



**Pacific Gas and
Electric Company®**

Curt Russell
Topock Project Manager
Environmental Remediation

Topock Compressor Station
145453 National Trails Hwy
Needles, CA 92363

Mailing Address
P.O. Box 337
Needles, CA 92363

760.791.5884
Fax: 760.326.5542
Email: gcr4@pge.com

October 10, 2019

Ms. Pamela Innis
U.S. Department of the Interior
CHF Remedial Project Manager
One North Central Avenue, Suite 800
Phoenix, AZ 85004-4427

Mr. Aaron Yue
California Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

**Subject: September 2019 Monthly Progress Report for the Final Groundwater Remedy
Construction and Startup, PG&E Topock Compressor Station, Needles, California**
(Document ID: TPK_Monthly_Progress_Rpt_September_2019_20191010_Final)

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 September 2019 as well as activities planned for the next six weeks (September 29 through November 9, 2019), and presents available results from sampling and testing performed in September 2019.

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 2019 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 twelfth monthly progress report. Please contact me at (760) 791-5884 if you have any questions or comments regarding this submittal.

Sincerely,

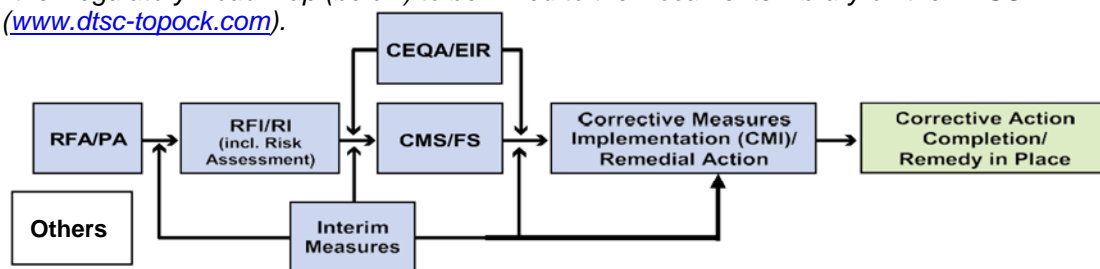
Curt Russell
Topock Project Manager

Topock Project Executive Abstract

<p>Document Title: <i>September 2019 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: 10/10/2019</p> <p>Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E</p>
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<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 September 2019 and activities planned for the next six weeks (September 29 through November 9, 2019) and presents available results from sampling and testing in September 2019. In addition, this report discusses material deviations from the approved design documents and/or the <i>Construction/ Remedial Action Work Plan</i> (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 at the Topock Compressor Station in support of DOI's 2012 Community Involvement Plan and DTSC's 2019 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



September 2019
Monthly Progress Report for the
Final Groundwater Remedy Construction and Startup

PG&E Topock Compressor Station
Needles, California

Document ID: TPK_Monthly_Progress_Rpt_September_20191010_Final

October 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
APE	Area of Potential Effect
ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BLM	U.S. Bureau of Land Management
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
PBA	Programmatic Biological Agreement
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 requires 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 above 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 DTSC on April 24, 2018 (DTSC, 2018a).

This is the twelfth of the monthly progress reports that will be submitted to DOI and DOI for the duration of the remedy construction and startup. This monthly progress report documents activities during August 2019, 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, 2019) 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 September 2019 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 September 30, 2019, a total of 64 six-week look-ahead schedule emails have been sent. **Of those, four six-week look-ahead schedule emails were sent in September 2019 (on September 8, 16, 22, and 29).**
- On August 10, 2018, PG&E issued the first Environmental Release to Construct (ERTC) to contractors. As of September 30, 2019, a total of 48 ERTCs were issued for mobilization and construction activities (see Table 2-1). **One new ERTC was issued in the month of September for the installation of MW-11D.**
- 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 September 2019, a total of 22 daily construction activities lists were published and discussed at the morning tailboards.**
- In September 2019, 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**):
 - **Pilot Boring/Well Installation Activities (Rotosonic drilling):**
 - a) Complete drilling of pilot borehole at IRZ-19.
 - b) Complete well installation at MW-Y' and MW-D.
 - c) Complete the abandonment of the shallower and damaged well MW-B-267.
 - d) Drilled MW-S and later determined that the well has been damaged.
 - e) Conducted well development activities at MW-D and determined that the shallowest well has been damaged.
 - f) Repaired MW-C-39 and MW-C-156 by installing plugs below the screen.
 - **Remedy Well Installation Activities (Dual Rotary drilling):**
 - a) Completed remedy well installation at RB-3.
 - b) Completed specific capacity test at IRZ-20, IRZ-21, IRZ-25, RB-4, and RB-5.
 - c) Completed injectivity test with freshwater at IRZ-20 and IRZ-21.
 - d) See **Attachment B** for available information such as boring logs, water analytical results, and well testing activities.
 - **Baseline/Opportunistic Soil Sampling Activities:**
 - 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 bottom of trench along Pipeline B/J alignment (sampled on September 5, 2019) and one soil

sample was collected and at approximately 1 foot below ground surface (bgs) at MW-11D (sampled on September 17, 2019).

- 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/observation was conducted through September 30, 2019 at the perimeter of select 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 or within 20 feet of Areas of Concern (AOCs) and within the construction footprint where hexavalent chromium concentrations in soil have been historically reported. No air sampling event occurred in the month of September 2019.
- 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 September 30, 2019, 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,
 - Location Maze C Area 1,
 - Location mobile home park at Topock Marina.
- 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 September 30, 2019, PG&E has started and will continue to perform the following activities:

- Continue to install remedy well RB-2 (dual rotary rig).
- Continue drilling of a replacement well at MW-B.
- Evaluating options for the damaged well MW-S and the shallower and damaged well MW-C.
- Continue to install Pipeline B.
- Start installation of Pipeline C, Segment C5, under and in the vicinity of BNSF railroad track after the maternity bat season ended.
- Continue planning for the installation of Pipeline C6 on the MW-20 Bench or C5/C7 in the floodplain.
- Continue to conduct noise and dust monitoring and inspection of Stormwater Pollution Prevention Plan (SWPPP) Best Management Practices (BMPs).
- Continue to track and manage waste generated.
- Continue to manage displaced soil per the approved Soil Management Plan (Appendix L of the C/RAWP).

2.1.3 Freshwater Usage, Waste Generation and Management

As of September 30, 2019, the volumes of freshwater used for remedy construction and waste streams generated from remedy construction (starting on October 2, 2018) are as follows:

Freshwater Usage and Wastewater Management

- An approximate total of 3,662,750 gallons (10.1 acre-feet) of freshwater was used, of which an approximate 15.2 percent was for pilot boring/well installation and general construction, 0.8 percent for hydrostatic testing of pipeline, and 79.5 percent was for fugitive dust suppression. Of this amount, 384,200 gallons of freshwater was used in September 2019.
- An approximate total of 45,600 gallons of hydrostatic testing water was discharged to land. Of this amount, 44,500 gallons were discharged in May 2019 and 1,100 gallons were discharged in June 2019. No hydrostatic testing activities occurred in July, August, and September 2019. All discharges to land comply with the substantive requirements of State Water Resources Control Board (SWRCB) Water Quality Order 2003-0003-DWQ. See **Attachment F** for approximate volume at each approved discharge location and date of each discharge.
- In September 2019, two injectivity tests using freshwater was conducted at IRZ-20 and IRZ-21. An approximate total of 18,250 gallons of freshwater was used and injected into the ground. Information related to this discharge to land is included in **Attachment F**, as required by the substantive requirements of SWRCB Water Quality Order 2003-0003-DWQ.
- An approximate total of 39,000 gallons of wastewater generated from drilling operations were sent to IM3 for treatment and reinjection. The discharge complies with the IM3 Applicable, Relevant, and Appropriate Requirements (ARARs). No remedy wastewater was sent to IM3 in September 2019.
- An approximate total of 413,059 gallons of wastewater generated from drilling operations were discharged to Compressor Station evaporation pond #4. In September 2019, 100,264 gallons of wastewater was discharged to pond #4. The discharge complies with the Waste Discharge Requirements (WDRs) of the California Regional Water Quality Control Board (CRWQCB), Colorado River Basin Region, Order No. R7-2018-0022.

At each sonic drilling location, the wastewater is initially stored in a holding tank in the primary work zone, and is transferred from the primary work zone, as needed, to 20,000-gallon frac tanks located at the MW-20 Bench. Each transfer load is tracked. At each dual rotary drilling location, freshwater and wastewater are conveyed between the frac tanks and the drilling location via pipes. Once a frac tank is full, its contents is characterized and managed in accordance with the approved Waste Management Plan (Appendix R of the C/RAWP).

Displaced Materials/Soils/Clay

- Approximately 422.3 cubic yards of displaced materials (drill cuttings from well drilling and geotechnical investigation, and excess soil from potholing activities) were generated. Of those, approximately 1.3 cubic yards are clay from Pipeline F geotechnical investigation (using hollow stem auger). Drill cuttings are typically stored in roll-off bins with closed tops. Samples are collected from the bins for characterization and analyzed in accordance with the Soil Management Plan.
- Approximately 20 cubic yards of drill cuttings generated in June 2019 and excess material from potholing activities conducted in May 2019 contain hexavalent chromium at concentrations slightly above the interim screening level (i.e., background concentration for hexavalent chromium). A waste profile has been accepted by US Ecology. This material was shipped offsite on October 1, 2019 for disposal at US Ecology landfill in Beatty, Nevada.
- In March 2019, approximately 40 cubic yards of displaced soil was generated from potholing activities at the MW-20 Bench and along remedy pipeline alignment in the shoulder of NTH to pre-characterize soil in preparation for pipeline installation. Samples were collected for characterization in accordance with the Soil Management Plan. These soils are currently stored in bins at the SPY. **A decision on the final disposition of these soils is forthcoming.**

- In February 2019, approximately 100 cubic yards of displaced soil was generated from excavation for the brine tanks containment upgrade at the MW-20 Bench. Samples were collected for characterization and analyzed in accordance with the Soil Management Plan. This soil is currently stockpiled on a plastic liner at the SPY. **A decision on the final disposition of this soil is forthcoming.**
- Displaced sands from construction of Pipeline C3-C5 in the floodplain has been and will continue to be used as pipe bedding material for Pipeline B/J.
- Displaced material from trenching along Pipeline B/J alignment (rocks, soils) has been and will continue to be used to repair/build a 2-foot berm to control erosion and fill in existing eroded channels along the alignment.

General Construction Waste, Sanitary Waste, and Recyclables

- In September 2019, approximately 72 cubic yards of general construction waste and 3.81 tons of construction debris (e.g., concrete from wash outs) were generated and transported to Republic Services in Lake Havasu City for disposal and management.
- Sanitary waste from construction trailers/portable toilets is hauled offsite as needed.
- Recycling was stopped due to

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 September 30, 2019, a total of 106 health and safety training sessions were held and 352 employees and contractors received the training. **Of those, in September 2019, four sessions were conducted and five 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 September 30, 2019, a total of 109 WEAT sessions were conducted and 402 employees and contractors received the training. **Of those, in September 2019, 4 sessions were conducted (on 9/4, 9/9, 9/19, and 9/23) and 7 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 WEAT completion form.
- 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 September 30, 2019, a total of 11 FCR training sessions were conducted and 55 employees and contractors received the training. **No FCR training was conducted in September 2019.**
- 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 (WVRs)

On September 12, 2019, PG&E submitted a WVR to change the alignment of pipeline segment C6 on the eastern slope of the MW-20 Bench. The purpose of the WVR is to reduce the amount of soil disturbance, reduce the number of plants to be removed, reduce the safety risks associated with construction atop the MW-20 bench, and reduce the hazards associated with operation at the MW-20 bench during construction. 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

- Installation of MW-S was started on 9/25/19. During installation of the grout, two 50-gallon lifts were used to bring the grout to the top of casing. After the first 10-foot section of outer drill casing was removed, the well casing was observed to be approximately 3 inches higher than initially installed. Following the observation of the elevated casing, the well was bailed to evaluate if damage to the well had occurred. Grout was observed during bailing and the well was determined to have been damaged. PG&E started to explore options to reinstall the damaged well, in discussion with the agencies.
- During well development of the shallowest well of the MW-D cluster on September 26, it was determined that there was about 12' of formation sand and filter pack sand in the well casing. Additional investigation led to a determination that the well has failed and PG&E started to explore options to abandon this damaged well and install a replacement well, in discussion with the agencies.
- During well development of MW-C-39 and MW-C-156, it was determined that sand had entered the well casing. In both cases, a plug was installed below the well screen to prevent sand intrusion. Well development proceeded successfully after the plugs were installed.
- In the month of September 2019, PG&E reported five releases to the agencies, land owner, and land manager. See **Attachment G** for detailed description and corrective action for each release. PG&E has since required each contractor to re-review and re-emphasize with the crew on proper daily equipment inspection procedures.
- PG&E continues to work with Transwestern to resolve the conflict between their gas pipeline and the portion of Pipeline F, just outside of the Transwestern Bench.
- PG&E and Frontier have made significant progress to resolve the conflict between Frontier's telecom line and Pipeline C segments C13, C15, and C16, in the shoulder of NTH. A final design from Frontier for their telecom line is anticipated in the next weeks.
- PG&E continues to work with Kinder Morgan to resolve the conflict between their gas pipeline and Pipeline C segment C17, north of the Transwestern Bench.
- PG&E is working with potential subcontractors on the details of an installation plan for the jack-and-bore under NTH.

2.1.8 Key Personnel Changes

There was no change to key PG&E project personnel in September 2019.

2.2 Communication with the Public

PG&E presented an overview of the PG&E Topock Remediation project to the Environmental Science Department of Arizona State University in Lake Havasu City on September 18, 2019:

2.3 Planned Activities for Next Six Weeks

The planned activities for next six weeks (September 29 through November 9, 2019) include the following:

- Complete installation of well at MW-11D.
- Start installation of MW-70BRd in the East Ravine.
- Start drilling the pilot holes at IRZ-37 and IRZ-39.

- Abandon the damaged well MW-S and install a replacement well.
- Abandon the damaged shallowest well at MW-C and install a replacement well.
- Continue to install remedy well at IRZ-17 and RB-2 (dual rotary rig).
- Conduct well testing at RB-3 and injectivity test at IRZ-25.
- Complete well development at MW-D, B, S, X, Y', IRZ-39, as well as RB-3, 4, 5.
- Continue to install Pipeline B and Pipeline C (segment C5/C7 in the floodplain).
- Start installation of Pipeline C6 on the eastern slope of and on the MW-20 Bench.
- Complete installation of the security fence at the Soil Processing Yard.
- 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 H 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 September 30, 2019.

In addition, the latest project schedule including Phase 1 construction can be downloaded from the project website at <https://dtsc-topock.com/documents/project-schedule/current-project-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 I**).

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.

