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January 10, 2019

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**Subject: December 2018 Monthly Progress Report for the Final Groundwater Remedy
Construction and Startup, PG&E Topock Compressor Station, Needles, California**
(Document ID: TPK_Monthly Progress Report_December 2018)

Dear Ms. Innis and Mr. Yue:

In compliance with the *1996 Corrective Action Consent Agreement* (CACA) (Attachment 6, Part E, Section 9a and Attachment 7) and the *2013 Remedial Design/Remedial Action Consent Decree* (CD) (§32 and Appendix C, Section 5), and pursuant to the *Construction/ Remedial Action Work Plan* (C/RAWP) (Section 2.6.3.1), this monthly report describes activities taken at Pacific Gas and Electric Company's (PG&E's) Topock Compressor Station during December 2018 as well as activities planned for the next six weeks (January 6 to February 16, 2019), and presents available results from sampling and testing performed in December 2018.

In addition, this report discusses material deviations from the approved design documents and/or the C/RAWP, if any, that PG&E has proposed to the California Department of Toxic Substances Control (DTSC) and the U.S. Department of the Interior (DOI), or that have been approved by DTSC and DOI. This report also highlights key personnel changes, if any, and summarizes activities performed and activities planned in support of DOI's 2012 Community Involvement Plan and DTSC's 2013 Community Outreach Plan, as well as contacts with the local community, representatives of the press, and/or public interest groups, if any. This report also includes data from samples collected as part of the sitewide groundwater monitoring program within 60 days of sample collection, as required by the Condition of Approval # xi in DTSC's approval letter dated August 24, 2018.

Please note that since activities conducted to comply with the project's Applicable or Relevant and Appropriate Requirement (ARARs) and the Subsequent Environmental Impact Report (SEIR) mitigation measures are currently reported in separate compliance reports, this information is not repeated in the monthly reports.

Monthly progress reports will be submitted to DTSC and DOI by the 10th day of the following month during construction and start-up of the groundwater remedy at the Topock Compressor Station which officially began on October 2, 2018. This is the third monthly progress report. Please contact me at (760) 791-5884 if you have any questions or comments regarding this submittal.

Sincerely,

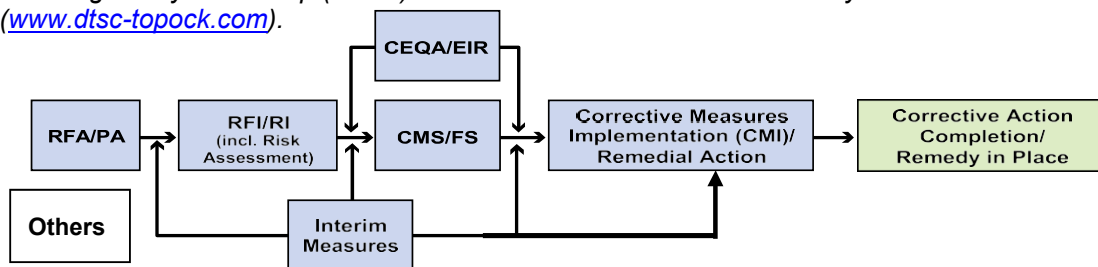
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Topock Project Executive Abstract

<p>Document Title: <i>December 2018 Monthly Progress Report for the Groundwater Remedy Construction and Startup, PG&E Topock Compressor Station, Needles, California</i></p> <p>Submitting Agency: DOI, DTSC</p> <p>Final Document? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Date of Document: 1/10/2019</p> <p>Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E</p>
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<p>Type of Document:</p> <p><input type="checkbox"/> Draft <input checked="" type="checkbox"/> Report <input type="checkbox"/> Letter <input type="checkbox"/> Memo</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Is this a Regulatory Requirement?</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If no, why is the document needed?</p>
<p>What does this information pertain to?</p> <p><input type="checkbox"/> Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)</p> <p><input type="checkbox"/> RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)</p> <p><input type="checkbox"/> Corrective Measures Study (CMS)/Feasibility Study (FS)</p> <p><input checked="" type="checkbox"/> Corrective Measures Implementation (CMI)/ Remedial Action(RA)</p> <p><input type="checkbox"/> California Environmental Quality Act (CEQA)/ Environmental Impact Report (EIR)</p> <p><input type="checkbox"/> Interim Measures</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Is this a Regulatory Requirement?</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If no, why is the document needed?</p>
<p>What is the consequence of NOT doing this item? What is the consequence of DOING this item?</p> <p>The consequence for not doing this item is PG&E will be out of compliance with the 1996 Corrective Action Consent Agreement (CACA) and the 2013 Remedial Design/ Remedial Action Consent Decree (CD), as well as the Construction/Remedial Action Work Plan (C/RAWP).</p>	<p>Other Justification/s:</p> <p><input type="checkbox"/> Permit <input type="checkbox"/> Other / Explain:</p>
<p>Brief Summary of attached document:</p> <p>This monthly report describes activities taken during December 2018 and activities planned for the next six weeks (January 6 to February 16, 2019) and presents available results from sampling and testing in December 2018. In addition, this report discusses material deviations from the approved design documents and/or the <i>Construction/ Remedial Action Work Plan (C/RAWP)</i>, if any, that PG&E has proposed to the California Department of Toxic Substances Control (DTSC) and the U.S. Department of the Interior (DOI) or that have been approved by DTSC and DOI. This report also highlights key personnel changes, if any, and summarizes activities performed and activities planned at the Topock Compressor Station in support of DOI's 2012 Community Involvement Plan and DTSC's 2013 Community Outreach Plan, as well as contacts with local community, representatives of the press, and/or public interest groups, if any.</p> <p>Written by: Pacific Gas and Electric Company</p>	
<p>Recommendations:</p> <p>Provide input to PG&E.</p>	
<p>How is this information related to the Final Remedy or Regulatory Requirements:</p> <p>This submittal is required in compliance with the CACA, CD, and pursuant to the C/RAWP.</p>	
<p>Other requirements of this information?</p> <p>None.</p>	

Related Reports and Documents:

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



Legend

RFA/PA – RCRA Facility Assessment/Preliminary Assessment

RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)

CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study



December 2018
Monthly Progress Report for the
Final Groundwater Remedy Construction and Startup

PG&E Topock Compressor Station
Needles, California

Document ID: TPK_Monthly Progress Report_December 2018

January 2019

Prepared for
U.S. Department of the Interior and California Department of Toxic Substances Control

On Behalf of
Pacific Gas and Electric Company



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Acronyms and Abbreviations

µg/m ³	micrograms per cubic meter
AOC	Area of Concern
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BMP	best management practice
CACA	Corrective Action Consent Agreement
C/RAWP	Construction/Remedial Action Work Plan
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL, Inc.
CHQ	Construction Headquarters
DOI	United States Department of the Interior
DTSC	California Department of Toxic Substances Control
ERTC	Environmental Release to Construct
FCR	field contact representative
LOC	level of concern
NTH	National Trails Highway
PG&E	Pacific Gas and Electric Company
RCRA	Resource Conservation and Recovery Act
SEIR	Subsequent Environmental Impact Report
SPY	Soil Processing Yard
SWPPP	Stormwater Pollution Prevention Plan
TCS	Topock Compressor Station
TRC	Technical Review Committee
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WEAT	Worker Environmental Awareness Training
WVR	Work Variance Request

1. Introduction

Pacific Gas and Electric Company (PG&E) is implementing the final groundwater remedy to address chromium in groundwater near the PG&E Topock Compressor Station (TCS), located in eastern San Bernardino County 15 miles southeast of the city of Needles, California.

The U.S. Department of the Interior (DOI) is the lead federal agency overseeing remedial actions at the TCS. PG&E and the United States executed a Remedial Design/Remedial Action Consent Decree (CD), on behalf of the DOI, under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 2012, which was approved by the U.S. District Court for the Central District of California in November 2013 (DOI, 2013). Paragraph 32 and Appendix C (Section 5) of the CD require PG&E to submit to DOI electronic progress reports during construction of the remedial action and on a quarterly basis after the selected remedy has been implemented and demonstrated to be operating as intended.

The California Department of Toxic Substances Control (DTSC) is the lead state agency overseeing corrective actions at the TCS. Remedial activities are being performed in conformance with the requirements of the Resource Conservation and Recovery Act (RCRA) Corrective Action pursuant to a Corrective Action Consent Agreement (CACA) entered into by PG&E and the DTSC in February 1996 (DTSC, 1996). Attachment 6, Part E, Section 9a and Attachment 7 of the CACA require PG&E to provide certain information in monthly progress reports during construction of the corrective action.

In compliance with the abovementioned CACA and CD requirements, PG&E proposed a template for the monthly progress reports in Exhibit 2.6-2 of the Construction/Remedial Action Work Plan (C/RAWP) (CH2M HILL, Inc. [CH2M], 2015b). The C/RAWP was approved by DOI on April 3, 2018 (DOI, 2018) and by DTSC on April 24, 2018 (DTSC, 2018a).

This is the third of the monthly progress reports that will be submitted to DOI and DTSC for the duration of the remedy construction and startup. This monthly progress report documents activities during December 2018, and follows the content and format described in Exhibit 2.6-2 of the approved C/RAWP. The report is organized as follows:

- **Section 2.1** describes completed construction activities; data collected, generated or received; nature and volume of waste generated; waste handling/disposal; issues encountered; actions taken to rectify problems/issues; personnel changes; and Work Variance Requests (WVRs; i.e., material deviations from the design documents, the C/RAWP, or other approved work plans), if any, as well as agencies' actions on those requests, and potential schedule impacts.
- **Section 2.2** summarizes contacts with representatives of the press, local community, or public interest groups during the reporting period, other activities provided to assist DTSC and/or DOI in support of the Community Outreach Plan (DTSC, 2013) and/or Community Involvement Plan (DOI, 2012), respectively, and anticipated near-term (approximately next six weeks) activities in support of the Community Outreach and Community Involvement Plans.
- **Section 2.3** describes the planned activities for the next six weeks (construction activities, sampling and monitoring events, etc.).
- **Section 2.4** provides information relating to the construction schedule progress, sequencing of activities, information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule, and a description of efforts made to mitigate those delays or anticipated delays, if any.
- **Section 3** lists the references cited in this report.

Please note that since activities conducted to comply with the project's Applicable or Relevant and Appropriate Requirement (ARARs) and the Subsequent Environmental Impact Report (SEIR; DTSC, 2018b) mitigation measures are currently reported in separate compliance reports, the same information is not repeated in the monthly reports.

2. Monthly Update

2.1 Description of Activities and Work Completed

2.1.1 Work Completed

Highlights of key activities related to the construction of the groundwater remedy completed during December 2018 include the following (in chronological order):

- On July 13, 2018, PG&E sent via email the first weekly six-week look-ahead schedule for the remedy construction field work. The weekly emails provide highlights of field activities in the previous week, field activities scheduled for the next week, and planned activities for the next six weeks. Recipients of the weekly emails are DOI, DTSC, the U.S. Fish and Wildlife Service (USFWS), Tribes, and the Technical Review Committee (TRC). PG&E continues to send these weekly emails to date. As of December 31, 2018, a total of 24 six-week look-ahead schedule emails were sent. **Of those, four six-week look-ahead schedule emails were sent in December 2018 (on December 3, 9, 16, and 21, 2018).**
- On August 10, 2018, PG&E issued the first Environmental Release to Construct (ERTC) to contractors. As of December 31, 2018, a total of 25 ERTCs were issued for mobilization and construction activities (see Table 2-1). **Of those, seven ERTCs were issued in December 2018.**
- Starting on October 4, 2018, PG&E has published a daily construction activities list and discussed the list at the morning tailboards with Tribes and agency representatives. This daily list is intended to inform and facilitate observation by Tribes and agency representatives on site on that day. PG&E continues to publish these daily lists and discuss the list at the daily morning tailboards to date. **In December 2018, a total of 19 daily construction activities lists were published and discussed at the morning tailboards.**
- In December 2018, PG&E completed the following construction activities (see Figures 2-1 and 2-2 for locations of key areas and wells, as well as select photos in **Attachment A**):
 - Poured concrete into the formwork for the access road at the Construction Headquarters (CHQ).
 - Surveyed and staked Pipeline C alignment.
 - On December 19, 2018, transplanted 30 sensitive plant species (29 palo verde and one cactus) from the Soil Processing Yard (SPY) and an area north of the Transwestern Bench. Planted those plants in the approved transplantation area off National Trails Highway (NTH).
 - Completed the spreading and compaction of soil (that was excavated during the construction of the truck containment pad) in TCS ponds area.
 - Completed installation and hydrostatic testing of the temporary construction water system. Freshwater from the TCS storage tanks was used for hydrostatic testing. Subsequent to the test, the water used for testing was re-used onsite for dust suppression.
 - **Pilot Boring/Well Installation Activities (Rotosonic drilling):**
 - a) Completed installation of MW-E on November 27, 2018 (drilled to 150 feet and reamed to 144 feet), and well development on December 15, 2018.
 - b) At the MW-L location, completed installation of monitoring wells in the first borehole on December 2, 2018 (drilled to 315 feet and reamed to 249 feet) and the second borehole on December 19, 2018 (drilled to 184 feet).
 - c) Completed drilling of the pilot boring at IRZ-13 on December 2, 2018 (drilled to 247 feet). Collected water samples at various intervals. Backfilled the borehole with sand.
 - d) Completed drilling of the pilot boring at IRZ-23 on December 3, 2018 (drilled to 147 feet). Collected water samples at various intervals. Backfilled the borehole with sand.

- e) Completed drilling of the pilot boring at IRZ-25 on December 14, 2018 (drilled to 172 feet). Collected water samples at various intervals. Backfilled the borehole with sand.
- f) Completed drilling of the pilot boring at IRZ-21 on December 19, 2018 (drilled to 158 feet). Collected water samples at various intervals. Backfilled the borehole with sand.
- g) Conducted site preparation activities at MW-N site.
- h) See **Attachment B** for available information such as boring logs and water analytical results. Boring logs for IRZ-15, 21, 23, and 25 are included in Attachment B.
- **Baseline/Opportunistic Soil Sampling Activities:**
 - a) Pursuant to the Baseline Soil Sampling and Analysis Plan (Appendix A of the Soil Management Plan [which is Appendix L of the C/RAWP]), one soil sample was collected at approximately 1 foot below ground surface (bgs) at IRZ-11/IRZ-16/IRZ-17 (sampled on 12/18/18), IRZ-21 (sampled on 12/13/18), IRZ-25 (sampled on 12/4/18), MW-B (sampled on 12/14/18), MW-F (sampled on 12/18/18), and MW-N (sampled on 12/5/18).
 - b) See **Attachment C** for information about soil sampling locations and soil analytical results that are available at this time.
- **Perimeter Air Sampling Activities:**
 - a) Dust monitoring continues in December 2018 at the perimeter of the work areas.
 - b) Perimeter air sampling for hexavalent chromium is performed at the perimeter of the work areas (outside of the exclusion zone) that are inside Areas of Concern (AOCs) within the construction footprint where hexavalent chromium concentrations in soil have been historically reported. No perimeter air sampling was conducted in December 2018.
 - c) See **Attachment D** for information about previous air sampling locations and air analytical results.
- **Noise Monitoring Activities:**
 - a) Noise monitoring is conducted at pre-approved locations closest to the construction activities. Through December 2018, noise monitoring was conducted at the following pre-approved locations:
 - Location west of the mobile home park at Moabi Regional Park,
 - Location Maze A Area 2,
 - Location Maze B Combined Area 1/2 and alternate location (the alternate location was only monitored when drilling at MW-L occurred), and
 - Location Maze C Area 1.
 - b) See **Attachment E** for information about pre-approved noise monitoring locations and a summary of noise monitoring data available to date.

2.1.2 Work Already Underway and During Implementation

As of December 31, 2018, PG&E has started and will continue to perform the following activities:

- Backfilling the pilot boring at IRZ-9 with sand.
- Continue to drill MW-F.
- Continue to improve the access road to the CHQ.
- Continue to water the transplanted plants, at the approved location off NTH, weekly for eight weeks.
- Continue to conduct noise and dust monitoring and inspection of SWPPP BMPs.
- Continue to track and manage waste generated.
- Continue to manage displaced soil per the approved Soil Management Plan.

2.1.3 Freshwater Usage, Waste Generation and Management

As of December 31, 2018, since construction of the groundwater remedy officially began on October 2, 2018, the volumes of freshwater used for remedy construction and waste streams generated from remedy construction are:

- Approximately 580,000 gallons of freshwater were used, of which 2 percent was for pilot boring/well installation and general construction activities (e.g., CHQ access road work) and 98 percent was for fugitive dust suppression.
- Approximately 41 cubic yards of drill cuttings were generated from well drilling and geotechnical investigation. Of those, approximately 1.3 cubic yards are clay, and PG&E is currently awaiting direction from DOI on the management of clay. The remaining drill cuttings were sampled in accordance to the approved Soil Management Plan, and the final disposition will be reported in future monthly reports.
- Approximately 27,000 gallons of wastewater were generated from drilling operations. At each drilling location, the wastewater is initially stored in a 3,000-gallon holding tank in the primary work zone, and is transferred from the primary work zone, as needed, to a common 20,000-gallon frac tank located at the MW-20 Bench. Each transfer load is tracked. Once the frac tank is full, its contents will be characterized and managed in accordance with the approved Waste Management Plan (Appendix R of the C/RAWP) and the final disposition will be reported in future monthly reports.
- Approximately 66 cubic yards of general construction waste and 18 cubic yards of recyclables were generated and transported to Republic Services in Lake Havasu City for disposal and management.
- Sanitary waste in portable toilets that is hauled offsite as needed.

2.1.4 Worker Training and Education

- PG&E continues to provide the mandatory Site Health and Safety Training for its employees and contractors on a daily basis. As of December 31, 2018, a total of 45 health and safety training sessions were held and 210 employees and contractors received the training. **Of those, in December 2018, 6 sessions were conducted and 22 employees/contractors were trained.** After the training, the attendees signed the training roster.
- PG&E continues to provide the mandatory Worker Environmental Awareness Training (WEAT) to its employees and contractors that will be involved in the remedy construction project. The training is offered regularly on Mondays and Thursdays, and more frequently as needed. As of December 31, 2018, a total of 42 WEAT sessions were conducted and 243 employees and contractors received the training. **Of those, in December 2018, 6 sessions were conducted and 22 employees/contractors were trained.** Educational brochures are made available to attendees of the training; they are designed to reinforce the key topics and highlight the take-aways discussed during the classroom training. After the training, the attendees signed the training roster.
- PG&E's onsite biologist also trained Field Contact Representatives (FCRs), who will be responsible for compliance with biological avoidance and mitigation measures. As of December 31, 2018, a total of 7 FCR training sessions were conducted and 33 employees and contractors received the training. **No FCR training sessions were conducted in December 2018.**
- Training records are kept electronically and at the temporary construction trailers at the SPY. The records are available upon request.

