/kg	5-10	31	31	100	7.36	170	N/A	N/A	37.7	37.7	30.8	886.8	29.78	X	46.22	95% Adjusted Gamma UCL	41.67	Bootstrap BCA 95UCL
Inorganics	Cobalt	mg/kg	5-10	28	28	100	3.16	10.7	NA	NA	8.253	8.253	8.67	3.13	1.769	--	--	--	--	--
Inorganics	Copper	mg/kg	5-10	29	29	100	5.78	41	N/A	N/A	14.96	14.96	14	41.59	6.449	X	17.04	95% Adjusted Gamma UCL	18.00	Bootstrap BCA 95UCL
Inorganics	Lead	mg/kg	5-10	28	28	100	1.5	14.6	NA	NA	4.478	4.478	4.13	5.779	2.404	X	5.25	95% Adjusted Gamma UCL	5.07	Bootstrap BCA 95UCL
Inorganics	Mercury	mg/kg	5-10	0	28	0	NA	NA	0.05	0.055	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Molybdenum	mg/kg	5-10	6	29	21	1	13	0.5	2.55	3.563	1.17	1.46	22.22	4.714	X	2.56	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	2.02	Bootstrap BCA 95UCL
Inorganics	Nickel	mg/kg	5-10	28	28	100	6.36	27	NA	NA	18.06	18.06	18.6	21.43	4.629	--	--	--	--	--
Inorganics	Selenium	mg/kg	5-10	0	28	0	NA	NA	0.5	1	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Silver	mg/kg	5-10	0	28	0	NA	NA	0.5	2.55	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Thallium	mg/kg	5-10	0	28	0	NA	NA	1	5	NA	NA	NA	NA	NA	--	--	--	--	--
Inorganics	Vanadium	mg/kg	5-10	28	28	100	16.6	43.6	NA	NA	32.89	32.89	32.7	47.48	6.89	--	--	--	--	--
Inorganics	Zinc	mg/kg	5-10	28	28	100	20.2	91.2	NA	NA	52.5	52.5	49	305.2	17.47	X	58.1	95% Student's-t UCL	54.5	Bootstrap BCA 95UCL
Volatile Organic Compounds	1,2,4-Trimethylbenzene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	1,3,5-Trimethylbenzene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Acetone	µg/kg	5-10	0	10	0	NA	NA	20.5	42.5	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Bromomethane	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloro methane	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Chloroform	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Ethyl- benzene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Isopropylbenzene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methyl ethyl ketone	µg/kg	5-10	0	20	0	NA	NA	20.5	48	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Methylene chloride	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Butylbenzene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	N-Propylbenzene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	sec-Butylbenzene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Toluene	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, m,p-	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylene, o-	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--
Volatile Organic Compounds	Xylenes, total	µg/kg	5-10	0	20	0	NA	NA	2.05	4.8	NA	NA	NA	NA	NA	--	--	--	--	--

Table AOC10-3.3
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 5-Foot Scouring Scenario for AOC 10 (5 to 6 feet bgs and 5 to 10 feet bgs)

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Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	COPC/ COPEC? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Semi-Volatile Organic Compounds	4-Methylphenol	µg/kg	5-10	0	23	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Bis (2-ethylhexyl) phthalate	µg/kg	5-10	0	23	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Butylbenzylphthalate	µg/kg	5-10	0	23	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Di-n-butyl phthalate	µg/kg	5-10	0	23	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Semi-Volatile Organic Compounds	Isophorone	µg/kg	5-10	0	23	0	NA	NA	165	170	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	PAH low molecular weight	µg/kg	5-10	4	27	15	1.72	36.8	0	0	13.19	1.954	7.12	254.7	15.96	X	4.64	95% KM (t) UCL	4.61	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	PAH high molecular weight	µg/kg	5-10	6	27	22	27	194	0	0	99.28	22.06	82.35	5163	71.86	X	40.6	95% KM (t) UCL	30.7	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	1-Methyl naphthalene	µg/kg	5-10	0	27	0	NA	NA	2.51	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	2-Methyl naphthalene	µg/kg	5-10	0	27	0	NA	NA	2.51	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/kg	5-10	0	27	0	NA	NA	2.51	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Acenaphthylene	µg/kg	5-10	0	27	0	NA	NA	2.51	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Anthracene	µg/kg	5-10	0	27	0	NA	NA	2.51	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Benzo (a) anthracene	µg/kg	5-10	4	27	15	4.24	18.9	2.55	2.6	11.46	3.87	11.35	44.26	6.653	X	5.33	95% KM (t) UCL	4.6	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (a) pyrene	µg/kg	5-10	5	27	19	4.67	20.5	2.55	21	9.622	3.979	5.8	44.82	6.695	X	5.47	95% KM (t) UCL	6.07	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (b) fluoranthene	µg/kg	5-10	5	27	19	5.9	19.7	2.55	21	10.97	4.254	6.64	43.72	6.612	X	5.89	95% KM (t) UCL	6.28	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (ghi) perylene	µg/kg	5-10	4	27	15	5.4	14.1	2.55	21	8.76	3.554	7.77	17.54	4.188	X	4.62	95% KM (t) UCL	5.7	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Benzo (k) fluoranthene	µg/kg	5-10	4	27	15	6.3	24.5	2.55	21	11.5	3.933	7.595	75.89	8.712	X	6.05	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	6.15	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Chrysene	µg/kg	5-10	6	27	22	4.83	26.9	2.55	2.6	14	5.093	10.45	90.69	9.523	X	7.35	95% KM (t) UCL	6.24	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Dibenzo (a,h) anthracene	µg/kg	5-10	1	27	4	6.51	6.51	2.55	21	6.51	2.715	6.51	NA	NA	X	6.51	Max Detect	6.51	Max Detect
Polycyclic Aromatic Hydrocarbons	Fluoranthene	µg/kg	5-10	6	27	22	6.83	69.3	2.55	2.6	24.4	7.404	15.65	570.3	23.88	X	12.3	95% KM (t) UCL	10.2	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Fluorene	µg/kg	5-10	0	27	0	NA	NA	2.51	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Indeno (1,2,3-cd) pyrene	µg/kg	5-10	3	27	11	5.04	13.3	2.55	21	9.48	3.386	10.1	17.35	4.165	X	13.3	Max Detect	13.3	Max Detect
Polycyclic Aromatic Hydrocarbons	Naphthalene	µg/kg	5-10	0	27	0	NA	NA	1.92	2.6	NA	NA	NA	NA	NA	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	Phenanthrene	µg/kg	5-10	4	27	15	3.76	37.3	2.55	2.6	14.08	4.258	7.63	243.5	15.6	X	8	Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	6.8	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	Pyrene	µg/kg	5-10	6	27	22	7.07	58.9	2.55	2.6	22.22	6.921	14.7	401.4	20.03	X	11.2	95% KM (t) UCL	9.28	Bootstrap BCA 95UCL
Polycyclic Aromatic Hydrocarbons	B(a)P equivalent	µg/kg	5-10	6	27	22	8.38	48.4	5.9	46.9	21.07	9.36	13.86	261.7	16.18	X	12.8	95% KM (t) UCL	12.9	Bootstrap BCA 95UCL
Polychlorinated Biphenyls	Total PCBs	µg/kg	5-10	1	6	17	195	195	25.5	27	195	53.75	195	NA	NA	X	195	Max Detect	195	Max Detect
Dioxins	TEQ Human	ng/kg	5-10	9	9	100	0.316	100	N/A	N/A	13.85	13.85	1.7	1056	32.5	X	45.33	95% BCA Bootstrap UCL	26.01	Bootstrap BCA 95UCL
Dioxins	TEQ Avian	ng/kg	5-10	9	9	100	0.402	86	N/A	N/A	11.69	11.69	2.2	781.7	27.96	X	39.06	95% BCA Bootstrap UCL	21.48	Bootstrap BCA 95UCL
Dioxins	TEQ Mammals	ng/kg	5-10	9	9	100	0.316	100	N/A	N/A	13.85	13.85	1.7	1056	32.5	X	45.33	95% BCA Bootstrap UCL	26.01	Bootstrap BCA 95UCL
Dioxins	2,3,7,8-TCDD	ng/kg	5-10	0	11	0	NA	NA	0.0215	1.05	NA	NA	NA	NA	NA	--	--	--	--	--

Table AOC10-3.3
Summary Statistics for Depth-Weighted Soil Data and Exposure Point Concentrations for the 5-Foot Scouring Scenario for AOC 10 (5 to 6 feet bgs and 5 to 10 feet bgs)

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Category	Constituent [a]	Units	Soil Depth Interval (ft bgs)	Detects	Total	Frequency of Detection	Minimum Detect	Maximum Detect	Minimum Nondetect	Maximum Nondetect	Mean Detected	Kaplan Meier Mean	Median	Variance	Standard Deviation	C O P C/ C O P E C? [b]	EPC (Depth-Weighted UCL) [c,d]	EPC Basis (Depth-Weighted UCL)	EPC (Area-Weighted UCL) [c,d]	EPC Basis (Area-Weighted UCL)
Total Petroleum Hydrocarbons	TPH as diesel	mg/kg	5-10	2	22	9	11.1	28.4	5	5	19.75	6.341	19.75	149.6	12.23	X	28.4	Max Detect	28.4	Max Detect
Total Petroleum Hydrocarbons	TPH as gasoline	mg/kg	5-10	0	20	0	NA	NA	0.441	0.81	NA	NA	NA	NA	NA	--	--	--	--	--
Total Petroleum Hydrocarbons	TPH as motor oil	mg/kg	5-10	9	22	41	6.2	38.3	5	5	16.9	9.868	12.2	102.8	10.14	X	14.4	95% KM Adjusted Gamma UCL	12	Bootstrap BCA 95UCL

Notes:

[a] The constituents presented consists of analytes detected at least once at the Topock Compressor Station site and measured in soil in this exposure area. The datasets for chromium (total and hexavalent), copper, and dioxins (TEQ Human, TEQ Mammal, and TEQ Avian) were updated to reflect the non-time critical removal actions outlined in Arcadis (2024).

[b] COPCs selected in the 2019 Soil Risk Assessment (Arcadis 2019) were also evaluated in this Post-NTCRA HHERA; and only risk-driving COPECs were evaluated in this Post-NTCRA HHERA (see footn

[c]ote e). If fewer than eight total locations and four total detected concentrations, the maximum depth-weighted concentration was selected as the EPC. Otherwise, the UCL was selected as the EPC.

[d] EPCs and summary statistics were not calculated for some constituents (i.e., dioxin congeners and essential nutrients). Those data, if available, are presented in Attachment A1 of each exposure area-specific appendix in the Soil Human Health and Ecological Risk Assessment Report (Arcadis 2019).

[e] Identifed as a COPEC for the Post-NTCRA HHERA.

Abbreviations:

"--" = not applicable
AOC = area of concern
B(a)P equivalent = benzo(a)pyrene equivalent
BCA = Bias-corrected accelerated bootstrap method
COPC = constituent of potential concern
COPEC = constituent of potential ecological concern
EPC = exposure point concentration
FOD = frequency of detection
ft bgs = feet below ground surface
KM = Kaplan-Meier
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
NA = not applicable
ND = not detected
ng/kg = nanograms per kilogram
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
PG&E = Pacific Gas and Electric Company
TCDD = Tetrachlorodibenzo-p-dioxin
TEQ = toxic equivalent
TPH = total petroleum hydrocarbons
UCL = upper confidence limit
X = COPC/COPEC in the exposure depth interval

References:

Arcadis. 2019. Final Soil Human Health and Ecological Risk Assessment Report, Topock Compressor Station, Needles, California.
Arcadis. 2024. Soil Risk Assessment Addendum: Proposed Approach to Update the Human Health and Ecological Risk Assessment after Completion of the 2023 Non-Time Critical Removal Action. January 30.