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Tables

Table 2-1 Summary of Environmental Release-To-Constructions (ERTCs) Issued to Contractors*September 2019 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 walkway 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
10	Scope included potholing activities along approved pipeline alignments and in building footprints, that are also in AOCs/SMWUs. The purpose is to pre-characterize soil in preparation for construction.	March 29, 2019
11	Scope included preparation of temporary staging areas, vegetation clearance, placement of stabilization mats, potholing in select locations, and installation of Pipeline C segments C1 through C6 in the floodplain.	January 3, 2019
11a	Scope included preparation of temporary staging areas, vegetation clearance, placement of stabilization mats, potholing in select locations, and installation of Pipeline C segments C7-C10, and C17 in the floodplain.	February 11, 2019
11b	Scope included installation of Pipelines B, F, and J.	May 31, 2019
Addendum 1 to ERTC #11b	Scope included details for installation of Pipeline B/F/J inside TCS.	July 25, 2019
12	Scope included non-intrusive site preparation work for the brine tanks containment upgrade on the MW-20 Bench (per Work Variance Request #1, see Table 2-2). A forthcoming addendum to this ERTC will be issued to include the actual upgrade activities.	January 10, 2019
12a	Scope included the actual brine tanks containment upgrade activities which include intrusive work on the MW-20 Bench (per Work Variance Request #1, see Table 2-2).	February 6, 2019
Well ERTCs		
5a	Scope included the site setup, drilling, testing, and demobilization at MW-L.	September 27, 2018

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

September 2019 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
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
5f	Scope included the site setup, drilling, testing, and demobilization at IRZ-13 in the floodplain.	November 7, 2018
5g	Scope included the site setup, drilling, testing, and demobilization at IRZ-23 on the MW-20 Bench.	November 8, 2018
5h	Scope included the site setup, drilling, testing, and demobilization at MW-M in the upland.	January 15, 2019
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
5o	Scope included the site setup, drilling, testing, and demobilization at MW-X and MW-Y' in Arizona.	April 23, 2019
5p	Scope included the site setup, drilling, testing, and demobilization at MW-G along NTH.	January 14, 2019
5q	Scope included the site setup, drilling, testing, and demobilization at IRZ-16 and IRZ-17 in the floodplain.	February 14, 2019
5r	Scope included the site setup, drilling, testing, and demobilization at IRZ-27 and IRZ-29 along NTH. Also included in the scope are potholing activities along Pipeline C Segments C13, C15, and C16 and on the MW-20 Bench.	March 9, 2019
Addendum #1 to ERTC #5r	Scope included the potholing to locate Transwestern Gas Pipeline within NTH (in support of Pipeline C installation).	April 24, 2019
5s	Scope included the site setup, drilling, testing, and demobilization at IRZ-39 in the low area, north of the Transwestern Bench.	March 12, 2019
5t	Scope included the site setup, drilling, testing, and demobilization at IRZ-27 along NTH.	March 19, 2019
5u	Scope included the site setup, drilling, testing, and demobilization at MW-U in I-40 median.	March 22, 2019
5v	Scope included the site setup, drilling, testing, and demobilization at MW-10D in Bat Cave Wash.	March 27, 2019
5w	Scope included the site setup, drilling, testing, and demobilization at MW-W in the floodplain.	March 22, 2019
5x	Scope included the site setup, drilling, testing, and demobilization at RB-1 through 5 wells and MW-O in the floodplain.	March 30, 2019
5y	Scope included the site setup, drilling, testing, and demobilization at MW-S on the access road to Bat Cave Wash.	April 12, 2019
5z	Scope included the site setup, drilling, testing, and demobilization at MW-R in the Upland.	May 8, 2019

Table 2-1 Summary of Environmental Release-To-Constructions (ERTCs) Issued to Contractors*September 2019 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
5aa	Scope included the site setup, drilling, testing, and demobilization at MW-C, MW-D, and MW-H in the floodplain	June 6, 2019
5ab	Scope included the site setup, drilling, testing, and demobilization at IRZ-19 (sonic drilling) in the floodplain	July 22, 2019
5ac	Scope included the site setup, drilling, testing, and demobilization at MW-11D (sonic drilling) in Bat Cave Wash	September 25, 2019

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

September 2019 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>
4	<p>PG&E proposed to revise a segment of Pipeline C near the I-40 bridge, to meet the permit requirement in Caltrans Encroachment Permit No. 08-18-6-MW-0533. The revision involves</p>	<p>DOI/DTSC approved</p>

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

September 2019 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
	relocating a small segment of Pipeline C to within National Trails Highway to meet a minimum distance of 10 feet from current and future I-40 bridge footings. The treatment measure specified for Segment X of National Trails Highway in the Cultural and Historic Property Management Plan will be implemented during installation of this pipeline segment.	WVR #4 on May 14, 2019
5	PG&E proposed to phase the remedy produced water conditioning system within the approved footprint inside TCS.	DOI and DTSC approved WVR #5 on July 19 and July 22, 2019, respectively.
6	<p>In early October 2018, PG&E conducted a geotechnical investigation along the Pipeline F alignment on the entrance road to the Topock Compressor Station (TCS) and the adjacent hill side. Based on the geotechnical results, the construction contractor (PIVOX) indicated that soldier piles and lagging would be required for temporary shoring. Over 40 soldier piles would be installed by drilling using a 330-sized excavator or larger. A 330-sized excavator has a general width of 11 feet, and counter weight clearance of approximately 4 feet. During operation, this rig would occupy a minimum 15 to 16 feet width of the TCS entrance road for about 12 days. The paved width of the road is between 22 to 24 feet in the area of shoring (per review of the location via Google Earth).</p> <p>Assuming a minimum clearance of 1 foot (which is still less than the recommended clearance) from any operating equipment, there will be approximately 5 to 8 feet of available lane width for access by TCS traffic. Large vehicles (tractor-trailers, delivery trucks, construction equipment) will likely not be able to pass by the active operation, and passenger vehicles may also not be able to pass the active operation in locations where the road narrows. Also, the excavator cannot be repositioned while soldier piles are being drilled. In sum, access to TCS will be severely restricted for about 12 days. This is not acceptable for Compressor Station operations.</p> <p>Therefore, PG&E proposed to realign Pipeline F (starting from segment F3) along the approved alignment of Pipelines B and J. Construction of Pipelines F, B, and J would occur in the same alignment and at the same time.</p>	DOI and DTSC approved WVR #6 on May 21 and May 22, 2019, respectively.
7	<p>This WVR proposed the following changes to remedy infrastructure at the CHQ and SPY.</p> <p>a) Locate all temporary office and break trailers at the SPY. PG&E proposed to keep the three existing office trailers at their current locations in the SPY and add two additional office trailers and one break trailer for workers. The additional trailers will be equipped with aboveground sewage tanks, similar to the existing trailers. They will also be powered by Needles Electric. This will require the original SPY fence line to be extended south/southwest to encompass these trailers and the original truck entrance from National Trails Highway to the access road east of SPY. Neither changes reduce the overall area available for soil storage.</p> <p>b) Eliminate the workshop/sample processing building at the CHQ. The function planned for this building will be moved to the Carbon Amendment building at the MW-20 Bench. Removal of this building reduces the amount of soil disturbance by approximately 334 cubic yards.</p> <p>c) Eliminate the sunshade at the CHQ. The function for the sunshade will be replaced by the break trailer for the workers. Removal of the sunshade reduces the amount of soil distance (i.e., installation of the footings) by approximately 14 cubic yards.</p> <p>d) Convert the utility pad at the CHQ to a smaller transformer/electrical panel pad. With the relocation of the six trailers to SPY and elimination of the workshop/sample processing building, PG&E proposed to convert the utility pad to smaller pad for a smaller transformer/electrical panel to serve the remaining trailers at the CHQ. This reduces the amount of soil disturbance by approximately 61 cubic yards.</p>	DOI and DTSC approved WVR #7 on June 14, 2019.
8	On September 12, 2019, PG&E proposed a WVR to change the alignment of pipeline segment C6 on the eastern slope of the MW-20 Bench. The purpose of the WVR is to reduce the amount of soil disturbance, reduce the number of plants to be removed, reduce the safety risks associated with construction atop the MW-20 bench, and reduce the hazards associated with operation at the MW-20 bench during construction.	Awaiting agencies' approval

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

September 2019 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
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Note:

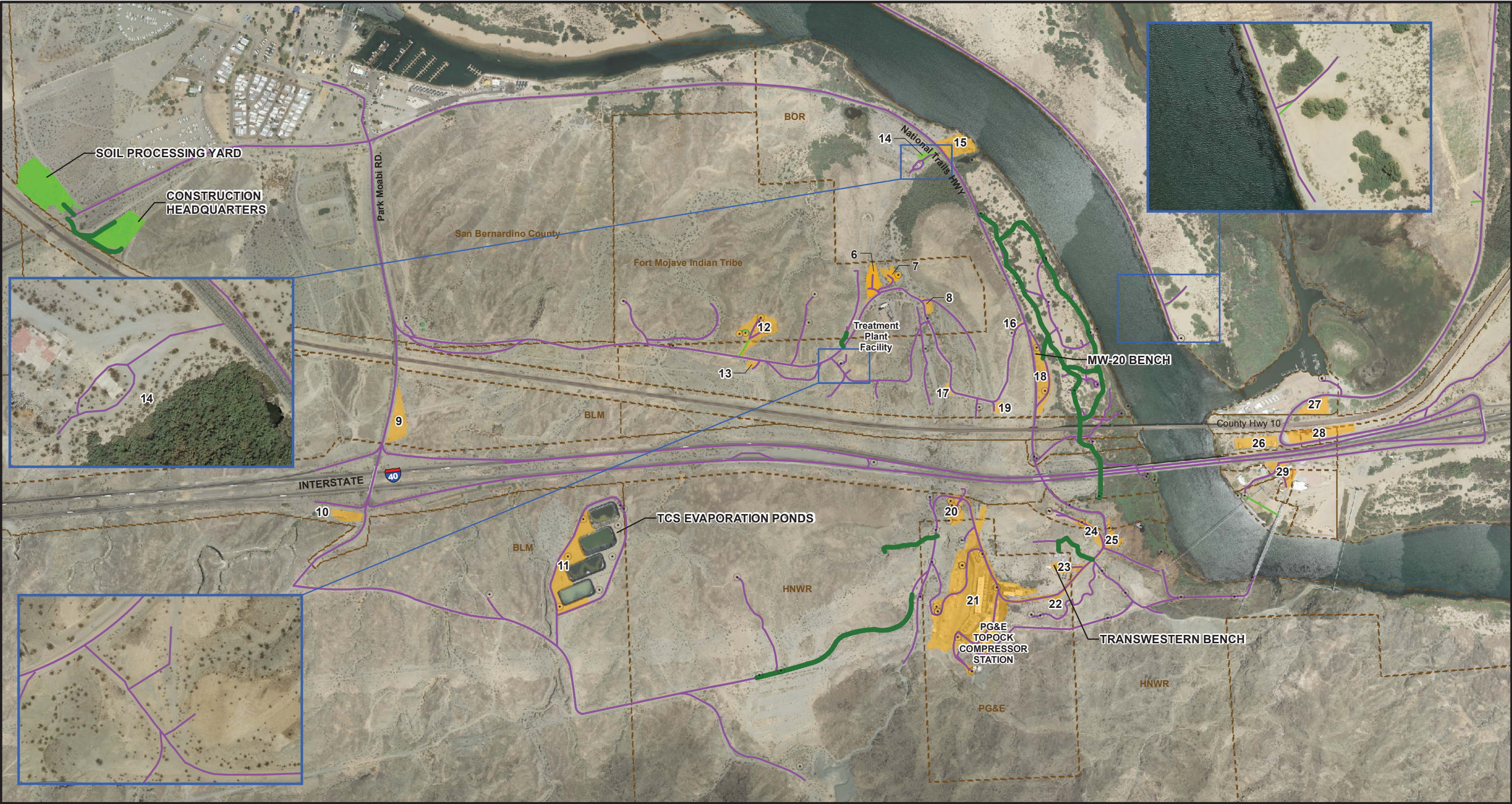
* CH2M HILL, Inc. (CH2M). 2015a. *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.

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

*September 2019 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 September 30, 2019)
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 (CHQ) access road	100%	Complete.
Aggregate-based access road in floodplain	Not Available	Portion north of BNSF bridge is substantially complete.
CHQ security fence	100%	Complete
MW-L, N, E, W, O, R, M, and 10D	100%	Complete.
MW-F, MW-G, MW-X, MW-H, MW-D, MW-Y'	Not Available	Well construction complete. Surface completion will be scheduled when rig is available.
MW-B-33, MW-B-117, and MW-B-337	Not Available	Well construction complete.
MW-B-267 (damaged)	100%	Completed well abandonment. Installation of replacement well underway.
MW-C (shallow well is damaged)	Not Available	Video log complete. Path forward is being discussed with agencies.
RB-5, RB-4, RB-3, RB-2, IRZ-9, 13, 15, 16, 17, 21, 23, 25, 27, and 39 pilot borings	100%	Complete.
RB-3, RB-4, RB-5	Not Available	Well construction complete. Well development in October.
IRZ-20 remedy well	Not Available	Well construction and development complete. Specific capacity testing conducted in July. Injection testing conducted in September.
IRZ-21, 23, and 25 remedy wells	Not Available	Well construction complete. Well testing ongoing.
Pipeline C Segments C3, C4, C5	Not Available	Substantially complete. Tested electrical conduits in September.
Brine Tanks containment upgrade	100%	Complete.
Pipeline B and J	Not Available	Started on August 12, 2019. Currently underway.

Figures

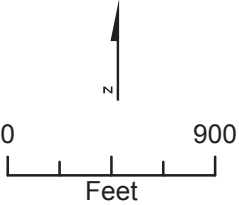


LEGEND

- 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 Headquarter (Area #4) for Remediation Project
- Staging Areas for Remediation Project

Notes:

- Decontamination pads will be located in Area #4 (Construction Headquarters), Area #21 (Topock Compressor Station), and Area #23 (Transwestern Bench).
- 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.
- 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.
- Public roadways outside of the EIR project area and the APE can also be used for remedy implementation.



**FIGURE 2.1-1
CONSTRUCTION SITE PLAN
AND ACCESS ROUTES**
GROUNDWATER REMEDY CONSTRUCTION/
PHASE 1
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

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.

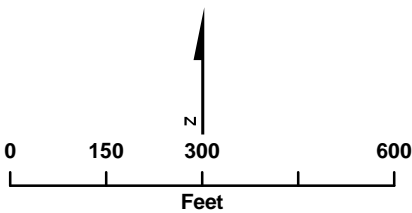


FIGURE 2-2
WELL AND PIPELINE LOCATIONS
GROUNDWATER REMEDY PHASE 1 CONSTRUCTION
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Attachment A

Photographs



Rock breaking at Pipeline B



Excavation progress at Pipeline B



Injection test at IRZ-21



Moving equipment between RB wells



Trenching at Pipeline C Segment C5



RB-2 Remedy Well Installation



MW-C – Airvac of borehole

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

Table B-1. Groundwater Sampling Results

September 2019 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-10D	MW-10D-041119	04/11/19	108 - 123	160	160
MW-10D	MW-10D-VAS-107-112	04/01/19	107 - 112	95	96
MW-10D	MW-10D-VAS-118-123	04/02/19	118 - 123	200	190
MW-B	MW-B-VAS-27-32	01/06/19	27 - 32	5.9 J	7.7J
MW-B	MW-B-VAS-47-52	01/09/19	47 - 52	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-67-72	01/09/19	67 - 72	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-102-107	01/10/19	102 - 107	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-142-147	01/15/19	142 - 147	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-182-187	02/13/19	182 - 187	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-207-212	02/14/19	207 - 212	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-247-252	02/17/19	247 - 252	11 J	< 0.83 U
MW-B	MW-B-VAS-264-269	02/18/19	264 - 269	< 0.13 U	< 0.33 U
MW-B	MW-B-VAS-287-292	02/20/19	287 - 292	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-317-322	02/21/19	317 - 322	< 0.13 U	< 0.17 U
MW-B	MW-B-VAS-339-344	02/27/19	339 - 344	< 0.13 U	< 0.33 U
MW-B	MW-B-VAS-352-357	02/28/19	352 - 357	0.603 J	< 0.33 U
MW-B	MW-B-117-033019	03/30/19	WD, 117	< 0.13 U	< 0.17 U
MW-B	MW-B-33-033119	03/31/19	WD, 33	3.7	2.3
MW-B	MW-B-337-062619-INTERIM	6/26/19	WD	0.255 J	< 0.17 U
MW-B	MW-B-337-090719	9/7/2019	WD	0.251 J	< 0.17 U
MW-C	MW-C-VAS-117-122	6/19/19	26-31	360	380
MW-C	MW-C-VAS-51-56	6/25/19	51-56	0.13 U	0.146 J
MW-C	DUP-01-062519	6/25/19	51-56	< 0.13 U	0.0931 J
MW-C	MW-C-VAS-66-71	6/26/19	66-71	< 0.13 U	< 0.033 U
MW-C	MW-C-VAS-81-86	6/27/19	81-86	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-117-122	6/28/19	117-122	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-147-152	6/29/19	147-152	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-165-170	6/30/19	165-170	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-176-181	7/1/19	176-181	380	410
MW-C	MW-C-VAS-186-191	7/1/19	186-191	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-200-205	7/2/19	200-205	< 0.13 U	< 0.17 U
MW-C	MW-C-VAS-216-221	7/3/19	216-221	0.448 J	< 0.17 U
MW-C	MW-C-VAS-26-31	6/19/2019	26 - 31	360	380
MW-C	MW-C-VAS-51-56	6/25/2019	51 - 56	< 0.13 U	0.146 J
MW-C	MW-C-VAS-66-71	6/26/2019	66 - 71	< 0.13 U	< 0.033 U
MW-C	MW-C-VAS-81-86	6/27/2019	81 - 86	< 0.13 U	< 0.17 U