2.1.5 Status of Work Variance Requests

PG&E submitted WVR #3 to DTSC and DOI on December 24, 2018. WVR #3 contains proposed changes within the CHQ fence line to avoid/minimize the overall amount of soil disturbance during construction, reduce the number of truck trips to haul wastewater, and allow for additional working space within the yard. There are no proposed changes to the CHQ footprint nor its fence line. DTSC and DOI approved WVR #3 on January 4, 2019.

See Table 2-2 for information regarding activities related to previously proposed WVRs (i.e., material deviations from the design documents, the C/RAWP, or other approved work plans), and agencies' actions on those requests.

2.1.6 Use of Future Activity Allowance

There was no proposed use of Future Activity Allowance (FAA) to date.

2.1.7 Issues Encountered and Actions Taken to Rectify Issues/Problems

- Several well locations were slightly adjusted to accommodate access for both sonic and dual rotary rigs, while minimizing ground disturbance and vegetation removal. Pipeline C alignment was adjusted accordingly in those locations.
- Pipeline C alignment was also adjusted to avoid conflict with the Interim Measure No. 3 extraction pipeline from well PE-1 to the MW-20 Bench.
- Based on recent site walks with the construction team, available space within the current maximum construction footprint may not adequate for installation of Pipeline C along segments C1-C3 (north end of the alignment) and just south of the BNSF railroad bridge. In addition, the Pipeline C jack-and-bore pit location west of NTH is currently located outside of the maximum construction footprint. PG&E is evaluating options to resolve these space-related issues and will report on actions to rectify them in the next monthly progress report.

2.1.8 Key Personnel Changes

There was no change to key PG&E project personnel in December 2018.

2.2 Communication with the Public

Below are the highlights of key communication and interactions with the public that occurred in December 2018:

- PG&E met with the Pirate Cove General Manager on a regular basis to provide project updates and check-in.
- PG&E met with the General Manager of Topock 66 Resort, the Editor of the *Topock Topics*, and the owner/operator of Golden Shores Water Company on a monthly basis to provide updates on the project and check-in.

2.3 Planned Activities for Next Six Weeks

The planned activities for next six weeks (January 6 through February 16, 2019) include the following:

- Well installation activities:
 - Complete installation of wells MW-N, MW-F, MW-B, MW-G, MW-D, IRZ-23, and IRZ-27.
 - Complete site preparation for wells MW-M and IRZ-27.
- Non-well construction activities:
 - Complete access road to the CHQ.
 - Perform clearance and grading at the CHQ.
 - Install perimeter fence at the SPY.
 - Conduct pre-characterization of soil along planned pipeline alignment and in infrastructure location within AOCs.

- Perform grubbing and clearing along Pipeline C alignment (C1, C2, C3, C4, C5, C7, C8, C9, C10, C14, C17, F1).
- Continue to conduct noise and dust monitoring and inspection of SWPPP BMPs.
- Continue to log and manage waste generated.
- Continue to manage displaced soil per the approved Soil Management Plan.

Attachment F contains the six-week look-ahead schedule available at this time. Any adjustments to the schedule will occur as needed via the weekly emails (sent at the end of each week) and/or the daily list of construction activities (published daily and discussed with agency and Tribal representatives on site on that day).

2.4 Construction Schedule Review

Phase 1 of the groundwater remedy construction started on October 2, 2018. Table 2-3 presents a summary of the percent completeness for key construction activities as of December 31, 2018. PG&E will continue to look for opportunities to optimize the construction workflow and schedule.

2.5 Available Sitewide Groundwater Monitoring Data (DTSC Condition of Approval xi)

Pursuant to Condition of Approval # xi in DTSC's approval letter dated August 24, 2018 (DTSC, 2018a), PG&E is required to report data from samples collected as part of the sitewide groundwater monitoring program within 60 days of sample collection. In compliance with this requirement, PG&E submitted validated data to DTSC via monthly emails. For ease of recordkeeping and to minimize the number of ad-hoc compliance reports/emails, PG&E has included validated data in each monthly progress report starting with the November 2018 report (see **Attachment G**).

3. References

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

California Department of Toxic Substances Control (DTSC). 2013. *Community Outreach Plan, Pacific Gas and Electric Company's Topock Compressor Station, Needles, California*. http://dtsc-topock.com/sites/default/files/2013-01-11_FinalCOP_Web.pdf. January.

California Department of Toxic Substances Control (DTSC). 2018a. *Acceptance and Conditional Approval of Groundwater Remedy Design and Corrective Measures Implementation Workplan at Pacific Gas and Electric Company, Topock Compressor Station, Needles, California*. April 24.

California Department of Toxic Substances Control (DTSC). 2018b. *Final Subsequent Environmental Impact Report for the Pacific Gas and Electric Company Topock Compressor Station Final Groundwater Remediation Project*. April 24.

CH2M HILL, Inc. (CH2M). 2015a. *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.

CH2M HILL, Inc. (CH2M). 2015b. *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.

United States Department of the Interior (DOI). 2012. *Community Involvement Plan, Pacific Gas and Electric Topock Compressor Station, Needles, California*. http://dtsc-topock.com/sites/default/files/FINAL_DOI_CIP_10-12.pdf. September.

United States Department of the Interior (DOI). 2013. *Remedial Action/Remedial Design Consent Decree (CD) between the United States of America and Pacific Gas & Electric Company*. Case 5:13-cv-00074-BRO-OP, Document 23. Entered November 21.

United States Department of the Interior (DOI). 2018. *Approval of PG&E Topock Compressor Station Remediation Site – Basis of Design Report/Final (100%) Design Submittal and Construction/Remedial Action Work Plan for the Final Groundwater Remedy and the Supplemental and Errata Information for the Final (100%) Design for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. Letter from Pamela Innis/DOI to Curt Russell/PG&E. April 3.

Tables

Table 2-1 Summary of Environmental Release-To-Constructions (ERTCs) Issued to Contractors

December 2018 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup

PG&E Topock Compressor Station, Needles, California

ERTC No.	Brief Description of Covered Areas and Scope of Authorized Activities	Issue Date
Non-Well ERTCs		
1	Initial mobilization activities at the Construction Headquarters (CHQ), Soil Processing Yard (SPY), and three staging areas (#9 Parking area off I-40, #18 MW-20 Bench, and #23 Transwestern Bench). Scope included installation of temporary construction trailers, portable generators, SWPPP BMPs, construction signages, and temporary construction fencing, as well as equipment staging and truck inspections.	August 10, 2018
Addendum 1 to ERTC #1	Scope included setup of wastewater and freshwater storage tanks at MW-20 Bench, improvement of the access road at the CHQ, installation of perimeter fence at the SPY, and grading at SPY.	September 21, 2018
Addendum 2 to ERTC #1	Scope included grading for drill rig setup at IRZ-20.	October 4, 2018
Addendum 3 to ERTC #1	Scope included geotechnical investigation in the footprint of the future Carbon Amendment building at the MW-20 Bench.	October 9, 2018
Addendum 4 to ERTC #1	Scope included the installation of a temporary handrail along the walk way from the MW-20 Bench to the floodplain.	December 28, 2018
2	Scope included the installation of the temporary construction water system and construction water tanks at Area #25 Route 66 Welcome Sign.	September 28, 2018
3	Scope included the installation of the Public Information Trailer, a fugitive dust sign, an information kiosk, and a construction delivery sign at the northwest corner of Park Moabi Road and National Trails Highway (NTH).	September 4, 2018
4	Scope included the installation of a truck containment pad at the TCS evaporation ponds and maintenance of the access road to the ponds.	September 24, 2018
6	Scope included the geotechnical investigation along Pipeline F alignment (on the Compressor Station entrance road).	October 3, 2018
7	Scope included the installation of traffic control along the southern end of NTH per the Traffic Control Plan.	September 17, 2018
9	Scope included the transplantation and planting of sensitive plants.	November 9, 2018 <i>Note that an ERTC walk with Tribes/agencies occurred on October 24, 2018</i>
Well ERTCs		
5a	Scope included the site setup, drilling, testing, and demobilization at MW-L.	September 27, 2018
5b	Scope included the placement of soil stabilization mats in the floodplain, setup of a temporary staging area near the north end of the access route in the floodplain, rig setup, installation of snow fence to protect plants, drilling, testing, and demobilization at IRZ-15.	October 12, 2018
5c	Scope included the site setup, drilling, testing, and demobilization at IRZ-20 on the MW-20 Bench.	October 15, 2018
5d	Scope included the site setup, drilling, testing, and demobilization at MW-E on the MW-20 Bench.	October 29, 2018
5e	Scope included the site setup, drilling, testing, and demobilization at MW-N in the upland.	November 15, 2018 <i>Note that an ERTC walk with Tribes/agencies occurred on November 1, 2018</i>
5f	Scope included the site setup, drilling, testing, and demobilization at IRZ-13 in the floodplain.	November 7, 2018

Table 2-1 Summary of Environmental Release-To-Constructions (ERTCs) Issued to Contractors

December 2018 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup

PG&E Topock Compressor Station, Needles, California

ERTC No.	Brief Description of Covered Areas and Scope of Authorized Activities	Issue Date
5g	Scope included the site setup, drilling, testing, and demobilization at IRZ-23 on the MW-20 Bench.	November 8, 2018
5i	Scope included the site setup, drilling, testing, and demobilization at IRZ-9 in the floodplain.	November 28, 2018
5j	Scope included the site setup, drilling, testing, and demobilization at IRZ-25 on the MW-20 Bench.	December 3, 2018
5k	Scope included the site setup, drilling, testing, and demobilization at IRZ-21 on the MW-20 Bench.	December 9, 2018
5l	Scope included the site setup, drilling, testing, and demobilization at MW-B in the floodplain.	December 10, 2018
Addendum to ERTC #5l	Scope included the setup of an additional temporary equipment and material staging area in the floodplain.	December 13, 2018
5m	Scope included the site setup, drilling, testing, and demobilization at MW-F along NTH.	December 17, 2018
5n	Scope included the site setup, drilling, testing, and demobilization at IRZ-11 in the floodplain.	December 17, 2018

Note: ERTC 5h (MW-M) and ERTC 8 (Wastewater Management) are under development.

Table 2-2 Summary of Work Variance Requests (WVRs)

December 2018 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup

PG&E Topock Compressor Station, Needles, California

WVR No.	Brief Description of Work Variance Request	Approval Dates
1	<p>This WVR addressed PG&E's proposed modification to the brine tanks containment for use by the remedy, specifically:</p> <ul style="list-style-type: none"> • Upgrade the existing lined containment to concrete - The original synthetic liner material has degraded from exposure to UV light, heat, and abrasion and must be replaced. PG&E proposed to replace the synthetic-lined containment (including K-rails) with a concrete containment to support the groundwater remedy. The concrete color will be desert tan, and information on this proposed concrete color will be submitted to the agencies for review. The proposed concrete material will be similar to the material of the truck lane in the final remedy design (see Appendix E of the Final Basis of Design Report (CH2M, 2015a),* Section 033 00, Cast-In-Place Concrete). • Shorten the length of the containment - This containment will have the same height as the existing containment, but with a slightly smaller footprint (the length is 5 feet shorter). This smaller footprint still meets the required volume for a secondary containment and allows for more space for remedy construction at the tight MW-20 bench. 	<p>DOI approved WVR #1 on June 22, 2018</p> <p>DTSC approved WVR #1 on July 5, 2018</p>
2	<p>PG&E proposed to relocate the tie-in point for remedy construction water to an aboveground location inside TCS and below the TCS Water Storage Tanks. This is to eliminate the risk of damaging the existing pressurized 6-inch water line and to avoid any interference with PG&E Gas Operations control of the Station's water supply. The WVR addressed this relocation, specifically:</p> <ul style="list-style-type: none"> • Relocate the construction water tie-in point to an aboveground location below the TCS Water Storage Tanks, inside TCS – The final design calls for the temporary construction water line to hot-tap into the existing 6-inch steel water line just as the line turns southwest to continue to TCS. PG&E proposed to move the tie-in point to an aboveground valve manifold, located below the TCS Water Storage Tanks in the boneyard area. • Extend the temporary construction water line to the new tie-in point, along Pipeline 300A access road – The planned 4-inch high-density polyethylene (HDPE) temporary construction water line will be extended, following the route of the Pipeline 300A access road, to the new tie-in point inside TCS. This pipeline extension is approximately 1,950 feet and is also made of 4-inch HDPE. The pipe will be laid on ground surface and to the south of the 6-inch water line where possible. At the crossing with the SoCal Gas pipeline access road, the pipeline will be at grade with fill to allow for vehicle crossing. 	<p>DOI/DTSC approved WVR #2 on August 29, 2018</p>
3	<p>PG&E proposed changes within the CHQ fence line to avoid/minimize the overall amount of soil disturbance during construction, reduce the number of truck trips to haul wastewater, and allow for additional working space within the yard. There are no proposed changes to the CHQ footprint nor its fence line. The specifics are described below:</p> <ul style="list-style-type: none"> • Relocate the decontamination pad from the western fence to the northern fence (near the western corner). Based on recent survey data collected during construction, the difference in ground elevation between northern and southern end of the pad is about 4 feet. Moving the pad to the northern fence would eliminate the difference in ground elevation and reduce the amount of soil disturbance by at least 80 cubic yards. • Bring the remedy-produced wastewater tank from belowground to aboveground, increase the tank volume from 1,000 to 2,500 gallons, and place the aboveground, double-walled tank adjacent to the decontamination pad. The change from belowground to aboveground reduces the amount of soil disturbance by at least 50 cubic yards. The change to a bigger tank will reduce the amount of truck trips needed to haul wastewater. The placement of the tank adjacent to the decontamination pad allows for the pad to function as a secondary containment for the haul truck during off-loading of the wastewater. • Defer construction of the underground sewage tanks. Deferral of the underground tanks reduces the overall amount of soil disturbance by at least 800 cubic yards. All sanitary wastes will be managed in aboveground sewage tanks (similar to the ones currently used for the SPY trailers) or portable toilets. • Swap the location of the construction trailers and the sunshade and change the configuration of the sunshade from a rectangle to a square. This change will allow for more working space within the CHQ. All functions that would occur in the Workshop/Sampling Processing building will be conducted in the construction trailers. 	<p>DOI/DTSC approved WVR #3 on January 4, 2019</p>

Note:

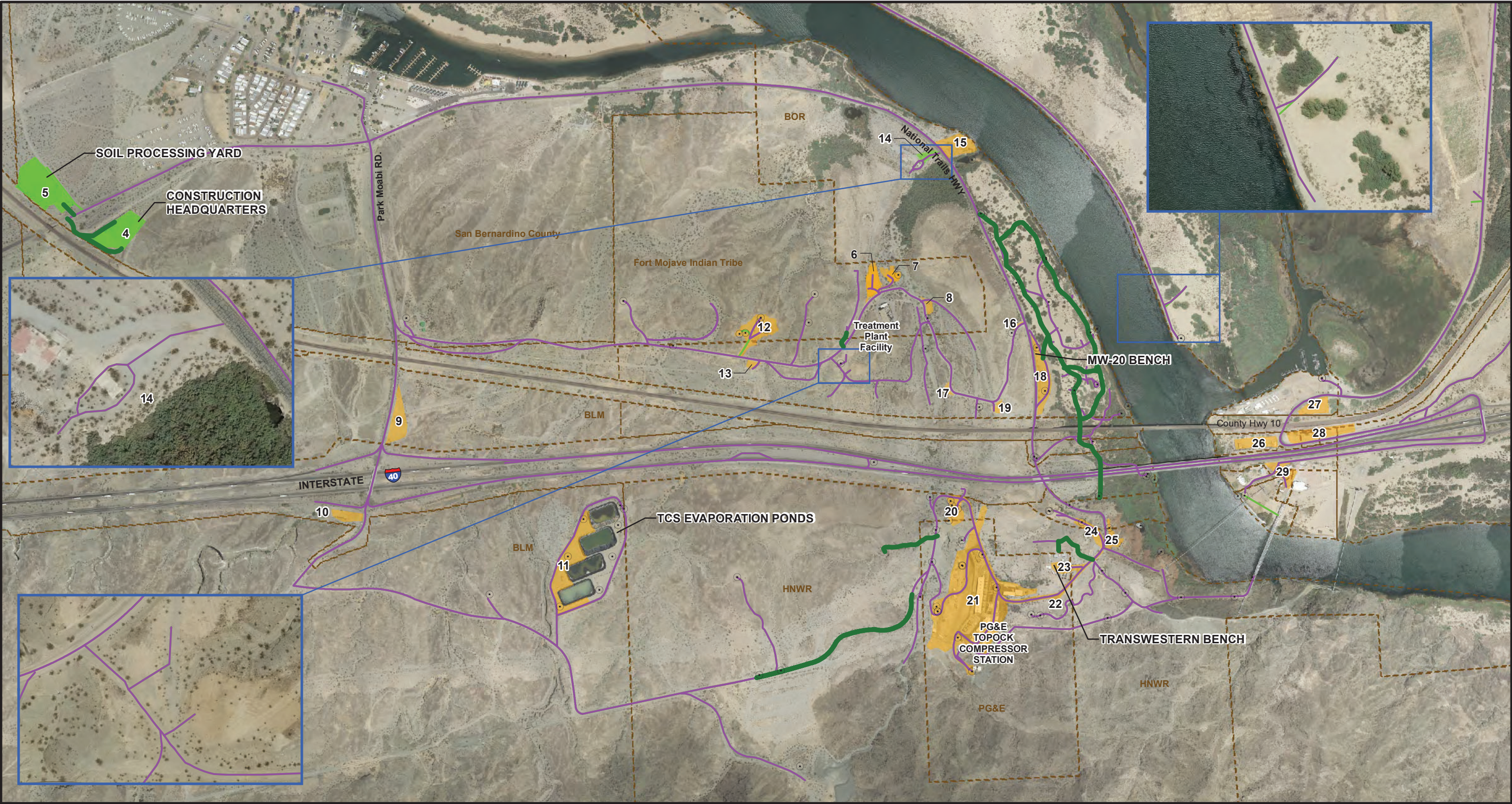
* CH2M HILL, Inc. (CH2M). 2015a. *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.