Table AOC10-4.1a
Summary of C O P Cs Evaluated in the HHRA for AOC 10: Baseline Scenario

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

C O P C	COPCs in Surface Soil (0 to 0.5 foot bgs)	COPCs in Shallow Soil (0 to 3 feet bgs)	COPCs in Subsurface II Soil (0 to 10 feet bgs)
Inorganics			
Antimony	--	x	x
Arsenic	x	x	x
Chromium, Hexavalent	x	x	x
Chromium, total	x	x	x
Copper	x	x	x
Cyanide	x	x	x
Lead	x	x	x
Manganese	x	x	x
Mercury (inorganic)	--	x	x
Thallium	--	x	x
Zinc	x	x	x
Polycyclic Aromatic Hydrocarbons			
1-Methyl naphthalene	x	x	x
2-Methyl naphthalene	x	x	x
Anthracene	x	x	x
Benzo (a) anthracene	x	x	x
Benzo (a) pyrene	x	x	x
Benzo (b) fluoranthene	x	x	x
Benzo (ghi) perylene	x	x	x
Benzo (k) fluoranthene	x	x	x

Table AOC10-4.1a
Summary of C O P Cs Evaluated in the HHRA for AOC 10: Baseline Scenario

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

C O P C	COPCs in Surface Soil (0 to 0.5 foot bgs)	COPCs in Shallow Soil (0 to 3 feet bgs)	COPCs in Subsurface II Soil (0 to 10 feet bgs)
Chrysene	x	x	x
Dibenzo (a,h) anthracene	x	x	x
Fluoranthene	x	x	x
Indeno (1,2,3-cd) pyrene	x	x	x
Naphthalene	x	x	x
Phenanthrene	x	x	x
Pyrene	x	x	x
B(a)P Equivalent	x	x	x
Polychlorinated Biphenyls			
Total PCBs	x	x	x
Total Petroleum Hydrocarbons			
TPH as diesel	x	x	x
TPH as motor oil	x	x	x
Dioxins/Furans			
TEQ Human	x	x	x

Abbreviations:
B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
-- = not detected or not analyzed.
x = Chemical included as C O P C in human health risk assessment.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

Table AOC10-4.1b
Summary of C O P Cs Evaluated in the HHRA for AOC 10: 2-Foot Scouring Scenario

Post-Soil N T C R A Human Health and Ecological Risk Assessment Repo
PG&E Topock Compressor Station
Needles, California

C O P C	C O P Cs in Surface Soil (2 to 3 feet bgs)	C O P Cs in Shallow Soil (2 to 6 feet bgs)	C O P Cs in Subsurface ll Soil (2 to 12 feet bgs)
Inorganics			
Antimony	x	x	x
Arsenic	x	x	x
Chromium, Hexavalent	x	x	x
Chromium, total	x	x	x
Copper	x	x	x
Lead	x	x	x
Mercury (inorganic)	x	x	x
Thallium	x	x	x
Zinc	x	x	x
Polycyclic Aromatic Hydrocarbons			
1-Methyl naphthalene	x	x	x
2-Methyl naphthalene	x	x	x
Anthracene	x	x	x
Benzo (a) anthracene	x	x	x
Benzo (a) pyrene	x	x	x
Benzo (b) fluoranthene	x	x	x
Benzo (ghi) perylene	x	x	x
Benzo (k) fluoranthene	x	x	x
Chrysene	x	x	x
Dibenzo (a,h) anthracene	x	x	x
Fluoranthene	x	x	x
Indeno (1,2,3-cd) pyrene	x	x	x
Phenanthrene	x	x	x
Pyrene	x	x	x
B(a)P Equivalent	x	x	x

Table AOC10-4.1b
Summary of C O P Cs Evaluated in the HHRA for AOC 10: 2-Foot Scouring Scenario

Post-Soil N T C R A Human Health and Ecological Risk Assessment Repo
PG&E Topock Compressor Station
Needles, California

C O P C	C O P Cs in Surface Soil (2 to 3 feet bgs)	C O P Cs in Shallow Soil (2 to 6 feet bgs)	C O P Cs in Subsurface ll Soil (2 to 12 feet bgs)
Polychlorinated Biphenyls			
Total PCBs	x	x	x
Total Petroleum Hydrocarbons			
TPH as diesel	x	x	x
TPH as motor oil	x	x	x
Dioxins/Furans			
TEQ Human	x	x	x

Abbreviations:
B (a) P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
-- = not detected or not analyzed.
x = Chemical included as C O P C in human health risk assessment.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

Table AOC10-4.1c
Summary of C O P Cs Evaluated in the HHRA for AOC 10: 5-Foot Scouring Scenario

Post-Soil N T C R A Human Health and Ecological Risk Assessment Repo
PG&E Topock Compressor Station
Needles, California

C O P C	C O P Cs in Surface Soil (5 to 6 feet bgs)	C O P Cs in Shallow Soil (5 to 10 feet bgs)	C O P Cs in Subsurface I Soil (5 to 15 feet bgs)
Inorganics			
Arsenic	x	x	x
Chromium, Hexavalent	x	x	x
Chromium, total	x	x	x
Copper	x	x	x
Lead	x	x	x
Zinc	x	x	x
Polycyclic Aromatic Hydrocarbons			
Benzo (a) anthracene	x	x	x
Benzo (a) pyrene	x	x	x
Benzo (b) fluoranthene	x	x	x
Benzo (ghi) perylene	x	x	x
Benzo (k) fluoranthene	x	x	x
Chrysene	x	x	x
Dibenzo (a,h) anthracene	x	x	x
Fluoranthene	x	x	x
Indeno (1,2,3-cd) pyrene	x	x	x
Phenanthrene	x	x	x
Pyrene	x	x	x
B(a)P Equivalent	x	x	x
Polychlorinated Biphenyls			
Total PCBs	x	x	x
Total Petroleum Hydrocarbons			
TPH as diesel	x	x	x
TPH as motor oil	x	x	x

Table AOC10-4.1c
Summary of C O P Cs Evaluated in the HHRA for AOC 10: 5-Foot Scouring Scenario

Post-Soil N T C R A Human Health and Ecological Risk Assessment Repo
PG&E Topock Compressor Station
Needles, California

C O P C	C O P Cs in Surface Soil (5 to 6 feet bgs)	C O P Cs in Shallow Soil (5 to 10 feet bgs)	C O P Cs in Subsurface I Soil (5 to 15 feet bgs)
Dioxins/Furans			
TEQ Human	x	x	x

Abbreviations:
B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
-- = not detected or not analyzed.
x = Chemical included as C O P C in human health risk assessment.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

Table AOC10-4.2a
Baseline Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (0 to 0.5 foot bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

C O P C	Exposure Point Concentration for Surface Soil: 0 to 0.5 foot bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 0 to 10 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics								
Antimony	ND	3.5E+00	NA	NV	NA	NV	NA	NV
Arsenic	5.9E+00	5.6E+00	4.4E-09	NV	4.4E-09	NV	7.0E-06	NV
Chromium, Hexavalent	1.1E+00	2.0E+01	7.9E-10	NV	7.9E-10	NV	1.3E-06	NV
Chromium, total	5.0E+01	7.4E+02	3.7E-08	NV	3.7E-08	NV	5.9E-05	NV
Copper	2.0E+01	7.9E+01	1.4E-08	NV	1.4E-08	NV	2.3E-05	NV
Cyanide	2.2E-01	2.2E-01	1.6E-10	NV	1.6E-10	NV	2.6E-07	NV
Lead	1.8E+01	1.5E+01	1.3E-08	NV	1.3E-08	NV	2.1E-05	NV
Manganese	6.3E+02	6.3E+02	4.6E-07	NV	4.6E-07	NV	7.4E-04	NV
Mercury (inorganic)	ND	3.3E-01	NA	NV	NA	NV	NA	NV
Thallium	ND	6.1E+00	NA	NV	NA	NV	NA	NV
Zinc	8.7E+01	9.7E+01	6.4E-08	NV	6.4E-08	NV	1.0E-04	NV
Polycyclic Aromatic Hydrocarbons								
1-Methyl naphthalene	8.1E-02	1.9E-02	6.0E-11	2.7E-07	6.0E-11	2.7E-07	9.6E-08	2.7E-07
2-Methyl naphthalene	9.1E-02	2.2E-02	6.7E-11	2.9E-07	6.7E-11	2.9E-07	1.1E-07	2.9E-07
Anthracene	7.9E-03	2.9E-03	5.8E-12	4.5E-09	5.8E-12	4.5E-09	9.3E-09	4.5E-09
Benzo (a) anthracene	3.3E-02	1.6E-02	2.4E-11	3.0E-09	2.4E-11	3.0E-09	3.8E-08	3.0E-09
Benzo (a) pyrene	4.6E-02	2.6E-02	3.4E-11	NV	3.4E-11	NV	5.5E-08	NV
Benzo (b) fluoranthene	7.1E-02	3.3E-02	5.3E-11	NV	5.3E-11	NV	8.4E-08	NV
Benzo (ghi) perylene	3.6E-02	2.3E-02	2.6E-11	NV	2.6E-11	NV	4.2E-08	NV
Benzo (k) fluoranthene	3.9E-02	2.0E-02	2.8E-11	NV	2.8E-11	NV	4.6E-08	NV
Chrysene	5.7E-02	3.4E-02	4.2E-11	NV	4.2E-11	NV	6.8E-08	NV
Dibenzo (a,h) anthracene	8.8E-03	6.0E-03	6.5E-12	NV	6.5E-12	NV	1.0E-08	NV
Fluoranthene	9.0E-02	4.9E-02	6.6E-11	NV	6.6E-11	NV	1.1E-07	NV
Indeno (1,2,3-cd) pyrene	3.1E-02	1.5E-02	2.3E-11	NV	2.3E-11	NV	3.6E-08	NV
Naphthalene	1.8E-02	5.7E-03	1.3E-11	9.5E-08	1.3E-11	9.5E-08	2.1E-08	9.5E-08
Phenanthrene	3.2E-02	1.7E-02	2.3E-11	NV	2.3E-11	NV	3.8E-08	NV
Pyrene	8.2E-02	5.0E-02	6.0E-11	1.6E-08	6.0E-11	1.6E-08	9.7E-08	1.6E-08
B(a)P Equivalent	7.0E-02	3.9E-02	5.1E-11	NV	5.1E-11	NV	8.3E-08	NV
Polychlorinated Biphenyls								
Total PCBs	3.8E-01	2.1E-01	2.8E-10	3.2E-07	2.8E-10	3.2E-07	4.5E-07	3.2E-07
Total Petroleum Hydrocarbons								
TPH as diesel	1.3E+01	1.0E+01	9.6E-09	4.1E-03	9.6E-09	4.1E-03	1.5E-05	4.1E-03
TPH as motor oil	2.9E+01	2.8E+01	2.1E-08	NV	2.1E-08	NV	3.4E-05	NV

Table AOC10-4.2a
Baseline Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (0 to 0.5 foot bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

C O P C	Exposure Point Concentration for Surface Soil: 0 to 0.5 foot bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 0 to 10 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans								
TEQ Human	1.6E-05	1.6E-04	1.2E-14	6.5E-11	1.2E-14	6.5E-11	1.9E-11	6.5E-11

Notes:

[a] Exposure point concentrations (EPCs) for surface soil (0 to 0.5 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface II soil (0 to 10 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
ND = Not detected.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and

United States Environmental Protection Agency (U S E P A). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May. Available at:

U S E P A. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for U S E P A Region 8. November 24. Available at: http://www2.epa.gov/sites/production/files/documents/SM_HH