Table B-1. Groundwater Sampling Results

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 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-C	MW-C-156-081519	8/15/2019	WD	Data not yet available	< 0.17 U
MW-C	MW-C-181-082019	8/20/2019	WD	280	280
MW-C	MW-C-218-082219	8/22/2019	WD	39	40
MW-C	MW-C-39-090519	9/5/2019	WD	14	16
MW-D	MW-D-VAS-30-35	08/10/19	30-35	<0.13 U	<0.17 U
MW-D	MW-D-VAS-46-51	08/11/19	46-51	0.558 J	0.47
MW-D	MW-D-VAS-91-96	08/12/19	91-96	<0.13 U	<0.033 U
MW-D	MW-D-VAS-131-136	08/21/19	131-136	< 0.13 U	<0.66 U
MW-D	MW-D-VAS-141-146	08/22/19	141-146	< 0.13 U	<0.17 U
MW-D	MW-D-VAS-151-156	08/22/19	151 - 156	< 0.13 U	< 0.17 U
MW-D	MW-D-VAS-161-166	08/23/19	161 - 166	< 0.13 U	< 0.17 U
MW-D	MW-D-VAS-171-176	08/23/19	171 - 176	< 0.13 U	< 0.17 U
MW-D	MW-D-VAS-181-186	08/24/19	181 - 186	< 0.13 U	< 0.17 U
MW-D	MW-D-VAS-191-196	08/25/19	191 - 196	< 0.13 U	< 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	WD, 70	-	3000
MW-E	MW-E-142-121418	12/14/18	WD, 142	4500	4200
MW-F	MW-F-VAS-52-57	01/06/19	52 - 57	2700	2500
MW-F	MW-F-VAS-82-87	01/07/19	82 - 87	120	110
MW-F	MW-F-VAS-97-102	01/07/19	97 - 102	1900	1800
MW-F	MW-F-VAS-112-117	01/08/19	112 - 117	790	740
MW-F	MW-F-104-022719	02/27/19	WD, 104	1800	1700
MW-F	MW-F-60-022819	02/28/19	WD, 60	2300	2200
MW-G	MW-G-VAS-52-57	02/13/19	52 - 57	790	680
MW-G	MW-G-VAS-67-72	02/14/19	67 - 72	1000	920
MW-G	MW-G-VAS-77-82	02/15/19	77 - 82	710	600
MW-G	MW-G-82-030219	03/02/19	WD, 82	1500	1500
MW-G	MW-G-57-030219	03/02/19	WD, 57	510	560
MW-H	MW-H-VAS-32-37	8/7/2019	32 - 37	<0.13 U	< 0.17 U
MW-H	MW-H-VAS-47-52	8/7/2019	47-52	<0.13 U	< 0.17 U
MW-H	MW-H-VAS-82-87	08/08/19	82-87	<0.13 U	<.033 U
MW-H	MW-H-VAS-112-117	08/09/19	112-117	8.1	<0.17 U
MW-H	MW-H-VAS-142-147	08/10/19	142-147	18 J	<0.17 U
MW-H	MW-H-VAS-152-157	08/10/19	152-157	< 0.13 U	<0.17 U

Table B-1. Groundwater Sampling Results

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 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-H	MW-H-VAS-162-167	08/11/19	162-167	<0.13 U	<0.17 U
MW-H	MW-H-VAS-172-177	08/12/19	172-177	<0.13 U	<0.17 U
MW-H	MW-H-VAS-182-187	08/13/19	182-187	<0.13 U	<0.17 U
MW-H	MW-H-VAS-192-197	08/14/19	192-197	<0.13 U	<0.17 U
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-L	MW-L-180-032819	03/28/19	WD, 180	< 0.13 U	< 0.17 U
MW-L	MW-L-245-030319	03/03/19	WD, 245	14	15
MW-L	MW-L-90-032919	03/29/19	WD, 90	19	18
MW-L	MW-L-225-032919	03/29/19	WD, 225	410	380
MW-M	MW-M-VAS-52-57	03/28/19	52 - 57	29	28
MW-M	MW-M-VAS-72-77	03/29/19	72 - 77	< 0.13 U	< 0.033 U
MW-M	MW-M-VAS-107-112	03/30/19	107 - 112	< 0.13 U	< 0.033 U
MW-M	MW-M-VAS-147-152	03/31/19	147 - 152	< 0.13 U	< 0.17 U
MW-M	MW-M-VAS-172-177	04/02/19	172 - 177	< 0.13 U	< 0.033 U
MW-M	MW-M-VAS-190-195	04/10/19	190 - 195	< 0.13 U	< 0.17 U
MW-M	MW-M-132-061519	6/16/19	WD	< 0.13 U	< 0.033 U
MW-M	MW-M-193-061419	6/14/19	WD	< 0.13 U	< 0.17 U
MW-M	MW-M-57-061719	6/17/19	WD	0.715 J	0.72
MW-M	MW-M-95-061619	6/16/19	WD	< 0.13 U	< 0.033 U
MW-N	MW-N-VAS-121-126	02/14/19	121 - 126	0.699 J	0.51
MW-N	MW-N-VAS-142-147	02/16/19	142 - 147	< 0.13 U	< 0.033 U
MW-N	MW-N-VAS-173-178	02/18/19	173 - 178	< 0.13 U	< 0.033 U
MW-N	MW-N-VAS-210-215	02/21/19	210 - 215	320	290
MW-N	MW-N-VAS-228-233	02/26/19	228 - 233	< 0.13 U	< 0.17 U
MW-N	MW-N-217-040219	04/02/19	WD, 217	110	110
MW-N	MW-N-237-040119	04/01/19	WD, 237	1600	1500
MW-N	MW-N-129-040319	04/03/19	WD, 129	45	46
MW-O	MW-O-VAS-101-106	05/10/19	101 - 106	< 0.13 U	< 0.033 U
MW-O	MW-O-VAS-106-111	05/11/19	106 - 111	< 0.13 U	< 0.17 U
MW-O	MW-O-VAS-12.5-17.5	05/08/19	12 - 18	< 0.13 U	0.163 J
MW-O	MW-O-VAS-136-141	05/11/19	136 - 141	< 0.13 U	< 0.17 U
MW-O	MW-O-VAS-51-56	05/09/19	51 - 56	< 0.13 U	< 0.033 U

Table B-1. Groundwater Sampling Results

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 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-O	MW-O-VAS-66-71	05/09/19	66 - 71	< 0.13 U	0.178 J
MW-O	MW-O-140-071819	7/18/19	WD	< 0.13 U	< 0.17 U
MW-O	MW-O-30-071719	7/17/19	WD	< 0.13 U	< 0.033 U
MW-O	MW-O-66-071519	7/15/19	WD	< 0.13 U	< 0.033 U
MW-R	MW-R-VAS-92-97	05/13/19	92 - 97	42	45
MW-R	MW-R-VAS-117-122	05/14/19	117 - 122	4.6	5.8
MW-R	MW-R-VAS-151-156	05/15/19	151 - 156	<0.13 U	< 0.033 U
MW-R	MW-R-VAS-192-197	05/16/19	192 - 197	<0.13 U	< 0.033 U
MW-R	MW-R-VAS-227-232	05/17/19	227 - 232	<0.13 U	< 0.033 U
MW-R	MW-R-VAS-255-260	05/29/19	255 - 260	<0.13 U	< 0.17 U
MW-R	MW-R-VAS-269-274	05/30/19	269 - 274	<0.13 U	< 0.17 U
MW-R	MW-R-109-062819	6/28/19	WD	2.6	2.5
MW-R	MW-R-139-071319	7/13/19	WD	< 0.13 U	< 0.033 U
MW-R	MW-R-192-070219	7/2/19	WD	< 0.13 U	< 0.033 U
MW-R	MW-R-275-070919	7/9/19	WD	< 0.13 U	< 0.17 U
MW-W	MW-W-VAS-7-12	03/27/19	7 - 12	0.266 J	< 0.17 U
MW-W	MW-W-VAS-22-27	03/28/19	22 - 27	< 0.13 U	< 0.33 U
MW-W	MW-W-31-040419	04/04/19	WD, 31	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-12-17	06/25/19	12-17	1.2	< 0.033 U
MW-X	MW-X-VAS-32-37	06/26/19	32-37	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-71-76	6/27/19	71 - 76	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-107-112	6/27/19	107-112	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-112-117	6/28/19	112-117	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-152-157	6/29/19	152-157	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-182-187	6/29/19	182-187	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-207-212	6/30/19	207-212	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-245-250	7/1/19	245-250	< 0.13 U	< 0.033 U
MW-X	MW-X-VAS-292-297	7/2/19	292-297	< 0.13 U	< 0.17 U
MW-X	MW-X-VAS-337-342	7/11/19	337-342	0.564 J	< 0.17 U
MW-X	MW-X-VAS-382-387	7/13/19	382-387	0.582 J	< 0.17 U
MW-X	MW-X-VAS-412-417	7/15/19	412-417	38	< 0.17 U
MW-Y'	MW-Y-VAS-12-17	08/20/19	12-17	< 0.13 U	<0.033 U
MW-Y'	MW-Y-VAS-52-57	08/21/19	52-57	0.378 J	<0.033 U
MW-Y'	MW-Y-VAS-92-97	08/22/19	92 - 97	0.620 J	0.31
MW-Y'	MW-Y-VAS-98-103	08/23/19	98 - 103	0.521 J	< 0.033 U
MW-Y'	MW-Y-VAS-112-117	08/23/19	112 - 117	< 0.13 U	< 0.033 U
MW-U	MW-U-VAS-137-142	04/12/19	137 - 142	0.818 J	1.4

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Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
MW-U	MW-U-VAS-181-186	04/13/19	181 - 186	< 0.13 U	0.112 J
MW-U	MW-U-VAS-222-227	04/14/19	222 - 227	< 0.13 U	< 0.033 U
MW-U	MW-U-VAS-257-262	04/16/19	257 - 262	< 0.13 U	0.0896 J
MW-U	MW-U-VAS-287-292	04/17/19	287 - 292	< 0.13 U	< 0.033 U
MW-U	MW-U-VAS-317-322	04/24/19	317 - 322	< 0.13 U	< 0.17 U
MW-U	MW-U-183-050819	05/08/19	WD, 183	< 0.13 U	< 0.033 U
MW-U	MW-U-273-051019	05/10/19	WD, 273	< 0.13 U	< 0.033 U
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	< 0.13 U	< 0.17 U
IRZ-9	IRZ-9-VAS-276-281	12/16/18	276 - 281	< 0.13 U	< 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
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-16	IRZ-16-VAS-27-32	02/20/19	27 - 32	480	480
IRZ-16	IRZ-16-VAS-57-62	02/20/19	57 - 62	< 0.33 U	< 0.33 U
IRZ-16	IRZ-16-VAS-102-107	02/21/19	102 - 107	< 0.33 U	< 0.33 U
IRZ-16	IRZ-16-VAS-132-137	02/26/19	132 - 137	< 0.17 U	< 0.17 U
IRZ-16	IRZ-16-VAS-147-152	02/27/19	147 - 152	< 0.17 U	< 0.17 U
IRZ-16	IRZ-16-VAS-172-177	02/27/19	172 - 177	110	110

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Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
IRZ-16	IRZ-16-VAS-192-197	02/28/19	192 - 197	< 0.17 U	< 0.17 U
IRZ-17	IRZ-17-VAS-32-37	03/02/19	32 - 37	78	67
IRZ-17	IRZ-17-VAS-62-67	03/02/19	62 - 67	0.750 J	0.604 J
IRZ-17	IRZ-17-VAS-102-107	03/03/19	102 - 107	< 0.13 U	< 0.17 U
IRZ-17	IRZ-17-VAS-132-137	03/13/19	132 - 137	< 0.13 U	< 0.17 U
IRZ-17	IRZ-17-VAS-137-142	03/12/19	137 - 142	< 0.13 U	< 0.13 U
IRZ-17	IRZ-17-VAS-142-147	03/04/19	142 - 147	68	84
IRZ-17	IRZ-17-VAS-147-152	03/12/19	147 - 152	< 0.13 U	< 0.33 U
IRZ-17	IRZ-17-VAS-152-157	03/04/19	152 - 157	16	7.0
IRZ-17	IRZ-17-VAS-162-167	03/04/19	162 - 167	< 0.13 U	< 0.17 U
IRZ-17	IRZ-17-VAS-172-177	03/05/19	172 - 177	< 0.13 U	< 0.17 U
IRZ-19	IRZ-19-VAS-122-127	9/8/2019	122 - 127	< 0.13 U	< 0.17 U
IRZ-19	IRZ-19-131-136	9/9/2019	131-136	< 0.13 U	< 0.17 U
IRZ-19	IRZ-19-142-147	9/9/2019	142-147	< 0.13 U	< 0.17 U
IRZ-19	IRZ-19-VAS-152-157	9/10/2019	152 - 157	0.187 J	< 0.17 U
IRZ-19	IRZ-19-VAS-162-167	9/11/2019	162 - 167	< 0.13 U	< 0.17 U
IRZ-19	IRZ-19-VAS-177-182	9/12/2019	177 - 182	0.275 J	< 0.17 U
IRZ-19	IRZ-19-VAS-27-32	9/6/2019	27 - 32	< 0.13 U	< 0.033 U
IRZ-19	IRZ-19-VAS-37-42	9/6/2019	37 - 42	< 0.13 U	< 0.033 U
IRZ-19	IRZ-19-VAS-82-87	9/7/2019	82 - 87	< 0.13 U	< 0.033 U
IRZ-20	IRZ-17-VAS-197-202	03/06/19	197 - 202	< 0.13 U	< 0.17 U
IRZ-20	IRZ-17-VAS-217-222	03/06/19	217 - 222	< 0.13 U	< 0.17 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	100	97
IRZ-21	IRZ-21-VAS-77-82	12/16/18	77 - 82	1.3	1.1
IRZ-21	IRZ-21-VAS-112-117	12/16/18	112 - 117	< 0.13 U	< 0.17 U
IRZ-21	IRZ-21-VAS-132-137	12/17/18	132 - 137	< 0.13 U	< 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

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Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
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
IRZ-27	IRZ-27-VAS-52-57	03/15/19	52 - 57	4500	4400
IRZ-27	IRZ-27-VAS-72-77	03/17/19	72 - 77	0.338 J	< 0.033 U
IRZ-27	IRZ-27-VAS-102-107	03/18/19	102 - 107	< 0.13 U	< 0.17 U
IRZ-27	IRZ-27-VAS-132-137	03/20/19	132 - 137	1200	1300
IRZ-39	IRZ-39-VAS-27-32	03/30/19	27 - 32	31	29
RB-2	RB-2-VAS-102-107	7/1/19	102-107	< 0.13 U	< 0.033 U
RB-2	RB-2-VAS-142-147	7/9/19	142-147	0.270 J	< 0.17 U
RB-2	RB-2-VAS-172-177	7/12/19	172-177	0.233 J	< 0.17 U
RB-2	RB-2-VAS-202-207	7/14/19	202-207	0.218 J	< 0.17 U
RB-2	RB-2-VAS-237-242	7/15/19	237-242	0.233J	< 0.17 U
RB-2	RB-2-VAS-274-279	7/18/19	274-279	0.514 J	< 0.17 U
RB-2	RB-2-VAS-287-292	7/26/19	287-292	<0.13 U	< 0.17 U
RB-2	RB-2-VAS-36.5-41.5	6/29/19	36 - 42	< 0.13 U	< 0.033 U
RB-2	RB-2-VAS-72-77	6/30/19	72 - 77	< 0.13 U	< 0.033 U
RB-3	RB-3-VAS-15-20	04/26/19	15 - 20	< 0.13 U	< 0.033 U
RB-3	RB-3-VAS-50-55	04/27/19	50 - 55	< 0.13 U	0.100 J
RB-3	RB-3-VAS-80-85	04/27/19	80 - 85	< 0.13 U	0.132 J
RB-3	RB-3-VAS-120-125	04/28/19	120 - 125	< 0.13 U	< 0.17 U
RB-3	RB-3-VAS-150-155	04/29/19	150 - 155	0.257 J	< 0.17 U
RB-3	RB-3-VAS-180-185	04/29/19	180 - 185	< 0.13 U	< 0.033 U
RB-3	RB-3-VAS-205-210	04/30/19	205 - 210	< 0.13 U	< 0.17 U
RB-4	RB-4-VAS-15-20	04/12/19	15 - 20	< 0.13 U	0.0556 J
RB-4	RB-4-VAS-41-46	04/12/19	41 - 46	< 0.13 U	< 0.033 U
RB-4	RB-4-VAS-81-86	04/12/19	81 - 86	< 0.13 U	< 0.033 U
RB-4	RB-4-VAS-121-126	04/13/19	121 - 126	< 0.13 U	< 0.033 U
RB-4	RB-4-VAS-136-141	04/13/19	136 - 141	< 0.13 U	< 0.17 U
RB-4	RB-4-VAS-155-160	04/17/19	155 - 160	< 0.13 U	< 0.17 U
RB-5	RB-5-VAS-12-17	04/04/19	12 - 17	0.235 J	0.125 J
RB-5	RB-5-VAS-42-47	04/09/19	42 - 47	< 0.13 U	< 0.033 U
RB-5	RB-5-VAS-82-87	04/09/19	82 - 87	0.769 J	0.127 J