Table 2-3 Summary of Percent Completeness of Key Construction Activities

*December 2018 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California*

Activity	% Complete	Current Status of Construction Activities (as of December 31, 2018)
Project signage & Public Information Office	100%	Complete.
Staging Area 9 setup	100%	Complete.
Staging Area 23 setup	100%	Complete.
Staging Area 18 setup	100%	Complete.
Temporary construction offices at Soil Processing Yard	100%	Complete.
Soil Processing Yard setup for construction staging	100%	Complete.
National Trails Highway lane closure and traffic control installation	100%	Complete.
Temporary construction water line	100%	Complete
TCS Ponds concrete containment pad	100%	Complete
Construction Headquarters access road	95%	Site prep, excavation, conduit installation, subgrade backfill, and concrete placement complete. Available for use in January after concrete cure period.
MW-B	5%	Site prep initiated. Begin drilling in January.
MW-E	100%	Complete
MW-F	5%	Site prep initiated. Begin drilling in January.
MW-L	95%	Well construction complete. Develop in January.
MW-N	5%	Site prep initiated. Begin drilling in January.
IRZ-9 pilot boring	95%	Boring and sampling complete; finish backfill in January.
IRZ-15 pilot boring	100%	Complete
IRZ-13 pilot boring	100%	Complete
IRZ-20 pilot boring	100%	Complete
IRZ-21 pilot boring	100%	Complete
IRZ-23 pilot boring	100%	Complete

Figures



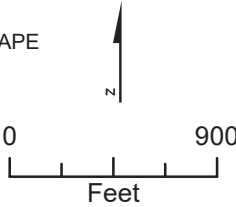
LEGEND

- Existing Access Route (will continue to be used for remedial activities)
- Existing Route (to be used as is for access to remedial activities)
- Roads to be improved or constructed for groundwater remedy
- Soil Processing (Area #5) and Construction Headquarters (Area #4) for Remediation Project
- Staging Areas for Remediation Project
- 5 Area # referenced in the Notes

Notes:

1. Decontamination pads will be located in Area #4 (Construction Headquarters), Area #21 (Topock Compressor Station), and Area #23 (Transwestern Bench).
2. Areas #15, 16, 17, 19, and 20 will not be used as staging areas. Areas #16, 17, and 19 may be part of the primary work zones for remedy infrastructure along the access road.
3. Area #20 may be part of the primary work zone for installation of future provisional well IRL-6 (if determined to be needed in the future) and associated piping/concrete/vault.

4. Public roadways outside of the EIR project area and the APE can also be used for remedy implementation.



**FIGURE 2-1
CONSTRUCTION SITE PLAN
AND ACCESS ROUTES**
GROUNDWATER REMEDY PHASE 1 CONSTRUCTION
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA



LEGEND

Property Boundaries

Existing Wells:

- Extraction Well
- Injection Well
- Monitoring Well
- Water Supply Well

Planned Wells:

- Extraction, National Trails Highway (NTH) In-situ Reactive Zone (IRZ)
- Extraction, Riverbank
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Remedy Monitoring Well
- Recirculation Well

Pipeline Corridor for Remedy

- Aboveground Pipe
- Underground Pipe/Conduit

Remedy Facilities

- Planned Transformer
- Future Provisional Transformer
- Proposed Remedy Structure

Approximate extent of hexavalent chromium [Cr(VI)] concentrations exceeding 32 micrograms per liter (µg/L) at any depth in groundwater based on fourth quarter 2013 sampling events. Dashed where based on limited data.

Note:

- Note that in compliance with EIR mitigation measure CUL-1a-9, as well as PA and CHPMP mitigation measures, the pipeline along the dirt road west of National Trails Hwy is located in an existing, previously disturbed, access road. In addition, the location of the road and pipeline was field verified and does not create any direct physical impact or effect on the Topock Maze, as it is manifested archaeologically, in compliance with EIR mitigation measure CUL-1a-10, PA, and CHPMP mitigation measures.
- All well and structure locations are approximate.

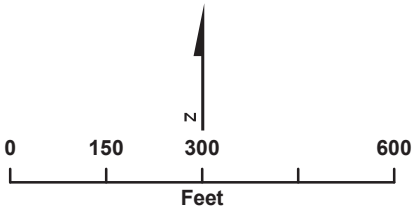


FIGURE 2-2
WELL AND PIPELINE LOCATIONS
GROUNDWATER REMEDY PHASE 1 CONSTRUCTION
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Attachment A

Photographs

PL01 Photo Log Photo Sheet



IRZ-25 sonic drilling (photo taken on 12/11/18)



IRZ-9 sonic drilling (photo taken on 12/11/18)



Well development at MW-E (photo taken on 12/13/18)



SWPPP BMPs (silt fence and fiber rolls) at MW-N well location (photo taken on 12/13/18)



Snow fence to protect plants at MW-B location (photo taken on 12/13/18)



Cement pour at CHQ access road (photo taken on 12/18/18)



Work on CHQ access road (photo collected on 12/18/18)



Temporary equipment staging area in floodplain (photo taken on 12/19/18)



Temporary pipe storage location in floodplain (photo taken on 12/19/18)

Attachment B
Available Boring Logs and Groundwater
Sample Results from Well Drilling

Table B-1. Groundwater Sampling Results through December 2018

*December 2018 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
PG&E Topock Compressor Station, Needles, California*

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
MW-L	MW-L-VAS-76-81	10/06/18	76 - 81	34	31
MW-L	MW-L-VAS-106-111	10/09/18	106 - 111	0.697 J	0.84
MW-L	MW-L-VAS-141-146	10/10/18	141 - 146	< 0.13 U	< 0.033 U
MW-L	MW-L-VAS-181-186	10/20/18	181 - 186	3.8	3.3
MW-L	MW-L-VAS-218-223	10/21/18	218 - 223	68	66
MW-L	MW-L-VAS-261-266	10/22/18	261 - 266	0.284 J	< 0.17 U
MW-E	MW-E-VAS-52-57	11/05/18	52 - 57	7800	7000
MW-E	MW-E-VAS-82-87	11/06/18	82 - 87	190	200
MW-E	MW-E-VAS-112-117	11/06/18	112 - 117	3000	3100
MW-E	MW-E-VAS-137-142	11/07/18	137 - 142	7900	7300
MW-E	MW-E-70-121418	12/14/18	70 (WD)	Data not yet available	3000
MW-E	MW-E-142-121418	12/14/18	142 (WD)	4500	4200
IRZ-9	IRZ-9-VAS-27-32	12/03/18	27 □32	120	120
IRZ-9	IRZ-9-VAS-47-52	12/04/18	47 □52	< 0.13 U	< 0.033 U
IRZ-9	IRZ-9-VAS-62-67	12/04/18	62 □67	< 0.13 U	< 0.033 U
IRZ-9	IRZ-9-VAS-182-187	12/11/18	182 □187	< 0.13 U	< 0.17 U
IRZ-9	IRZ-9-VAS-207-212	12/13/18	207 □212	< 0.13 U	< 0.17 U
IRZ-9	IRZ-9-VAS-232-237	12/13/18	232 □237	0.811 J	< 0.17 U
IRZ-9	IRZ-9-VAS-264-269	12/15/18	264 □269	Data not yet available	< 0.17 U
IRZ-9	IRZ-9-VAS-276-281	12/16/18	276 □281	Data not yet available	< 0.17 U
IRZ-9	IRZ-9-VAS-292-297	12/18/18	292 □297	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-32-37	11/17/18	32 - 37	170	220
IRZ-13	IRZ-13-VAS-57-62	11/18/18	57 - 62	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-102-107	11/19/18	102 - 107	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-142-147	11/19/18	142 - 147	< 0.13 U	< 0.17 U
IRZ-13	IRZ-13-VAS-180-185	11/27/18	180 - 185	230	190
IRZ-13	IRZ-13-VAS-197-202	11/28/18	197 - 202	< 0.13	< 0.83
IRZ-13	IRZ-13-VAS-224-229	11/28/18	224 - 229	< 0.13	< 0.83
IRZ-13	IRZ-13-VAS-237-242	11/29/18	237 - 242	< 0.13 U	< 0.17 U
IRZ-15	IRZ-15-VAS-32-37	11/01/18	32 - 37	13	13
IRZ-15	IRZ-15-VAS-62-67	11/02/18	62 - 67	< 0.65 U	0.459 J
IRZ-15	IRZ-15-VAS-102-107	11/03/18	102 - 107	< 0.65 U	< 0.17 U
IRZ-15	IRZ-15-VAS-132-137	11/04/18	132 - 137	0.228 J	< 0.17 U

Table B-1. Groundwater Sampling Results through December 2018*December 2018 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup**PG&E Topock Compressor Station, Needles, California*

Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
IRZ-15	IRZ-15-VAS-162-167	11/05/18	162 - 167	3400	3200
IRZ-15	IRZ-15-VAS-182-187	11/06/18	182 - 187	130	140
IRZ-15	IRZ-15-VAS-222-227	11/07/18	222 - 227	< 0.13 U	< 0.17 U
IRZ-20	IRZ-20-VAS-51-56	10/20/18	51 - 56	130	150
IRZ-20	IRZ-20-VAS-82-87	10/21/18	82 - 87	< 0.13 U	< 0.033 U
IRZ-20	IRZ-20-VAS-112-117	10/22/18	112 - 117	< 0.13 U	< 0.17 U
IRZ-20	IRZ-20-VAS-131-136	10/23/18	131 - 136	< 0.13 U	< 0.17 U
IRZ-20	IRZ-20-VAS-173-178	10/24/18	173 - 178	< 0.13 U	< 0.83 U
IRZ-21	IRZ-21-VAS-52-57	12/15/18	52 □ 57	Data not yet available	97
IRZ-21	IRZ-21-VAS-77-82	12/16/18	77 □ 82	Data not yet available	1.1
IRZ-21	IRZ-21-VAS-112-117	12/16/18	112 □ 117	Data not yet available	< 0.17 U
IRZ-21	IRZ-21-VAS-132-137	12/17/18	132 □ 137	Data not yet available	< 0.17 U
IRZ-21	IRZ-21-VAS-147-152	12/18/18	147 □ 152	4000	3600
IRZ-23	IRZ-23-VAS-67-72	12/01/18	67 □ 72	86	85
IRZ-23	IRZ-23-VAS-92-97	12/01/18	92 □ 97	0.453 J	< 0.033 U
IRZ-23	IRZ-23-VAS-122-127	12/02/18	122 □ 127	2100	2000
IRZ-23	IRZ-23-VAS-139-144	12/02/18	139 □ 144	3400	3000
IRZ-25	IRZ-25-VAS-52-57	12/05/18	52 □ 57	4300	3500
IRZ-25	IRZ-25-VAS-67-72	12/05/18	67 □ 72	750	620
IRZ-25	IRZ-25-VAS-92-97	12/06/18	92 □ 97	140	130
IRZ-25	IRZ-25-VAS-112-117	12/11/18	112 □ 117	< 0.13 U	< 0.17 U
IRZ-25	IRZ-25-VAS-147-152	12/11/18	147 □ 152	3800	3600
IRZ-25	IRZ-25-VAS-162-167	12/13/18	162 □ 167	3000	3000

µg/L = micrograms per liter

ft bgs = feet below ground surface

J = The analyte was positively identified; however, the associated numerical value is an estimated concentration only

U = The analyte was analyzed for but not detected at the analyte method detection limit indicated

VAS = vertical aquifer sampling

WD = sample from well development, depth noted is from bottom of screen



Date Started:	10/31/2018	Surface Elevation:	N/A	Boring No.: IRZ-15 Pilot	
Date Completed:	11/15/2018	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	257 ft bgs	Location:	Groundwater Remedy Phase I
Driller Name:	Nick Petrone	Borehole Diameter:	6 in	Needles, California	
Drilling Asst:	T. Aylmer/J. Candelaria	Depth to First Water:	N/A		
Logger:	A. Garcia / G Jeffers	Sampling Method:	10 ft Core Barrel	Project Number:	Topock
Editor:	Sean McGrane	Sampling Interval:	Continuous		
Weather:	Sunny warm to hot	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
1	0						(0.0 - 2.0'); No Recovery lost during hand clearance		
2									
3									
4	60				SP		(2.0 - 7.0') Poorly graded sand (SP); yellowish brown / moderate yellowish brown(10YR 5/4); very fine grained to medium grained, angular to round; little coarse to very coarse grained sand, angular to round; trace granules to small pebbles, subround; trace silt; trace clay; dry; no staining		
5									
6									
7									
8							(7.0 - 17.0') Poorly graded sand (SP); brown (10YR 4/3); very fine grained to medium grained, angular to round; little coarse to very coarse grained sand, angular to round; trace granules to small pebbles, subround; trace silt; trace clay; dry; no staining		
9									
10									
11									
12	120				SP				
13									
14									
15									
16									
17									
18					SM		(17.0 - 24.5') Silty sand with gravel (SM); dark yellowish brown (10YR 4/4); very fine grained to very coarse grained, angular to subangular; some granules to large pebbles, angular to subangular; trace clay; dry; no staining		
19									
20									

0 gal of water used




Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
21	120				SM			27' Approximate depth of water table	0 gal of water used
22									
23									
24									
25	IRZ-15-SS-25-30			GW-GM		(24.5 - 27.0') Well graded gravel with silt and sand (GW-GM); very dark grayish brown (10YR 3/2); granules to large pebbles, angular to subangular; little very fine to very coarse grained sand, angular; little silt; moist; no staining			
26									
27									
28									
29	IRZ-15-SS-30-35			ML		(27.0 - 29.5') Gravelly silt with sand (ML); brown (10YR 4/3); medium plasticity; little granules to very large pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subangular; trace clay; wet; no staining			
30									
31									
32									
33	IRZ-15-SS-35-40		IRZ-15-VAS-32-37 (13 ppb)		GM		(29.5 - 47.0') Silty gravel with sand (GM); brown (10YR 5/3); granules to medium pebbles, angular to subangular; and silt; little very fine to very coarse grained sand, subangular to round; trace large pebbles, angular to subangular; wet; no staining		
34									
35									
36									
37									
38									
39									
40									




Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
41	96	IRZ-15-SS-40-45			GM				
42									
43									
44	96	IRZ-15-SS-45-50			GM		(47.0 - 57.0') Silty gravel with sand (GM); grayish brown (10YR 5/2); granules to medium pebbles, angular to subangular; some very fine to very coarse grained sand, subangular to round; little large to very large pebble, angular to subangular; little silt; trace cobbles, subangular; wet; no staining		
45									
46									
47									
48									
49									
50									
51									
52									
53									
54	96	IRZ-15-SS-50-55			GM		(57.0 - 69.5') Silty gravel with sand (GM); brown (7.5YR 5/3) and reddish brown (5YR 5/3); granules to medium pebbles, angular to subangular; some very fine to very coarse grained sand, subangular to round; little large to very large pebbles, angular to subangular; little silt; trace cobbles, subangular; wet; no staining		0 gal of water used
55									
56									
57									
58									
59									
60									




Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
61	108	IRZ-15-SS-60-65	IRZ-15-VAS-62-67 (0.459 J ppb)		GM				
62									
63									
64									
65	96	IRZ-15-SS-65-70			GW-GM		(69.5 - 74.5') Well graded gravel with silt and sand (GW-GM); brown (7.5YR 4/3); granules to large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; little silt; trace very large pebbles, angular; trace cobbles, subangular; wet; no staining		0 gal of water used
66									
67									
68									
69									
70									
71									
72									
73		IRZ-15-SS-70-75			SW-SM		(74.5 - 87.0') Well graded sand with silt and gravel (SW-SM); brown (7.5YR 4/3); very fine grained to very coarse grained, angular to subround; and granules to very large pebbles, angular to subangular; little silt; wet; no staining		
74									
75									
76									
77									
78									
79									
80									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.






Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
81	108	IRZ-15-SS-80-85			SW-SM				
82									
83									
84									
85	96	IRZ-15-SS-85-90			GM		(87.0 - 97.0') Silty gravel with sand (GM); brown (7.5YR 4/3); granules to large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, angular to subround; trace very large pebbles, angular; trace clay; metadiorite pebbles; wet; no staining		0 gal of water used
86									
87									
88									
89		IRZ-15-SS-90-95			GM				
90									
91									
92									
93		IRZ-15-SS-95-100			SM		(97.0 - 104.5') Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subangular; and granules to very large pebbles, angular; little silt; trace cobbles, angular; wet; no staining		
94									
95									
96									
97									
98									
99									
100									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.





















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Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
101	96	IRZ-15-SS-100-105	IRZ-15-VAS-102-107 (< 0.17 U ppb)		SM				
102									
103									
104									
105	96	IRZ-15-SS-105-110			SM		(104.5 - 106.5') Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebble, angular; some silt; trace cobbles, angular; wet; no staining		
106									
107									
108									
109	96	IRZ-15-SS-110-115			ML		(106.5 - 116.0') Sandy silt with gravel (ML); reddish brown / moderate brown(5YR 4/4); medium plasticity; some granules to very large pebble, angular to subangular; some very fine to very coarse grained sand, angular to subangular; wet; weak cementation; no staining		
110									
111									
112									
113	96	IRZ-15-SS-110-115			ML		(106.5 - 116.0') Sandy silt with gravel (ML); reddish brown / moderate brown(5YR 4/4); medium plasticity; some granules to very large pebbles, angular to subangular; and silt; little very fine to very coarse grained sand, angular to subangular; wet; weak cementation; no staining		
114									
115									
116									
117	96	IRZ-15-SS-110-115			GM		(116.0 - 117.0') Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4); granules to very large pebbles, angular to subangular; and silt; little very fine to very coarse grained sand, angular to subangular; wet; weak cementation; no staining		
118									
119									
120									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
121	108				GM		(120.0 - 121.0') Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4); granules to very large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, angular to subangular; wet; no staining		
122					ML		(121.0 - 127.0') Gravelly silt with sand (ML); reddish brown / moderate brown(5YR 4/4); medium plasticity; some granules to very large pebble, angular to subangular; little very fine to very coarse grained sand, angular to subangular; wet; weak cementation; no staining		
123									
124									
125									
126	96				GM		(127.0 - 137.0') Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; some silt; wet; weak cementation; no staining; pebbles composed of metadiorite.		0 gal of water used
127									
128									
129									
130									
131									
132									
133									
134									
135									
136			IRZ-15-VAS-132-137 (< 0.17 U ppb)		ML		(137.0 - 139.5') Gravelly silt with sand (ML); reddish brown / moderate brown(5YR 4/4); low plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; wet; weak cementation; no staining		
137									
138									
139									
140					SM		(139.5 - 144.5') Silty sand with gravel (SM); reddish brown (2.5YR		





Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: <u>10/31/2018</u>	Surface Elevation: <u>N/A</u>	Boring No.: <u>IRZ-15 Pilot</u>
Date Completed: <u>11/15/2018</u>	Northing (NAD83): <u>N/A</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>N/A</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>257 ft bgs</u>	Location: <u>Groundwater Remedy Phase I</u>
Driller Name: <u>Nick Petrone</u>	Borehole Diameter: <u>6 in</u>	<u>Needles, California</u>
Drilling Asst: <u>T. Aylmer/J. Candelaria</u>	Depth to First Water: <u>N/A</u>	
Logger: <u>A. Garcia / G Jeffers</u>	Sampling Method: <u>10 ft Core Barrel</u>	Project Number: <u>Topock</u>
Editor: <u>Sean McGrane</u>	Sampling Interval: <u>Continuous</u>	
Weather: <u>Sunny warm to hot</u>	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid						
141	96	IRZ-15-SS-140-145			SM	<div></div>	4/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular; little silt; trace cobbles, angular; wet; no staining		0 gal of water used						
142															
143															
144															
145		IRZ-15-SS-145-150			SM	<div></div>	(144.5 - 161.0') Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular; some silt; trace cobbles, angular; wet; no staining								
146															
147															
148															
149	96	IRZ-15-SS-150-150								SM	<div></div>	(147'); increase in granules and very large pebbles, decrease in silt.			
150															
151															
152															
153		IRZ-15-SS-155-160											SM	<div></div>	(154.5'); no staining; decrease in silt, trace clay.
154															
155															
156															
157		IRZ-15-SS-155-160		SM	<div></div>										
158															
159															
160															