Table AOC10-4.2b
Baseline Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

C O P C	Exposure Point Concentration for Shallow Soil: 0 to 3 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 0 to 10 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics								
Antimony	3.5E+00	3.5E+00	2.6E-09	NV	2.6E-09	NV	4.1E-06	NV
Arsenic	5.6E+00	5.6E+00	4.1E-09	NV	4.1E-09	NV	6.6E-06	NV
Chromium, Hexavalent	1.1E+00	2.0E+01	8.1E-10	NV	8.1E-10	NV	1.3E-06	NV
Chromium, total	4.8E+01	7.4E+02	3.5E-08	NV	3.5E-08	NV	5.7E-05	NV
Copper	1.9E+01	7.9E+01	1.4E-08	NV	1.4E-08	NV	2.2E-05	NV
Cyanide	2.2E-01	2.2E-01	1.6E-10	NV	1.6E-10	NV	2.6E-07	NV
Lead	2.2E+01	1.5E+01	1.6E-08	NV	1.6E-08	NV	2.6E-05	NV
Manganese	6.3E+02	6.3E+02	4.6E-07	NV	4.6E-07	NV	7.4E-04	NV
Mercury (inorganic)	3.3E-01	3.3E-01	2.4E-10	NV	2.4E-10	NV	3.9E-07	NV
Thallium	6.1E+00	6.1E+00	4.5E-09	NV	4.5E-09	NV	7.2E-06	NV
Zinc	1.0E+02	9.7E+01	7.6E-08	NV	7.6E-08	NV	1.2E-04	NV
Polycyclic Aromatic Hydrocarbons								
1-Methyl naphthalene	5.6E-02	1.9E-02	4.1E-11	2.7E-07	4.1E-11	2.7E-07	6.6E-08	2.7E-07
2-Methyl naphthalene	6.3E-02	2.2E-02	4.6E-11	2.9E-07	4.6E-11	2.9E-07	7.4E-08	2.9E-07
Anthracene	3.2E-03	2.9E-03	2.3E-12	4.5E-09	2.3E-12	4.5E-09	3.7E-09	4.5E-09
Benzo (a) anthracene	3.3E-02	1.6E-02	2.4E-11	3.0E-09	2.4E-11	3.0E-09	3.9E-08	3.0E-09
Benzo (a) pyrene	4.5E-02	2.6E-02	3.3E-11	NV	3.3E-11	NV	5.3E-08	NV
Benzo (b) fluoranthene	6.3E-02	3.3E-02	4.6E-11	NV	4.6E-11	NV	7.5E-08	NV
Benzo (ghi) perylene	3.1E-02	2.3E-02	2.3E-11	NV	2.3E-11	NV	3.6E-08	NV
Benzo (k) fluoranthene	4.1E-02	2.0E-02	3.0E-11	NV	3.0E-11	NV	4.8E-08	NV
Chrysene	5.7E-02	3.4E-02	4.2E-11	NV	4.2E-11	NV	6.7E-08	NV
Dibenzo (a,h) anthracene	8.8E-03	6.0E-03	6.5E-12	NV	6.5E-12	NV	1.0E-08	NV
Fluoranthene	8.6E-02	4.9E-02	6.4E-11	NV	6.4E-11	NV	1.0E-07	NV
Indeno (1,2,3-cd) pyrene	3.1E-02	1.5E-02	2.3E-11	NV	2.3E-11	NV	3.7E-08	NV
Naphthalene	1.3E-02	5.7E-03	9.5E-12	9.5E-08	9.5E-12	9.5E-08	1.5E-08	9.5E-08
Phenanthrene	3.0E-02	1.7E-02	2.2E-11	NV	2.2E-11	NV	3.6E-08	NV
Pyrene	7.9E-02	5.0E-02	5.8E-11	1.6E-08	5.8E-11	1.6E-08	9.4E-08	1.6E-08
B(a)P Equivalent	6.7E-02	3.9E-02	5.0E-11	NV	5.0E-11	NV	8.0E-08	NV
Polychlorinated Biphenyls								
Total PCBs	3.5E-01	2.1E-01	2.6E-10	3.2E-07	2.6E-10	3.2E-07	4.2E-07	3.2E-07
Total Petroleum Hydrocarbons								
TPH as diesel	2.1E+01	1.0E+01	1.5E-08	4.1E-03	1.5E-08	4.1E-03	2.4E-05	4.1E-03
TPH as motor oil	3.2E+01	2.8E+01	2.4E-08	NV	2.4E-08	NV	3.8E-05	NV

Table AOC10-4.2b
Baseline Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (0 to 3 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

C O P C	Exposure Point Concentration for Shallow Soil: 0 to 3 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 0 to 10 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans								
TEQ Human	2.6E-05	1.6E-04	1.9E-14	6.5E-11	1.9E-14	6.5E-11	3.0E-11	6.5E-11

Notes:

[a] Exposure point concentrations (EPCs) for shallow soil (0 to 3 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface II soil (0 to 10 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
ND = Not detected.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and United States Environmental Protection Agency (U S E P A). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May. Available at:

U S E P A. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for U S E P A Region 8. November 24. Available at: http://www2.epa.gov/sites/production/files/documents/SM_HH

Table AOC10-4.3a
2-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (2 to 3 feet bgs)

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C O P C	Exposure Point Concentration for Surface Soil: 2 to 3 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics								
Antimony	3.5E+00	3.5E+00	2.6E-09	NV	2.6E-09	NV	4.1E-06	NV
Arsenic	4.8E+00	5.5E+00	3.5E-09	NV	3.5E-09	NV	5.7E-06	NV
Chromium, Hexavalent	1.1E+00	2.8E+01	8.3E-10	NV	8.3E-10	NV	1.3E-06	NV
Chromium, total	3.5E+01	9.7E+02	2.6E-08	NV	2.6E-08	NV	4.1E-05	NV
Copper	1.6E+01	9.0E+01	1.2E-08	NV	1.2E-08	NV	1.9E-05	NV
Lead	3.0E+01	1.2E+01	2.2E-08	NV	2.2E-08	NV	3.5E-05	NV
Mercury (inorganic)	3.3E-01	3.3E-01	2.4E-10	NV	2.4E-10	NV	3.9E-07	NV
Thallium	6.1E+00	6.1E+00	4.5E-09	NV	4.5E-09	NV	7.2E-06	NV
Zinc	1.4E+02	1.3E+02	1.0E-07	NV	1.0E-07	NV	1.6E-04	NV
Polycyclic Aromatic Hydrocarbons								
1-Methyl naphthalene	5.8E-03	3.5E-03	4.3E-12	4.9E-08	4.3E-12	4.9E-08	6.8E-09	4.9E-08
2-Methyl naphthalene	6.8E-03	3.8E-03	5.0E-12	5.1E-08	5.0E-12	5.1E-08	8.0E-09	5.1E-08
Anthracene	9.8E-03	4.7E-03	7.2E-12	7.3E-09	7.2E-12	7.3E-09	1.2E-08	7.3E-09
Benzo (a) anthracene	5.6E-02	1.8E-02	4.1E-11	3.2E-09	4.1E-11	3.2E-09	6.6E-08	3.2E-09
Benzo (a) pyrene	6.5E-02	1.8E-02	4.8E-11	NV	4.8E-11	NV	7.7E-08	NV
Benzo (b) fluoranthene	8.1E-02	2.6E-02	6.0E-11	NV	6.0E-11	NV	9.6E-08	NV
Benzo (ghi) perylene	3.5E-02	1.6E-02	2.6E-11	NV	2.6E-11	NV	4.1E-08	NV
Benzo (k) fluoranthene	4.6E-02	1.6E-02	3.4E-11	NV	3.4E-11	NV	5.4E-08	NV
Chrysene	8.5E-02	2.5E-02	6.2E-11	NV	6.2E-11	NV	1.0E-07	NV
Dibenzo (a,h) anthracene	1.1E-02	5.3E-03	8.3E-12	NV	8.3E-12	NV	1.3E-08	NV
Fluoranthene	1.3E-01	4.1E-02	9.4E-11	NV	9.4E-11	NV	1.5E-07	NV
Indeno (1,2,3-cd) pyrene	4.7E-02	1.5E-02	3.5E-11	NV	3.5E-11	NV	5.6E-08	NV
Phenanthrene	3.3E-02	2.1E-02	2.4E-11	NV	2.4E-11	NV	3.9E-08	NV
Pyrene	1.2E-01	3.9E-02	8.7E-11	1.2E-08	8.7E-11	1.2E-08	1.4E-07	1.2E-08
B(a)P Equivalent	9.7E-02	2.9E-02	7.1E-11	NV	7.1E-11	NV	1.1E-07	NV
Polychlorinated Biphenyls								
Total PCBs	8.0E-01	3.4E-01	5.9E-10	5.2E-07	5.9E-10	5.2E-07	9.4E-07	5.2E-07
Total Petroleum Hydrocarbons								
TPH as diesel	5.2E+01	1.1E+01	3.8E-08	4.6E-03	3.8E-08	4.6E-03	6.1E-05	4.6E-03
TPH as motor oil	4.9E+01	2.7E+01	3.6E-08	NV	3.6E-08	NV	5.8E-05	NV

Table AOC10-4.3a
2-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (2 to 3 feet bgs)

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C O P C	Exposure Point Concentration for Surface Soil: 2 to 3 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans								
TEQ Human	1.3E-04	1.0E-04	9.2E-14	4.3E-11	9.2E-14	4.3E-11	1.5E-10	4.3E-11

Notes:

[a] Exposure point concentrations (EPCs) for surface soil (2 to 3 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface II soil (2 to 12 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and United States Environmental Protection Agency (U S E P A). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May. Available at:

U S E P A. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for U S E P A Region 8. November 24. Available at: http://www2.epa.gov/sites/production/files/documents/SM_H

Table AOC10-4.3b
2-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (2 to 6 feet bgs)

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C O P C	Exposure Point Concentration for Shallow Soil: 2 to 6 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics								
Antimony	3.5E+00	3.5E+00	2.6E-09	NV	2.6E-09	NV	4.1E-06	NV
Arsenic	5.0E+00	5.5E+00	3.7E-09	NV	3.7E-09	NV	5.9E-06	NV
Chromium, Hexavalent	1.2E+00	2.8E+01	8.7E-10	NV	8.7E-10	NV	1.4E-06	NV
Chromium, total	5.7E+01	9.7E+02	4.2E-08	NV	4.2E-08	NV	6.7E-05	NV
Copper	1.8E+01	9.0E+01	1.3E-08	NV	1.3E-08	NV	2.1E-05	NV
Lead	1.8E+01	1.2E+01	1.4E-08	NV	1.4E-08	NV	2.2E-05	NV
Mercury (inorganic)	3.3E-01	3.3E-01	2.4E-10	NV	2.4E-10	NV	3.9E-07	NV
Thallium	6.1E+00	6.1E+00	4.5E-09	NV	4.5E-09	NV	7.2E-06	NV
Zinc	1.3E+02	1.3E+02	9.8E-08	NV	9.8E-08	NV	1.6E-04	NV
Polycyclic Aromatic Hydrocarbons								
1-Methyl naphthalene	5.0E-03	3.5E-03	3.7E-12	4.9E-08	3.7E-12	4.9E-08	5.9E-09	4.9E-08
2-Methyl naphthalene	5.7E-03	3.8E-03	4.2E-12	5.1E-08	4.2E-12	5.1E-08	6.8E-09	5.1E-08
Anthracene	8.0E-03	4.7E-03	5.9E-12	7.3E-09	5.9E-12	7.3E-09	9.4E-09	7.3E-09
Benzo (a) anthracene	4.1E-02	1.8E-02	3.0E-11	3.2E-09	3.0E-11	3.2E-09	4.9E-08	3.2E-09
Benzo (a) pyrene	4.8E-02	1.8E-02	3.5E-11	NV	3.5E-11	NV	5.6E-08	NV
Benzo (b) fluoranthene	6.0E-02	2.6E-02	4.4E-11	NV	4.4E-11	NV	7.0E-08	NV
Benzo (ghi) perylene	2.6E-02	1.6E-02	1.9E-11	NV	1.9E-11	NV	3.1E-08	NV
Benzo (k) fluoranthene	3.5E-02	1.6E-02	2.5E-11	NV	2.5E-11	NV	4.1E-08	NV
Chrysene	4.9E-02	2.5E-02	3.6E-11	NV	3.6E-11	NV	5.8E-08	NV
Dibenzo (a,h) anthracene	9.0E-03	5.3E-03	6.6E-12	NV	6.6E-12	NV	1.1E-08	NV
Fluoranthene	9.4E-02	4.1E-02	6.9E-11	NV	6.9E-11	NV	1.1E-07	NV
Indeno (1,2,3-cd) pyrene	3.5E-02	1.5E-02	2.5E-11	NV	2.5E-11	NV	4.1E-08	NV
Phenanthrene	2.6E-02	2.1E-02	1.9E-11	NV	1.9E-11	NV	3.1E-08	NV
Pyrene	8.7E-02	3.9E-02	6.4E-11	1.2E-08	6.4E-11	1.2E-08	1.0E-07	1.2E-08
B(a)P Equivalent	7.2E-02	2.9E-02	5.3E-11	NV	5.3E-11	NV	8.5E-08	NV
Polychlorinated Biphenyls								
Total PCBs	6.6E-01	3.4E-01	4.8E-10	5.2E-07	4.8E-10	5.2E-07	7.8E-07	5.2E-07
Total Petroleum Hydrocarbons								
TPH as diesel	1.3E+01	1.1E+01	9.3E-09	4.6E-03	9.3E-09	4.6E-03	1.5E-05	4.6E-03
TPH as motor oil	3.9E+01	2.7E+01	2.9E-08	NV	2.9E-08	NV	4.6E-05	NV