Notes:

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:	08/20/2019	Surface Elevation:	N/A	Well ID: MW-Y'-102/122
Date Completed:	09/25/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	J. Khem / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya / O. Flourez	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	4.6 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	137 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input checked="" type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
0					(+2.5 - 82.0') 2" PVC Sch 80 Casing (+3.0 - 2.0') 12-inch lockable monument		Note: Painted Desert Sand
1					(+0.5 - 3.4') 24-inch diameter concrete well pad		(-0.5 - 3.4') 15 bags (%) Note: King Kon-Crete 4000 PSI
2							
3							
4							
5							
6							
7							
8					(2.0 - 13.0') Grout	(2.0 - 13.0') 72.1 gallons	(2.0 - 13.0') 90 gallons (25%) Note: Type I, II and V and Benseal
9		Topock - Fill	SP		(0.0 - 48.0') 12.0" Borehole		
10							
11							
12							
13							
14	MW-Y'-VAS-12-17 (<0.033 U ppb) 8/20/2019 13:58				(13.0 - 79.9') Bentonite seal chips	(13.0 - 79.9') 58.3 bags	(13.0 - 79.9') 60 bags (3%) Note: Puregold Medium Chips
15							
16							
17							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started: 08/20/2019	Surface Elevation: N/A	Well ID: MW-Y'-102/122
Date Completed: 09/25/2019	Shallow Well Elevation: N/A	
Drilling Co.: Cascade	Deep Well Elevation: N/A	Client: PG&E
Drilling Method: Sonic Drilling	Northing (NAD83): N/A	Project: Final GW Remedy Phase 1
Driller Name: J. Khem / S. Vasquez	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: L. Amaya / O. Flourez	Borehole Diameter: 6-12 inches	
Logger: Grant Willford	Water Level Start: 4.6 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: N/A	
Total Depth: 137 ft bgs	Well Completion: <input type="checkbox"/> Flush <input checked="" type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
18		Topock - Fill	SP		(+2.5 - 82.0') 2" PVC Sch 80 Casing		
19							
20					(19.5 - 20.5') Centralizer		
21							
22		Topock - Alluvium Deposits	SP-SM				
23							
24							
25							
26							
27					(13.0 - 79.9') Bentonite seal chips	(0.0 - 48.0') 12.0" Borehole	(13.0 - 79.9') 58.3 bags
28							(13.0 - 79.9') 60 bags (3%) Note: Puregold Medium Chips
29							
30							
31							
32			NR				
33							
34							
35							
36							
37							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	08/20/2019	Surface Elevation:	N/A	Well ID: MW-Y'-102/122
Date Completed:	09/25/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	J. Khem / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya / O. Flourez	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	4.6 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	137 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input checked="" type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
38					(+2.5 - 82.0') 2" PVC Sch 80 Casing		
39							
40							
41							
42			NR				
43							
44							
45							
46							
47					(13.0 - 79.9') Bentonite seal chips	(13.0 - 79.9') 58.3 bags	(13.0 - 79.9') 60 bags (3%) Note: Puregold Medium Chips
48							
49							
50							
51							
52	MW-Y'-VAS-52-57 (<0.033 U ppb) 8/21/2019 11:41	Topock - Fluvial Deposits	SP		(48.0 - 126.0') 10.0" Borehole		
53							
54							
55							
56							
57							

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Date Started:	08/20/2019	Surface Elevation:	N/A	Well ID: MW-Y'-102/122
Date Completed:	09/25/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	J. Khem / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya / O. Flourez	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	4.6 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	137 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input checked="" type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
58		Topock - Fluvial Deposits	SP		(+2.5 - 82.0') 2" PVC Sch 80 Casing		
59							
60					(59.5 - 60.5') Centralizer		
61							
62		Topock - Fluvial Deposits	SP-SM				
63							
64							
65							
66							
67					(13.0 - 79.9') Bentonite seal chips	(48.0 - 126.0') 10.0" Borehole	(13.0 - 79.9') 58.3 bags
68							(13.0 - 79.9') 60 bags (3%) Note: Puregold Medium Chips
69		Topock - Fluvial Deposits	SW-SM				
70							
71							
72							
73							
74			NR				
75							
76							
77							

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Date Started:	08/20/2019	Surface Elevation:	N/A	Well ID: MW-Y'-102/122
Date Completed:	09/25/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	J. Khem / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya / O. Flourez	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	4.6 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	137 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input checked="" type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
78		Topock - Fluvial Deposits	SP-SM		(+2.5 - 82.0') 2" PVC Sch 80 Casing		
79					(13.0 - 79.9') Bentonite seal chips	(13.0 - 79.9') 58.3 bags	(13.0 - 79.9') 60 bags (3%) Note: Puregold Medium Chips
80							
81							
82		Topock - Fluvial Deposits	SW-SM		(82.0 - 102.0') 2" Sch 80 PVC (20-slot) Screen		
83							
84							
85							
86							
87					(48.0 - 126.0') 10.0" Borehole		
88							
89					(79.9 - 105.0') Cemex #3 MESH (8x10)	(79.9 - 105.0') 25.5 bags	(79.9 - 105.0') 30 bags (18%) Note: Lapis Lustre Sand
90							
91							
92		Topock - Fluvial Deposits	SM				
93							
94	MW-Y-VAS-92-97 (0.31 ppb) 8/22/2019 11:43						
95							
96							
97							

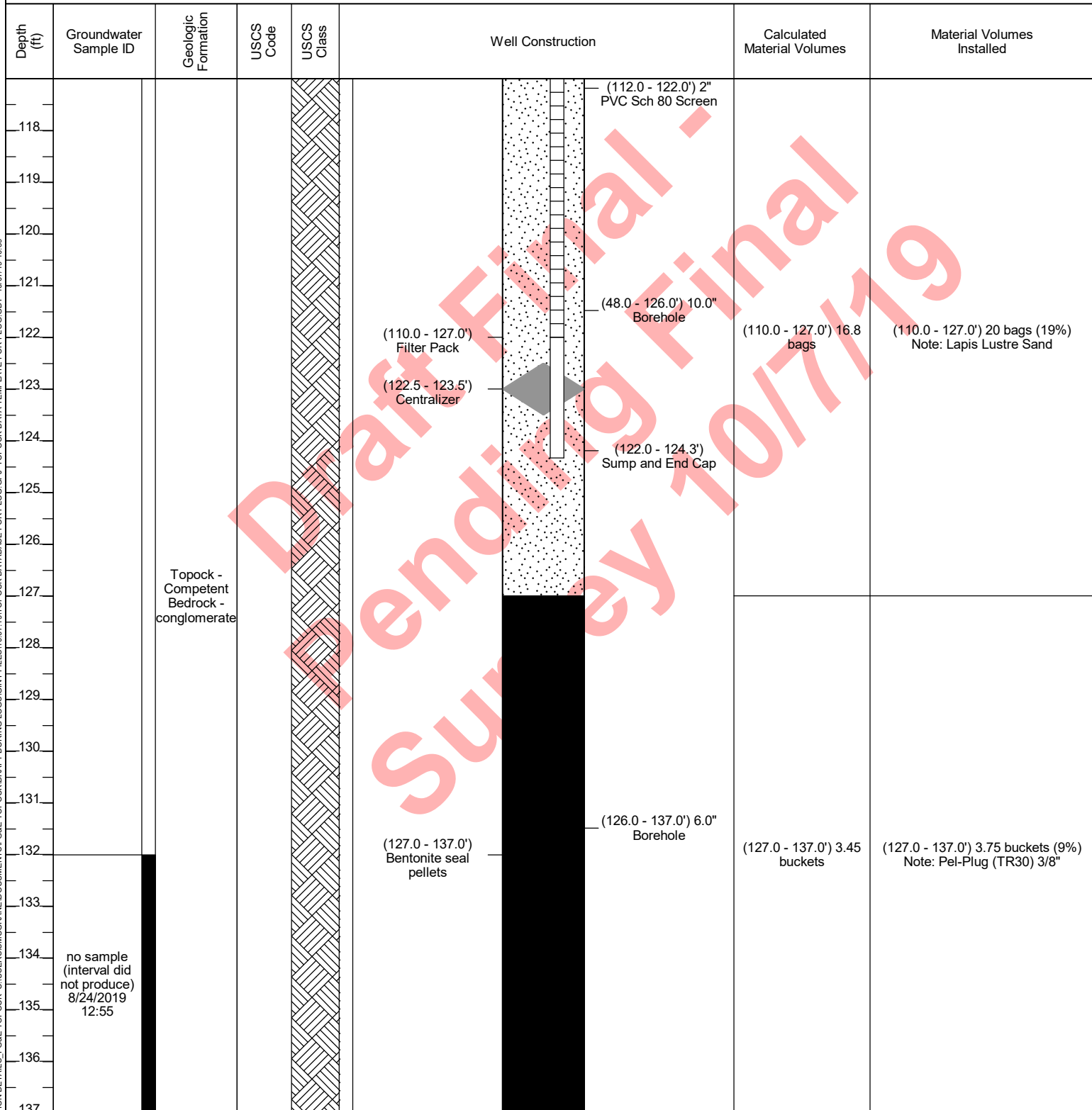
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	08/20/2019	Surface Elevation:	N/A	Well ID: MW-Y'-102/122
Date Completed:	09/25/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	J. Khem / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya / O. Flourez	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	4.6 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	137 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input checked="" type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
98					(82.0 - 102.0') 2" Sch 80 PVC (20-slot) Screen		
99							
100	MW-Y'-VAS-98-103 (<0.033 U ppb) 8/23/2019 21:24	Topock - Fluvial Deposits	SM				
101					(79.9 - 105.0') Cemex #3 MESH (8x10)	(79.9 - 105.0') 25.5 bags	(79.9 - 105.0') 30 bags (18%) Note: Lapis Lustre Sand
102							
103					(102.5 - 103.5') Centralizer		
104					(102.0 - 104.3') Sump and End Cap		
105							
106							
107							
108					(105.0 - 110.0') Bentonite seal pellets	(105.0 - 110.0') 4.8 buckets	(105.0 - 110.0') 4 buckets (-17%) Note: Pel-Plug (TR30) 3/8"
109		Topock - Competent Bedrock - conglomerate					
110							
111							
112							
113					(112.0 - 122.0') 2" PVC Sch 80 Screen		
114	MW-Y'-VAS-112-117 (<0.033 U ppb) 8/23/2019 15:11				(110.0 - 127.0') Filter Pack	(110.0 - 127.0') 16.8 bags	(110.0 - 127.0') 20 bags (19%) Note: Lapis Lustre Sand
115							
116							
117							

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Date Started:	08/20/2019	Surface Elevation:	N/A	Well ID: MW-Y'-102/122
Date Completed:	09/25/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	J. Khem / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	L. Amaya / O. Flourez	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	4.6 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	137 ft bgs	Well Completion:	<input type="checkbox"/> Flush <input checked="" type="checkbox"/> Stick-up	



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	08/20/2019	Surface Elevation:	N/A	Boring No.: MW-Y'd
Date Completed:	09/25/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	137 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Pro-Sonic Truck Mounted	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	J. Khem / S. Vasquez	Depth to First Water:	4.6 ft bgs	
Drilling Asst:	L. Amaya / O. Flourez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	Grant Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1							(0.0 - 18.0') Topock - Fill; Poorly graded sand (SP); pale yellow (2.5Y 7/3); very fine grained to fine grained, subangular to subround; trace silt; some organics; dry; homogeneous	(0.0 - 3.0') Area around borehole subsided overnight after advancing the 10-inch casing.	(0.0 - 97.0') 4437 gallons of water used; 0 gallons of water recovered; 4437 gallons of water lost
2									
3									
4	60								
5									
6									
7							(7'); moist; no organics		
8								(7.0 - 17.0') Heaving sands.	
9				Topock - Fill	SP				
10							(10'); wet		
11									
12	120								
13								(12.0 - 17.0') Sample interval was chosen based on moisture content of soils. Static water during sampling was higher possible from drill water used for heaving sands or possible confining unit.	
14		MW-Y'-VAS-12-17 (<0.033 U ppb) 8/20/2019 13:58							
15									
16									
17									
18								(17.0 - 37.0') Soft drilling. Very loose material being pushed out by core barrel causing poor recovery. Heaving sands encountered.	
19	102			Topock - Alluvium Deposits	SP-SM		(18.0 - 26.0') Topock - Alluvium Deposits; Poorly graded sand with silt (SP-SM); grayish brown (10YR 5/2) with pale yellow (2.5Y 7/3); very fine grained to fine grained, subangular to round; little silt; trace clay; some organics; moist to wet; some organics at 18-19 ft bgs and 20-20.5 ft. bgs (19'); no organics		
20									

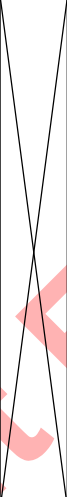


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Date Started:	08/20/2019	Surface Elevation:	N/A	Boring No.: MW-Y'd	
Date Completed:	09/25/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	137 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Pro-Sonic Truck Mounted	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	J. Khem / S. Vasquez	Depth to First Water:	4.6 ft bgs		
Drilling Asst:	L. Amaya / O. Flourez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21							(20'); some organics	(17.0 - 37.0') Soft drilling. Very loose material being pushed out by core barrel causing poor recovery. Heaving sands encountered.	(0.0 - 97.0') 4437 gallons of water used; 0 gallons of water recovered; 4437 gallons of water lost
22							(20.5'); no organics		
23				Topock - Alluvium Deposits	SP-SM				
24									
25									
26									
27							(26.0 - 37.0') No recovery (NR)		
28									
29	102								
30									
31									
32					NR			(30.0') Due to borehole conditions 10" casing was retreated from 75 ft bgs to 30 ft bgs and re-advanced to 70 ft bgs on 8.26.19.	
33									
34									
35									
36									
37							(37.0 - 47.0') No recovery (NR)		
38	6								
39					NR				
40									

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Date Started:	08/20/2019	Surface Elevation:	N/A	Boring No.: MW-Y'd
Date Completed:	09/25/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	137 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Pro-Sonic Truck Mounted	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	J. Khem / S. Vasquez	Depth to First Water:	4.6 ft bgs	
Drilling Asst:	L. Amaya / O. Flourez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	Grant Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	6				NR			(37.0 - 47.0') Soft drilling. Very loose material being pushed out by core barrel causing poor recovery. Core barrel pushed down 10 ft bgs with very little to no resistance, approximately 0.5 ft of soil in core barrel. Heaving sands encountered.	(0.0 - 97.0') 4437 gallons of water used; 0 gallons of water recovered; 4437 gallons of water lost
42									
43									
44									
45									
46	120				SP		(47.0 - 60.0') Topock - Fluvial Deposits; Poorly graded sand (SP); very pale brown (10YR 7/3); very fine grained to fine grained, subangular to round; trace silt; moist to wet	(47.0 - 57.0') Soft drilling. Heaving sands encountered.	
47									
48									
49									
50									
51									
52									
53									
54									
55									
56	120				SP		(55'); to 57 ft. bgs, core is saturated		
57									
58									
59									
60									