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Date Started: 10/31/2018		Surface Elevation: N/A		Boring No.: IRZ-15 Pilot	
Date Completed: 11/15/2018		Northing (NAD83): N/A			
Drilling Co.: Cascade		Easting (NAD83): N/A		Client: PG&E	
Drilling Method: Sonic Drilling		Total Depth: 257 ft bgs		Location: Groundwater Remedy Phase I	
Driller Name: Nick Petrone		Borehole Diameter: 6 in		Needles, California	
Drilling Asst: T. Aylmer/J. Candelaria		Depth to First Water: N/A			
Logger: A. Garcia / G Jeffers		Sampling Method: 10 ft Core Barrel		Project Number: Topock	
Editor: Sean McGrane		Sampling Interval: Continuous			
Weather: Sunny warm to hot		Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
161	96	IRZ-15-SS-160-165	IRZ-15-VAS-162-167 (3200 ppb)		SM				0 gal of water used
162				ML		(161.0 - 164.5') Gravelly silt with sand (ML); dark reddish brown(2.5YR 3/3); no plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; wet; weak cementation; no staining			
163									
164									
165	114	IRZ-15-SS-165-170		SM		(164.5 - 167.0') Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular; some silt; trace cobbles, angular; wet; no staining			
166									
167									
168							IRZ-15-SS-170-175		
169									
170									
171		IRZ-15-SS-170-175		GM		(172.0 - 174.5') Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; some silt; wet; weak cementation; no staining			
172									
173									
174									
175									
176									
177									
178									
179									
180									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
181	108	IRZ-15-SS-180-185	IRZ-15-VAS-182-187 (140 ppb)		GM				
182									
183									
184									
185									
186	108	IRZ-15-SS-185-190			ML		(187.0 - 189.5') Gravelly silt with sand (ML); reddish brown (2.5YR 4/4); no plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; wet; weak cementation; no staining	0 gal of water used	
187									
188									
189									
190		IRZ-15-SS-190-195			ML		(189.5 - 192.0') Gravelly silt with sand (ML); reddish brown (2.5YR 4/4); very fine grained to fine grained, subangular to round; no plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; some silt; wet; weak cementation; no staining		
191									
192									
193									
194		IRZ-15-SS-195-200				ML			(192.0 - 197.0') Sandy silt with gravel (ML); reddish brown (2.5YR 4/4); no plasticity; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; wet; weak cementation; no staining
195									
196									
197									
198		IRZ-15-SS-195-200			SM		(197.0 - 200.0') Silty sand with gravel (SM); dark reddish brown (2.5YR 3/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular; some silt; trace cobbles, angular; trace clay; wet; no staining	197' Zone is coarse grained and very saturated.	
199									
200									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
201	108	IRZ-15-SS-200-205			SM		(200.0 - 206.5') Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular; some silt; trace cobbles, angular; trace clay; wet; no staining		
202									
203									
204									
205	108	IRZ-15-SS-205-210			ML		(206.5 - 212.0') Sandy silt with gravel (ML); reddish brown (2.5YR 4/4); low plasticity; some very fine to very coarse grained sand, angular to subround; little granules to very large pebbles, angular to subangular; trace clay; wet; weak cementation; no staining		0 gal of water used
206									
207									
208									
209	108	IRZ-15-SS-210-215			ML		(212.0 - 227.0') Sandy silt with gravel (ML); red (2.5YR 4/6); medium plasticity; some silt; little granules to very large pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; trace clay; wet; weak cementation; no staining		
210									
211									
212									
213	108	IRZ-15-SS-215-220			ML		(212.0 - 227.0') Sandy silt with gravel (ML); red (2.5YR 4/6); medium plasticity; some silt; little granules to very large pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; trace clay; wet; weak cementation; no staining		
214									
215									
216									
217	108	IRZ-15-SS-215-220			ML		(212.0 - 227.0') Sandy silt with gravel (ML); red (2.5YR 4/6); medium plasticity; some silt; little granules to very large pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; trace clay; wet; weak cementation; no staining		
218									
219									
220									
220							(219.5') red (2.5YR 4/6) and gray (2.5Y 6/1); no staining		

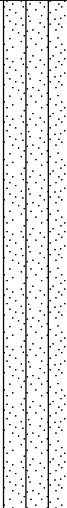


Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: <u>10/31/2018</u>	Surface Elevation: <u>N/A</u>	Boring No.: <u>IRZ-15 Pilot</u>
Date Completed: <u>11/15/2018</u>	Northing (NAD83): <u>N/A</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>N/A</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>257 ft bgs</u>	Location: <u>Groundwater Remedy Phase I</u>
Driller Name: <u>Nick Petrone</u>	Borehole Diameter: <u>6 in</u>	<u>Needles, California</u>
Drilling Asst: <u>T. Aylmer/J. Candelaria</u>	Depth to First Water: <u>N/A</u>	
Logger: <u>A. Garcia / G Jeffers</u>	Sampling Method: <u>10 ft Core Barrel</u>	Project Number: <u>Topock</u>
Editor: <u>Sean McGrane</u>	Sampling Interval: <u>Continuous</u>	
Weather: <u>Sunny warm to hot</u>	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
221	96				ML				
222			IRZ-15-VAS-222-227 (0.17 U ppb)						
223									
224									
225									
226									
227	60				ML	(227.0 - 232.0') Sandy silt with gravel (ML); red (2.5YR 4/6); medium plasticity; some very fine to very coarse grained sand, angular to subround; little granules to very large pebbles, angular to subangular; little clay; wet; weak cementation; no staining		0 gal of water used	
228									
229									
230									
231									
232									
233	60	IRZ-15-SS-232-237			SM	(232.0 - 237.0') Silty sand with gravel (SM); red (2.5YR 4/6); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular; some silt; trace cobbles, angular; moist; no staining			
234									
235									
236									
237									
238									SM
239									
240									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 10/31/2018	Surface Elevation: N/A	Boring No.: IRZ-15 Pilot
Date Completed: 11/15/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 257 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Nick Petrone	Borehole Diameter: 6 in	Needles, California
Drilling Asst: T. Aylmer/J. Candelaria	Depth to First Water: N/A	
Logger: A. Garcia / G Jeffers	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny warm to hot	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
241	108				SM				0 gal of water used
242									
243									
244									
245									
246									
247	108				SM		(247.0 - 255.0') Silty sand with gravel (SM); red (2.5YR 4/6); very fine grained to medium grained, angular to subround; some granules to very large pebbles, angular; some silt; trace clay; moist; no staining; trace coarse to very coarse sand		
248									
249									
250									
251									
252									
253									
254									
255	Topock - Competent Bedrock - conglomerate		(255.0 - 257.0') Topock - Competent Bedrock - conglomerate; red (2.5YR 4/6)						
256									
257									
End of Boring at 257.0 'bgs.									
258									
259									
260									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started:	12/15/2018	Surface Elevation:	N/A	Boring No.: IRZ-21-Pilot	
Date Completed:	12/19/2018	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	166 ft bgs	Location:	Groundwater Remedy Phase I
Driller Name:	Steve Vasquez	Borehole Diameter:	6 in	Needles, California	
Drilling Asst:	N. Dominguez/C. Alvarez	Depth to First Water:	N/A		
Logger:	Connor Mills	Sampling Method:	10 ft Core Barrel	Project Number:	Topock
Editor:	Sean McGrane	Sampling Interval:	Continuous		
Weather:	Sunny cool to warm	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		




Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
1	84				SP		(0.0 - 4.5') Poorly graded sand with gravel (SP); yellowish brown / moderate yellowish brown(10YR 5/4); very fine grained to medium grained, subangular to subround; some granules to very large pebbles, subangular to subround; trace silt; dry		
2									
3									
4									
5					GW		(4.5 - 11.5') Well graded gravel with sand (GW); brown (10YR 5/3); granules to very large pebbles, subangular to subround; some very fine to medium grained sand, angular to subround; trace cobbles, angular to subround; trace silt; dry		
6									
7									
8									
9	120				SP		(11.5 - 13.0') Poorly graded sand (SP); yellowish brown (10YR 5/6); very fine grained to fine grained, subangular to round; trace granules, angular to subround; trace silt; dry		0 gal of water used
10									
11									
12									
13					GW		(13.0 - 16.0') Well graded gravel with sand (GW); yellowish brown / moderate yellowish brown(10YR 5/4); granules to very large pebbles, subangular to subround; some very fine to medium grained sand, subangular to subround; trace silt; dry		
14									
15									
16									
17					SP		(16.0 - 17.0') Poorly graded sand (SP); yellowish brown (10YR 5/6); very fine grained to fine grained, subangular to round; trace granules, angular to subround; trace cobbles, angular to subangular; trace silt; dry		
18									
19									
20									
21					GM		(19.0 - 23.0') Silty gravel with sand (GM); light yellowish brown (10YR 6/4); granules to very large pebbles, angular to subround; little very fine to coarse grained sand, angular to subangular; little silt; trace boulders; dry		

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Boring Log

Sheet: 2 of 9

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	


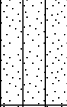




Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
21	120				GM		(21') boulders; 1 foot solid core of basalt.		
22									
23					GM		(23.0 - 25.0') Silty gravel with sand (GM); light brownish gray / pale yellowish brown(10YR 6/2); granules to very large pebbles, subangular to subround; some silt; little very fine to very coarse grained sand, angular to subangular; trace boulders; dry; powdered boulder from 23-24.		
24									
25	120				GM		(25.0 - 34.5') Silty gravel with sand (GM); yellowish brown / moderate yellowish brown(10YR 5/4); granules to large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, angular to subangular; dry		
26									
27									
28									
29					GM				
30									
31									
32									
33	60				GM		(34.5 - 37.0') Silty gravel with sand (GM); light reddish brown / light brown(5YR 6/4); granules to very large pebbles; some very fine to coarse grained sand, angular to subangular; little silt; dry		
34									
35									
36									
37					GM		(37.0 - 42.0') Silty gravel with sand (GM); granules to very large pebbles, angular to subangular; some very fine to coarse grained sand, angular to subround; little silt; dry		
38									
39									
40									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Boring Log

Sheet: 3 of 9

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
41					GM				
42									
43					SM		(42.0 - 43.5') Silty sand (SM); yellowish brown / moderate yellowish brown(10YR 5/4); fine grained to very coarse grained, subangular to subround; little granules to medium pebbles, angular to subangular; little silt; dry		
44									
45	60	IRZ-21-SS-43-48					(43.5 - 52.0') Silty sand (SM); light yellowish brown (10YR 6/4); fine grained to very coarse grained, angular to subround; some silt; little granules to large pebbles, angular to subround; little clay; moist (44.5'); wet	44.5' Approximate depth of water table	
46									
47									
48					SM				
49									
50		IRZ-21-SS-48-53							
51									
52	120								
53									
54									
55		IRZ-21-SS-52-57	IRZ-21-VAS-52-57 (97 ppb)		ML		(52.0 - 57.0') Silty sand with gravel (ML); light yellowish brown (10YR 6/4); no plasticity; some very fine to very coarse grained sand grained sand, angular to subangular; some silt; little granules to small pebbles, angular to subangular; little clay; wet		
56									
57									
58									
59		IRZ-21-SS-57-62			ML		(57.0 - 62.0') Gravelly silt with sand (ML); yellowish brown / moderate yellowish brown(10YR 5/4); no plasticity; some granules to very large pebbles, angular to subangular; little very fine to coarse grained sand, angular to subangular; little clay; wet		
60									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
61	108	IRZ-21-SS-57-62			ML				
62							(62.0 - 64.5') Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; wet; @ 64.5 ft bgs trace small cobbles of weathered metadiorite.		
63									
64		IRZ-21-SS-62-67			SM				
65							(64.5 - 67.0') Silty sand (SM); brown (10YR 5/3); fine grained to very coarse grained, subround to round; some silt; little granules to small pebbles, angular to subround; wet		
66					SM				
67									
68	108	IRZ-21-SS-67-72			SC		(67.0 - 74.5') Clayey sand with gravel (SC); yellowish red (5YR 4/6); very fine grained to very coarse grained, angular to subangular; some clay; little granules to medium pebbles, angular to subangular; little silt; wet		
69									
70									
71		IRZ-21-SS-72-77			SM				
72							(74.5 - 82.0') Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; some silt; wet; trace very large pebbles.		
73									
74									
75									
76									
77									
78		IRZ-21-SS-77-82	IRZ-21-VAS-77-82 (1.1 ppb)		SM				
79									
80									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

0 gal of water used

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
81	120	IRZ-21-SS-77-82	IRZ-21-VAS-77-82 (1.1 ppb)		SM				
82		IRZ-21-SS-82-87			ML		(82.0 - 87.0') Sandy silt with gravel (ML); brown (7.5YR 5/4); no plasticity; some clay; little granules to large pebbles, angular to subangular; little very fine to medium grained sand, angular to subangular; trace boulders, angular to subangular; dry to moist; tightly packed.		
83									
84									
85									
86	120	IRZ-21-SS-87-92			SM		(86.6'); trace 4 inch fragment of a boulder.		0 gal of water used
87									
88							(87.0 - 89.5') Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, subangular to subround; some silt; little medium to very large pebbles, angular to subangular; little clay; wet		
89									
90		IRZ-21-SS-92-97			SM		(89.5 - 92.0') Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, subangular to subround; some medium to very large pebbles, angular to subangular; little silt; little clay; wet		
91									
92							(92.0 - 97.0') Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, angular to subangular; some granules to large pebbles, angular; some silt; little clay; wet		
93									
94	120	IRZ-21-SS-97-102			SM		(97.0 - 117.0') Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to very coarse grained, angular to subround; some small to large pebbles, angular to subangular; some silt; wet; composed of metadiorite		
95									
96									
97									
98									
99									
100									







Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
101	120	IRZ-21-SS-97-102							
102									
103									
104									
105	120	IRZ-21-SS-102-107							
106									
107									
108									
109	120	IRZ-21-SS-107-112			SM				
110									
111									
112							(111.5'); trace cobbles		
113	120	IRZ-21-SS-112-117	IRZ-21-VAS-112-117 (< 0.17 U ppb)						
114									
115									
116									
117	120	IRZ-21-SS-117-122			SM		(117.0 - 121.0') Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, subangular to round; little small to large pebbles, angular; little silt; little clay; wet; gravel composed of metadiorite		
118									
119									
120									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
121	120	IRZ-21-SS-117-122			SM				
122		IRZ-21-SS-122-127			ML		(121.0 - 127.0') Silt with sand (ML); yellowish red (5YR 4/6); low plasticity; some clay; little granules to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; wet; gravel composed of metadiorite		
123									
124									
125									
126	137	IRZ-21-SS-127-132			ML		(127.0 - 129.5') Sandy silt (ML); reddish brown (5YR 5/4); low plasticity; little granules to large pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; wet; gravel composed of metadiorite		
127									
128									
129									
130	137	IRZ-21-SS-132-137	IRZ-21-VAS-132-137 (< 0.17 U ppb)		SM		(129.5 - 132.0') Silty sand (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, angular to subangular; and silt; little granules to medium pebbles, angular to subangular; wet; gravel composed of metadiorite		
131									
132									
133									
134	137	IRZ-21-SS-137-142			GC		(132.0 - 136.0') Clayey gravel with sand (GC); reddish brown (5YR 5/4); granules to large pebbles, angular to subangular; some clay; little very fine to very coarse grained sand, angular to subangular; little silt; wet; gravel composed of metadiorite		
135									
136									
137									
138		IRZ-21-SS-137-142			ML		(136.0 - 146.0') Sandy silt (ML); reddish brown (5YR 5/4); no plasticity; some clay; little granules to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subangular; moist; gravel composed of metadiorite		
139									
140									


Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
141	120	IRZ-21-SS-137-142			ML				
142									
143									
144									
145		IRZ-21-SS-142-147							
146									
147							(146.0 - 153.0') Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); fine grained to very coarse grained, subangular to round; some silt; little granule to medium pebble, subangular to subround; wet; gravel composed of metadiorite		
148									
149	54	IRZ-21-SS-147-152	IRZ-21-VAS-147-152 (3600 ppb)		SM				0 gal of water used
150									
151									
152									
153									
154	102	IRZ-21-SS-152-158			ML		(153.0 - 158.0') Sandy silt (ML); yellowish red (5YR 4/6); no plasticity; some very fine to very coarse grained sand, angular to subround; little granule to large pebble, subangular to subround; dry to moist; gravel composed of metadiorite, some metadiorite has iron oxidation		
155									
156									
157									
158									
159				Topock - Competent Bedrock - conglomerate			(158.0 - 166.0') Topock - Competent Bedrock - conglomerate; red (2.5YR 5/6); dry	158' Rough drilling	
160									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/15/2018	Surface Elevation: N/A	Boring No.: IRZ-21-Pilot
Date Completed: 12/19/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 166 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
161	60			Topock - Competent Bedrock - conglomerate					
162									
163									
164									
165									
166									
End of Boring at 166.0 'bgs.									
167									
168									
169									
170									
171									
172									
173									
174									
175									
176									
177									
178									
179									
180									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

SOIL BORING LOG, PG&E TOPACK C:\USERS\MCGRANE\DOCUMENTS\PG&E TOPOCK\DRAFT BORING LOGS\GINT FILES\12.31.18\TOPOCK DATABASE FOR PLOG.GPJ ARCADIS 20180927 PLOG.GDT 1/4/19

Date Started: 11/28/2018	Surface Elevation: N/A	Boring No.: IRZ-23 Pilot
Date Completed: 12/03/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 147 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Partly Cloudy 46 to 74 F	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	







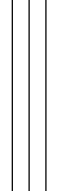
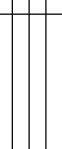

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
1	84				SP-SM		(0.0 - 2.0') Poorly graded sand with silt and gravel (SP-SM); brown (7.5YR 5/3); very fine grained to medium grained, angular to subround; little granule to very large pebbles, subangular to round; little silt; trace cobbles, subangular to round; dry		
2									
3					GM		(2.0 - 4.5') Silty gravel with sand (GM); brown (7.5YR 5/3); granules to large pebbles, angular to subround; some very fine to medium grained sand, angular to subround; some silt; trace cobbles, angular to subangular; dry; a 2 inch streak of orangish silt is through out the core.		
4									
5	120				SW-SM		(4.5 - 5.0') Well graded sand with silt (SW-SM); very pale brown / grayish orange(10YR 7/4); very fine grained to coarse grained, angular to round; little silt; dry		
6					GM		(5.0 - 7.0') Silty gravel with sand (GM); brown (7.5YR 5/3); granules to large pebbles, angular to subangular; some very fine to medium grained sand, angular to subangular; trace cobbles, angular to subangular; dry		
7									
8									
9	60				SP-SM		(7.0 - 17.0') Poorly graded sand with silt and gravel (SP-SM); very fine grained to medium grained, subangular to subround; some granule to very large pebbles, angular to round; little silt; trace cobbles, angular to subround; dry		0 gal of water used
10									
11									
12									
13									
14									
15									
16									
17					SM		(17.0 - 19.5') Silty sand (SM); reddish brown (5YR 5/3) with brownish yellow / dark yellowish orange(10YR 6/6); very fine grained to fine grained, angular to subround; little silt; trace boulders; dry		
18							(18') very dark grayish brown (10YR 3/2); solid 1.5 ft core of basalt with a frothy texture.		
19									
20					SM		(19.5 - 23.0') Silty sand with gravel (SM); brown (10YR 5/3); very fine		