Table AOC10-4.3b
2-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (2 to 6 feet bgs)

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C O P C	Exposure Point Concentration for Shallow Soil: 2 to 6 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans								
TEQ Human	2.4E-04	1.0E-04	1.8E-13	4.3E-11	1.8E-13	4.3E-11	2.9E-10	4.3E-11

Notes:

[a] Exposure point concentrations (EPCs) for shallow soil (2 to 6 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface II soil (2 to 12 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B (a) P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and United States Environmental Protection Agency (U S E P A). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May. Available at:
U S E P A. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for U S E P A Region 8. November 24. Available at: http://www2.epa.gov/sites/production/files/documents/SM_H

Table AOC10-4.4a
5-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (5 to 6 feet bgs)

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COPC	Exposure Point Concentration for Surface Soil: 5 to 6 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface I Soil: 5 to 15 feet bgs (mg/kg) [b]	Recreational User - Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Hunter Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Hunter Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User - Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics										
Arsenic	5.9E+00	6.4E+00	4.3E-09	NV	4.3E-09	NV	4.3E-09	NV	6.9E-06	NV
Chromium, Hexavalent	4.9E-01	8.5E-01	3.6E-10	NV	3.6E-10	NV	3.6E-10	NV	5.8E-07	NV
Chromium, total	4.5E+01	5.2E+01	3.3E-08	NV	3.3E-08	NV	3.3E-08	NV	5.3E-05	NV
Copper	1.9E+01	1.7E+01	1.4E-08	NV	1.4E-08	NV	1.4E-08	NV	2.2E-05	NV
Lead	5.7E+00	4.7E+00	4.2E-09	NV	4.2E-09	NV	4.2E-09	NV	6.8E-06	NV
Zinc	5.9E+01	5.9E+01	4.3E-08	NV	4.3E-08	NV	4.3E-08	NV	6.9E-05	NV
Polycyclic Aromatic Hydrocarbons										
Benzo (a) anthracene	2.3E-02	4.2E-03	1.7E-11	7.7E-10	1.7E-11	7.7E-10	1.7E-11	7.7E-10	2.7E-08	7.7E-10
Benzo (a) pyrene	6.2E-03	4.7E-03	4.6E-12	NV	4.6E-12	NV	4.6E-12	NV	7.3E-09	NV
Benzo (b) fluoranthene	6.7E-03	5.1E-03	4.9E-12	NV	4.9E-12	NV	4.9E-12	NV	7.9E-09	NV
Benzo (ghi) perylene	1.7E-02	4.3E-03	1.3E-11	NV	1.3E-11	NV	1.3E-11	NV	2.0E-08	NV
Benzo (k) fluoranthene	3.0E-02	5.0E-03	2.2E-11	NV	2.2E-11	NV	2.2E-11	NV	3.5E-08	NV
Chrysene	8.6E-03	5.7E-03	6.3E-12	NV	6.3E-12	NV	6.3E-12	NV	1.0E-08	NV
Dibenzo (a,h) anthracene	7.5E-03	4.5E-03	5.5E-12	NV	5.5E-12	NV	5.5E-12	NV	8.9E-09	NV
Fluoranthene	1.5E-02	8.3E-03	1.1E-11	NV	1.1E-11	NV	1.1E-11	NV	1.8E-08	NV
Indeno (1,2,3-cd) pyrene	1.6E-02	1.0E-02	1.2E-11	NV	1.2E-11	NV	1.2E-11	NV	1.9E-08	NV
Phenanthrene	4.6E-02	3.9E-03	3.4E-11	NV	3.4E-11	NV	3.4E-11	NV	5.4E-08	NV
Pyrene	1.4E-02	7.7E-03	1.0E-11	2.5E-09	1.0E-11	2.5E-09	1.0E-11	2.5E-09	1.6E-08	2.5E-09
B(a)P Equivalent	1.5E-02	1.0E-02	1.1E-11	NV	1.1E-11	NV	1.1E-11	NV	1.7E-08	NV
Polychlorinated Biphenyls										
Total PCBs	2.4E-01	1.1E-01	1.7E-10	1.7E-07	1.7E-10	1.7E-07	1.7E-10	1.7E-07	2.8E-07	1.7E-07
Total Petroleum Hydrocarbons										
TPH as diesel	3.4E+01	1.7E+01	2.5E-08	6.7E-03	2.5E-08	6.7E-03	2.5E-08	6.7E-03	4.0E-05	6.7E-03
TPH as motor oil	1.5E+01	1.8E+01	1.1E-08	NV	1.1E-08	NV	1.1E-08	NV	1.8E-05	NV

Table AOC10-4.4a
5-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (5 to 6 feet bgs)

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COPC	Exposure Point Concentration for Surface Soil: 5 to 6 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface I Soil: 5 to 15 feet bgs (mg/kg) [b]	Recreational User - Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Hunter Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Hunter Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User - Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans										
TEQ Human	1.0E-04	1.1E-04	7.4E-14	4.6E-11	7.4E-14	4.6E-11	7.4E-14	4.6E-11	1.2E-10	4.6E-11

Notes:

[a] Exposure point concentrations (EPCs) for surface soil (5 to 6 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface I soil (5 to 15 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
COPC = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. September 30.

United States Environmental Protection Agency (USEPA). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May. Available at: http://www.epa.gov/region09/toxic/noa/clearcreek/pdf/CCMARiskDoc24Apr08-withoutAppxG.pdf

USEPA. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for USEPA Region 8. November 24. Available at: http://www2.epa.gov/sites/production/files/documents/SM_HHRA_Addendum.pdf

Table AOC10-4.4b
5-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (5 to 10 feet bgs)

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COPC	Exposure Point Concentration for Shallow Soil: 5 to 10 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface I Soil: 5 to 15 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hunter Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hunter Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics										
Arsenic	6.1E+00	6.4E+00	4.4E-09	NV	4.4E-09	NV	4.4E-09	NV	7.1E-06	NV
Chromium, Hexavalent	4.1E-01	8.5E-01	3.0E-10	NV	3.0E-10	NV	3.0E-10	NV	4.9E-07	NV
Chromium, total	4.6E+01	5.2E+01	3.4E-08	NV	3.4E-08	NV	3.4E-08	NV	5.5E-05	NV
Copper	1.7E+01	1.7E+01	1.3E-08	NV	1.3E-08	NV	1.3E-08	NV	2.0E-05	NV
Lead	5.3E+00	4.7E+00	3.9E-09	NV	3.9E-09	NV	3.9E-09	NV	6.2E-06	NV
Zinc	5.8E+01	5.9E+01	4.3E-08	NV	4.3E-08	NV	4.3E-08	NV	6.9E-05	NV
Polycyclic Aromatic Hydrocarbons										
Benzo (a) anthracene	5.3E-03	4.2E-03	3.9E-12	7.7E-10	3.9E-12	7.7E-10	3.9E-12	7.7E-10	6.3E-09	7.7E-10
Benzo (a) pyrene	5.5E-03	4.7E-03	4.0E-12	NV	4.0E-12	NV	4.0E-12	NV	6.5E-09	NV
Benzo (b) fluoranthene	5.9E-03	5.1E-03	4.3E-12	NV	4.3E-12	NV	4.3E-12	NV	7.0E-09	NV
Benzo (ghi) perylene	4.6E-03	4.3E-03	3.4E-12	NV	3.4E-12	NV	3.4E-12	NV	5.5E-09	NV
Benzo (k) fluoranthene	6.1E-03	5.0E-03	4.4E-12	NV	4.4E-12	NV	4.4E-12	NV	7.1E-09	NV
Chrysene	7.4E-03	5.7E-03	5.4E-12	NV	5.4E-12	NV	5.4E-12	NV	8.7E-09	NV
Dibenzo (a,h) anthracene	6.5E-03	4.5E-03	4.8E-12	NV	4.8E-12	NV	4.8E-12	NV	7.7E-09	NV
Fluoranthene	1.2E-02	8.3E-03	9.0E-12	NV	9.0E-12	NV	9.0E-12	NV	1.5E-08	NV
Indeno (1,2,3-cd) pyrene	1.3E-02	1.0E-02	9.8E-12	NV	9.8E-12	NV	9.8E-12	NV	1.6E-08	NV
Phenanthrene	8.0E-03	3.9E-03	5.9E-12	NV	5.9E-12	NV	5.9E-12	NV	9.4E-09	NV
Pyrene	1.1E-02	7.7E-03	8.2E-12	2.5E-09	8.2E-12	2.5E-09	8.2E-12	2.5E-09	1.3E-08	2.5E-09
B(a)P Equivalent	1.3E-02	1.0E-02	9.4E-12	NV	9.4E-12	NV	9.4E-12	NV	1.5E-08	NV
Polychlorinated Biphenyls										
Total PCBs	2.0E-01	1.1E-01	1.4E-10	1.7E-07	1.4E-10	1.7E-07	1.4E-10	1.7E-07	2.3E-07	1.7E-07
Total Petroleum Hydrocarbons										
TPH as diesel	2.8E+01	1.7E+01	2.1E-08	6.7E-03	2.1E-08	6.7E-03	2.1E-08	6.7E-03	3.4E-05	6.7E-03
TPH as motor oil	1.4E+01	1.8E+01	1.1E-08	NV	1.1E-08	NV	1.1E-08	NV	1.7E-05	NV

Table AOC10-4.4b
5-Foot Scouring Scenario Depth-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (5 to 10 feet bgs)

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COPC	Exposure Point Concentration for Shallow Soil: 5 to 10 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface I Soil: 5 to 15 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hunter Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hunter Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans										
TEQ Human	4.5E-05	1.1E-04	3.3E-14	4.6E-11	3.3E-14	4.6E-11	3.3E-14	4.6E-11	5.4E-11	4.6E-11

Notes:

[a] Exposure point concentrations (EPCs) for shallow soil (5 to 10 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface I soil (5 to 15 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
COPC = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. September 30.
United States Environmental Protection Agency (USEPA). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May. Available at: http://www.epa.gov/region09/toxic/noa/clearcreek/pdf/CCMARiskDoc24Apr08-withoutAppxG.pdf
USEPA. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for USEPA Region 8. November 24. Available at: http://www2.epa.gov/sites/production/files/documents/SM_HHRA_Addendum.pdf

Table AOC10-4.5a
2-Foot Scouring Scenario Area-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (2 to 3 feet bgs)