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Date Started:	08/20/2019	Surface Elevation:	N/A	Boring No.: MW-Y'd	
Date Completed:	09/25/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	137 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Pro-Sonic Truck Mounted	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	J. Khem / S. Vasquez	Depth to First Water:	4.6 ft bgs		
Drilling Asst:	L. Amaya / O. Flourez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Grant Willford	Sampling Interval:	Continuous		
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	120			Topock - Fluvial Deposits	SP-SM		(60.0 - 68.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); very pale brown (10YR 7/3); very fine grained to very fine grained, subangular to round; little medium grained grained sand, subangular to round; little silt; wet	(57.0 - 67.0') Soft drilling. Heaving sands encountered.	(0.0 - 97.0') 4437 gallons of water used; 0 gallons of water recovered; 4437 gallons of water lost
62									
63									
64									
65	54			Topock - Fluvial Deposits	SW-SM		(68.0 - 71.5') Topock - Fluvial Deposits; Well graded sand with silt and gravel (SW-SM); very pale brown (10YR 7/3); very fine grained to very coarse grained, subangular to round; little granules to large pebbles, subround to round; little silt; wet	(67.0 - 77.0') Soft drilling. Very loose material being pushed out by core barrel causing poor recovery. Heaving sands encountered.	
66									
67									
68									
69									
70									
71									
72									
73				NR	NR		(71.5 - 77.0') No recovery (NR)		
74									
75									
76									
77	120			Topock - Fluvial Deposits	SP-SM		(77.0 - 80.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); very pale brown (10YR 7/3); very fine grained to medium grained, subangular to round; little granules to medium pebbles, subangular to round; little silt; wet		
78									
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	08/20/2019	Surface Elevation:	N/A	Boring No.: MW-Y'd
Date Completed:	09/25/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	137 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Pro-Sonic Truck Mounted	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	J. Khem / S. Vasquez	Depth to First Water:	4.6 ft bgs	
Drilling Asst:	L. Amaya / O. Flourez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	Grant Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	120			Topock - Fluvial Deposits	SW-SM		(80.0 - 87.5') Topock - Fluvial Deposits; Well graded sand with silt and gravel (SW-SM); very fine grained to very coarse grained, subangular to round; some granules to very large pebbles, subround to round; little silt; trace small cobbles, subround; wet	(77.0 - 87.0') Soft drilling. Very loose material being pushed out by core barrel causing poor recovery. Heaving sands encountered. Spindle bolts broke while advancing 6-inch casing.	(0.0 - 97.0') 4437 gallons of water used; 0 gallons of water recovered; 4437 gallons of water lost
82									
83									
84									
85									
86	120			Topock - Fluvial Deposits	SM		(87.5 - 97.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); pale brown (10YR 6/3); very fine grained to coarse grained, subangular to round; little granules to medium pebbles, subangular to round; little silt; trace small cobbles, round; trace clay; wet; fat clay lense at 88.0-88.2 ft bgs	(87.0 - 97.0') Soft drilling. Heaving sands encountered.	
87									
88									
89									
90									
91									
92									
93									
94									
95									
96	72			Topock - Fluvial Deposits	SM		(97.0 - 101.6') Topock - Fluvial Deposits; Silty sand with gravel (SM); pale brown (10YR 6/3) some gray (10YR 6/1); very fine grained to coarse grained, subangular to round; little granules to large pebbles, subangular to round; little silt; trace clay; wet to moist		
97									
98									
99									
100									

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Date Started:	08/20/2019	Surface Elevation:	N/A	Boring No.: MW-Y'd
Date Completed:	09/25/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	137 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Pro-Sonic Truck Mounted	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	J. Khem / S. Vasquez	Depth to First Water:	4.6 ft bgs	
Drilling Asst:	L. Amaya / O. Flourez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	Grant Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	72		MW-Y'-VAS-98-103 (<0.033 U ppb) 8/23/2019 21:24	Topock - Fluvial Deposits	SM			(100.0 - 103.0') Rough drilling.	
102							(101.6 - 137.0') Topock - Competent Bedrock - conglomerate; red (2.5YR 4/8); dry; strong cementation; heavily fractured-pulverized rock, friable		
103								(103.0 - 107.0') Very rough drilling.	
104									
105	48								
106									
107									
108								(107.0 - 117.0') Very rough drilling.	(107.0 - 117.0') 100 gallons of water used; 0 gallons of water recovered; 100 gallons of water lost
109									
110									
111				Topock - Competent Bedrock - conglomerate					
112	120								
113									
114			MW-Y'-VAS-112-117 (<0.033 U ppb) 8/23/2019 15:11						
115									
116									
117									
118	120							(117.0 - 127.0') Very rough drilling.	(117.0 - 127.0') 60 gallons of water used; 0 gallons of water recovered; 60 gallons of water lost
119									
120									

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Date Started:	08/20/2019	Surface Elevation:	N/A	Boring No.: MW-Y'd
Date Completed:	09/25/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	137 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Pro-Sonic Truck Mounted	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	J. Khem / S. Vasquez	Depth to First Water:	4.6 ft bgs	
Drilling Asst:	L. Amaya / O. Flourez	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	Grant Willford	Sampling Interval:	Continuous	
Editor:	Sean McGrane	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	120							(117.0 - 127.0') Very rough drilling.	(117.0 - 127.0') 60 gallons of water used; 0 gallons of water recovered; 60 gallons of water lost
122									
123									
124									
125									
126	60								
127									
128				Topock - Competent				(127.0 - 132.0') Very rough drilling.	(127.0 - 137.0') 60 gallons of water used; 0 gallons of water recovered; 60 gallons of water lost
129				Bedrock - conglomerate					(127.1') 675 gallons of water used; 675 gallons of water recovered; 0 gallons of water lost
130									
131	60								
132									
133								(132.0 - 137.0') Very rough drilling.	
134									
135									
136			no sample (interval did not produce) 8/24/2019 12:55						
137									
End of Boring at 137.0' bgs.									
138									
139									
140									

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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1				Topock - Fill	SP		(0.0 - 3.0') Topock - Fill; Poorly graded sand (SP); brown (10YR 4/3); fine grained to medium grained, subround; dry	(0.0 - 7.0') Soft drilling	2 gallons used; 0 gallons recovered; 2 gallons lost
2									
3									
4	36						(3.0 - 7.0') No recovery (NR)	(3.0 - 7.0') Lost recovery due to soft dredge sands	
5					NR				
6									
7									
8				Topock - Fill	SP		(7.0 - 11.0') Topock - Fill; Poorly graded sand (SP); brown (7.5YR 4/3); fine grained to medium grained, subangular to subround; dry	(7.0 - 17.0') Heaving sands. No recovery 11 to 17 ft bgs due to loose dredge sands	1 gallons used; 0 gallons recovered; 1 gallons lost
9									
10									
11									
12	48						(11.0 - 17.0') No recovery (NR)		
13									
14					NR				
15									
16									
17				Topock - Fill	SP		(17.0 - 18.5') Topock - Fill; Poorly graded sand (SP); brown (10YR 4/3); fine grained to medium grained, subangular to subround; dry		
18	36								
19				Topock - Fluvial Deposits	SP		(18.5 - 20.0') Topock - Fluvial Deposits; Poorly graded sand (SP); light yellowish brown (10YR 6/4); very fine grained to fine grained, round; trace silt; dry		
20									


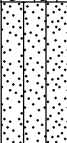




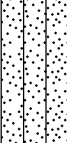
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	36				NR		(20.0 - 27.0') No recovery (NR)	(17.0 - 27.0') Heaving sands, no recovery 20 to 27 ft bgs due to loose dredge sands, during backfilling the sand dropped ~12 ft. indicating void at ~15 to 25 ft bgs	
22									
23									
24									
25									
26	48	RB-2-SS-27-31 7/15/2019 09:31		Topock - Fluvial Deposits	SP		(27.0 - 31.5') Topock - Fluvial Deposits; Poorly graded sand (SP); light yellowish brown (10YR 6/4); very fine grained to fine grained, subangular to round; trace silt; moist	(27.0 - 37.0') Heaving sands. No recovery 31.5 to 37 ft bgs due to loose dredge sands	2 gallons used; 0 gallons recovered; 2 gallons lost
27									
28									
29									
30									
31									
32							(31.5 - 37.0') No recovery (NR)		
33									
34									
35									
36	60	RB-2-SS-37-42 7/15/2019 09:46	RB-2-VAS-36.5-41.5 (<0.033 U ppb) 6/29/2019 11:43	Topock - Fluvial Deposits	SP-SM		(37.0 - 38.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (10YR 5/3); fine grained, subangular to round; little silt; moist		(37.0 - 307.0') No used
37				Topock - Fluvial Deposits	SM		(38.0 - 39.0') Topock - Fluvial Deposits; Silty sand (SM); brown (10YR 5/3); very fine grained to fine grained, round; little silt; moist		
38				Topock - Fluvial Deposits	GW-GM		(39.0 - 42.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); grayish brown (10YR 5/2); granules to very large pebbles, subangular to subround; some very fine		
39									
40									






Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
41	60	RB-2-SS-37-42 7/15/2019 09:46		Topock - Fluvial Deposits	GW-GM		grained to very coarse grained sand; little small cobbles; little silt; trace caliche; trace coarser clast consists of metidiorite and quartz; wet	(41.5') Bottom of sampler set at 41.5 instead of 42 ft bgs because of formation collapse	(37.0 - 307.0') No used
42									
43				Topock - Fluvial Deposits	SM		(42.0 - 45.0') Topock - Fluvial Deposits; Silty sand (SM); dark yellowish brown (10YR 4/4); very fine grained, round; little silt; trace clay; wet		
44		RB-2-SS-42-47 7/15/2019 10:06							
45									
46				Topock - Fluvial Deposits	GW-GM		(45.0 - 48.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); dark gray (10YR 4/1); granules to very large pebbles, round; little very fine grained to very coarse grained sand; little silt; trace small cobbles; trace clay; little caliche; little coarser clast consists of metidiorite and quartz; wet		
47									
48		RB-2-SS-47-50 7/15/2019 10:00							
49	180						(48.0 - 54.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4); small pebbles to very large pebbles, angular to subangular; some very fine grained to very coarse grained sand; little silt; trace clay; some coarser clasts composed of metadiorite; wet		
50									
51				Topock - Alluvium Deposits	GM				
52		RB-2-SS-50-55 7/15/2019 10:10							
53									
54				Topock - Alluvium Deposits	GM		(54.0 - 55.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4); small pebbles to very large pebbles, angular to subangular; some very fine grained to very coarse grained sand; some clay; little silt; some coarser clasts composed of metadiorite; moist		
55								(55.0 - 59.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4); fine grained to medium grained, subangular; some granules to medium pebbles; little silt; trace clay; little coarser clasts composed of metadiorite; little coarser clast composed of quartz; moist	
56									
57		RB-2-SS-55-60 7/15/2019 10:15		Topock - Alluvium Deposits	SM				
58	120								
59				Topock - Alluvium Deposits	SC		(59.0 - 60.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); reddish brown (5YR 5/4); fine grained to coarse grained, angular to subangular; little granules to large pebbles, angular to		
60									

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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61	120	RB-2-SS-60-65 7/15/2019 10:20		Topock - Alluvium Deposits	GM		subangular; little clay; trace silt; little coarser clasts composed of metadiorite; little granite; moist		(37.0 - 307.0') No used
62							(60.0 - 67.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 5/4); granules to large pebbles, angular to subangular; some very fine grained to very coarse grained sand; little silt; trace coarser clasts composed of metadiorite; moist		
63									
64									
65	120	RB-2-SS-65-70 7/15/2019 10:25		Topock - Alluvium Deposits	GW		(67.0 - 74.0') Topock - Alluvium Deposits; Well graded gravel (GW); reddish gray / pale brown(5YR 5/2); granules to small cobbles, angular to subangular; and medium to very coarse grained sand, angular to subangular; trace small cobbles; trace silt; some coarser clasts composed of metadiorite, quartz, granite, and basalt; wet		
66									
67									
68									
69	120	RB-2-SS-70-75 7/15/2019 11:38		Topock - Alluvium Deposits	GC		(74.0 - 75.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); dark reddish gray (5YR 4/2); granules to medium pebbles, subangular; some very fine grained to very coarse grained sand; little clay; trace silt; some coarser clasts composed of metadiorite; moist		
70									
71									
72									
73	120	RB-2-VAS-72-77 (<0.033 U ppb) 6/30/2019 14:10		Topock - Alluvium Deposits	SW		(75.0 - 77.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); reddish brown / moderate brown(5YR 4/4); medium grained to very coarse grained, angular to subround; some granules to medium pebbles, angular; trace silt; and coarser clasts composed of metadiorite; wet		
74									
75									
76									
77	120	RB-2-SS-75-80 7/15/2019 12:14		Topock - Alluvium Deposits	SW-SM		(77.0 - 81.5') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); reddish gray / pale brown(5YR 5/2); medium grained to coarse grained, angular to subround; some granules to large pebbles, angular to subangular; little silt; little coarser clasts composed of metadiorite; little granite; moist		
78									
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81				Topock - Alluvium Deposits	SW-SM				(37.0 - 307.0') No used
82		RB-2-SS-80-85 7/15/2019 12:21		Topock - Alluvium Deposits	ML		(81.5 - 86.5') Topock - Alluvium Deposits; Silt with gravel (ML); low plasticity; some granules to large pebbles, angular to subangular; little very fine grained to very coarse grained sand; little clay; little coarser clasts composed of metadiorite; wet		
83	120								
84									
85									
86									
87		RB-2-SS-85-90 7/15/2019 14:00		Topock - Alluvium Deposits	GC		(86.5 - 90.0') Topock - Alluvium Deposits; Clayey gravel (GC); yellowish red / light brown(5YR 5/6); granules to large pebbles, angular to subangular; some clay; little silt; trace fine to coarse grained sand, subangular to subround; some coarser clasts composed of metadiorite; wet		
88									
89									
90									
91				Topock - Alluvium Deposits	GC		(90.0 - 93.0') Topock - Alluvium Deposits; Clayey gravel (GC); brown (7.5YR 5/4); granules to very large pebbles, angular to subangular; some clay; trace very fine grained to very coarse grained sand; trace silt; some coarser clasts composed of metadiorite; trace granite; moist	(90.0 - 103.0') Rough drilling	
92	120	RB-2-SS-90-95 7/16/2019 08:04							
93									
94				Topock - Alluvium Deposits	GM		(93.0 - 96.5') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; little silt; trace very fine grained to very coarse grained sand; trace clay; and coarser clasts composed of metadiorite; dry		
95									
96									
97		RB-2-SS-95-100 7/16/2019 08:12		Topock - Alluvium Deposits	GM		(96.5 - 99.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some silt; little clay; trace very fine grained to very coarse grained sand; some coarser clasts composed of metadiorite; moist		
98	120								
99									
100				Topock - Alluvium Deposits	GC		(99.0 - 104.0') Topock - Alluvium Deposits; Clayey gravel (GC); yellowish red / light brown(5YR 5/6); granules to very large pebbles, angular to subangular; some clay; little silt; trace very		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101							fine grained to very coarse grained sand; some coarser clasts composed of metadiorite; moist	(90.0 - 103.0') Rough drilling	(37.0 - 307.0') No used
102									
103		RB-2-SS-100-105 7/16/2019 08:20		Topock - Alluvium Deposits	GC				
104	120								
105			RB-2-VAS-102-107 (<0.033 U ppb) 7/1/2019 15:21	Topock - Alluvium Deposits	GM		(104.0 - 107.0') Topock - Alluvium Deposits; Silty gravel (GM); yellowish red / light brown(5YR 5/6); granules to medium pebbles, angular to subangular; some silt; little clay; little coarser clasts composed of metadiorite; wet		
106									
107									
108		RB-2-SS-105-110 7/16/2019 08:33		Topock - Alluvium Deposits	GC		(107.0 - 109.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); yellowish red / light brown(5YR 5/6); granules to medium pebbles, angular to subangular; little very fine grained to very coarse grained sand; little silt; little clay; trace mica; little coarser clasts composed of metadiorite; moist		
109									
110				Topock - Alluvium Deposits	GM		(109.0 - 111.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to large pebbles, subangular; some silt; little very fine grained to very coarse grained sand; little clay; little coarser clasts composed of metadiorite; moist	(110.0 - 125.0') Rough drilling	
111									
112	120	RB-2-SS-110-115 7/16/2019 08:40		Topock - Alluvium Deposits	GM		(111.0 - 112.0') Topock - Alluvium Deposits; Silty gravel (GM); yellowish brown (10YR 5/6); granules to large pebbles, angular to subangular; little very fine grained to very coarse grained sand; little silt; little clay; little coarser clasts composed of metadiorite; moist		
113				Topock - Alluvium Deposits	GM		(112.0 - 114.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to large pebbles, angular to subangular; some silt; little very fine grained to very coarse grained sand; trace clay; trace caliche; some coarser clasts composed of metadiorite; moist		
114									
115							(114.0 - 121.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to small pebbles, subangular; some silt; little granules to small pebbles, subangular; trace clay; trace coarser clasts composed of metadiorite; moist		
116									
117				Topock - Alluvium Deposits	GM				
118	120	RB-2-SS-115-120 7/16/2019 08:51							
119									
120							(119.5'); less silt, more clay		