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Boring Log

Sheet: 2 of 8

Date Started: 11/28/2018	Surface Elevation: N/A	Boring No.: IRZ-23 Pilot
Date Completed: 12/03/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 147 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Partly Cloudy 46 to 74 F	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
21	60				SM		grained to coarse grained, angular to subround; some granule to very large pebbles, angular to subround; some silt; trace cobbles, angular to subangular; dry		
22									
23					ML		(23.0 - 23.5') Silt with sand (ML); gray (10YR 5/1); no plasticity; little very fine to coarse grained sand, angular to subround; trace granule to medium pebbles, angular to subround; dry; soft		
24					GW-GM		(23.5 - 27.0') Well graded gravel with silt and sand (GW-GM); light brown (7.5YR 6/3); granules to very large pebbles; some very fine to coarse grained sand, angular to subround; little silt; dry		
25	60								
26									
27									
28					GM		(27.0 - 30.5') Silty gravel (GM); brown (10YR 5/3); granules to very large pebbles, angular to subround; and silt; little fine to medium grained sand, angular to subround; trace cobbles, angular; dry; gravel composed of 1-4 in. metadiorite, cobbles were pulverized into a silty powder.		
29	60								
30									
31					SM		(30.5 - 31.5') Silty sand with gravel (SM); light yellowish brown (10YR 6/4); very fine grained to coarse grained, subangular to subround; and granule to large pebble, subangular to subround; some silt; dry		
32					ML		(31.5 - 32.0') Silt with sand (ML); gray (10YR 5/1); no plasticity; little very fine to coarse grained sand, angular to subround; trace granule to medium pebbles, angular to subround; dry; soft; 4.5 inch Basalt boulder at end of core.		
33	120				ML		(32.0 - 35.0') Sandy silt with gravel (ML); brown (7.5YR 5/3); no plasticity; some very fine to coarse grained sand, angular to subround; little granule to large pebbles, angular to subangular; dry		
34									
35									
36					ML		(35.0 - 37.0') Gravelly silt with sand (ML); brown (7.5YR 5/3); no plasticity; some granule to very large pebbles, angular to subangular; little very fine to coarse grained sand, angular to subangular; dry		
37	120								
38					ML		(37.0 - 47.0') Sandy silt with gravel (ML); no plasticity; some very fine to coarse grained sand, angular to subangular; little small to medium pebbles, angular to subangular; dry; soft		
39									
40									

0 gal of water used

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 11/28/2018	Surface Elevation: N/A	Boring No.: IRZ-23 Pilot
Date Completed: 12/03/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 147 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Partly Cloudy 46 to 74 F	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
41									
42									
43									
44					ML				
45									
46									
47	108	IRZ-23-SS-45-50					(47.0 - 49.5') Silty sand (SM); fine grained to very coarse grained, subangular to subround; some silt; little granule to large pebbles, angular to subangular; poorly sorted; wet	47' Approximate depth of water table.	
48					SM				
49									
50					SM		(49.5 - 52.0') Silty sand with gravel (SM); very fine grained to coarse grained, angular to subround; some silt; little granule to very large pebbles, angular to subangular; trace cobbles, angular to subangular; wet		0 gal of water used
51									
52		IRZ-23-SS-50-55					(52.0 - 59.5') Silt with sand (ML); no plasticity; little fine to coarse grained sand, angular to subround; trace medium to very large pebble, angular to subangular; wet		
53									
54									
55									
56					ML				
57	120	IRZ-23-SS-55-60							
58			IRZ-23-VAS-57-62 (5.3 ppb)						
59									
60					SM		(59.5 - 62.0') Silty sand with gravel (SM); brown (7.5YR 5/3); very fine		

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Boring Log

Sheet: 4 of 8

Date Started: 11/28/2018	Surface Elevation: N/A	Boring No.: IRZ-23 Pilot
Date Completed: 12/03/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 147 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Partly Cloudy 46 to 74 F	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
61			IRZ-23-VAS-57-62 (5.3 ppb)		SM		grained to very coarse grained, angular to subround; some silt; little granule to medium pebbles, angular to subround; wet		
62		IRZ-23-SS-60-65					(62.0 - 69.5') Silty sand with gravel (SM); brown (7.5YR 5/3); fine grained to very coarse grained, angular to subround; some granule to very large pebbles, subangular to subround; little silt; trace cobbles, subangular to round; wet	62' Sediments were very saturated	
63									
64									
65									
66					SM				
67	120								
68		IRZ-23-SS-65-70							
69									
70			IRZ-23-VAS-67-72 (85 ppb)				(69.5 - 72.0') Silty sand with gravel (SM); brown (7.5YR 5/3); fine grained to very coarse grained, angular to subround; little granules to very large pebbles, subangular to subround; little silt; trace cobbles, subangular to round; wet		0 gal of water used
71					SM				
72		IRZ-23-SS-70-75					(72.0 - 82.0') Silt with sand (ML); reddish brown (5YR 5/3); no plasticity; little very fine to medium grained sand, angular to subround; trace granule to small pebbles, angular to subangular; dry; potential contact of older and younger alluvium	72' Drilling was tough, cores came out hot and smoking	
73									
74									
75									
76					ML				
77	120								
78		IRZ-23-SS-75-80							
79									
80									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 11/28/2018		Surface Elevation: N/A		Boring No.: IRZ-23 Pilot	
Date Completed: 12/03/2018		Northing (NAD83): N/A			
Drilling Co.: Cascade		Easting (NAD83): N/A		Client: PG&E	
Drilling Method: Sonic Drilling		Total Depth: 147 ft bgs		Location: Groundwater Remedy Phase I	
Driller Name: Steve Vasquez		Borehole Diameter: 6 in		Needles, California	
Drilling Asst: N. Dominguez/C. Alvarez		Depth to First Water: N/A			
Logger: Connor Mills		Sampling Method: 10 ft Core Barrel		Project Number: Topock	
Editor: Sean McGrane		Sampling Interval: Continuous			
Weather: Partly Cloudy 46 to 74 F		Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
81					ML				
82		IRZ-23-SS-80-85			SM		(82.0 - 84.5') Silty sand (SM); brown (7.5YR 4/4); very fine grained to coarse grained, angular to subangular; and silt; little granule to large pebbles, angular to subangular; wet		
83									
84									
85					ML		(84.5 - 87.0') Sandy silt (ML); reddish brown (5YR 5/4); no plasticity; little granule to medium pebbles, angular to subangular; little very fine to coarse grained sand, angular to subangular; moist; medium stiff		
86									
87	108	IRZ-23-SS-85-90					(87.0 - 94.5') Silty sand (SM); brown (7.5YR 4/4); very fine grained to coarse grained, angular to subangular; some silt; little granule to large pebbles, angular to subangular; little clay; wet		
88									
89									
90					SM				
91									
92		IRZ-23-SS-90-95							
93									
94			IRZ-23-VAS-92-97 (<0.033 U ppb)						
95					SM		(94.5 - 97.0') Silty sand (SM); reddish brown (5YR 5/4); fine grained to very coarse grained, angular to subround; some silt; little granule to medium pebbles, angular to subround; wet		
96									
97	120	IRZ-23-SS-95-100					(97.0 - 102.0') Silty sand (SM); dark yellowish brown (10YR 4/4); fine grained to very coarse grained, angular to subround; some silt; trace granule to large pebbles, angular to subangular; wet		
98									
99					SM				
100	54								

0 gal of water used

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

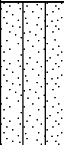

Date Started: 11/28/2018	Surface Elevation: N/A	Boring No.: IRZ-23 Pilot
Date Completed: 12/03/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 147 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Partly Cloudy 46 to 74 F	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
101					SM				
102		IRZ-23-SS-100-105			GM		(102.0 - 103.0') Silty gravel (GM); brown (7.5YR 4/4); granules to very large pebbles, angular to subangular; some silt; little very fine to medium grained sand, angular to subround; trace cobbles, angular to subangular; dry		
103					SM		(103.0 - 107.0') Silty sand with gravel (SM); dark yellowish brown (10YR 4/4); fine grained to very coarse grained, subangular to subround; some silt; little granule to large pebbles, angular to subangular; wet		
104									
105									
106									
107		IRZ-23-SS-105-110							
108							(107.0 - 117.0') Silty gravel (GM); brown (10YR 4/3); granules to large pebbles, subangular to subround; little fine to very coarse grained sand, angular to subround; little silt; little clay; dry; potential contact of older and younger alluvium		
109									
110									
111		IRZ-23-SS-110-115			GM				
112	120								
113									
114									
115									
116									
117		IRZ-23-SS-115-120							
118					SM		(117.0 - 122.0') Silty sand with gravel (SM); brown (7.5YR 4/4); very fine grained to coarse grained, angular to subround; and silt; little granule to medium pebbles, angular to subangular; wet; tight formation, potential contact of weathered bedrock.	117' hard drilling, dry	
119									
120									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

0 gal of water used

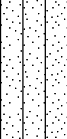

Date Started: 11/28/2018	Surface Elevation: N/A	Boring No.: IRZ-23 Pilot
Date Completed: 12/03/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 147 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Partly Cloudy 46 to 74 F	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
121	120	IRZ-23-SS-120-125	IRZ-23-VAS-122-127 (2000 ppb)		SM				
122							(122.0 - 127.0') Sandy silt with gravel (ML); yellowish red (5YR 4/6); no plasticity; little granule to medium pebbles, angular to subangular; little fine to medium grained sand, angular to subangular; wet		
123									
124									
125									
126	114	IRZ-23-SS-125-130			SM		(127.0 - 133.0') Silty sand (SM); (5YR 4/8); fine grained to coarse grained, angular to subround; some silt; little granule to medium pebbles, angular to subangular; wet; granules and pebbles composed of trace pieces of metadiorite 1-4 in. dia.		
127									
128									
129									
130									
131		IRZ-23-SS-130-135			ML	(133.0 - 136.5') Sandy silt (ML); reddish brown (5YR 4/3); no plasticity; some very fine to medium grained sand, angular to subround; trace granule to medium pebbles, angular to subround; wet			
132									
133									
134									
135									
136	IRZ-23-SS-135-140	GM	(136.5 - 137.0') Silty gravel (GM); dark gray (7.5YR 4/1); granules to very large pebbles, angular to subangular; some silt; little very fine to medium grained sand, angular to subangular; dry						
137				(137.0 - 139.5') Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4); granules to large pebbles, angular to subangular; some silt; little fine to coarse grained sand, angular to subround; trace clay; wet; trace pebbles of metadiorite 20-70 mm.					
138									
139									
140					SM	(139.5 - 142.0') Silty sand (SM); yellowish red (5YR 4/6); very fine			

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

0 gal of water used

Date Started: 11/28/2018	Surface Elevation: N/A	Boring No.: IRZ-23 Pilot
Date Completed: 12/03/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 147 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Partly Cloudy 46 to 74 F	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
141	120	IRZ-23-SS-140-147	IRZ-23-VAS-139-144 (3000 ppb)	Topock - Competent Bedrock - conglomerate	SM		grained to coarse grained, angular to subround; and silt; trace granule to medium pebbles, angular to subround; wet; trace pebbles of metadiorite 10-40 mm.	142' Drill was tough with rig chattering.	0 gal of water used
142					ML		(142.0 - 147.0') Topock - Competent Bedrock - conglomerate; Silt with sand (ML); yellowish red (5YR 4/6); no plasticity; little very fine to coarse grained sand, subangular to round; trace granule, subround to round; dry; hard; strong cementation		
143									
144									
145									
146									
147							End of Boring at 147.0 'bgs.		
148									
149									
150									
151									
152									
153									
154									
155									
156									
157									
158									
159									
160									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

SOIL BORING LOG, PG&E TOPACK C:\USERS\SMC\GRAND\DOCUMENTS\PG&E TOPACK\DRAFT BORING LOGS\GINT FILES\12.31.18\TOPOCK DATABASE FOR PLOG.GPJ ARCADIS 20180927 PLOG.GDT 1/4/19

Date Started: 12/04/2018 Surface Elevation: N/A
 Date Completed: 12/12/2018 Northing (NAD83): N/A
 Drilling Co.: Cascade Easting (NAD83): N/A Client: PG&E
 Drilling Method: Sonic Drilling Total Depth: 172 ft bgs Location: Groundwater Remedy Phase I
 Driller Name: Steve Vasquez Borehole Diameter: 6 in Needles, California
 Drilling Asst: N. Dominguez/C. Alvarez Depth to First Water: N/A
 Logger: Connor Mills Sampling Method: 10 ft Core Barrel Project Number: Topock
 Editor: Sean McGrane Sampling Interval: Continuous
 Weather: Sunny cool to warm Converted to Well: ☐ Yes ☒ No

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
1	84				SP-SM		(0.0 - 4.5') Poorly graded sand with silt and gravel (SP-SM); very fine grained to fine grained, subangular to subround; little granules to very large pebbles, angular to subangular; little silt; dry		
2									
3									
4							(4'); 0.5 ft thick lens of granule- medium pebbles		
5	10				SP-SM		(4.5 - 12.0') Poorly graded sand with silt (SP-SM); pale brown (10YR 6/3); very fine grained to fine grained, angular to subround; little silt; trace granules to very large pebbles, angular to round; trace cobbles, subround to round; dry	7' rough drilling.	0 gal of water used
6									
7									
8									
9	10				SW-SM		(12.0 - 17.0') Well graded sand with silt and gravel (SW-SM); pale brown (10YR 6/3); very fine grained to coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; trace boulders, angular to subangular; dry		
10									
11									
12									
13	10				SM		(14') very dark grayish brown (10YR 3/2); basalt boulders with frothy texture, in soil core segments.		
14									
15									
16									
17	10						(17.0 - 20.5') Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to coarse grained, angular to subangular; some silt; little granules to very large pebbles, angular to subround; trace cobbles, angular to subangular; trace boulders, angular to subangular; dry		
18									
19									
20							(19') gray (7.5YR 6/1) and white (10YR 8/1); 1.5 ft core from a boulder composed of metadiorite, very hard.		
















Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: <u>12/04/2018</u>	Surface Elevation: <u>N/A</u>	Boring No.: <u>IRZ-25-Pilot</u>
Date Completed: <u>12/12/2018</u>	Northing (NAD83): <u>N/A</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>N/A</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>172 ft bgs</u>	Location: <u>Groundwater Remedy Phase I</u>
Driller Name: <u>Steve Vasquez</u>	Borehole Diameter: <u>6 in</u>	<u>Needles, California</u>
Drilling Asst: <u>N. Dominguez/C. Alvarez</u>	Depth to First Water: <u>N/A</u>	
Logger: <u>Connor Mills</u>	Sampling Method: <u>10 ft Core Barrel</u>	Project Number: <u>Topock</u>
Editor: <u>Sean McGrane</u>	Sampling Interval: <u>Continuous</u>	
Weather: <u>Sunny cool to warm</u>	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid	
21	10				SM		(20.5 - 32.0') Sandy silt with gravel (ML); light yellowish brown (10YR 6/4); no plasticity; little granules to large pebbles, angular to subround; little very fine to fine grained sand, angular to subround; trace cobbles, angular to subround; trace boulders, angular to subangular; dry		0 gal of water used	
22										
23										
24										
25										
26	10					ML				(29.5'); to 32' powerdized rock and solid cores from boulders composed of metadiorite.
27										
28										
29										
30										
31	10							(32.0 - 40.0') Silty sand with gravel (SM); pale brown (10YR 6/3); very fine grained to medium grained, angular to subround; and granules to very large pebbles, subangular to subround; little silt; trace cobbles, angular to subround; dry		
32										
33										
34										
35										
36	10					SM				
37										
38										
39										
40										

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/04/2018	Surface Elevation: N/A	Boring No.: IRZ-25-Pilot
Date Completed: 12/12/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 172 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
41	9				GM		(40.0 - 41.5') Silty gravel with sand (GM); pale brown (10YR 6/3); granules to very large pebbles, angular to subround; some very fine to medium grained sand, angular to subangular; little silt; trace cobbles, angular to subround; dry	49.5' Approximate depth to water table.	0 gal of water used
42					GW-GM		(41.5 - 49.5') Well graded gravel with silt and sand (GW-GM); light brown (7.5YR 6/4); granules to very large pebbles, subangular to subround; some cobbles, angular to subround; little very fine to medium grained sand, angular to round; little silt; dry		
43									
44									
45	9.5	IRZ-25-SS-47-52			SM		(47'); moist; to 49.5 ft bgs		
46									
47		IRZ-25-SS-52-57	IRZ-25-VAS-52-57 (3500 ppb)		GM		(49.5 - 52.0') Silty sand with gravel (SM); brown (10YR 5/3); very fine grained to very coarse grained, subangular to subround; some granules to medium pebbles, angular to subangular; some silt; wet		
48									
49									
50		IRZ-25-SS-57-62			ML		(52.0 - 57.0') Silty gravel with sand (GM); reddish brown (5YR 5/4); angular to subangular; some very fine to coarse grained sand, angular to subangular; some silt; little clay; dry to moist		
51									
52							(57.0 - 59.5') Sandy silt (ML); reddish brown (5YR 5/4); no plasticity; and very fine to very coarse grained sand, angular to subangular; little granules to small pebble, angular to subangular; wet to dry; stiff; strong cementation		
53					GM		(59.5 - 68.0') Silty gravel with sand (GM); reddish brown (5YR 5/4);		
54									
55									





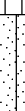

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/04/2018	Surface Elevation: N/A	Boring No.: IRZ-25-Pilot
Date Completed: 12/12/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 172 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
61	10	IRZ-25-SS-57-62					granules to very large pebbles, angular to subangular; some very fine to coarse grained sand, angular to subangular; some silt; little clay; dry to moist		
62									
63									
64		IRZ-25-SS-62-67	IRZ-25-VAS-62-67 (620 ppb)		GM				
65	10								
66									
67									
68									
69		IRZ-25-SS-67-72			SM		(68.0 - 72.0') Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to very coarse grained, subangular to subround; some silt; little granules to medium pebble, angular to subangular; wet		
70									
71									
72									
73		IRZ-25-SS-72-77			SM		(72.0 - 77.0') Silty sand with gravel (SM); yellowish brown / moderate yellowish brown(10YR 5/4); fine grained to very coarse grained, subangular to subround; some silt; little granules to medium pebble, angular to subround; wet		
74									
75									
76									
77									
78		IRZ-25-SS-77-82			GM		(77.0 - 79.5') Silty gravel with sand (GM); reddish brown (5YR 5/4); granules to large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; little silt; wet		
79									
80					SM		(79.5 - 87.0') Silty sand with gravel (SM); reddish brown (5YR 5/4);		0 gal of water used







Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/04/2018	Surface Elevation: N/A	Boring No.: IRZ-25-Pilot
Date Completed: 12/12/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 172 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
81	5	IRZ-25-SS-77-82			SM		very fine grained to very coarse grained, subangular to round; little granules to medium pebbles, angular to subangular; little silt; trace cobbles, angular to subangular; wet; cobbles composed of metadiorite		0 gal of water used
82									
83									
84									
85									
86	9	IRZ-25-SS-82-87		SM		(87.0 - 94.5') Silty sand with gravel (SM); reddish brown (5YR 5/4); fine grained to very coarse grained, subangular to round; some silt; little granules to medium pebble, angular to subangular; wet; trace large pebbles			
87									
88									
89									
90									
91		IRZ-25-SS-87-92	IRZ-25-VAS-92-97 (130 ppb)		SM				
92									
93									
94									
95									
96		IRZ-25-SS-92-97			ML		(94.5 - 95.5') Gravelly silt (ML); reddish brown (5YR 5/4); no plasticity; little granules to medium pebble, angular to subangular; little very fine to very coarse grained sand, angular to subangular; dry to moist; hard; pebbles composed of metadiorite		
97					SM		(95.5 - 97.0') Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, angular to subround; some granules to large pebble, angular to subangular; some silt; trace cobbles; wet; cobble composed of metadiorite		
98					SW-SM		(97.0 - 102.0') Well graded sand with silt and gravel (SW-SM); light reddish brown / light brown(5YR 6/4); fine grained to very coarse grained, angular to round; some small to very large pebbles, angular to subangular; some silt; wet; trace very large pebbles composed of metadiorite.		
99									
100									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/04/2018	Surface Elevation: N/A	Boring No.: IRZ-25-Pilot
Date Completed: 12/12/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 172 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
101	9.5	IRZ-25-SS-97-102			SW-SM				0 gal of water used
102		IRZ-25-SS-102-107			ML		(102.0 - 103.5') Sandy silt with gravel (ML); light reddish brown / light brown(5YR 6/4); little granules to large pebbles, angular to subangular; little very fine to very coarse grained sand, subangular to subround; little clay; trace cobbles; wet; contains a 100 mm cobble of metadiorite		
103					GM		(103.5 - 109.5') Silty gravel (GM); reddish brown (5YR 5/4); granules to large pebbles, angular to subround; some silt; little very fine to very coarse grained sand, angular to subround; trace; wet; trace very large pebble		
104									
105									
106									
107									
108	10	IRZ-25-SS-107-112	IRZ-25-VAS-112-117 (< 0.17 U ppb)		SM		(109.5 - 117.0') Silty sand with gravel (SM); (5YR 4/); fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, angular to subround; some silt; trace cobbles; wet; trace very large pebbles to small cobbles composed of metadiorite.		
109									
110									
111									
112									
113									
114	IRZ-25-SS-112-117								
115									
116									
117		IRZ-25-SS-117-122			SM		(117.0 - 119.5') Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, subangular to subround; little granules to medium pebbles, angular to subround; little silt; little clay; wet		
118									
119									
120					ML		(119.5 - 124.5') Sandy silt with gravel (ML); reddish brown / moderate		

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/04/2018	Surface Elevation: N/A	Boring No.: IRZ-25-Pilot
Date Completed: 12/12/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 172 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
121	10	IRZ-25-SS-117-122			ML		brown(5YR 4/4); some very fine to very coarse grained sand, angular to subround; little granules to medium pebbles, angular to subangular; wet		
122									
123									
124									
125	10	IRZ-25-SS-122-127			SM		(124.5 - 127.0') Silty sand (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to coarse grained, subangular to subround; some silt; little granules to medium pebbles, angular to subangular; wet		
126									
127									
128									
129	10	IRZ-25-SS-127-132			GM		(127.0 - 132.0') Silty gravel with sand (GM); reddish brown (5YR 5/4); granules to large pebbles, angular to subangular; and silt; little very fine to coarse grained sand, angular to subangular; dry to moist; moderate cementation		
130									
131									
132									
133	10	IRZ-25-SS-132-137			ML		(132.0 - 137.0') Sandy silt with gravel (ML); reddish brown / moderate brown(5YR 4/4); no plasticity; little granules to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; dry to moist		
134									
135									
136									
137	10	IRZ-25-SS-137-142			ML		(137.0 - 139.5') Sandy silt (ML); reddish brown / moderate brown(5YR 4/4); no plasticity; some very fine to coarse grained sand, angular to subround; little granules to medium pebbles, angular to subangular; little clay; wet; dessicated		
138									
139									
140									
					ML		(139.5 - 147.0') Sandy silt with gravel (ML); reddish brown / moderate		0 gal of water used

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/04/2018	Surface Elevation: N/A	Boring No.: IRZ-25-Pilot
Date Completed: 12/12/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 172 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
141	10	IRZ-25-SS-137-142			ML		brown(5YR 4/4); no plasticity; little granules to medium pebbles, angular to subangular; little very fine to coarse grained sand, angular to subangular; little clay; hard		
142									
143									
144									
145		IRZ-25-SS-142-147							
146	9				SM		(147.0 - 157.0') Silty sand with gravel (SM); reddish brown (5YR 4/3); fine grained to very coarse grained, subangular to round; some granules to large pebbles, angular to subround; little silt; trace cobbles, angular to subangular; wet; trace small cobbles composed of metadiorite	147' very loose saturated material with potential to produce a lot of water.	0 gal of water used
147									
148		IRZ-25-SS-147-152	IRZ-25-VAS-147-152 (3600 ppb)						
149									
150									
151	9				ML		(157.0 - 162.0') Gravelly silt (ML); reddish brown (5YR 5/4); no plasticity; little granules to large pebbles, angular to subangular; little very fine to medium grained sand, angular to subangular; dry		
152									
153		IRZ-25-SS-152-157							
154									
155									
156	9								
157									
158									
159									
160									

Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Date Started: 12/04/2018	Surface Elevation: N/A	Boring No.: IRZ-25-Pilot
Date Completed: 12/12/2018	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 172 ft bgs	Location: Groundwater Remedy Phase I
Driller Name: Steve Vasquez	Borehole Diameter: 6 in	Needles, California
Drilling Asst: N. Dominguez/C. Alvarez	Depth to First Water: N/A	
Logger: Connor Mills	Sampling Method: 10 ft Core Barrel	Project Number: Topock
Editor: Sean McGrane	Sampling Interval: Continuous	
Weather: Sunny cool to warm	Converted to Well: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Description	Drilling Notes	Drilling Fluid
161					ML				
162									
163									
164		IRZ-25-SS-162-166	IRZ-25-VAS-162-167 (3000 ppb)		ML		(162.0 - 166.0') Gravelly silt (ML); reddish brown / moderate brown(5YR 4/4); low plasticity; some granules to medium pebbles, angular to subround; little very fine to coarse grained sand, angular to subround; wet; stiff	162' Drill rods chattering	
165									
166									
167	5						(166.0 - 172.0') Topock - Competent Bedrock - conglomerate; Gravelly silt (ML); reddish brown (5YR 5/4); no plasticity; little granules to large pebbles, angular to subangular; little very fine to medium grained sand, angular to subangular; dry; moderate cementation		0 gal of water used
168									
169				Topock - Competent Bedrock - conglomerate	ML				
170									
171									
172									
173							End of Boring at 172.0 'bgs.		
174									
175									
176									
177									
178									
179									
180									

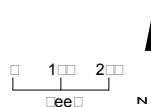
Notes: USCS = Unified Soil Classification System, U = not detected above the laboratory reporting limit, ppb = Parts per Billion.

Attachment C
Soil Sampling Locations and Available Soil
Analytical Results
(Soil Data Presented in Excel File)



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Baseline and Opportunistic Soil Sampling Locations

Locations

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o a e e P a e 1 o o

PG&E Topock Compressor Station, Needles, California

JACOBS

Attachment D
Perimeter Air Sampling Analytical Results

Attachment D. Perimeter Air Sampling Analytical Results

In conformance with the approved *Construction/Remedial Action Work Plan for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California* (CH2M, 2015), air monitoring has been conducted during construction to evaluate the ongoing effectiveness of the dust control program, to guide modifications to field activities and engineering control measures, if necessary, and to document that construction activities do not result in the migration of soil contaminants beyond the work area boundaries.

Perimeter air monitoring has been performed if construction activities have the potential to generate visible dust. The air monitoring program consists of both real-time fugitive dust monitoring and perimeter air sampling for select soil contaminants. Locations to be monitored and sampled are as follows:

- Real-time fugitive dust monitoring is performed at the perimeter of the work areas (outside of the exclusion zone) that have the potential to generate visible dust, including the Construction Headquarters (CHQ) and the Soil Processing Yard (SPY).
- Perimeter air sampling for hexavalent chromium is performed at the perimeter of the work areas (outside of the exclusion zone) that are inside Areas of Concern (AOCs) within the construction footprint where hexavalent chromium concentrations in soil have been historically reported. Air sampling for hexavalent chromium in the SPY will be performed when soil from AOCs with reported concentrations of hexavalent chromium is actively being processed. Air sampling may also be performed at other work areas at the site based on hexavalent chromium concentrations reported from new soil data or based on field observations during construction activities.
- Air sampling for asbestos will be limited to work areas where Asbestos Containing Material (ACM) has been observed in prior field investigations, including two areas in AOC 12 and one area in AOC 4. Perimeter air monitoring may also be performed at other work areas at the site if ACM is discovered during construction activities.

Project-specific levels of concern (LOC) and action levels were developed as an indicator to determine whether additional dust control measures, as presented in the project's Dust Control Plan required by the Mojave Desert Air Quality Management District (MDAQMD), are necessary.

- The LOCs, which represent conservative concentrations of compounds that receptors outside the work area could be safely exposed to during construction, have been evaluated for all compounds that have been detected in soil samples collected at the site in the prior investigations. The LOCs were developed using standard U.S. Environmental Protection Agency (USEPA) and California Environmental Protection Agency risk assessment methodology, toxicology data, and exposure assumptions (USEPA, 2009, 2017; California Department of Toxic Substances Control [DTSC], 2018). Both cancer and noncancer health effects were considered. For each type of health effect, the LOC was back-calculated from an established target or from acceptable cancer risk or noncancer hazard where USEPA or DTSC toxicity values are available. The LOCs for cancer effects are based on a target excess cancer risk of one in a million (1×10^{-6}). The LOCs for noncancer effects are based on a target hazard quotient of 1. The LOCs were developed using these assumptions:
 - Receptors are present outside the perimeter of the work areas
 - Exposure via inhalation is 10 hours per day for a 10 days on /4 days off schedule
 - Duration of Phase 1 of the final groundwater remedy construction is 20 months
- The action level for fugitive dust monitoring is 100 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for a net (downwind minus upwind) dust concentration. This action level is based on MDAQMD Rule 403, Part C. A 10-hour time-weighted average of readings collected throughout the work day will be used to document compliance with MDAQMD Rule 403.
- For analytes detected in soil, the following equation was used to calculate maximum allowable airborne particulate concentrations for receptor exposure outside the work area (based on the approach presented by Marlowe (1999):

$$AL = \frac{LOC \times 1,000,000 \text{ mg/kg}}{CS}$$

Where:

AL = action level for airborne particulates ($\mu\text{g}/\text{m}^3$)

LOC = Project specific risk-based level of concern ($\mu\text{g}/\text{m}^3$)

CS = maximum detected concentration of compound in site soil (milligrams per kilogram [mg/kg])

Action levels were determined as follows:

- Soil data from prior investigations were gathered for the entire site.
- Sample locations within the maximum construction footprint were evaluated. Some sample locations were removed from evaluation as they were within the compressor station in locations where no construction activities will actually occur.
- The maximum reported soil concentration for each compound was determined and then used to calculate an airborne particulate action level.
- All compounds had allowable airborne particulate action levels greater than $100 \mu\text{g}/\text{m}^3$ except for hexavalent chromium at a few locations.
- Lead does not have USEPA or DTSC toxicity values; however, an action level was calculated using the DTSC (2011) LeadSpread 8 model. This is based on the maximum reported soil concentration for lead of 1,400 mg/kg from samples collected within the construction footprint and a blood level of concern through inhalation of 1 microgram per deciliter. The resulting action level for lead is $548 \mu\text{g}/\text{m}^3$.
- Therefore, keeping fugitive dust below the action level $100 \mu\text{g}/\text{m}^3$ will result in airborne particulate concentrations of contaminants (other than hexavalent chromium) remaining below their respective LOCs.
- Fugitive dust monitoring will be used to evaluate airborne contaminants in dust for all compounds except for hexavalent chromium.

In December 2018, over 20 real time dust monitoring events were conducted at the perimeter of the work areas (outside of the exclusion zone). On December 3 and 4, 2018, during site preparation activities at the MW-N well location, temporary exceedance of the action level for fugitive dust monitoring ($100 \mu\text{g}/\text{m}^3$) was observed and additional water was applied to minimize/control fugitive dust.

No perimeter air sampling for hexavalent chromium was conducted in December 2018.

References Cited:

California Department of Toxic Substances Control (DTSC). 2011. LeadSpread 8.
<https://www.dtsc.ca.gov/AssessingRisk/LeadSpread8.cfm>.

California Department of Toxic Substances Control (DTSC). 2018. Human Health Risk Assessment Note 3 – DTSC-Modified Screening Levels (DTSC-SLs), California Department of Toxic Substances Control, Human and Ecological Risk Office (HERO). January.

Marlowe, C. 1999. *Safety Now! Controlling Chemical Exposures at Hazardous Waste Sites with Real-Time Measurements*. Fairfax, Va.: American Industrial Hygiene Association Press.

U.S. Environmental Protection Agency (USEPA). 2009. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)*. Final. OSWER 9285.7-82. January.

U.S. Environmental Protection Agency (USEPA). 2017. Regional Screening Levels (RSLs)—Generic Tables. November.

Table 1

Perimeter Air Sampling Results
Groundwater Remediation Phase 1 Construction
PG&E Topock Compressor Station, Needles, California

Location ID	Location	Date	Sample Type	Hexavalent Chromium (ug/m ³)
AOC13-D1	AOC13 Downwind 1	10/09/18	N	0.000732 J
AOC13-D2	AOC13 Downwind 2	10/09/18	N	0.000709 J
AOC13-U	AOC13 Upwind	10/09/18	N	ND (0.000172)

Notes:

ug/m³ field duplicate
J concentration or reporting limit estimated by laboratory or data validation
N primary sample
ND not detected at the listed reporting limit

Attachment E
Noise Monitoring Results
(SEIR NOISE-2 Requirement)

Attachment E. Noise Monitoring Results

In conformance with the SEIR Mitigation Measure NOISE-2, noise monitoring has been conducted with ANSI S1.4 Type 1, precision sound level meters when construction activities are within the specified distance (e.g., 1,850 feet from sensitive receptors in California) at approved monitoring locations previously determined in coordination with the Tribes and land owners/managers (refer to Figures 1, 2 and 3). The goal of the noise monitoring is to identify if noise levels from project construction activities exceed applicable standards of the San Bernardino and Mohave County codes. Exceedance of standards would require coordination with the Tribes and land owners/managers to evaluate the potential constraints and locations for temporary engineered acoustical barriers. Consistent with the request of the Tribes, monitoring equipment is not left at the approved monitoring locations, rather it is mounted on a tripod for attended representative measurements and removed when the monitoring event is complete.

When a new construction activity is conducted or a previously monitored construction activity is conducted closer to a noise-sensitive area, monitoring is conducted at more frequent intervals to evaluate the potential need for an acoustical barrier. As the activities continue in the same location and multiple attended measurements indicate that the applicable standard has not been exceeded by the construction activity, periodic attended monitoring events are conducted to confirm continued compliance.

The attended monitoring events document the A-weighted L_{eq} sound level at periodic intervals (e.g., 5-, 10-, 15-, 20-, 30-, 40-, 50- and 60-minutes). The trend of the data at these intervals is evaluated in the field to assess the stability in the sound level to determine the duration of the monitoring event. When this interval data is relatively stable or clearly below the standard, the attended monitoring event will typically be 15- to 30-minutes in duration. As the applicable standards are in terms of the 24-hour average L_{dn} which is based on the L_{eq} metric, the measured L_{eq} is compared to the applicable L_{dn} standard for mobile noise sources (i.e., 60 dBA for Park Moabi, 65 dBA at all other locations). This results in a reasonable and conservative assessment given construction activities are not emitting noise continuously over a 24-hour period nor are they occurring during the nighttime hours (10 p.m. to 7 a.m.).

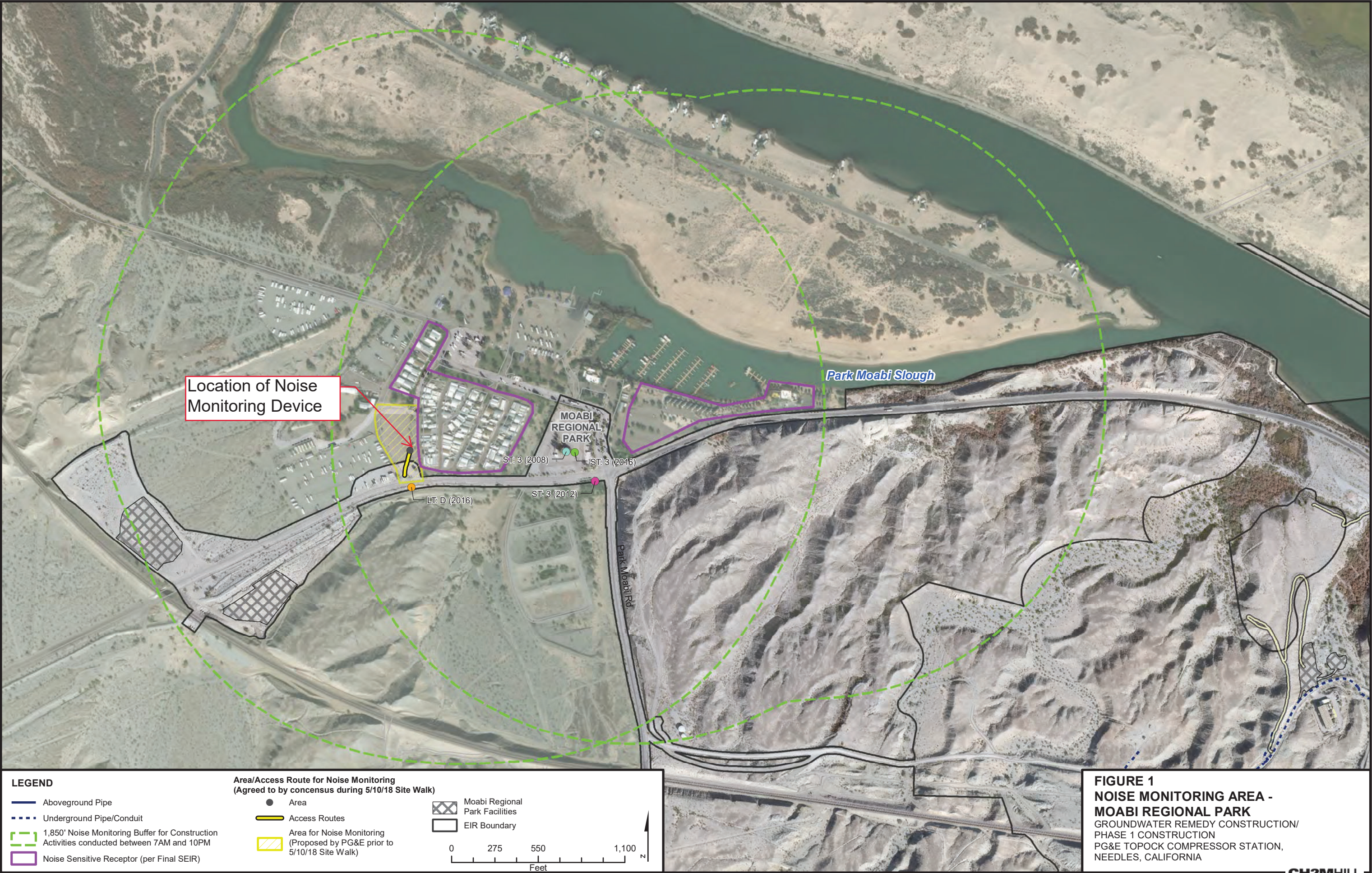
In December 2018, over 20 monitoring events were conducted at the Park Moabi monitoring location (Figure 1). These measurements were occasionally contaminated by rain, which results in elevated levels of pseudo-noise on the microphone. Outside of these events, the sound level typically varied between 37 to 57 dBA.