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C O P C	Exposure Point Concentration for Surface Soil: 2 to 3 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics								
Antimony	3.5E+00	3.5E+00	2.6E-09	NV	2.6E-09	NV	4.1E-06	NV
Arsenic	4.6E+00	5.4E+00	3.4E-09	NV	3.4E-09	NV	5.4E-06	NV
Chromium, Hexavalent	1.7E+00	1.4E+01	1.2E-09	NV	1.2E-09	NV	2.0E-06	NV
Chromium, total	3.7E+01	4.4E+02	2.7E-08	NV	2.7E-08	NV	4.4E-05	NV
Copper	1.6E+01	4.9E+01	1.2E-08	NV	1.2E-08	NV	1.9E-05	NV
Lead	2.0E+01	2.1E+01	1.4E-08	NV	1.4E-08	NV	2.3E-05	NV
Mercury (inorganic)	3.3E-01	3.3E-01	2.4E-10	NV	2.4E-10	NV	3.9E-07	NV
Thallium	6.1E+00	6.1E+00	4.5E-09	NV	4.5E-09	NV	7.2E-06	NV
Zinc	9.1E+01	8.6E+01	6.7E-08	NV	6.7E-08	NV	1.1E-04	NV
Polycyclic Aromatic Hydrocarbons								
1-Methyl naphthalene	5.8E-03	3.5E-03	4.3E-12	4.9E-08	4.3E-12	4.9E-08	6.8E-09	4.9E-08
2-Methyl naphthalene	6.8E-03	3.8E-03	5.0E-12	5.1E-08	5.0E-12	5.1E-08	8.0E-09	5.1E-08
Anthracene	9.8E-03	4.7E-03	7.2E-12	7.3E-09	7.2E-12	7.3E-09	1.2E-08	7.3E-09
Benzo (a) anthracene	3.6E-02	1.2E-02	2.6E-11	2.2E-09	2.6E-11	2.2E-09	4.2E-08	2.2E-09
Benzo (a) pyrene	4.8E-02	1.6E-02	3.5E-11	NV	3.5E-11	NV	5.7E-08	NV
Benzo (b) fluoranthene	6.1E-02	2.0E-02	4.5E-11	NV	4.5E-11	NV	7.2E-08	NV
Benzo (ghi) perylene	3.7E-02	1.3E-02	2.7E-11	NV	2.7E-11	NV	4.3E-08	NV
Benzo (k) fluoranthene	4.8E-02	1.5E-02	3.6E-11	NV	3.6E-11	NV	5.7E-08	NV
Chrysene	5.8E-02	2.1E-02	4.3E-11	NV	4.3E-11	NV	6.9E-08	NV
Dibenzo (a,h) anthracene	1.2E-02	5.5E-03	8.5E-12	NV	8.5E-12	NV	1.4E-08	NV
Fluoranthene	8.9E-02	2.7E-02	6.5E-11	NV	6.5E-11	NV	1.1E-07	NV
Indeno (1,2,3-cd) pyrene	3.7E-02	1.2E-02	2.7E-11	NV	2.7E-11	NV	4.4E-08	NV
Phenanthrene	3.2E-02	1.5E-02	2.4E-11	NV	2.4E-11	NV	3.8E-08	NV
Pyrene	8.3E-02	2.7E-02	6.1E-11	8.6E-09	6.1E-11	8.6E-09	9.8E-08	8.6E-09
B(a)P Equivalent	ND	ND	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls								
Total PCBs	8.0E-01	3.4E-01	5.9E-10	5.2E-07	5.9E-10	5.2E-07	9.4E-07	5.2E-07
Total Petroleum Hydrocarbons								
TPH as diesel	5.2E+01	1.4E+01	3.8E-08	5.5E-03	3.8E-08	5.5E-03	6.1E-05	5.5E-03
TPH as motor oil	4.7E+01	4.2E+01	3.5E-08	NV	3.5E-08	NV	5.6E-05	NV

Table AOC10-4.5a
2-Foot Scouring Scenario Area-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Surface Soil (2 to 3 feet bgs)

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Needles, California

C O P C	Exposure Point Concentration for Surface Soil: 2 to 3 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans								
TEQ Human	1.1E-04	1.0E-04	8.3E-14	4.1E-11	8.3E-14	4.1E-11	1.3E-10	4.1E-11

Notes:

[a] Exposure point concentrations (EPCs) for surface soil (2 to 3 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface II soil (2 to 12 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B(a)P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and United States Environmental Protection Agency (U S E P A). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May. Available at:

U S E P A. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for U S E P A Region 8. November 24. Available at: http://www2.epa.gov/sites/production/files/documents/SM_H

Table AOC10-4.5b
2-Foot Scouring Scenario Area-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (2 to 6 feet bgs)

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C O P C	Exposure Point Concentration for Shallow Soil: 2 to 6 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User Off Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User Off Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Inorganics								
Antimony	3.5E+00	3.5E+00	2.6E-09	NV	2.6E-09	NV	4.1E-06	NV
Arsenic	4.9E+00	5.4E+00	3.6E-09	NV	3.6E-09	NV	5.8E-06	NV
Chromium, Hexavalent	1.1E+00	1.4E+01	8.3E-10	NV	8.3E-10	NV	1.3E-06	NV
Chromium, total	4.7E+01	4.4E+02	3.5E-08	NV	3.5E-08	NV	5.6E-05	NV
Copper	1.5E+01	4.9E+01	1.1E-08	NV	1.1E-08	NV	1.8E-05	NV
Lead	2.0E+01	2.1E+01	1.5E-08	NV	1.5E-08	NV	2.4E-05	NV
Mercury (inorganic)	3.3E-01	3.3E-01	2.4E-10	NV	2.4E-10	NV	3.9E-07	NV
Thallium	6.1E+00	6.1E+00	4.5E-09	NV	4.5E-09	NV	7.2E-06	NV
Zinc	8.8E+01	8.6E+01	6.5E-08	NV	6.5E-08	NV	1.0E-04	NV
Polycyclic Aromatic Hydrocarbons								
1-Methyl naphthalene	5.0E-03	3.5E-03	3.7E-12	4.9E-08	3.7E-12	4.9E-08	5.9E-09	4.9E-08
2-Methyl naphthalene	5.7E-03	3.8E-03	4.2E-12	5.1E-08	4.2E-12	5.1E-08	6.8E-09	5.1E-08
Anthracene	8.0E-03	4.7E-03	5.9E-12	7.3E-09	5.9E-12	7.3E-09	9.4E-09	7.3E-09
Benzo (a) anthracene	2.5E-02	1.2E-02	1.8E-11	2.2E-09	1.8E-11	2.2E-09	2.9E-08	2.2E-09
Benzo (a) pyrene	3.2E-02	1.6E-02	2.3E-11	NV	2.3E-11	NV	3.8E-08	NV
Benzo (b) fluoranthene	4.0E-02	2.0E-02	3.0E-11	NV	3.0E-11	NV	4.8E-08	NV
Benzo (ghi) perylene	2.6E-02	1.3E-02	1.9E-11	NV	1.9E-11	NV	3.0E-08	NV
Benzo (k) fluoranthene	3.3E-02	1.5E-02	2.4E-11	NV	2.4E-11	NV	3.8E-08	NV
Chrysene	4.1E-02	2.1E-02	3.0E-11	NV	3.0E-11	NV	4.8E-08	NV
Dibenzo (a,h) anthracene	8.8E-03	5.5E-03	6.5E-12	NV	6.5E-12	NV	1.0E-08	NV
Fluoranthene	6.0E-02	2.7E-02	4.4E-11	NV	4.4E-11	NV	7.0E-08	NV
Indeno (1,2,3-cd) pyrene	2.5E-02	1.2E-02	1.8E-11	NV	1.8E-11	NV	2.9E-08	NV
Phenanthrene	2.3E-02	1.5E-02	1.7E-11	NV	1.7E-11	NV	2.7E-08	NV
Pyrene	5.6E-02	2.7E-02	4.1E-11	8.6E-09	4.1E-11	8.6E-09	6.6E-08	8.6E-09
B(a)P Equivalent	ND	ND	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls								
Total PCBs	6.6E-01	3.4E-01	4.8E-10	5.2E-07	4.8E-10	5.2E-07	7.8E-07	5.2E-07
Total Petroleum Hydrocarbons								
TPH as diesel	1.3E+01	1.4E+01	9.6E-09	5.5E-03	9.6E-09	5.5E-03	1.5E-05	5.5E-03
TPH as motor oil	4.4E+01	4.2E+01	3.2E-08	NV	3.2E-08	NV	5.2E-05	NV

Table AOC10-4.5b
2-Foot Scouring Scenario Area-Weighted Exposure Point Concentrations and Predicted Outdoor Air Concentrations for Recreational Users:
C O P Cs in AOC 10 Shallow Soil (2 to 6 feet bgs)

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
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C O P C	Exposure Point Concentration for Shallow Soil: 2 to 6 feet bgs (mg/kg) [a]	Exposure Point Concentration for Subsurface II Soil: 2 to 12 feet bgs (mg/kg) [b]	Recreational User - Camper Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Camper Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Hiker Outdoor Airborne Particulate Concentration (mg/m^3) [c]	Recreational User - Hiker Outdoor Vapor Concentration (mg/m^3) [d]	Recreational User - Off-Highway Vehicle Rider Outdoor Airborne Particulate Concentration (mg/m^3) [e]	Recreational User - Off-Highway Vehicle Rider Outdoor Vapor Concentration (mg/m^3) [d]
Dioxins/Furans								
TEQ Human	1.2E-04	1.0E-04	8.6E-14	4.1E-11	8.6E-14	4.1E-11	1.4E-10	4.1E-11

Notes:

[a] Exposure point concentrations (EPCs) for shallow soil (2 to 6 feet bgs) are used to evaluate inhalation of particulates in outdoor air.

[b] EPCs for subsurface II soil (2 to 12 feet bgs) are used to evaluate inhalation of volatiles in outdoor air.

[c] Outdoor airborne particulate concentration is calculated by dividing the soil EPCs by the particulate emission factor (PEF). Default PEF of 1.4×10^9 m^3/kg was used for recreational users (campers and hikers) as recommended by Department of Toxic Substances Control (2014).

[d] Chemical-specific volatilization factors (VFs) were estimated as discussed in Section 4.0, Exposure Assessment, of the main report. Outdoor vapor concentration is calculated by dividing the soil EPC by the VF.

[e] PEF of 8.5×10^5 m^3/kg was used for recreational users (off-highway vehicle rider) as calculated in United States Environmental Protection Agency (2008, 2009) and recommended in "Revised Technical Memorandum, Recreational Visitor Exposure Scenario for Federal Land, PG&E Topock Compressor Station Remediation Project, California," prepared by the Department of the Interior (DOI).

Abbreviations:

B (a) P equivalent = Benzo(a)pyrene equivalent.
bgs = below ground surface.
C O P C = Constituent of Potential Concern.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not applicable.
NV = Not volatile.
PCB = Polychlorinated biphenyls.
TPH = Total Petroleum Hydrocarbons.
TEQ = Toxic Equivalent.

References:

Department of Toxic Substances Control (DTSC). 2014. DTSC/HERO Human Health Risk Assessment (HHRA) Note Number 1: Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and

United States Environmental Protection Agency (U S E P A). 2008. Clear Creek Management Areas Asbestos Exposure and Human Health Risk Assessment. Region 9. May.
US E P A. 2009. Baseline Human Health Risk Assessment for the Standard Mine Site, Gunnison County, CO; Addendum. Prepared by SRC for U S E P A Region 8. November 24.

Table AOC10-4.6a
Human Health Risk and Hazard Estimate Summary at AOC 10 for the Baseline Scenario Using Depth-Weighted Exposure Point Concentrations

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Receptor	Depth Interval	ILCR	HI
Recreational User - Camper	Surface	2E-06	6E-01
Recreational User - Camper	Shallow	2E-06	7E-01
Recreational User - Hiker	Surface	5E-06	1E+00
Recreational User - Hiker	Shallow	4E-06	1E+00
Recreational User - OHV Rider	Surface	3E-06	3E-01
Recreational User - OHV Rider	Shallow	3E-06	3E-01

Abbreviations:
ILCR = Incremental Lifetime Cancer Risk
H I = Hazard Index

Table AOC10-4.6b
Human Health Risk and Hazard Estimate Summary at AOC 10 for the 2-Foot Scouring Scenario Using Depth-Weighted Exposure Point Concentrations

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Receptor	Depth Interval	ILCR	H I
Recreational User - Camper	Surface	2E-06	7E-01
Recreational User - Camper	Shallow	3E-06	8E-01
Recreational User - Hiker	Surface	5E-06	1E+00
Recreational User - Hiker	Shallow	6E-06	2E+00
Recreational User - OHV Rider	Surface	3E-06	3E-01
Recreational User - OHV Rider	Shallow	4E-06	3E-01

Abbreviations:
ILCR = Incremental Lifetime Cancer Risk
H I = Hazard Index

Table AOC10-4.6c
Human Health Risk and Hazard Estimate Summary at AOC 10 for the 5-Foot Scouring Scenario Using Depth-Weighted Exposure Point Concentrations

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Receptor	Depth Interval	ILCR	H I
Recreational User - Camper	Surface	3E-06	6E-01
Recreational User - Camper	Shallow	2E-06	6E-01
Recreational User - Hiker	Surface	5E-06	1E+00
Recreational User - Hiker	Shallow	5E-06	1E+00
Recreational User - OHV Rider	Surface	3E-06	3E-01
Recreational User - OHV Rider	Shallow	3E-06	2E-01