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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	120	RB-2-SS-120-125 7/16/2019 09:00		Topock - Alluvium Deposits	GM		(121.0 - 127.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to small pebbles, subangular; some silt; little granules to small pebbles, subangular; trace clay; trace coarser clasts composed of metadiorite; moist	(110.0 - 125.0') Rough drilling	(37.0 - 307.0') No used
122				Topock - Alluvium Deposits	GM				
123									
124									
125	RB-2-SS-125-129 7/16/2019 09:09		Topock - Alluvium Deposits				ML		(127.0 - 131.5') Topock - Alluvium Deposits; Gravelly silt with sand (ML); brown (7.5YR 5/4); low plasticity; some granules to small pebbles, angular to subangular; little very fine grained to very coarse grained sand; little clay; little coarser clasts composed of metadiorite; wet
126									
127									
128									
129	120	RB-2-SS-129-134 7/16/2019 09:22		Topock - Alluvium Deposits	GM		(131.5 - 137.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); yellowish brown (10YR 5/6); granules to very large pebbles, subangular; some silt; little very fine grained to very coarse grained sand; trace clay; trace coarser clasts composed of metadiorite; moist		
130									
131									
132									
133	120	RB-2-SS-134-139 7/16/2019 10:36		Topock - Alluvium Deposits	GM		(137.0 - 142.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/6); very fine grained to very coarse grained, angular to subround; some granules to large pebbles, angular; some silt; some coarser clasts composed of metadiorite; moist		
134									
135									
136									
137	120	RB-2-SS-139-144 7/16/2019		Topock - Alluvium Deposits	SM				
138									
139									
140									













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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141		10:45		Topock - Alluvium Deposits	SM				(37.0 - 307.0') No used
142		RB-2-SS-139-144 7/16/2019 10:45					(142.0 - 145.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular; little silt; trace small cobbles; some coarser clasts composed of metadiorite; moist		
143									
144	120		RB-2-VAS-142-147 (<0.17 U ppb) 7/9/2019 13:20	Topock - Alluvium Deposits	GM				
145									
146		RB-2-SS-144-149 7/16/2019 10:56		Topock - Alluvium Deposits	SM		(145.5 - 147.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); strong brown (7.5YR 5/6); very fine grained to very coarse grained, subangular to subround; some granules to large pebbles, angular to subangular; little coarser clasts composed of metadiorite; trace granite; moist		
147									
148				Topock - Alluvium Deposits	SM		(147.0 - 149.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4); very fine grained to coarse grained, subangular to subround; little granules to medium pebbles, angular; little silt; trace coarser clasts composed of metadiorite; little granite; wet		
149									
150		RB-2-SS-149-154 7/16/2019 11:06		Topock - Alluvium Deposits	SM		(149.0 - 153.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish brown (10YR 5/6); medium grained to very coarse grained, angular to subround; little granules to very large pebbles, subangular; little silt; trace coarser clasts composed of metadiorite; trace granite; wet		
151									
152	120								
153									
154		RB-2-SS-154-157 7/16/2019 11:14		Topock - Alluvium Deposits	GM		(153.0 - 156.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some medium to very coarse grained sand, subangular to subround; little silt; trace coarser clasts composed of metadiorite; wet		
155									
156									
157									
158	120	RB-2-SS-157-162 7/16/2019 11:20		Topock - Alluvium Deposits	GM		(156.5 - 159.5') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, subangular to subround; trace clay; some coarser clasts composed of metadiorite; wet		
159									
160				Topock - Alluvium	GC		(159.5 - 160.0') Topock - Alluvium Deposits; Clayey gravel (GC);		

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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	120	RB-2-SS-157-162 7/16/2019 11:20		Deposits	GM		yellowish brown (10YR 5/6); granules to very large pebbles, angular to subangular; some clay; little very fine to very coarse grained sand, subangular to subround; little silt; little coarser clasts composed of metadiorite; moist		(37.0 - 307.0') No used
162		Topock - Alluvium Deposits		(160.0 - 163.0') Topock - Alluvium Deposits; Silty gravel (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular to subangular; some silt; little very fine to very coarse grained sand, subangular to subround; trace clay; some coarser clasts composed of metadiorite; wet					
163		RB-2-SS-162-165 7/16/2019 11:58		Topock - Alluvium Deposits	GM		(160.5'); 0.3' lense of grayish green color change		
164									
165									
166	120	RB-2-SS-165-170 7/16/2019 12:07		Topock - Alluvium Deposits	SM		(163.0 - 167.0') Topock - Alluvium Deposits; Silty gravel (GM); reddish yellow (7.5YR 6/8); granules to very large pebbles, angular to subangular; and silt; little very fine to very coarse grained sand, subangular to subround; trace clay; some coarser clasts composed of metadiorite; moist	(167.0 - 177.0') Rough drilling	
167									
168									
169		RB-2-SS-170-172 7/16/2019 12:18		Topock - Alluvium Deposits	SM		(167.0 - 171.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to fine grained, subangular to subround; and silt; little granules to medium pebbles, subangular; trace clay; little coarser clasts composed of metadiorite; wet		
170									
171									
172	120	RB-2-SS-172-177 7/16/2019 12:29	RB-2-VAS-172-177 (<0.17 U ppb) 7/12/2019 14:55	Topock - Alluvium Deposits	SM		(170'); moist; 0.2' lense of grayish green color change		
173									
174									
175		RB-2-SS-177-180 7/17/2019 07:59		Topock - Alluvium Deposits	SM		(171.0 - 172.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to coarse grained, angular; little granules to medium pebbles, angular; little silt; little coarser clasts composed of metadiorite; wet		
176									
177									
178	120			Topock - Alluvium Deposits	SM		(172.5 - 177.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to fine grained, subangular to subround; and silt; little granules to medium pebbles, subangular; trace clay; little coarser clasts composed of metadiorite; moist		
179				Topock - Alluvium Deposits	SM		(174'); saturated zone		
180				Topock - Alluvium Deposits	SM		(175.5'); 0.2' lense of grayish green color change		
	120			Topock - Alluvium Deposits	SM		(177.0 - 178.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4); very fine grained to coarse grained, angular; and silt; little granules to medium pebbles, angular to subangular; trace clay; little coarser clasts composed of metadiorite; wet		
				Topock - Alluvium Deposits	SM		(178.0 - 179.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to coarse grained, angular; little granules to medium pebbles, angular; little silt; little coarser clasts composed of metadiorite; wet		
				Topock - Alluvium Deposits	SM				





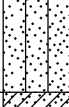
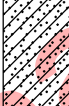
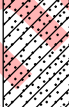




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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181		RB-2-SS-180-182 7/17/2019 08:08		Topock - Alluvium Deposits	SM		(179.0 - 181.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to fine grained, subangular to subround; and silt; little granules to medium pebbles, subangular; trace clay; little coarser clasts composed of metadiorite; wet		(37.0 - 307.0') No used
182							(181.0 - 188.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); strong brown (7.5YR 5/6); very fine grained to very coarse grained, angular; some granules to large pebbles, angular; trace silt; some coarser clasts composed of metadiorite; wet		
183	120								
184		RB-2-SS-182-187 7/17/2019 08:17		Topock - Alluvium Deposits	SW				
185									
186									
187									
188		RB-2-SS-187-190 7/17/2019 08:25		Topock - Alluvium Deposits	GW-GM		(188.0 - 189.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular; and very fine to very coarse grained sand, angular; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet		
189				Topock - Alluvium Deposits	SM		(189.0 - 189.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); strong brown (7.5YR 5/6); very fine grained to very coarse grained, angular; some granules to large pebbles, angular; some silt; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet		
190				Topock - Alluvium Deposits	GM		(189.5 - 192.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); strong brown (7.5YR 5/6); granules to very large pebbles, angular; some very fine to very coarse grained sand, angular; little silt; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet		
191	120	RB-2-SS-190-195 7/17/2019 08:33					(192.0 - 197.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); strong brown (7.5YR 5/6); very fine grained to very coarse grained, angular; some granules to very large pebbles, angular; little silt; trace clay; little coarser clasts composed of metadiorite; trace coarser clast composed of quartz; wet; green staining		
192				Topock - Alluvium Deposits	SW-SM				
193									
194									
195									
196		RB-2-SS-195-198 7/17/2019 08:40							
197									
198	120	RB-2-SS-198-203 7/17/2019 09:03		Topock - Alluvium Deposits	SM		(197.0 - 199.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); very fine grained to medium grained, angular; and silt; little granules to small pebbles, angular; trace clay; trace coarser clasts composed of metadiorite; moist		
199									
200					ML		(199.5 - 202.0') Topock - Alluvium Deposits; Gravelly silt with sand		


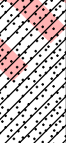

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs	
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous	
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid		
201	120	RB-2-SS-198-203 7/17/2019 09:03	RB-2-VAS-202-207 (<0.17 U ppb) 7/14/2019 09:20	Topock - Alluvium Deposits	ML		(ML); strong brown (7.5YR 5/6); low plasticity; some granules to small pebbles, angular; little very fine to medium grained sand, angular; little clay; little coarser clasts composed of metadiorite; wet	(207.0') Switched driller T. Alymer with D. OMara	(37.0 - 307.0') No used		
202				Topock - Alluvium Deposits	SM		(202.0 - 204.0') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); very fine grained to medium grained, angular; and silt; little small to very large pebbles, angular; trace clay; trace coarser clasts composed of metadiorite; wet (202.5'); green staining				
203		RB-2-SS-203-207 7/17/2019 09:09		Topock - Alluvium Deposits	SM		(204.0 - 204.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); fine grained to coarse grained, angular; little granules to small pebbles, angular; little silt; trace clay; trace coarser clasts composed of metadiorite; wet				
204				Topock - Alluvium Deposits	ML		(204.5 - 205.0') Topock - Alluvium Deposits; Gravelly silt with sand (ML); strong brown (7.5YR 5/6); low plasticity; some small to very large pebbles, angular; little very fine to medium grained sand, angular; little clay; little coarser clasts composed of metadiorite; wet				
205				Topock - Alluvium Deposits	SM		(205.0 - 207.5') Topock - Alluvium Deposits; Silty sand (SM); strong brown (7.5YR 5/6); very fine grained to medium grained, angular; and silt; little small to very large pebbles, angular; trace clay; trace coarser clasts composed of metadiorite; moist				
206				Topock - Alluvium Deposits	SC		(207.5 - 217.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 4/4); very fine grained to very coarse grained, angular to subround; some small to very large pebbles, angular; little clay; trace silt; little coarser clasts composed of metadiorite; moist				
207		120		RB-2-SS-207-209 7/17/2019 09:15	Topock - Alluvium Deposits	SC				(207.5 - 217.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 4/4); very fine grained to very coarse grained, angular to subround; some small to very large pebbles, angular; little clay; trace silt; little coarser clasts composed of metadiorite; moist	
208	(207.5 - 217.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 4/4); very fine grained to very coarse grained, angular to subround; some small to very large pebbles, angular; little clay; trace silt; little coarser clasts composed of metadiorite; moist										
209	RB-2-SS-209-214 7/17/2019 09:22		Topock - Alluvium Deposits	SC							(217.0 - 219.5') Topock - Alluvium Deposits; Clayey sand (SC); (7.5R 4/4); medium grained to very coarse grained, angular; some clay; trace granules, angular; trace silt; trace coarser clasts composed of metadiorite; wet
210											
211											
212											
213											
214	180	RB-2-SS-214-217 7/17/2019 09:28	Topock - Alluvium Deposits	SC		(217.0 - 219.5') Topock - Alluvium Deposits; Clayey sand (SC); (7.5R 4/4); medium grained to very coarse grained, angular; some clay; trace granules, angular; trace silt; trace coarser clasts composed of metadiorite; wet					
215											
216											
217											
218	180	RB-2-SS-217-222 7/17/2019 09:35	Topock - Alluvium Deposits	SC		(217.0 - 219.5') Topock - Alluvium Deposits; Clayey sand (SC); (7.5R 4/4); medium grained to very coarse grained, angular; some clay; trace granules, angular; trace silt; trace coarser clasts composed of metadiorite; wet					
219											
220							Topock - Alluvium Deposits	GC		(219.5 - 222.0') Topock - Alluvium Deposits; Clayey gravel with	





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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
221		RB-2-SS-217-222 7/17/2019 09:35		Topock - Alluvium Deposits	GC		sand (GC); strong brown (7.5YR 5/6); granules to very large pebbles, angular; some fine to very coarse grained sand, angular to subround; little clay; some coarser clasts composed of metadiorite; trace granite; wet		(37.0 - 307.0') No used
222									
223									
224									
225		RB-2-SS-222-227 7/17/2019 09:40					(222.0 - 237.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 5/4); very fine grained to very coarse grained, angular to subround; some small to very large pebbles, angular; little clay; trace silt; little coarser clasts composed of metadiorite; moist		
226	180								
227									
228								(227.0 - 244.0') Rough drilling	
229									
230		RB-2-SS-227-233 7/17/2019 09:45		Topock - Alluvium Deposits	SC				
231									
232									
233									
234		RB-2-SS-233-235 7/17/2019 09:50					(234'); greenish gray staining		
235	60								
236									
237									
238		RB-2-SS-235-240 7/17/2019 10:30	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC		(237.0 - 241.0') Topock - Alluvium Deposits; Clayey gravel with sand (GC); reddish brown / moderate brown(5YR 4/4); granules to small pebbles, angular; some fine to coarse grained sand, subangular to subround; some clay; trace silt; little coarser clasts composed of metadiorite; moist	(237.0') Switched driller D. O'Mara with S. Vasquez	
239	84								
240									

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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs	
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous	
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
241	84	RB-2-SS-240-245 7/17/2019 10:35	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC		(241.0 - 244.0') Topock - Weathered Bedrock - conglomerate; Sandy lean clay with gravel (CL); reddish brown (5YR 5/4); low plasticity; some granules to very large pebbles, angular; little fine to coarse grained sand, subangular to subround; little silt; little coarser clasts composed of metadiorite; dry	(227.0 - 244.0') Rough drilling	(37.0 - 307.0') No used
242				Topock - Weathered Bedrock - conglomerate	CL				
243									
244	36	RB-2-SS-245-250 7/17/2019 10:40		Topock - Weathered Bedrock - conglomerate	SC		(244.0 - 247.0') Topock - Weathered Bedrock - conglomerate; Clayey sand with gravel (SC); yellowish red / light brown(5YR 5/6); very fine grained to medium grained, subangular to subround; some granules to large pebbles, angular to subangular; little clay; trace silt; little coarser clasts composed of metadiorite; moist		
245									
246									
247	84	RB-2-SS-250-255 7/17/2019 10:45		Topock - Weathered Bedrock - conglomerate	CL		(247.0 - 274.0') Topock - Weathered Bedrock - conglomerate; Gravelly lean clay with sand (CL); reddish brown (2.5YR 4/4); low plasticity; some granules to medium pebbles, angular to subangular; little very fine to fine grained sand, subangular to subround; trace silt; little coarser clasts composed of metadiorite; trace coarser clasts composed of granite; moist	(251.0 - 254.0') Rough drilling	
248									
249									
250	84	RB-2-SS-255-260 7/17/2019 10:50					(252') dark reddish brown (2.5YR 3/4); decrease in moisture content, white mottling		
251									
252									
253							(254') reddish brown (2.5YR 4/4); increase in moisture content		
254									
255									
256	84						(257') dark reddish brown (2.5YR 3/4); decrease in moisture content		
257									
258									
259									
260									





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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
261	84								(37.0 - 307.0') No used
262		RB-2-SS-250-265 7/17/2019 10:55							
263									
264	72						(264') reddish brown / moderate brown(5YR 4/4); decrease in moisture content		
265								(265.0 - 267.0') Rough drilling	
266									
267		RB-2-SS-265-270 7/17/2019 11:00		Topock - Weathered Bedrock - conglomerate	CL				
268									
269								(269.0 - 274.0') Rough drilling, drill rig ran out of fuel mid-drill run	
270									
271	84								
272		RB-2-SS-270-275 7/17/2019 11:00							
273									
274									
275							(274.0 - 277.0') Topock - Weathered Bedrock - conglomerate; Clayey sand with gravel (SC); brown (7.5YR 4/4); very fine grained to very coarse grained, subangular to subround; some medium to very large pebbles, angular; little clay; trace small cobbles; trace silt; little coarser clasts composed of metadiorite; wet		
276		RB-2-VAS-274-279 (<0.17 U ppb) 7/18/2019 09:17		Topock - Weathered Bedrock - conglomerate	SC				
277	108	RB-2-SS-275-280 7/17/2019 12:49					(277.0 - 279.0') Topock - Weathered Bedrock - conglomerate; Sandy lean clay with gravel (CL); reddish brown / moderate brown(5YR 4/4); low plasticity; some very fine to medium grained sand, subangular to subround; little granules to very large pebbles, subangular; trace silt; little coarser clasts composed of metadiorite; moist		
278				Topock - Weathered Bedrock - conglomerate	CL				
279									
280				Topock - Weathered Bedrock -	CL		(279.0 - 285.0') Topock - Weathered Bedrock - conglomerate; Gravely lean clay with sand (CL); reddish brown / moderate brown(5YR 4/4); low plasticity; some granules to very large		