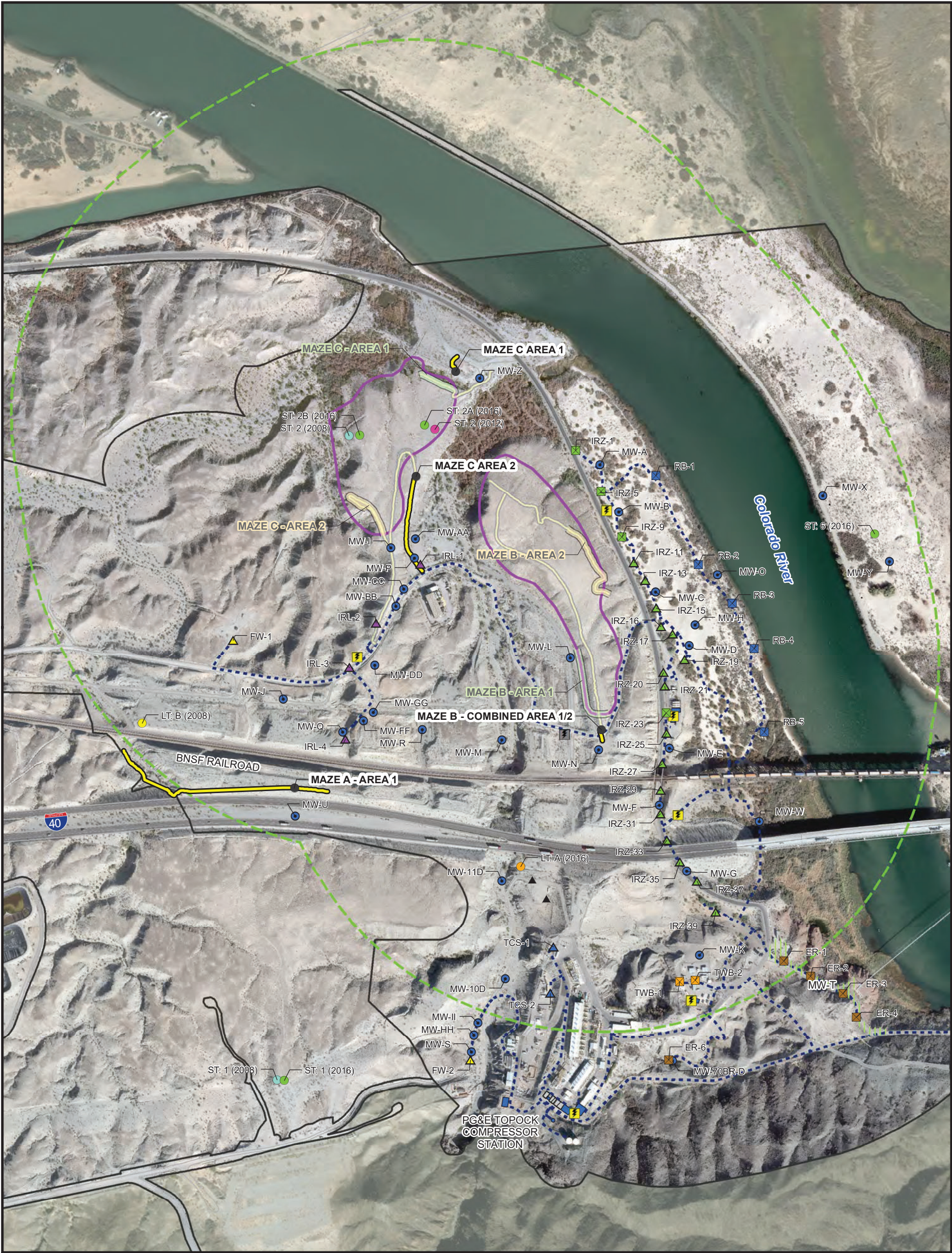
In December 2018, over 30 monitoring events were conducted at Maze B-Combined Area 1/2 (Figure 2) and the associated alternate location for MW-L drilling activities. Other activities monitored at this location include site preparation activities at MW-N and drilling at IRZ-9 and IRZ-21. While some of these measurements are contaminated by periodic train pass-by's, clean samples of drilling noise have not identified exceedances of 65 dBA. One monitoring event resulted in 66 dBA which included train and aircraft overflight noise while the remainder were generally less than 61 dBA.

In December 2018, 8 monitoring events were conducted at Maze C-Area 1 (Figure 2). One measurement resulted in 51 dBA while the remainder were lower.

In December 2018, one monitoring event was conducted at Maze A-Area 2 (Figure 3) and a level of 45 dBA was reported during this event.

Noise monitoring conducted through December 2018 did not identify that construction activities exceed the applicable standards. In addition, there have been no complaints resulting from project construction-related noise. Therefore, the temporary acoustical barriers have not been necessary. Monitoring will continue as work progresses and moves into new areas to identify when an acoustical barrier needs to be considered.





LEGEND

Planned Wells:

- Extraction, East Ravine
- Extraction, NTH IRZ
- Extraction, Riverbank
- Extraction, Transwestern Bench
- Injection, Freshwater
- Injection, Inner Recirculation Loop
- Injection, NTH IRZ
- Injection, Topock Compressor Station
- Remedy Monitoring Well
- Recirculation Well
- Area for Monitoring Well MW-T

Pipeline Corridor for Remedy

- Underground Pipe/Conduit

Remedy Facilities

- Planned Transformer
- Future Provisional Transformer
- Proposed Remedy Structure
- Contingent Freshwater Pre-injection Treatment System
- 1,850' Noise Monitoring Buffer for Construction Activities conducted between 7AM and 10PM
- Noise Sensitive Receptor (per Final SEIR)
- EIR Boundary

Areas/Access Routes for Noise Monitoring (Agreed to by consensus during 5/10/18 Site Walk)

- Area
- Access Route

Areas for Noise Monitoring (Proposed by PG&E Prior to 5/10/18 Site Walk)

- Area 1
- Area 2
- Access Route

0 275 550 1,100
Feet

**FIGURE 2
NOISE MONITORING AREAS-
NORTH OF I-40**
GROUNDWATER REMEDY CONSTRUCTION/
PHASE 1 CONSTRUCTION
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

Attachment F
Six-Week Look-Ahead Schedule
(January 6 through February 16, 2019)

PG&E Topock Final Groundwater Remedy	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Primary Planned Activities	1/6/2019	1/7/2019	1/8/2019	1/9/2019	1/10/2019	1/11/2019	1/12/2019
Start Time (PST)	7:00 AM		7:00 AM	7:00 AM	7:00 AM	7:00 AM	No Work
Construction Headquarters E1		Install conduit north of CHQ access road improvements	Install conduit north of CHQ access road improvements				
Pipeline Alignment grubbing and clearing E5, F5		Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	
North Floodplain Temp Well Water Management Surface Pipeline E5		Surface/on-grade temporary pipeline placement	Surface/on-grade temporary pipeline placement	Surface/on-grade temporary pipeline placement	Surface/on-grade temporary pipeline placement		
Well Installation	MW-N (F5), MW-F (F5), MW-B (E5)	MW-N (F5), MW-F (F5), MW-B (E5), MW-G site prep (F5)	MW-N (F5), MW-F (F5), MW-B (E5), MW-G site prep (F5), MW-D site prep (E5)	MW-N (F5), MW-F (F5), MW-B (E5), MW-D site prep (E5)	MW-N (F5), MW-F (F5), MW-B (E5), MW-D site prep (E5)	--	
Primary Planned Activities	1/13/2019	1/14/2019	1/15/2019	1/16/2019	1/17/2019	1/18/2019	1/19/2019
Start Time (PST)	No Work	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM
Soil Processing Yard (D1)		Perimeter Fence Install	Perimeter Fence Install	Perimeter Fence Install	Perimeter Fence Install	Perimeter Fence Install	
Pipeline Alignment grubbing and clearing E5, F5		Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	Pipeline C1, C2, C3, C4, C5, C7, C8	
Well Installation		--	MW-N (F5), MW-B (E5), MW-L (E5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), IRZ-27 site prep (F5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), IRZ-27 site prep (F5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), IRZ-27 site prep (F5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), IRZ-27 site prep (F5)
Primary Planned Activities	1/20/2019	1/21/2019	1/22/2019	1/23/2019	1/24/2019	1/25/2019	1/26/2019
Start Time (PST)	7:00 AM		7:00 AM	7:00 AM	7:00 AM	7:00 AM	No Work
Soil Processing Yard (D1)		Perimeter Fence Install	Perimeter Fence Install	Perimeter Fence Install	Perimeter Fence Install	Perimeter Fence Install	
Construction Headquarters E1		Site-wide clearing & grading Rip Rap installation	Site-wide clearing & grading Rip Rap installation	Site-wide clearing & grading Rip Rap installation	Site-wide clearing & grading Rip Rap installation	Site-wide clearing & grading	
Pipeline Alignment grubbing and clearing E5, F5, C5, F6		Pending ERTC 'Pipeline C9, C10, C14, C17, F1	Pending ERTC 'Pipeline C9, C10, C14, C17, F1	Pending ERTC 'Pipeline C9, C10, C14, C17, F1	Pending ERTC 'Pipeline C9, C10, C14, C17, F1	Pending ERTC 'Pipeline C9, C10, C14, C17, F1	
Pre-Trenching/Excavation Potholing and Characterization (F5), (G5)		Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	
Well Installation	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), MW-M site prep (F5), IRZ-27 site prep (F5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), MW-M site prep (F5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), MW-M site prep (F5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), MW-M site prep (F5)	MW-N (F5), MW-B (E5), MW-G (F5), MW-L (E5), MW-F (F5), MW-M site prep (F5)	--	
Primary Planned Activities	1/27/2019	1/28/2019	1/29/2019	1/30/2019	1/31/2019	2/1/2019	2/2/2019
Start Time (PST)	No Work	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM
Construction Headquarters E1		Site-wide clearing & grading	Site-wide clearing & grading, electrical conduit install	Site-wide clearing & grading, electrical conduit install	Site-wide clearing & grading, electrical conduit install	Site-wide clearing & grading, electrical conduit install	
Potholing E5, F5		Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	
Pre-Trenching/Excavation Potholing and Characterization (F5), (G5)		Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	
Well Installation		--	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)
Primary Planned Activities	2/3/2019	2/4/2019	2/5/2019	2/6/2019	2/7/2019	2/8/2019	2/9/2019
Start Time (PST)	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	No Work
Construction Headquarters E1		Site-wide clearing & grading, electrical conduit install	Site-wide clearing & grading, electrical conduit install	Site-wide clearing & grading, electrical conduit install	Site-wide clearing & grading, electrical conduit install	Site-wide clearing & grading, electrical conduit install	
Pre-Trenching/Excavation Potholing and Characterization (F5), (G5)		Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	
Pipeline C Installation E5, F5		Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	
Well Installation	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	MW-N (F5), MW-B (E5), IRZ-27 (F5), IRZ-20 (F5)	--	
Primary Planned Activities	2/10/2019	2/11/2019	2/12/2019	2/13/2019	2/14/2019	2/15/2019	2/16/2019
Start Time (PST)	No Work	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM	7:00 AM
Construction Headquarters E1		Electrical conduit install, Decontamination pad excavation	Electrical conduit install, Decontamination pad excavation	Electrical conduit install, Decontamination pad excavation	Electrical conduit install, Decontamination pad formwork & rebar install	Electrical conduit install, Decontamination pad formwork & rebar install	
Pre-Trenching/Excavation Potholing and Characterization (F5), (G5)		Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	Pending ERTC Potholing, Air-vac	
Pipeline C Installation E5, F5		Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	Pipeline C1 - C6	
Well Installation		--	MW-N (F5), MW-D (E5), IRZ-23 (F5)	MW-N (F5), MW-D (E5), IRZ-23 (F5)	MW-N (F5), MW-D (E5), IRZ-23 (F5)	MW-N (F5), MW-D (E5), IRZ-23 (F5)	MW-N (F5), MW-D (E5), IRZ-23 (F5)


Note - The timing of field activities are estimated and may change day-to-day based on site conditions, field progress, or other factors.


When planning to visit the site to observe a specific activity or area, please contact Curt Russell (760-791-5884) for the latest schedule information.


Attachment G
Validated Sitewide Groundwater
Monitoring Data
(DTSC Condition of Approval xi)


Attachment G. Validated Sitewide Groundwater Monitoring Data


Pursuant to Condition of Approval # xi in DTSC's approval letter dated August 24, 2018 (DTSC, 2018a), PG&E is required to report data from samples collected as part of the sitewide groundwater monitoring program within 60 days of sample collection. In compliance with this requirement, PG&E submitted validated data to DTSC via monthly emails. For ease of recordkeeping and minimize the number of ad-hoc compliance reports/emails, PG&E has included validated data in each monthly progress report starting with the November 2018 report (see attached table).

<div><div><div>Design & Consultancy for natural and built assets</div></div><div><div>PMP 2018-11 Sampling</div></div></div>					<i>Filtered:</i>	F	N	N	N	N	N	N	N	F	F	F	F	F	F	
					<i>Lab:</i>	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
					<i>Description:</i>	Hexavalent Chromium	Alkalinity, Total as CaCO3	Chloride	pH	Specific Conductance	Sulfate	Total Dissolved Solids	Nitrate/Nitrite as Nitrogen	Calcium, Dissolved	Total Dissolved Chromium	Iron, Dissolved	Magnesium, Dissolved	Manganese, Dissolved	Sodium, Dissolved	
					<i>Units:</i>	µg/L	mg/L	mg/L	PHUNITS	µS/cm	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	mg/L	µg/L	mg/L	
					<i>Method:</i>	EPA 218.6	SM 2320 B	EPA 300.0	SM4500-HB	EPA 120.1	EPA 300.0	SM 2540 C	SM 4500-NO3 F	EPA 200.7	EPA 200.8	EPA 200.7	EPA 200.7	EPA 200.8	EPA 200.7	
Sample Type		Sample ID	Matrix	Date Collected																
PE-01	N	PE-01-1118	GW	11/7/2018	ND (0.2)	220	450	7.4	2,100	260	1,400	ND (0.05)	180	ND (1)	ND (20)	39	590	520		
TW-03D	N	TW-03D-1118	GW	11/7/2018	490	150	2,100	7.3	7,100	510	4,300	2.7	230	510	ND (20)	26	15	1,400		

 <div> <div>Design & Consultancy for natural and built assets</div> <div>CMP 2018-10 Sampling</div> </div>					Filtered: Lab: Description: Units: Method:	F ASSET Hexavalent Chromium µg/L EPA 218.6	N ASSET Alkalinity, Total as CaCO3 mg/L SM 2320 B	N ASSET Chloride mg/L EPA 300.0	N ASSET Fluoride mg/L EPA 300.0	N ASSET Specific Conductance uS/cm EPA 120.1	N ASSET Sulfate mg/L EPA 300.0	N ASSET Dissolved Solids mg/L SM 2540 C	N ASSET Turbidity NTU SM 2130B	N ASSET Ammonia as nitrogen mg/L SM4500-NH3D	N ASSET Nitrate/Nitrite as Nitrogen mg/L SM 4500-NO3 F	N ASSET Total Organic Carbon mg/L SM5310B
Location ID	Sample Type	Sample ID	Matrix	Date Collected												
CW-01D	N	CW-01D-3V-Q418	GW	12/3/2018	0.29	76	2,100	2.2	8,000	480	3,900	0.16	ND (0.2)	2.5		
CW-01D	N	CW-01D-LF-Q418	GW	12/3/2018	0.29	74	2,100	2.2	8,000	480	4,000	1.4	ND (0.2)	2.8		
CW-01M	N	CW-01M-3V-Q418	GW	12/3/2018	1.4	89	2,100	2	7,900	480	4,000	0.14	ND (0.2)	2.8		
CW-01M	N	CW-01M-LF-Q418	GW	12/3/2018	1.2	88	2,100	2.1	7,800	460	4,000	11	ND (0.2)	2.9		
CW-01M	FD	MW-900-Q418	GW	12/3/2018	1.3	91	2,100	2.1	7,900	480	4,100	0.15	ND (0.2)	2.9		
CW-02D	N	CW-02D-3V-Q418	GW	12/3/2018	ND (0.2)	61	2,100	1.8	7,900	480	3,900	0.47	ND (0.2)	2.9		
CW-02D	N	CW-02D-LF-Q418	GW	12/3/2018	ND (0.2)	63	2,100	1.8	7,800	480	3,900	0.37	ND (0.2)	2.9		
CW-02M	N	CW-02M-3V-Q418	GW	12/3/2018	0.96	60	2,100	2.8	7,800	480	3,900	0.41	ND (0.2)	2.8		
CW-02M	N	CW-02M-LF-Q418	GW	12/3/2018	1.1	59	2,100	3	7,800	480	3,800	1.2	ND (0.2)	2.9		
CW-03D	N	CW-03D-3V-Q418	GW	12/3/2018	ND (0.2)	62	2,100	2.3	8,000	480	4,000	0.79	ND (0.2)	2.7	ND (10 J)	
CW-03D	N	CW-03D-LF-Q418	GW	12/3/2018	0.22	65	2,100	2.3	8,000	480	4,000	1.1	ND (0.2)	2.6	ND (10 J)	
CW-03M	N	CW-03M-3V-Q418	GW	12/3/2018	3.9	52	2,300	3.5	8,600	510	4,100	19	ND (0.2)	2.3	ND (10 J)	
CW-03M	N	CW-03M-LF-Q418	GW	12/3/2018	3.3	32	2,300	3.4	8,600	530	4,500	7.3	ND (0.2)	2.4	ND (10 J)	
CW-04D	N	CW-04D-3V-Q418	GW	12/4/2018	0.31	59	2,100	2.8	7,400	480	4,200	0.6	ND (0.2)	2.8		
CW-04D	N	CW-04D-LF-Q418	GW	12/4/2018	0.28	61	2,100	2.6	7,300	480	4,000	8.4	ND (0.2)	3		
CW-04M	N	CW-04M-3V-Q418	GW	12/4/2018	1.3	55	2,000	2	7,200	490	4,200	0.66 J	ND (0.2)	2.7		
CW-04M	N	CW-04M-LF-Q418	GW	12/4/2018	1.3	53	2,000	1.9	7,200	490	4,000	3.1	ND (0.2)	2.6		
CW-04M	FD	MW-901-Q418	GW	12/4/2018	1.3	55	2,000	2	7,200	490	4,100	0.86 J	ND (0.2)	2.8		
OW-01D	N	OW-01D-Q418	GW	12/4/2018	0.54	76	2,100	2.2	7,400	490	4,100	11	ND (0.2)	2.5		
OW-01M	N	OW-01M-Q418	GW	12/3/2018	0.78	83	2,100	2.3	7,900	480	3,800	3.3	ND (0.2)	2.8		
OW-01S	N	OW-01S-Q418	GW	12/3/2018	4.1		1,900	0.94	7,100	430	3,900	3.7		2.8		
OW-02D	N	OW-02D-Q418	GW	12/4/2018	ND (0.2)		2,100	2.2	7,400	490	4,200	2.9		2.6		
OW-02M	N	OW-02M-Q418	GW	12/3/2018	0.96		2,100	2.1	7,900	490	3,900	11		2.6		
OW-02S	N	OW-02S-Q418	GW	12/4/2018	15		910	3.1	3,300	140	1,900	6.4		3		
OW-05D	N	OW-05D-Q418	GW	12/4/2018	ND (0.2)		2,100	2.3	7,400	500	4,200	0.36		2.4		
OW-05M	N	OW-05M-3V-Q418	GW	12/4/2018	0.22	77	2,100	2.2	7,400	500	4,200	3.8	ND (0.2)	2.8		
OW-05M	N	OW-05M-LF-Q418	GW	12/4/2018	0.21	76	2,200	2.2	7,300	490	4,200	28 J	ND (0.2)	2.6		
OW-05M	FD	MW-902-Q418	GW	12/4/2018	0.22	74	2,100	2.2	7,400	490	4,100	19 J	ND (0.2)	2.1		
OW-05S	N	OW-05S-3V-Q418	GW	12/4/2018	12		1,500	1.4	5,000	300	3,100	2.3		3		
OW-05S	N	OW-05S-LF-Q418	GW	12/4/2018	12		1,600	1.5	5,200	320	3,200	6.8		2.9		