Abbreviations:
ILCR = Incremental Lifetime Cancer Risk
H I = Hazard Index

Table AOC10-4.7
Human Health Risk and Hazard Estimate Summary at AOC 10 for the 2-Foot Scouring Scenario Using Area-Weighted Exposure Point Concentrations

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Receptor	Depth Interval	ILCR	H I
Recreational User - Camper	Surface	2E-06	7E-01
Recreational User - Camper	Shallow	2E-06	7E-01
Recreational User - Hiker	Surface	5E-06	1E+00
Recreational User - Hiker	Shallow	5E-06	1E+00
Recreational User - OHV Rider	Surface	3E-06	3E-01
Recreational User - OHV Rider	Shallow	3E-06	3E-01

Abbreviations:
ILCR = Incremental Lifetime Cancer Risk
H I = Hazard Index

Table AOC10-5.1
Depth-Weighted Exposure Point Concentrations for Soil and Biota for AOC 10

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	C O P E C	Units	Soil EPC (0-0.5 ft bgs)	Soil EPC (2-3 ft bgs)	Soil EPC (5-6 ft bgs)	Biota EPC (0-0.5 ft bgs) [a]	Biota EPC (2-3 ft bgs) [a]	Biota EPC (5-6 ft bgs) [a]
Inorganics	Chromium, hexavalent	mg/kg	1.08E+00	1.13E+00	4.89E-01	3.31E-01	3.45E-01	1.50E-01
Inorganics	Chromium, total	mg/kg	5.00E+01	3.51E+01	4.46E+01	1.53E+01	1.07E+01	1.37E+01
Inorganics	Copper	mg/kg	1.96E+01	1.58E+01	1.86E+01	1.01E+01	8.15E+00	9.58E+00
Dioxins	TEQ Mammals	ng/kg	1.59E+01	1.26E+02	1.00E+02	7.27E+01	8.39E+02	6.40E+02

Notes:

[a] Calculated using selected soil EPC and uptake model. See Section 6 of the main report.

Abbreviations:

C O P E C = constituent of potential ecological concern
EPC = exposure point concentration
ft bgs = feet below ground surface
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
TEQ = toxicity equivalent

Table AOC10-5.2
Area-Weighted Exposure Point Concentrations for Soil and Biota for AOC 10

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Category	C O P E C	Units	Soil EPC (0-0.5 ft bgs)	Soil EPC (2-3 ft bgs)	Soil EPC (5-6 ft bgs)	Biota EPC (0-0.5 ft bgs) [a]	Biota EPC (2-3 ft bgs) [a]	Biota EPC (5-6 ft bgs) [a]
Inorganics	Chromium, hexavalent	mg/kg	8.84E-01	1.68E+00	4.24E-01	2.70E-01	5.15E-01	1.30E-01
Inorganics	Chromium, total	mg/kg	4.47E+01	3.69E+01	3.96E+01	1.37E+01	1.13E+01	1.21E+01
Inorganics	Copper	mg/kg	1.79E+01	1.64E+01	1.84E+01	9.22E+00	8.45E+00	9.50E+00
Dioxins	TEQ Avian	ng/kg	4.81E+00	8.36E+01	8.60E+01	1.77E+01	5.18E+02	5.36E+02
Dioxins	TEQ Mammals	ng/kg	8.05E+00	1.12E+02	1.00E+02	3.26E+01	7.34E+02	6.40E+02

Notes:

[a] Calculated using selected soil EPC and uptake model. See Section 6 of the main report.

Abbreviations:

C O P E C = constituent of potential ecological concern
EPC = exposure point concentration
ft bgs = feet below ground surface
mg/kg = milligrams per kilogram
ng/kg = nanograms per kilogram
TEQ = toxicity equivalent

Table AOC10-5.3
Toxic Equivalency Factors for Dioxin Congeners and Calculated Tissue Exposure Point Concentrations for Dioxin TEQ for AOC 10

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Constituent	Units	Soil EPC 95% UCL (0-0.5 ft bgs)	Soil EPC 95% UCL (2-3 ft bgs)	Soil EPC 95% UCL (5-6 ft bgs)	Terrestrial Invertebrate Bioaccumulation Factors	Terrestrial Invertebrate Tissue EPC (0-0.5 ft bgs)	Terrestrial Invertebrate Tissue EPC (2-3 ft bgs)	Terrestrial Invertebrate Tissue EPC (5-6 ft bgs)	Mammal TEFs[a]	Terrestrial Invertebrate Tissue EPCs (0-0.5 ft bgs, Mammal TEF Applied)	Terrestrial Invertebrate Tissue EPCs (2-3 ft bgs, Mammal TEF Applied)	Terrestrial Invertebrate Tissue EPCs (5-6 ft bgs, Mammal TEF Applied)
Congener-Specific Approach (USEPA 1999)												
1,2,3,4,6,7,8-hpcdd	ng/kg	1606	3335	1800	0.081	130	270	146	0.01	1.30	2.70	1.5
1,2,3,4,6,7,8-hpcdf	ng/kg	301.7	685.9	440	0.017	5.13	11.66	7.48	0.01	0.051	0.1166	0.075
1,2,3,4,7,8,9-hpcdf	ng/kg	5.152	33.83	36	0.62	3.19	20.97	22.32	0.01	0.032	0.2097	0.223
1,2,3,4,7,8-hxcdd	ng/kg	3.438	76	11	0.49	1.68	37.24	5.39	0.1	0.17	3.724	0.54
1,2,3,4,7,8-hxcdf	ng/kg	3.116	13.07	12	0.121	0.38	1.58	1.45	0.1	0.038	0.158	0.15
1,2,3,6,7,8-hxcdd	ng/kg	14.23	200	80	0.19	2.70	38.00	15.20	0.1	0.27	3.80	1.52
1,2,3,6,7,8-hxcdf	ng/kg	2.644	63	15	0.3	0.79	18.90	4.50	0.1	0.08	1.890	0.45
1,2,3,7,8,9-hxcdd	ng/kg	6.48	64.44	25	0.22	1.43	14.18	5.50	0.1	0.14	1.418	0.55
1,2,3,7,8,9-hxcdf	ng/kg	0.667	2.661	3.9	1	0.67	2.66	3.90	0.1	0.07	0.266	0.39
1,2,3,7,8-pecdd	ng/kg	1.215	18.34	2.85	1.46	1.77	26.78	4.16	1	1.77	26.78	4.16
1,2,3,7,8-pecdf	ng/kg	0.282	1.2	2.5	0.32	0.09	0.38	0.80	0.03	0.003	0.012	0.0240
2,3,4,6,7,8-hxcdf	ng/kg	3.634	3.255	0.73	1.07	3.89	3.48	0.78	0.1	0.39	0.348	0.08
2,3,4,7,8-pecdf	ng/kg	0.79	0.93	12	2.54	2.01	2.36	30.48	0.3	0.60	0.71	9.14
2,3,7,8-tcdd	ng/kg	0.0707	0.23	0.065	1.59	0.11	0.37	0.10	1	0.11	0.37	0.10
2,3,7,8-tcdf	ng/kg	0.243	2.5	1.1	1.27	0.31	3.18	1.40	0.1	0.03	0.318	0.140
ocdd	ng/kg	18688	32629	15000	0.019	355	620	285	0.0003	0.107	0.186	0.09
ocdf	ng/kg	487	2023	830	0.025	12.2	50.58	20.75	0.0003	0.0037	0.0152	0.0062
Dioxin TEQ	ng/kg									**5.2**	**43.0**	**19.1**
Congener-Specific Approach (Fagervold et al. 2010)[b]												
1,2,3,4,6,7,8-hpcdd	ng/kg	1606	3335	1800	0.20	317.85	660.05	356.25	0.01	3.18	6.60	3.6
1,2,3,4,6,7,8-hpcdf	ng/kg	301.7	685.9	440	0.36	107.20	243.72	156.35	0.01	1.07	2.44	1.56
1,2,3,4,7,8,9-hpcdf	ng/kg	5.152	33.83	36	0.34	1.74	11.43	12.17	0.01	0.017	0.1143	0.122
1,2,3,4,7,8-hxcdd	ng/kg	3.438	76	11	0.23	0.79	17.42	2.52	0.1	0.08	1.742	0.252
1,2,3,4,7,8-hxcdf	ng/kg	3.116	13.07	12	0.48	1.48	6.21	5.70	0.1	0.15	0.621	0.57
1,2,3,6,7,8-hxcdd	ng/kg	14.23	200	80	0.19	2.74	38.50	15.40	0.1	0.27	3.85	1.54
1,2,3,6,7,8-hxcdf	ng/kg	2.644	63	15	0.59	1.55	36.89	8.78	0.1	0.15	3.689	0.88
1,2,3,7,8,9-hxcdd	ng/kg	6.48	64.44	25	0.13	0.83	8.27	3.21	0.1	0.08	0.827	0.32
1,2,3,7,8,9-hxcdf	ng/kg	0.667	2.661	3.9	1.22	0.81	3.25	4.76	0.1	0.08	0.325	0.48
1,2,3,7,8-pecdd	ng/kg	1.215	18.34	2.85	0.18	0.22	3.36	0.52	1	0.22	3.362	0.52
1,2,3,7,8-pecdf	ng/kg	0.282	1.2	2.5	0.79	0.22	0.94	1.97	0.03	0.007	0.03	0.059
2,3,4,6,7,8-hxcdf	ng/kg	3.634	3.255	0.73	0.33	1.21	1.08	0.24	0.1	0.12	0.108	0.02
2,3,4,7,8-pecdf	ng/kg	0.79	0.93	12	0.56	0.45	0.52	6.77	0.3	0.13	0.157	2.03
2,3,7,8-tcdd	ng/kg	0.0707	0.23	0.065	1.65	0.12	0.38	0.11	1	0.12	0.38	0.11
2,3,7,8-tcdf	ng/kg	0.243	2.5	1.1	1.21	0.29	3.02	1.33	0.1	0.03	0.302	0.133
ocdd	ng/kg	18688	32629	15000	0.25	4717.16	8236.10	3786.25	0.0003	1.42	2.47	1.1
ocdf	ng/kg	486.9	2023	830	0.27	133.45	554.47	227.49	0.0003	0.040	0.166	0.068
Dioxin TEQ	ng/kg									**7.17**	**27.2**	**13.4**

Table AOC10-5.3
Toxic Equivalency Factors for Dioxin Congeners and Calculated Tissue Exposure Point Concentrations for Dioxin TEQ for AOC 10

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Constituent	Units	Soil EPC 95% UCL (0-0.5 ft bgs)	Soil EPC 95% UCL (2-3 ft bgs)	Soil EPC 95% UCL (5-6 ft bgs)	Terrestrial Invertebrate Bioaccumulation Factors	Terrestrial Invertebrate Tissue EPC (0-0.5 ft bgs)	Terrestrial Invertebrate Tissue EPC (2-3 ft bgs)	Terrestrial Invertebrate Tissue EPC (5-6 ft bgs)	Mammal TEFs[a]	Terrestrial Invertebrate Tissue EPCs (0-0.5 ft bgs, Mammal TEF Applied)	Terrestrial Invertebrate Tissue EPCs (2-3 ft bgs, Mammal TEF Applied)	Terrestrial Invertebrate Tissue EPCs (5-6 ft bgs, Mammal TEF Applied)
ERA Approach[c]												
TEQ mammals	ng/kg	15.9	126	100	ln(Ci) = 1.182 * ln(Cs) + 3.533	–	–	–	–	**72.7**	**839**	**640**

Notes:
[a] Toxic Equivalentcy Factors (TEFs) from Van den Berg (2006) for mammals.
[b] Fagervold et al. (2010) bioaccumulation factors calculated using soil-to-earthworm 2,3,7,8-TCDD BAF for soil at location SW-20 (BAF = 1.65) and congener-specific earthworm bioaccumulation equivalency factors. See Table 6-34 of the 2019 H H E R A (Arcadis 2019).
[c] ERA approach bioaccumulation factor based on tetrachlorodibenzo-p-dioxin (TCDD) in Sample et al. (1998).