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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: <u>RB-2 Pilot</u>	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
281	108	RB-2-SS-280-283 7/17/2019 12:56		conglomerate	CL		pebbles, angular to subangular; little very fine to medium grained sand, subangular to subround; trace small cobbles; trace silt; little coarser clasts composed of metadiorite; trace mica; moist; some white and dark brown mottling		(37.0 - 307.0') No used
282									
283									
284	120	RB-2-SS-283-288 7/18/2019 11:15		Topock - Weathered Bedrock - conglomerate	CL		(285.0 - 294.0') Topock - Weathered Bedrock - conglomerate; Gravelly lean clay with sand (CL); reddish brown / moderate brown(5YR 4/4); low plasticity; some granules to very large pebbles, angular to subround; some fine to medium grained sand, subangular to subround; trace silt; little coarser clasts composed of metadiorite; trace granite; moist	(283.0 - 293.0') Rough drilling	
285									
286									
287									
288									
289		RB-2-VAS-287-292 (<0.17 U ppb) 7/26/2019 11:56	Topock - Weathered Bedrock - conglomerate	CL					
290									
291									
292									
293									
294	168			Topock - Competent Bedrock - conglomerate			(294.0 - 303.0') Topock - Competent Bedrock - conglomerate; reddish brown / moderate brown(5YR 4/4); little granules to medium pebbles, angular to subangular; little very fine to medium grained sand; trace silt; little coarser clasts composed of metadiorite; dry to moist; friable conglomerate, highly pulverized and fractured	(293.0 - 307.0') 10' of slough in core barrel. From 303 to 307 very rough drilling. (294.0') Independent QC inspector on-site to confirm bedrock	
295									
296									
297									
298									
299									
300									

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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Boring No.: RB-2 Pilot	
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9		
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Boart Longyear Track Mount	Borehole Diameter:	4-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Tyler Alymer	Depth to First Water:	23.77 ft bgs		
Drilling Asst:	J. Condelaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous		
Editor:	Grant Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
301	168			Topock - Competent Bedrock - conglomerate			(303.0 - 307.0'); dry; friable conglomerate, moderately pulverized and fractured	(293.0 - 307.0') 10' of slough in core barrel. From 303 to 307 very rough drilling.	(37.0 - 307.0') No used
302									
303									
304									
305									
306									
307									
End of Boring at 307.0' bgs.									
308									
309									
310									
311									
312									
313									
314									
315									
316									
317									
318									
319									
320									

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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
1		Topock - Fill	SP		(0.0 - 0.5') Temporary Steel Plate with BMP		
2							
3					(0.5 - 5.0') Cemex #1/20 MESH (20x40)	(0.5 - 5.0') 7.9 bags	(0.5 - 5.0') 7 bags (-11%) Note: Lapis Lustre Sand
4							
5			NR		(0.0 - 8.5') 12.0" Borehole		
6							
7							
8		Topock - Fill	SP				
9							
10							
11							
12							
13					(5.0 - 243.5') Cemex #3 MESH (8x10)	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
14							
15			NR		(8.5 - 297.0') 6.0" Borehole		
16							
17							
18		Topock - Fill	SP				
19		Topock - Fluvial Deposits	SP				
20							








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Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condalaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
21							
22							
23							
24			NR				
25							
26							
27							
28							
29		Topock - Fluvial Deposits	SP				
30					(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
31							(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
32							
33							
34			NR				
35							
36							
37							
38	RB-2-VAS-36.5-41.5 (<0.033 U ppb) 6/29/2019 11:43	Topock - Fluvial Deposits	SP-SM				
39		Topock - Fluvial Deposits	SM				
40		Topock - Fluvial Deposits	GW-GM				


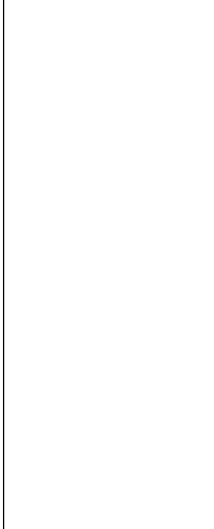
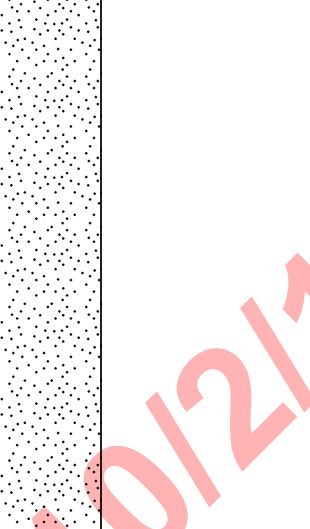

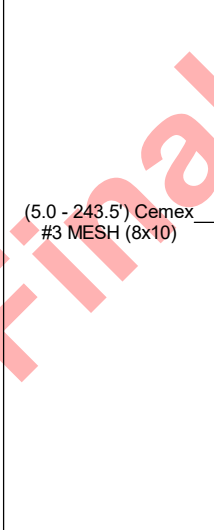
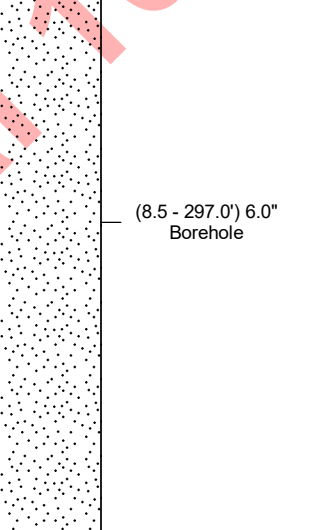









Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condalaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
41		Topock - Fluvial Deposits	GW-GM					
42								
43		Topock - Fluvial Deposits	SM					
44								
45								
46		Topock - Fluvial Deposits	GW-GM					
47								
48								
49								
50					(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
51		Topock - Alluvium Deposits	GM					
52								
53								
54								
55		Topock - Alluvium Deposits	GM					
56								
57		Topock - Alluvium Deposits	SM					
58								
59								
60		Topock - Alluvium Deposits	SC					

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condalaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
61		Topock - Alluvium Deposits	GM					
62								
63								
64								
65		Topock - Alluvium Deposits	GW					
66								
67								
68								
69		Topock - Alluvium Deposits	GC					
70								
71								
72								
73	RB-2-VAS-72-77 (<0.033 U ppb) 6/30/2019 14:10	Topock - Alluvium Deposits	SW					
74								
75								
76								
77		Topock - Alluvium Deposits	SW-SM					
78								
79								
80								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
81		Topock - Alluvium Deposits	SW-SM					
82								
83								
84		Topock - Alluvium Deposits	ML					
85								
86								
87								
88		Topock - Alluvium Deposits	GC					
89								
90					(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
91		Topock - Alluvium Deposits	GC					
92								
93								
94		Topock - Alluvium Deposits	GM					
95								
96								
97		Topock - Alluvium Deposits	GM					
98								
99		Topock - Alluvium Deposits	GC					
100								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
101	RB-2-VAS-102-107 (<0.033 U ppb) 7/1/2019 15:21	Topock - Alluvium Deposits	GC					
102		Topock - Alluvium Deposits	GM					
103		Topock - Alluvium Deposits	GC		(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
104		Topock - Alluvium Deposits	GM					
105		Topock - Alluvium Deposits	GM					
106		Topock - Alluvium Deposits	GM					
107		Topock - Alluvium Deposits	GM					
108		Topock - Alluvium Deposits	GM					
109		Topock - Alluvium Deposits	GM					
110		Topock - Alluvium Deposits	GM					
111		Topock - Alluvium Deposits	GM					
112		Topock - Alluvium Deposits	GM					
113		Topock - Alluvium Deposits	GM					
114		Topock - Alluvium Deposits	GM					
115		Topock - Alluvium Deposits	GM					
116		Topock - Alluvium Deposits	GM					
117		Topock - Alluvium Deposits	GM					
118		Topock - Alluvium Deposits	GM					
119		Topock - Alluvium Deposits	GM					
120		Topock - Alluvium Deposits	GM					

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
121		Topock - Alluvium Deposits	GM					
122								
123								
124		Topock - Alluvium Deposits	GM					
125								
126								
127								
128								
129		Topock - Alluvium Deposits	ML					
130					(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
131								
132								
133								
134		Topock - Alluvium Deposits	GM					
135								
136								
137								
138								
139		Topock - Alluvium Deposits	SM					
140								


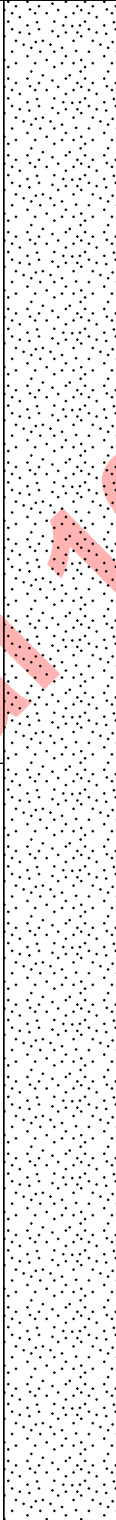
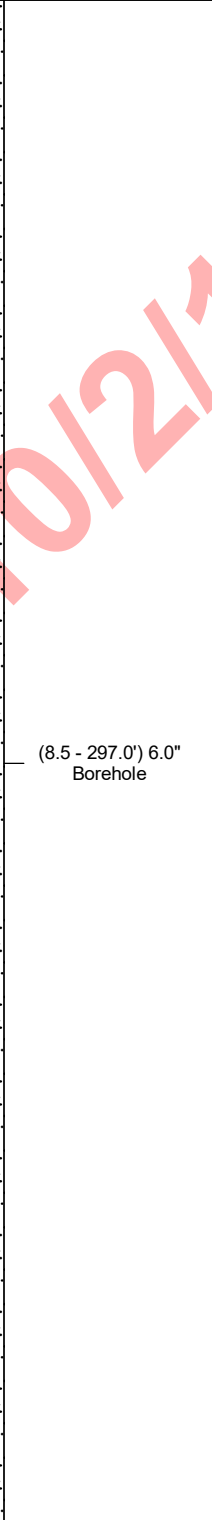







Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
141		Topock - Alluvium Deposits	SM				
142							
143							
144	RB-2-VAS-142-147 (<0.17 U ppb) 7/9/2019 13:20	Topock - Alluvium Deposits	GM				
145							
146		Topock - Alluvium Deposits	SM				
147							
148		Topock - Alluvium Deposits	SM				
149							
150					(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
151		Topock - Alluvium Deposits	SM				(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
152							
153							
154		Topock - Alluvium Deposits	GM				
155							
156							
157							
158		Topock - Alluvium Deposits	GM				
159							
160		Topock - Alluvium	GC				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed			
		Deposits									
161		Topock - Alluvium Deposits	GM								
162											
163		Topock - Alluvium Deposits	GM								
164											
165											
166	Topock - Alluvium Deposits	SM									
167											
168											
169											
170	Topock - Alluvium Deposits	SM		(5.0 - 243.5') Cemex #3 MESH (8x10)					(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
171											
172											
173	RB-2-VAS-172-177 (<0.17 U ppb) 7/12/2019 14:55	Topock - Alluvium Deposits	SM								
174											
175		Topock - Alluvium Deposits	SM								
176											
177											
178		Topock - Alluvium Deposits	SM								
179											
180			Topock - Alluvium Deposits	SM							

(5.0 - 243.5') Cemex #3 MESH (8x10)

(8.5 - 297.0') 6.0" Borehole

(5.0 - 243.5') 97.7 bags

(5.0 - 243.5') 126 bags (29%)
Note: Lapis Lustre Sand

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
181		Topock - Alluvium Deposits	SM				
182							
183							
184		Topock - Alluvium Deposits	SW				
185							
186							
187							
188		Topock - Alluvium Deposits	GW-GM				
189		Topock - Alluvium Deposits	SM				
190					(5.0 - 243.5') Cemex #3 MESH (8x10)		
191		Topock - Alluvium Deposits	GM			(8.5 - 297.0') 6.0" Borehole	
192						(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
193							
194		Topock - Alluvium Deposits	SW-SM				
195							
196							
197							
198		Topock - Alluvium Deposits	SM				
199							
200			ML				




Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
201	RB-2-VAS-202-207 (<0.17 U ppb) 7/14/2019 09:20	Topock - Alluvium Deposits	ML					
202								
203		Topock - Alluvium Deposits	SM					
204		Topock - Alluvium Deposits	SM					
205		Topock - Alluvium Deposits	ML					
206		Topock - Alluvium Deposits	SM		(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
207								
208								
209								
210								
211								
212		Topock - Alluvium Deposits	SC					
213								
214								
215								
216								
217								
218		Topock - Alluvium Deposits	SC					
219								
220			GC					








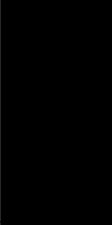
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started: 06/28/2019	Surface Elevation: 480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed: 07/29/2019	Northing (NAD83): 2103398.9	
Drilling Co.: Cascade	Easting (NAD83): 7616014.8	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name: Tyler Alymer	Borehole Diameter: 4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst: J. Condellaria, G. Angiano	Depth to First Water: 23.77 ft bgs	
Logger: Joe Latham	Editor: Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
221		Topock - Alluvium Deposits	GC					
222								
223								
224								
225								
226								
227								
228								
229								
230		Topock - Alluvium Deposits	SC		(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
231								
232								
233								
234								
235								
236								
237								
238	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC					
239								
240								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
241	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:48	Topock - Alluvium Deposits	GC		(5.0 - 243.5') Cemex #3 MESH (8x10)		(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
242		Topock - Weathered Bedrock - conglomerate	CL					
243								
244								
245		Topock - Weathered Bedrock - conglomerate	SC					
246								
247	Topock - Weathered Bedrock - conglomerate	CL		(243.5 - 254.0') Cemex #1/20 MESH (20x40)	(8.5 - 297.0') 6.0" Borehole		(243.5 - 254.0') 4.1 bags	(243.5 - 254.0') 8 bags (95%) Note: Lapis Lustre Sand
248								
249								
250								
251								
252								
253								
254								
255								
256								
257	(254.0 - 307.0') Bentonite seal chips			(254.0 - 307.0') 12.9 bags	(254.0 - 307.0') 18.5 bags (43%) Note: Puregold Medium Chips			
258								
259								
260								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condelaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
261							
262							
263							
264							
265							
266							
267		Topock - Weathered Bedrock - conglomerate	CL				
268							
269							
270					(254.0 - 307.0') Bentonite seal chips	(8.5 - 297.0') 6.0" Borehole	(254.0 - 307.0') 12.9 bags
271							(254.0 - 307.0') 18.5 bags (43%) Note: Puregold Medium Chips
272							
273							
274							
275		Topock - Weathered Bedrock - conglomerate	SC				
276	RB-2-VAS-274-279 (<0.17 U ppb) 7/18/2019 09:17						
277		Topock - Weathered Bedrock - conglomerate	CL				
278							
279		Topock - Weathered Bedrock - conglomerate	CL				
280							



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condellaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
281							
282		Topock - Weathered Bedrock - conglomerate	CL				
283							
284							
285							
286							
287							
288							
289	RB-2-VAS-287-292 (<0.17 U ppb) 7/26/2019 11:56	Topock - Weathered Bedrock - conglomerate	CL		(8.5 - 297.0') 6.0" Borehole		
290					(254.0 - 307.0') Bentonite seal chips	(254.0 - 307.0') 12.9 bags	(254.0 - 307.0') 18.5 bags (43%) Note: Puregold Medium Chips
291							
292							
293							
294							
295							
296							
297		Topock - Competent Bedrock - conglomerate					
298							
299					(297.0 - 307.0') 4" Borehole		
300							