 <div> Design & Consultancy for natural and built assets </div> <div>CMP 2018-10 Sampling</div>					Filtered: Lab: Description: Units: Method:	F ASSET Silver, Dissolved µg/L EPA 200.8	F ASSET Aluminum, Dissolved µg/L EPA 200.7	F ASSET Arsenic, Dissolved µg/L EPA 200.8	F ASSET Barium, Dissolved µg/L EPA 200.8	F ASSET Boron, Dissolved mg/L EPA 200.7	F ASSET Beryllium, Dissolved µg/L EPA 200.8	F ASSET Calcium, Dissolved mg/L EPA 200.7	F ASSET Cadmium, Dissolved µg/L EPA 200.8	F ASSET Cobalt, Dissolved µg/L EPA 200.8	F ASSET Dissolved Chromium µg/L EPA 200.8	F ASSET Copper, Dissolved µg/L EPA 200.8
Location ID	Sample Type	Sample ID	Matrix	Date Collected												
CW-01D	N	CW-01D-3V-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.2	24	1.1	ND (0.5)	150	ND (0.5)	ND (0.5)	ND (1)	ND (1)	
CW-01D	N	CW-01D-LF-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.1	24	1	ND (0.5)	150	ND (0.5)	ND (0.5)	ND (1)	ND (1)	
CW-01M	N	CW-01M-3V-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.2	87	1.2 J	ND (2.5)	160	ND (0.5)	ND (0.5)	1.5	ND (1)	
CW-01M	N	CW-01M-LF-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.1	81	1.2	ND (2.5)	170	ND (0.5)	ND (0.5)	2.7	ND (1 J)	
CW-01M	FD	MW-900-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.2	84	1.2	ND (2.5)	150	ND (0.5)	ND (0.5)	1.3	ND (1)	
CW-02D	N	CW-02D-3V-Q418	GW	12/3/2018	ND (0.5)	ND (50)	2.8	16	1.1 J	ND (0.5)	110	ND (0.5)	ND (0.5)	ND (1)	ND (1 J)	
CW-02D	N	CW-02D-LF-Q418	GW	12/3/2018	ND (0.5)	ND (50)	2.6	17	1.1	ND (0.5)	110	ND (0.5)	ND (0.5)	ND (1)	ND (1)	
CW-02M	N	CW-02M-3V-Q418	GW	12/3/2018	ND (0.5)	ND (50)	2	67	1.1	ND (0.5)	130	ND (0.5)	ND (0.5)	1.3	ND (1)	
CW-02M	N	CW-02M-LF-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.9	58	1.2	ND (0.5)	130	ND (0.5)	ND (0.5)	2.1	ND (1)	
CW-03D	N	CW-03D-3V-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.5	15	1	ND (2.5)	67	ND (0.5)	ND (0.5)	1.1	ND (1)	
CW-03D	N	CW-03D-LF-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.5	16	0.88	ND (2.5)	70	ND (0.5)	ND (0.5)	1.1	ND (1)	
CW-03M	N	CW-03M-3V-Q418	GW	12/3/2018	ND (0.5)	ND (50)	1.3	41	1	ND (2.5)	170	ND (0.5)	ND (0.5)	4.8	ND (1)	
CW-03M	N	CW-03M-LF-Q418	GW	12/3/2018	ND (0.5)	85	1.4	41	1	ND (2.5)	170	ND (0.5)	ND (0.5)	10	ND (1)	
CW-04D	N	CW-04D-3V-Q418	GW	12/4/2018	ND (0.5)	ND (50)	3	19	1.2 J	ND (0.5)	150	ND (0.5)	ND (0.5)	ND (1)	ND (1 J)	
CW-04D	N	CW-04D-LF-Q418	GW	12/4/2018	ND (0.5)	ND (50)	3	18	1.1	ND (0.5)	140	ND (0.5)	ND (0.5)	ND (1)	ND (1)	
CW-04M	N	CW-04M-3V-Q418	GW	12/4/2018	ND (0.5)	ND (50)	2.1	110	0.98	ND (0.5)	190	ND (0.5)	ND (0.5)	2	ND (1)	
CW-04M	N	CW-04M-LF-Q418	GW	12/4/2018	ND (0.5)	ND (50)	2	99	1.1	ND (0.5)	210	ND (0.5)	ND (0.5)	2.1	ND (1)	
CW-04M	FD	MW-901-Q418	GW	12/4/2018	ND (0.5)	ND (50)	2	100	1	ND (0.5)	200	ND (0.5)	ND (0.5)	1.9	ND (1)	
OW-01D	N	OW-01D-Q418	GW	12/4/2018	ND (0.5)	ND (50)	1.2	30	1.1	ND (0.5)	160	ND (0.5)	ND (0.5)	ND (1)	ND (1)	
OW-01M	N	OW-01M-Q418	GW	12/3/2018	ND (0.5)	ND (50)	2.3	70	1	ND (0.5)	140	ND (0.5)	ND (0.5)	1.2	ND (1)	
OW-01S	N	OW-01S-Q418	GW	12/3/2018										4.6		
OW-02D	N	OW-02D-Q418	GW	12/4/2018										1.1		
OW-02M	N	OW-02M-Q418	GW	12/3/2018										2.1		
OW-02S	N	OW-02S-Q418	GW	12/4/2018										17		
OW-05D	N	OW-05D-Q418	GW	12/4/2018										ND (1)		
OW-05M	N	OW-05M-3V-Q418	GW	12/4/2018	ND (0.5)	ND (50)	0.74	40	1.1 J	ND (0.5)	160	ND (0.5)	ND (0.5)	ND (1)	ND (1 J)	
OW-05M	N	OW-05M-LF-Q418	GW	12/4/2018	ND (0.5)	ND (50 J)	0.82 J	38	1.1	ND (0.5)	150	ND (0.5)	ND (0.5 J)	4.9 J	ND (1)	
OW-05M	FD	MW-902-Q418	GW	12/4/2018	ND (0.5)	390 J	1.5 J	42	1	ND (0.5)	150	ND (0.5)	1.1 J	87 J	ND (1)	
OW-05S	N	OW-05S-3V-Q418	GW	12/4/2018										12		
OW-05S	N	OW-05S-LF-Q418	GW	12/4/2018										12		

 <div> Design & Consultancy for natural and built assets </div> <div>CMP 2018-10 Sampling</div>					Filtered: Lab: Description: Units: Method:	F ASSET Iron, Dissolved µg/L EPA 200.7	F ASSET Mercury, Dissolved µg/L EPA 245.1	F ASSET Potassium, Dissolved mg/L EPA 200.7	F ASSET Magnesium, Dissolved mg/L EPA 200.7	F ASSET Manganese, Dissolved µg/L EPA 200.8	F ASSET Molybdenum, Dissolved µg/L EPA 200.8	F ASSET Sodium, Dissolved mg/L EPA 200.7	F ASSET Nickel, Dissolved µg/L EPA 200.8	F ASSET Lead, Dissolved µg/L EPA 200.8	F ASSET Antimony, Dissolved µg/L EPA 200.8	F ASSET Selenium, Dissolved µg/L EPA 200.8
Location ID	Sample Type	Sample ID	Matrix	Date Collected												
CW-01D	N	CW-01D-3V-Q418	GW	12/3/2018	ND (20)	ND (0.2)	14	18	ND (0.5)	20	1,500	ND (1)	ND (1)	ND (0.5)	4	
CW-01D	N	CW-01D-LF-Q418	GW	12/3/2018	ND (20)	ND (0.2)	13	17	0.78	20	1,500	ND (1)	ND (1)	ND (0.5)	4	
CW-01M	N	CW-01M-3V-Q418	GW	12/3/2018	ND (20)	ND (0.2)	14	14	1 J	17	1,600	ND (1)	ND (1)	ND (0.5)	3.8	
CW-01M	N	CW-01M-LF-Q418	GW	12/3/2018	ND (20)	ND (0.2)	14	15	1.7	17	1,600	2.9	ND (1)	ND (0.5)	4	
CW-01M	FD	MW-900-Q418	GW	12/3/2018	ND (20)	ND (0.2)	13	16	2.3 J	16	1,500	ND (1)	ND (1)	ND (0.5)	3.9	
CW-02D	N	CW-02D-3V-Q418	GW	12/3/2018	ND (20)	ND (0.2)	13	6	2.1	12	2,300	ND (1)	ND (1)	ND (0.5)	3.8	
CW-02D	N	CW-02D-LF-Q418	GW	12/3/2018	ND (20)	ND (0.2)	13	6.5	2.2	13	1,700	ND (1)	ND (1)	ND (0.5)	3.4	
CW-02M	N	CW-02M-3V-Q418	GW	12/3/2018	ND (20)	ND (0.2)	12	9.7	1.6	15	1,500	ND (1)	ND (1)	ND (0.5)	3.7	
CW-02M	N	CW-02M-LF-Q418	GW	12/3/2018	ND (20)	ND (0.2)	13	9.6	1.8	18	1,600	1.5	ND (1)	ND (0.5)	3.7	
CW-03D	N	CW-03D-3V-Q418	GW	12/3/2018	ND (20)	ND (0.2)	11	4.9	2.6	14	1,600	ND (1)	ND (1)	ND (0.5)	3.9	
CW-03D	N	CW-03D-LF-Q418	GW	12/3/2018	ND (20)	ND (0.2)	12	4.1	2.4	15	1,600	ND (1)	ND (1)	ND (0.5)	4.2	
CW-03M	N	CW-03M-3V-Q418	GW	12/3/2018	ND (20)	ND (0.2)	18	11	2.2	30	1,600	1.2	ND (1)	ND (0.5)	2.7	
CW-03M	N	CW-03M-LF-Q418	GW	12/3/2018	140	ND (0.2)	19	11	8.1	30	1,600	1.9	ND (1)	ND (0.5)	2.7	
CW-04D	N	CW-04D-3V-Q418	GW	12/4/2018	ND (20)	ND (0.2)	14	9.1	1.7	20	1,600	ND (1)	ND (1)	ND (0.5)	4	
CW-04D	N	CW-04D-LF-Q418	GW	12/4/2018	28	ND (0.2)	13	8.4	2.4	20	1,400	ND (1)	ND (1)	ND (0.5)	4	
CW-04M	N	CW-04M-3V-Q418	GW	12/4/2018	ND (20)	ND (0.2)	14	15	0.84	11	1,400	ND (1)	ND (1)	ND (0.5)	3.9	
CW-04M	N	CW-04M-LF-Q418	GW	12/4/2018	ND (20)	ND (0.2)	15	16	0.89	11	1,500	ND (1)	ND (1)	ND (0.5)	3	
CW-04M	FD	MW-901-Q418	GW	12/4/2018	ND (20)	ND (0.2)	14	15	0.86	10	1,400	ND (1)	ND (1)	ND (0.5)	3.7	
OW-01D	N	OW-01D-Q418	GW	12/4/2018	ND (20)	ND (0.2)	16	24	1	21	1,500	1.4	ND (1)	ND (0.5)	3.8	
OW-01M	N	OW-01M-Q418	GW	12/3/2018	ND (20)	ND (0.2)	15	26	ND (0.5)	23	1,500	ND (1)	ND (1)	ND (0.5)	4.1	
OW-01S	N	OW-01S-Q418	GW	12/3/2018						4	980					
OW-02D	N	OW-02D-Q418	GW	12/4/2018						21	1,500					
OW-02M	N	OW-02M-Q418	GW	12/3/2018						22	1,500					
OW-02S	N	OW-02S-Q418	GW	12/4/2018						27	590					
OW-05D	N	OW-05D-Q418	GW	12/4/2018						22	1,500					
OW-05M	N	OW-05M-3V-Q418	GW	12/4/2018	ND (20)	ND (0.2)	17	26	ND (0.5)	22	1,500	ND (1)	ND (1)	ND (0.5)	3.9	
OW-05M	N	OW-05M-LF-Q418	GW	12/4/2018	49 J	ND (0.2)	16	26	6.3 J	22	1,500	1.5 J	ND (1)	0.84	4	
OW-05M	FD	MW-902-Q418	GW	12/4/2018	1,200 J	ND (0.2)	16	25	83 J	22	1,500	6.7 J	ND (1)	0.84	3.6	
OW-05S	N	OW-05S-3V-Q418	GW	12/4/2018						9.8	620					
OW-05S	N	OW-05S-LF-Q418	GW	12/4/2018						9.3	630					

<div>  <div> Design & Consultancy for natural and built assets </div> </div> <div> <div>CMP 2018-10 Sampling</div> </div>					Filtered: Lab: Description: Units: Method:	F ASSET Thallium, Dissolved µg/L EPA 200.8	F ASSET Vanadium, Dissolved µg/L EPA 200.8	F ASSET Zinc, Dissolved µg/L EPA 200.8	N ASSET Total Iron µg/L SW 6010B
Location ID	Sample Type	Sample ID	Matrix	Date Collected					
CW-01D	N	CW-01D-3V-Q418	GW	12/3/2018	ND (0.5)	2.3	ND (10)	ND (20)	
CW-01D	N	CW-01D-LF-Q418	GW	12/3/2018	ND (0.5)	2.2	ND (10)	29	
CW-01M	N	CW-01M-3V-Q418	GW	12/3/2018	ND (0.5)	2.5	ND (10)	ND (20)	
CW-01M	N	CW-01M-LF-Q418	GW	12/3/2018	ND (0.5)	2.4	ND (10 J)	370	
CW-01M	FD	MW-900-Q418	GW	12/3/2018	ND (0.5)	2.3	ND (10)	ND (20)	
CW-02D	N	CW-02D-3V-Q418	GW	12/3/2018	ND (0.5)	3.9	ND (10 J)	ND (20)	
CW-02D	N	CW-02D-LF-Q418	GW	12/3/2018	ND (0.5)	3.8	ND (10)	ND (20)	
CW-02M	N	CW-02M-3V-Q418	GW	12/3/2018	ND (0.5)	3.6	ND (10)	ND (20)	
CW-02M	N	CW-02M-LF-Q418	GW	12/3/2018	ND (0.5)	3.5	ND (10)	120	
CW-03D	N	CW-03D-3V-Q418	GW	12/3/2018	ND (0.5)	2.4	ND (10)	ND (20)	
CW-03D	N	CW-03D-LF-Q418	GW	12/3/2018	ND (0.5)	2.6	ND (10)	ND (20)	
CW-03M	N	CW-03M-3V-Q418	GW	12/3/2018	ND (0.5)	2.7	ND (10)	740	
CW-03M	N	CW-03M-LF-Q418	GW	12/3/2018	ND (0.5)	3	ND (10)	74	
CW-04D	N	CW-04D-3V-Q418	GW	12/4/2018	ND (0.5)	2.7	ND (10 J)	32	
CW-04D	N	CW-04D-LF-Q418	GW	12/4/2018	ND (0.5)	2.6	ND (10)	280	
CW-04M	N	CW-04M-3V-Q418	GW	12/4/2018	ND (0.5)	3	ND (10)	32	
CW-04M	N	CW-04M-LF-Q418	GW	12/4/2018	ND (0.5)	2.7	ND (10)	180	
CW-04M	FD	MW-901-Q418	GW	12/4/2018	ND (0.5)	2.7	ND (10)	33	
OW-01D	N	OW-01D-Q418	GW	12/4/2018	ND (0.5)	2.2	ND (10)	460	
OW-01M	N	OW-01M-Q418	GW	12/3/2018	ND (0.5)	3.1	ND (10)	85	
OW-01S	N	OW-01S-Q418	GW	12/3/2018					
OW-02D	N	OW-02D-Q418	GW	12/4/2018					
OW-02M	N	OW-02M-Q418	GW	12/3/2018					
OW-02S	N	OW-02S-Q418	GW	12/4/2018					
OW-05D	N	OW-05D-Q418	GW	12/4/2018					
OW-05M	N	OW-05M-3V-Q418	GW	12/4/2018	ND (0.5)	ND (1)	ND (10 J)	180	
OW-05M	N	OW-05M-LF-Q418	GW	12/4/2018	ND (0.5)	ND (1 J)	ND (10)	1,900 J	
OW-05M	FD	MW-902-Q418	GW	12/4/2018	ND (0.5)	3.4 J	ND (10)	54 J	
OW-05S	N	OW-05S-3V-Q418	GW	12/4/2018					
OW-05S	N	OW-05S-LF-Q418	GW	12/4/2018					