Abbreviations:
BCW = Bat Cave Wash
C O P E C = constituent of potential ecological concern
EPC = exposure point concentration
ft bgs = feet below ground surface
ng/kg = nanograms per kilogram
TEQ = toxicity equivalent
TEF = toxic equivalency factor

References:

Arcadis. 2019. Final Soil Human Health and Ecological Risk Assessment Report, Topock Compressor Station, Needles, California.
Fagervold, SK, Y Chai, JW Davis, M Wilken, G Cornelissen, and U Ghosh. 2010. Bioaccumulation of polychlorinated dibenzo-p-dioxins/dibenzofurans in E. fetida from floodplain soils and the effect of activated carbon amendment. Environ Sci Technol. 44(14):5546-52
Sample, B.E., J.J. Beauchamp, R.A. Efroymson, G.W. Suter, II, and T.L. Ashwood. 1998. Development and Validation of Bioaccumulation Models for Earthworms. ES/ER/TM-220. Oak Ridge National Laboratory, Oak Ridge TN. 93 pp.47
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Van den Berg, et al. 2006. The 2005 World Health Organization reevaluation of human and mammalian TEFs for dioxins and dioxin-like compounds. Toxicological Sciences 93:223-241.

Table AOC10-5.4
Desert Shrew Risk Estimate Summary Using Depth-Weighted Exposure Point Concentrations (Wildlife SUF = 1, TRVs used for RBRG Development, and Selected BAFs) for AOC 10

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
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Scenario	Category	C O P E C	Desert Shrew N O A E L HQ TRV Used for RBRG Development SUF = 1	NOAEL HQ TRV Basis[a]	NOAEL HQ Notes	Desert Shrew L O A E L HQ TRV Used for RBRG Development SUF = 1	LOAEL HQ TRV Basis[a]	LOAEL HQ Notes
Baseline	Inorganics	Chromium, hexavalent	8E-03	Selected TRV	None	2E-03	Selected TRV	None
Baseline	Inorganics	Chromium, total	1E+00	Selected TRV	None	3E-01	Selected TRV	None
Baseline	Inorganics	Copper	2E-01	Selected TRV	None	1E-01	Selected TRV	None
Baseline	Dioxins	TEQ Mammals	**3E+00**	Alternate TRV	Note 1	5E-01	Alternate TRV	None
2 ft Scouring	Inorganics	Chromium, hexavalent	8E-03	Selected TRV	None	2E-03	Selected TRV	None
2 ft Scouring	Inorganics	Chromium, total	1E+00	Selected TRV	None	2E-01	Selected TRV	None
2 ft Scouring	Inorganics	Copper	2E-01	Selected TRV	None	1E-01	Selected TRV	None
2 ft Scouring	Dioxins	TEQ Mammals	**3E+01**	Alternate TRV	Note 1	**6E+00**	Alternate TRV	Note 2
5 ft Scouring	Inorganics	Chromium, hexavalent	4E-03	Selected TRV	None	8E-04	Selected TRV	None
5 ft Scouring	Inorganics	Chromium, total	1E+00	Selected TRV	None	3E-01	Selected TRV	None
5 ft Scouring	Inorganics	Copper	2E-01	Selected TRV	None	1E-01	Selected TRV	None
5 ft Scouring	Dioxins	TEQ Mammals	**3E+01**	Alternate TRV	Note 1	**4E+00**	Alternate TRV	Note 2

Notes:

[a] Selected TRVs for metals are based on the TRVs used to develop the U S E P A Ecological Soil Screening Levels (U S E P A 2005). Alternate TRVs for dioxin TEQ were developed for mammals based the geometric mean of the reproduction and growth endpoints for the NOAEL and LOAEL effect levels, respectively.

Note 1	N O A E L HQ greater than 1
Note 2	L O A E L HQ greater than 1
Note 3	L O A E L HQ greater than 10
Note 4	L O A E L HQ greater than 100

Abbreviations:

C O P E C = constituent of potential ecological concern
ft = foot
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
NOAEL = no-observed adverse effect level
RBRG = risk-based remedial goal
TEQ = toxicity equivalent
TRV = toxicity reference value

Table AOC10-5.5
Desert Shrew Risk Estimate Summary Using Area-Weighted Exposure Point Concentrations (Wildlife SUF = 1, TRVs used for RBRG Development, and Selected BAFs) for AOC 10

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Scenario	Category	C O P E C	Desert Shrew N O A E L HQ TRV Used for RBRG Development SUF = 1	NOAEL HQ TRV Basis[a]	NOAEL HQ Notes	Desert Shrew L O A E L HQ TRV Used for RBRG Development SUF = 1	LOAEL HQ TRV Basis[a]	LOAEL HQ Notes
Baseline	Inorganics	Chromium, hexavalent	6E-03	Selected	None	2E-03	Selected	None
Baseline	Inorganics	Chromium, total	1E+00	Selected	None	3E-01	Selected	None
Baseline	Inorganics	Copper	2E-01	Selected	None	1E-01	Selected	None
Baseline	Dioxins	TEQ Mammals	1E+00	Alternate	None	2E-01	Alternate	None
2 ft Scouring	Inorganics	Chromium, hexavalent	1E-02	Selected	None	3E-03	Selected	None
2 ft Scouring	Inorganics	Chromium, total	1E+00	Selected	None	3E-01	Selected	None
2 ft Scouring	Inorganics	Copper	2E-01	Selected	None	1E-01	Selected	None
2 ft Scouring	Dioxins	TEQ Mammals	**3E+01**	Alternate	Note 1	**5E+00**	Alternate	Note 2
5 ft Scouring	Inorganics	Chromium, hexavalent	3E-03	Selected	None	7E-04	Selected	None
5 ft Scouring	Inorganics	Chromium, total	1E+00	Selected	None	3E-01	Selected	None
5 ft Scouring	Inorganics	Copper	2E-01	Selected	None	1E-01	Selected	None
5 ft Scouring	Dioxins	TEQ Mammals	**3E+01**	Alternate	Note 1	**4E+00**	Alternate	Note 2

Notes:
[a] Selected TRVs for metals are based on the TRVs used to develop the U S E P A Ecological Soil Screening Levels (U S E P A 2005). Alternate TRVs for dioxin TEQ were developed for mammals based the geometric mean of the reproduction and growth endpoints for the NOAEL and LOAEL effect levels, respectively.

Note 1	N O A E L HQ greater than 1
Note 2	L O A E L HQ greater than 1
Note 3	L O A E L HQ greater than 10
Note 4	L O A E L HQ greater than 100

Abbreviations:
C O P E C = constituent of potential ecological concern
ft = foot
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
NOAEL = no-observed adverse effect level
RBRG = risk-based remedial goal
TEQ = toxicity equivalent
TRV = toxicity reference value

Table AOC10-5.6
Desert Shrew Risk Estimate Summary for Dioxin TEQ Using Depth-Weighted Exposure Point Concentrations and Congener-Specific BAFs (Wildlife SUF = 1, TRVs used for RBRG Development) for AOC 10

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PG&E Topock Compressor Station
Needles, California

Scenario	Category	BAF Type	C O P E C	Desert Shrew N O A E L HQ TRV Used for RBRG Development SUF = 1	NOAEL HQ TRV Basis[a]	NOAEL HQ Notes	Desert Shrew L O A E L HQ TRV Used for RBRG Development SUF = 1	LOAEL HQ TRV Basis[a]	LOAEL HQ Notes
Baseline	Dioxins	Congener-Specific (USEPA 1999)	TEQ Mammals	2E-01	Alternate	None	4E-02	Alternate	None
2 ft Scouring	Dioxins	Congener-Specific (USEPA 1999)	TEQ Mammals	**2E+00**	Alternate	Note 1	3E-01	Alternate	None
5 ft Scouring	Dioxins	Congener-Specific (USEPA 1999)	TEQ Mammals	9E-01	Alternate	None	1E-01	Alternate	None
Baseline	Dioxins	Congener-Specific (Fagervold et al. 2010)	TEQ Mammals	3E-01	Alternate	None	5E-02	Alternate	None
2 ft Scouring	Dioxins	Congener-Specific (Fagervold et al. 2010)	TEQ Mammals	1E+00	Alternate	None	2E-01	Alternate	None
5 ft Scouring	Dioxins	Congener-Specific (Fagervold et al. 2010)	TEQ Mammals	6E-01	Alternate	None	1E-01	Alternate	None

Notes:
[a] Selected TRVs for metals are based on the TRVs used to develop the U S E P A Ecological Soil Screening Levels (U S E P A 2005). Alternate TRVs for dioxin TEQ were developed for mammals based the geometric mean of the reproduction and growth endpoints for the NOAEL and LOAEL effect levels, respectively.

Note 1	N O A E L HQ greater than 1
Note 2	L O A E L HQ greater than 1
Note 3	L O A E L HQ greater than 10
Note 4	L O A E L HQ greater than 100

Abbreviations:
C O P E C = constituent of potential ecological concern
ft = foot
HQ = hazard quotient
LOAEL = lowest observed adverse effect level
NOAEL = no-observed adverse effect level
RBRG = risk-based remedial goal
TEQ = toxicity equivalent
TRV = toxicity reference value

Table AOC10-6.1
Desert Shrew Risk Estimate Summary Using Depth-Weighted and Area-Weighted Exposure Point Concentrations for AOC 10

Post-Soil N T C R A Human Health and Ecological Risk Assessment Report
PG&E Topock Compressor Station
Needles, California

Scenario	Category	C O P E C	BAF Type	Desert Shrew Depth-Weighted N O A E L HQ TRV Used for RBRG Development SUF = 1	Notes for Depth-Weighted N O A E L HQ TRV Used for RBRG Development SUF = 1	Desert Shrew Depth-Weighted L O A E L HQ TRV Used for RBRG Development SUF = 1	Notes for Depth-Weighted L O A E L HQ TRV Used for RBRG Development SUF = 1	Desert Shrew Area-Weighted N O A E L HQ TRV Used for RBRG Development SUF = 1	Notes for Area-Weighted N O A E L HQ TRV Used for RBRG Development SUF = 1	Desert Shrew Area-Weighted L O A E L HQ TRV Used for RBRG Development SUF = 1	Notes for Area-Weighted L O A E L HQ TRV Used for RBRG Development SUF = 1	W O E Result[a]
Baseline	Inorganics	Chromium, hexavalent	Selected BAF	8E-03	None	2E-03	None	6E-03	None	2E-03	None	HQ less than or equal to 1
Baseline	Inorganics	Chromium, total	Selected BAF	1E+00	None	3E-01	None	1E+00	None	3E-01	None	HQ less than or equal to 1
Baseline	Inorganics	Copper	Selected BAF	2E-01	None	1E-01	None	2E-01	None	1E-01	None	HQ less than or equal to 1
Baseline	Dioxins	TEQ Mammals	Selected BAF	3E+00	Note 1	5E-01	None	1E+00	None	2E-01	None	See W O E for Alternate BAFs
Baseline	Dioxins	TEQ Mammals	Alternate BAF (USEPA 1999)	2E-01	None	4E-02	None	--	None	--	None	HQ less than or equal to 1
Baseline	Dioxins	TEQ Mammals	Alternate BAF (Fagervold et al. 2010)	3E-01	None	5E-02	None	--	None	--	None	HQ less than or equal to 1
2 ft Scouring	Inorganics	Chromium, hexavalent	Selected BAF	8E-03	None	2E-03	None	1E-02	None	3E-03	None	HQ less than or equal to 1
2 ft Scouring	Inorganics	Chromium, total	Selected BAF	1E+00	None	2E-01	None	1E+00	None	3E-01	None	HQ less than or equal to 1
2 ft Scouring	Inorganics	Copper	Selected BAF	2E-01	None	1E-01	None	2E-01	None	1E-01	None	HQ less than or equal to 1
2 ft Scouring	Dioxins	TEQ Mammals	Selected BAF	3E+01	Note 1	6E+00	Note 2	3E+01	Note 1	5E+00	Note 2	See W O E for Alternate BAFs
2 ft Scouring	Dioxins	TEQ Mammals	Alternate BAF (USEPA 1999)	2E+00	Note 1	3E-01	None	--	None	--	None	Unlikely
2 ft Scouring	Dioxins	TEQ Mammals	Alternate BAF (Fagervold et al. 2010)	1E+00		2E-01		--	None	--	None	HQ less than or equal to 1
5 ft Scouring	Inorganics	Chromium, hexavalent	Selected BAF	4E-03	None	8E-04	None	3E-03	None	7E-04	None	HQ less than or equal to 1
5 ft Scouring	Inorganics	Chromium, total	Selected BAF	1E+00	None	3E-01	None	1E+00	None	3E-01	None	HQ less than or equal to 1
5 ft Scouring	Inorganics	Copper	Selected BAF	2E-01	None	1E-01	None	2E-01	None	1E-01	None	HQ less than or equal to 1
5 ft Scouring	Dioxins	TEQ Mammals	Selected BAF	3E+01	Note 1	4E+00	Note 2	3E+01	Note 1	4E+00	Note 2	See W O E for Alternate BAFs
5 ft Scouring	Dioxins	TEQ Mammals	Alternate BAF (USEPA 1999)	9E-01	None	1E-01	None	--	None	--	None	HQ less than or equal to 1
5 ft Scouring	Dioxins	TEQ Mammals	Alternate BAF (Fagervold et al. 2010)	6E-01	None	1E-01	None	--	None	--	None	HQ less than or equal to 1

Notes:

[a] W O E result for dioxin TEQ is risk conclusion based on 1) L O A E L HQ based on depth-weighted EPCs and assumptions used for RBRG development (i.e., a SUF of 1, congener-specific BAFs, and alternate TRVs), and 2) supporting L O E s. W O E result for metals is risk conclusion based on 1) L O A E L HQ based on area-weighted EPCs and assumptions used for RBRG development (i.e., a SUF of 1 and selected BAFs and TRVs), and 2) supporting L O E s.

Note 1	N O A E L HQ greater than 1
Note 2	L O A E L HQ greater than 1
Note 3	L O A E L HQ greater than 10
Note 4	L O A E L HQ greater than 100

Abbreviations:

"--" = not applicable
BAF = bioaccumulation factor
C O P E C = constituent of potential ecological concern
E P C = exposure point concentration
H Q = hazard quotient
L O A E L = lowest observed adverse effect level
L O E = line of evidence
N O A E L = no-observed adverse effect level
R B R G = risk-based remedial goal
S U F = site use factor
T E Q = toxicity equivalent
T R V = toxicity reference value
U S E P A = United States Environmental Protection Agency
W O E = weight of evidence, considering multiple L O E s. If HQs/L O A E L HQs are greater than 1, W O E Result is either 1) not expected, 2) unlikely, or 3) possible.

FIGURES

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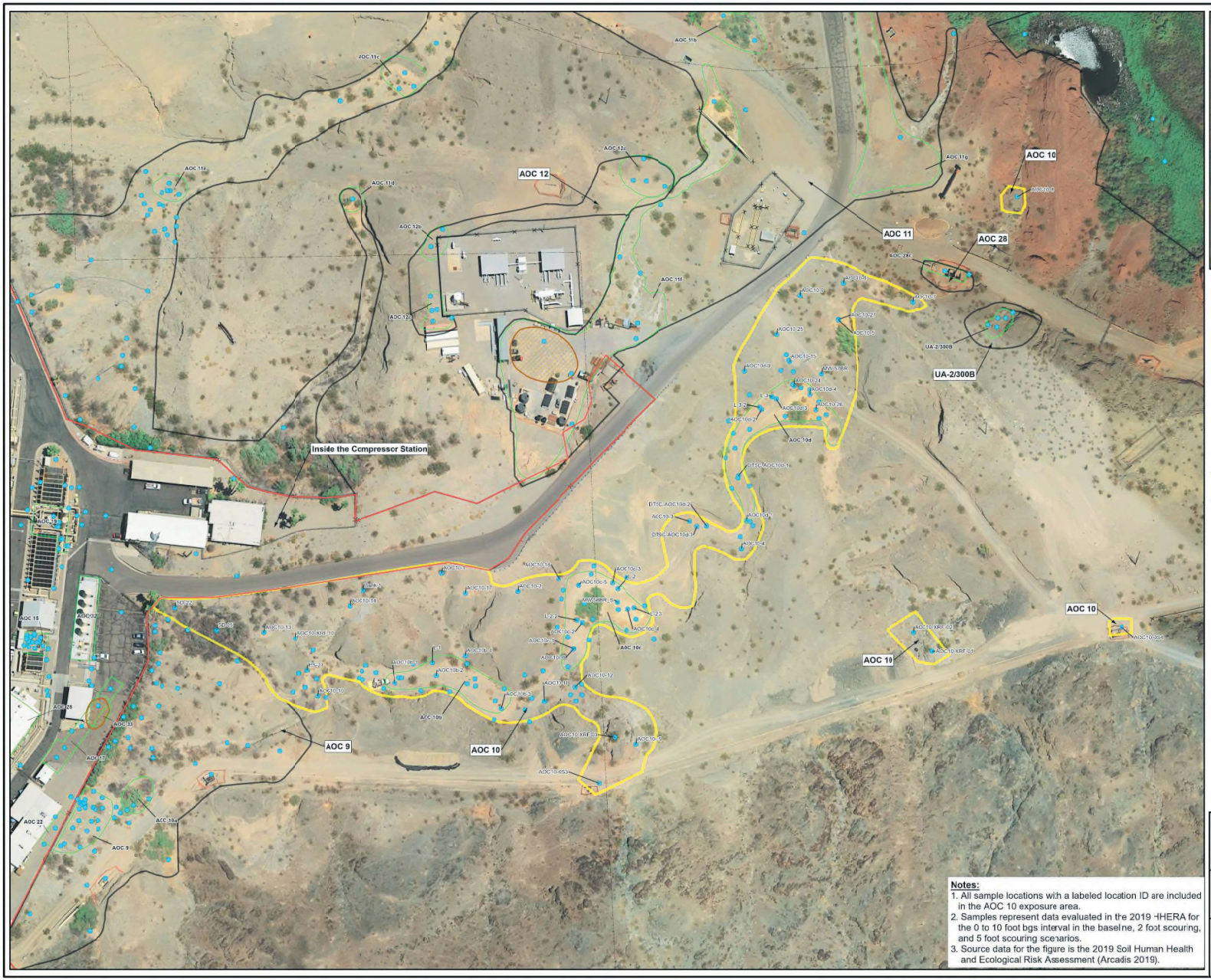

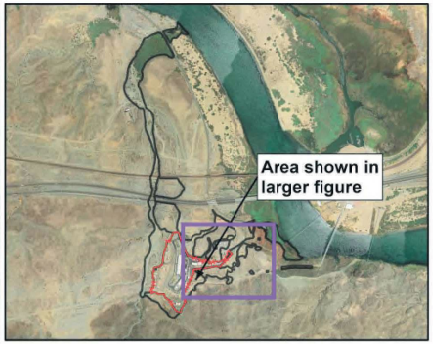

Legend:

- Soil Sampling Locatcn
- Area of Concern
- Potential Burning Related Lccation
- AOC 10 Exposure Area
- Exposure Area
- Property Boundaries
- Fencing
- Inside the Topock Compressor Station boundary, as defined by current fenceline

AOC 28 Label for Exposure Area

AOC 28c Label for Area of Concern

0 120 240

SCALE IN FEET

Notes:

1. All sample locations with a labeled location ID are included in the AOC 10 exposure area.
2. Samples represent data evaluated in the 2019 HHERA for the 0 to 10 foot bgs interval in the baseline, 2 foot scouring, and 5 foot scouring scenarios.
3. Source data for the figure is the 2019 Soil Human Health and Ecological Risk Assessment (Arcadis 2019).

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA
POST-SOIL NTCRA HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT REPORT

SOIL SAMPLING LOCATIONS
AOC 10 EXPOSURE AREA (PRE-NTCRA)

ARCADIS

FIGURE
AOC10-1.1

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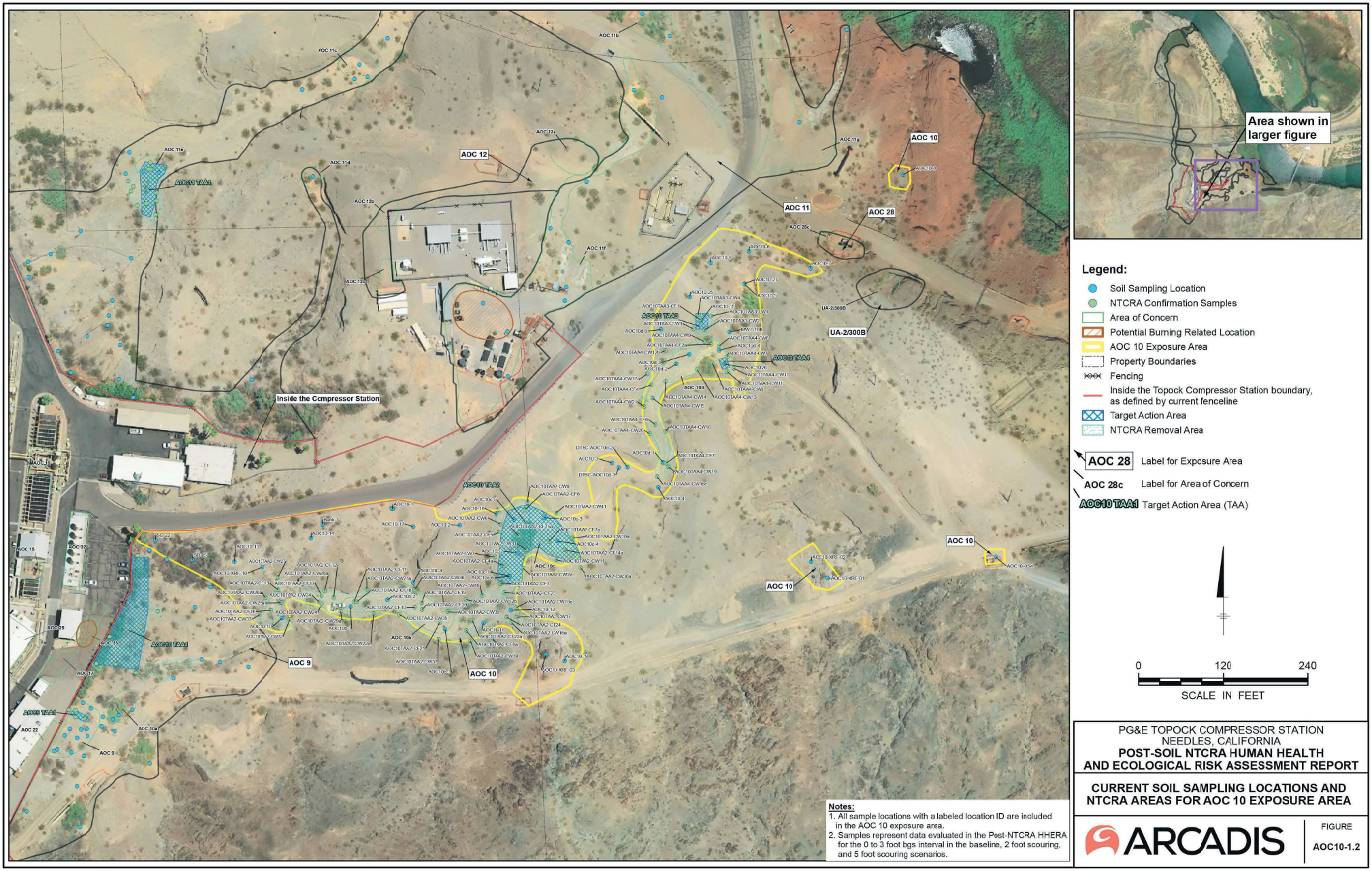

Notes:

1. All sample locations with a labeled location ID are included in the AOC 10 exposure area.
2. Samples represent data evaluated in the Post-NTCRA HHERA for the 0 to 3 foot bgs interval in the baseline, 2 foot scouring, and 5 foot scouring scenarios.

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA
POST-SOIL NTCRA HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT REPORT

CURRENT SOIL SAMPLING LOCATIONS AND NTCRA AREAS FOR AOC 10 EXPOSURE AREA

ARCADIS

FIGURE
AOC10-1.2