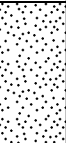






Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	480.9 ft amsl	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	2103398.9	
Drilling Co.:	Cascade	Easting (NAD83):	7616014.8	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Tyler Alymer	Borehole Diameter:	4-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	J. Condellaria, G. Angiano	Depth to First Water:	23.77 ft bgs	
Logger:	Joe Latham	Editor:	Grant Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
301		Topock - Competent Bedrock - conglomerate			(254.0 - 307.0') Bentonite seal chips		(254.0 - 307.0') 12.9 bags	(254.0 - 307.0') 18.5 bags (43%) Note: Puregold Medium Chips
302								
303								
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Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous	
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1	240			Topock - Fill	SP		(0.0 - 2.0') Topock - Fill; Poorly graded sand (SP); (10YR5/3); fine grained to medium grained; dry; trace amounts of wood fragments		(0.0 - 26.0') No water used
2									
3					NR		(2.0 - 6.0') No recovery (NR)	(2.0 - 6.0') Poor recovery, loose sands, no indication that core fell out of the core fell of core barrel, possibly pushing through loose sand	
4									
5									
6									
7	24			Topock - Fill	SP		(6.0 - 8.0') Topock - Fill; Poorly graded sand (SP); (10YR5/3); fine grained to medium grained; dry; trace amounts of wood fragments		
8									
9					NR		(8.0 - 16.0') No recovery (NR)	(8.0 - 16.0') Poor recovery, loose sands, possibly pushing through loose sand	
10									
11									
12					NR				
13									
14									
15									
16				Topock - Fluvial Deposits	SP		(16.0 - 17.5') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); fine grained to medium grained; moist to wet		(15.0') Sample screen was pulled up to collect sample closer to the water table
17	48	RB-4-SS-16-20 4/16/2019 11:15	RB-4-VAS-15-20 (0.0556 J ppb) 4/12/2019 09:20						
18				Topock - Fluvial Deposits	SP-SM		(17.5 - 20.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 4/2); very fine grained to medium grained; little silt; wet (18') brown (7.5YR 4/3)		
19									
20									







Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: <u>RB-4 Pilot</u>	
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	48				NR		(20.0 - 26.0') No recovery (NR)	(20.0 - 26.0') Poor recovery in loose sands. No indication of lost core. driller noted water at 24 feet. 26 to 24 feet was wet which indicated core recovered was 26 to 22 feet bgs.	(0.0 - 26.0') No water used
22									
23									
24									
25									
26									
27	90	RB-4-SS-26-30 4/16/2019 11:20		Topock - Fluvial Deposits	SP-SM		(26.0 - 34.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 4/2); very fine grained to medium grained; little silt; wet	(26.0 - 36.0') 15 gallons of water used; gallons of water recovered; gallons of water lost	
28									
29									
30									
31									
32									
33									
34									
35									
36									
37	60	RB-4-SS-36-40 4/16/2019 11:30		Topock - Fluvial Deposits	SP		(36.0 - 40.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/3); fine grained to medium grained; wet	(34.0 - 36.0') No recovery, soft sands, no indication that core fell out of core barrel	(36.0 - 46.0') No water used
38									
39									
40									

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Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: <u>RB-4 Pilot</u>	
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid					
41	60		RB-4-VAS-41-46 (<0.033 U ppb) 4/12/2019 12:05	Topock - Fluvial Deposits	GW		(40.0 - 41.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (7.5YR 5/4); small pebbles to very large pebbles, subround to round; some medium to coarse grained sand, subround to round; wet	(41.0 - 46.0') No recovery, loose sands, no indication that core fell out of core barrel	(36.0 - 46.0') No water used					
42										(41.0 - 46.0') No recovery (NR)				
43														
44														
45														
46	84	RB-4-SS-46-50 4/16/2019 11:35		Topock - Fluvial Deposits	SP		(46.0 - 52.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/3); medium grained to coarse grained, subround to round; little small to very large pebbles, subround to round; wet	(46.0 - 56.0') 20 gallons of water used; 0 gallons of water recovered; 20 gallons of water lost						
47														
48														
49														
50														
51		RB-4-SS-50-53 4/16/2019 11:40		Topock - Fluvial Deposits	SP-SM		(52.0 - 53.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3); fine grained to medium grained; little silt; wet			(53.0 - 56.0') No recovery, loose sands, no indication that core fell out of core barrel				
52														
53														
54							NR						(53.0 - 56.0') No recovery (NR)	
55														
56	204	RB-4-SS-56-60 4/16/2019 11:45		Topock - Fluvial Deposits	SP-SM		(56.0 - 58.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3); fine grained to medium grained; little silt; trace medium to large pebbles, subround to round; wet	(56.0 - 76.0') 20 gallons of water used; 0 gallons of water recovered; 20 gallons of water lost						
57														
58				Topock - Fluvial Deposits	SM		(58.0 - 60.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to medium grained; little granules to very large pebbles; little silt; little clay							
59														
60														







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Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: <u>RB-4 Pilot</u>	
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
61				Topock - Fluvial Deposits	SP		(60.0 - 60.1') Topock - Fluvial Deposits; Poorly graded sand (SP); yellowish brown / moderate yellowish brown (10YR 5/4); medium grained to coarse grained, subround to round; wet		
62				Topock - Fluvial Deposits	SC		(60.1 - 60.4') Topock - Fluvial Deposits; Clayey sand (SC); brown (7.5YR 4/4); very fine grained to medium grained; some clay; little silt; wet		
63		RB-4-SS-61-65 4/16/2019 11:50		Topock - Fluvial Deposits	SP		(60.4 - 60.7') Topock - Fluvial Deposits; Lean clay (CL); dark brown (7.5YR 3/4); medium plasticity; little very fine to fine grained sand; little silt; wet		
64				Topock - Fluvial Deposits	SP		(60.7 - 65.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4); fine grained to medium grained; little small to very large pebbles, subround to round; trace silt; wet		
65				Topock - Fluvial Deposits	SP		(65.0 - 67.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); fine grained to medium grained; trace small to medium pebbles, subround to round; trace silt		
66		RB-4-SS-65-69 4/16/2019 11:55		Topock - Fluvial Deposits	SP		(67.0 - 69.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4); fine grained to medium grained; little medium to large pebbles, subround to round; trace silt		
67				Topock - Fluvial Deposits	GP		(69.0 - 69.5') Topock - Fluvial Deposits; Poorly graded gravel with sand (GP); brown (7.5YR 5/4); granules to medium pebbles, subround to round; some medium to coarse grained sand, subround to round; wet		
68	204			Topock - Fluvial Deposits	SP		(69.5 - 71.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); fine grained to medium grained; trace small to medium pebbles, subround to round; trace silt; wet		
69				Topock - Fluvial Deposits	SP		(71.0 - 73.0') Topock - Fluvial Deposits; Silt with sand (ML); dark brown (7.5YR 3/3) little yellowish brown (10YR 5/6); very fine grained to medium grained; low plasticity; some very fine to fine grained sand; little clay; wet		
70		RB-4-SS-71-73 4/16/2019 12:00		Topock - Fluvial Deposits	ML		(73.0 - 76.0') No recovery (NR)		
71					NR		(75.5'); small layer of potential charcoal collected by on-site archeologist	(73.0 - 76.0') No recovery, loose sands, no indication that core fell out of core barrel	
72							(76.0 - 80.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/3); fine grained to medium grained; trace silt; wet		
73									
74									
75									
76									
77									
78	84	RB-4-SS-76-80 4/16/2019 12:05		Topock - Fluvial Deposits	SP				(76.0 - 86.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
79									
80									

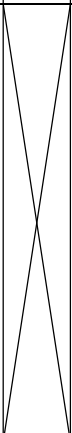

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Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: <u>RB-4 Pilot</u>	
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	84	RB-4-SS-80-83 4/16/2019 12:10		Topock - Fluvial Deposits	GW		(80.0 - 83.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (7.5YR 4/3); granules to very large pebbles, subround to round; some medium to very coarse grained sand, subround to round; trace silt; trace clay; wet	(83.0 - 86.0') No recovery, loose sands, no indication that core fell out of core barrel	(76.0 - 86.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
82									
83			RB-4-VAS-81-86 (<0.033 U ppb) 4/12/2019 15:45		NR		(83.0 - 86.0') No recovery (NR)		
84									
85	168	RB-4-SS-86-88.5 4/16/2019 12:15		Topock - Fluvial Deposits	SP		(86.0 - 88.5') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); fine grained to medium grained; trace silt; wet	(86.0 - 96.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost	
86									
87		Topock - Fluvial Deposits	GM		(88.5 - 90.0') Topock - Fluvial Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3); granules to very large pebbles, subangular to round; little fine to medium grained sand; little silt; trace clay; wet				
88									
89		Topock - Fluvial Deposits	SP		(90.0 - 90.3') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); black (5Y 2.5/2); fine grained to coarse grained, subround to round; little granules to small pebbles, subround to round; trace silt; wet				
90									
91		Topock - Fluvial Deposits	GW-GM		(90.3 - 90.7') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); yellowish brown (10YR 5/6); medium grained to very coarse grained, subround to round; some granules to medium pebbles, subround to round; trace silt; wet; iron oxide staining				
92									
93		RB-4-SS-91-95 4/16/2019 12:20					(90.7 - 100.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); brown (7.5YR 4/3); granules to small cobbles, subround to round; little very fine to medium grained sand; little silt; trace clay; wet		
94									
95	RB-4-SS-95-100 4/16/2019 12:25						(96.0 - 106.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost		
96									
97									
98									
99									
100									

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Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: <u>RB-4 Pilot</u>	
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	168				NR		(100.0 - 106.0') No recovery (NR)	(100.0 - 106.0') No recovery, loose sands, no indication that core fell out of core barrel	(96.0 - 106.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
102									
103									
104									
105									
106	240	RB-4-SS-106-110 4/16/2019 12:30		Topock - Alluvium Deposits	SM		(106.0 - 130.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark brown (7.5YR 3/3); very fine grained to very coarse grained, subround to round; some granules to very large pebbles, subround to round; little clay; trace silt; wet		(106.0 - 116.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
107		(109'); decrease in granules and pebbles, increase in silt							
108									
109									
110									
111									
112									
113			(113') fine grained to very coarse grained, angular to subangular; some granules to medium pebbles, angular; decrease in granules and pebbles, increase in sand						
114									
115									
116									
117			RB-4-SS-115-120 4/16/2019 12:40						
118									
119									
120									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous	
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
121	240	RB-4-SS-120-125 4/16/2019 12:45	RB-4-VAS-121-126 (<0.033 U ppb) 4/13/2019 11:56	Topock - Alluvium Deposits	SM		(126') very fine grained to very coarse grained, angular to subangular; some granules to medium pebbles, angular to subangular; increase in granules and pebbles, no clay		(116.0 - 126.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
122									
123									
124									
125	216	RB-4-SS-125-130 4/16/2019 12:50							(126.0 - 161.0') No water used
126									
127									
128									
129		Topock - Alluvium Deposits	GM		(130.0 - 132.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); dark brown (7.5YR 3/3); granules to very large pebbles, angular; some very fine to very coarse grained sand, angular to subangular; little silt; trace clay; wet				
130									
131		Topock - Alluvium Deposits				(132.0 - 141.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark brown (7.5YR 3/3); fine grained to coarse grained, angular to subangular; little granules to very large pebbles, angular to subangular; little silt; little clay; wet			
132									
133									
134									
135									
136									
137	RB-4-SS-135-140 4/16/2019 13:00	RB-4-VAS-136-141 (<0.17 U ppb) 4/13/2019 17:18							
138									
139									
140									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: <u>RB-4 Pilot</u>	
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	216			Topock - Alluvium Deposits	SM				(126.0 - 161.0') No water used
142			Topock - Weathered Bedrock - conglomerate	SM		(141.0 - 144.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to medium grained; some granules to very large pebbles, subangular to subround; some silt; trace small cobbles, subangular to subround; trace clay; moist to wet; weak cementation			
143									
144	60						(144.0 - 146.0') No recovery (NR)	(144.0 - 146.0') Lost core in hopper during sample collection	
145			NR						
146									
147	120		Topock - Weathered Bedrock - conglomerate	SM			(146.0 - 161.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to medium grained; some silt; little granules to very large pebbles, subangular to subround; little clay; trace small cobbles, subangular to subround; moist to wet; weak cementation		
148									
149									
150									
151									
152									
153									
154									
155									
156						(155'); trace large cobbles; trace boulders			
157	RB-4-VAS-155-160 (<0.17 U ppb) 4/17/2019 12:48								
158									
159									
160									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Boring No.: <u>RB-4 Pilot</u>	
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.98 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	D. Maurer / G. Jeffers	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Willford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	120				SM				(126.0 - 161.0') No water used

End of Boring at 161.0 'bgs.

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Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
1		Topock - Fill	SP		(0.0 - 0.5') Steel Plate		
2							
3					(0.5 - 5.0') Plastering Sand	(0.5 - 5.0') 6.1 bags	(0.5 - 5.0') 3 bags (-51%) Note: Wildcat Washed
4			NR				
5							
6							
7		Topock - Fill	SP				
8							
9							
10							
11							
12			NR				
13					(5.0 - 136.0') Cemex #3 MESH (8x10)	(5.0 - 136.0') 51.4 bags	(5.0 - 136.0') 69.5 bags (35%) Note: Lapis Lustre Sand
14							
15							
16							
17	RB-4-VAS-15-20 (0.0556 J ppb) 4/12/2019 09:20	Topock - Fluvial Deposits	SP				
18							
19		Topock - Fluvial Deposits	SP-SM				
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
21							
22							
23			NR				
24							
25							
26							
27							
28							
29							
30		Topock - Fluvial Deposits	SP-SM		(5.0 - 136.0') Cemex #3 MESH (8x10)	(3.5 - 161.0') 6" Borehole	(5.0 - 136.0') 51.4 bags
31							
32							
33							
34							
35			NR				
36							
37							
38		Topock - Fluvial Deposits	SP				
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater,

ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol

represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during

drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41		Topock - Fluvial Deposits	GW				
42							
43	RB-4-VAS-41-46 (<0.033 U ppb) 4/12/2019 12:05		NR				
44							
45							
46							
47							
48							
49		Topock - Fluvial Deposits	SP				
50					(5.0 - 136.0') Cemex #3 MESH (8x10)	(3.5 - 161.0') 6" Borehole	(5.0 - 136.0') 51.4 bags
51							(5.0 - 136.0') 69.5 bags (35%) Note: Lapis Lustre Sand
52							
53		Topock - Fluvial Deposits	SP-SM				
54			NR				
55							
56							
57		Topock - Fluvial Deposits	SP-SM				
58							
59		Topock - Fluvial Deposits	SM				
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
61		Topock - Fluvial Deposits	SP				
62		Topock - Fluvial Deposits	SC				
63		Topock - Fluvial Deposits	CL				
64		Topock - Fluvial Deposits					
65		Topock - Fluvial Deposits	SP				
66		Topock - Fluvial Deposits	SP				
67		Topock - Fluvial Deposits	SP				
68		Topock - Fluvial Deposits	SP				
69		Topock - Fluvial Deposits	GP				
70		Topock - Fluvial Deposits	SP		(5.0 - 136.0') Cemex #3 MESH (8x10)	(3.5 - 161.0') 6" Borehole	(5.0 - 136.0') 51.4 bags
71		Topock - Fluvial Deposits	SP				
72		Topock - Fluvial Deposits	ML				
73		Topock - Fluvial Deposits	NR				
74		Topock - Fluvial Deposits	NR				
75		Topock - Fluvial Deposits	NR				
76		Topock - Fluvial Deposits	NR				
77		Topock - Fluvial Deposits	SP				
78		Topock - Fluvial Deposits	SP				
79		Topock - Fluvial Deposits	SP				
80		Topock - Fluvial Deposits	SP				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
81	RB-4-VAS-81-86 (<0.033 U ppb) 4/12/2019 15:45	Topock - Fluvial Deposits	GW				
82							
83							
84							
85			NR				
86							
87		Topock - Fluvial Deposits	SP		(5.0 - 136.0') Cemex #3 MESH (8x10)	(3.5 - 161.0') 6" Borehole	(5.0 - 136.0') 51.4 bags
88							
89		Topock - Fluvial Deposits	GM				
90		Topock - Fluvial Deposits	SP				
91		Topock - Fluvial Deposits	SP				
92							
93							
94							
95		Topock - Fluvial Deposits	GW-GM				
96							
97							
98							
99							
100							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
101							
102							
103			NR				
104							
105							
106							
107							
108							
109							
110					(5.0 - 136.0') Cemex #3 MESH (8x10)	(3.5 - 161.0') 6" Borehole	(5.0 - 136.0') 51.4 bags
111							
112							
113		Topock - Alluvium Deposits	SM				(5.0 - 136.0') 69.5 bags (35%) Note: Lapis Lustre Sand
114							
115							
116							
117							
118							
119							
120							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed			
121	RB-4-VAS-121-126 (<0.033 U ppb) 4/13/2019 11:56	Topock - Alluvium Deposits	SM			(5.0 - 136.0') Cemex #3 MESH (8x10)	(5.0 - 136.0') 51.4 bags	(5.0 - 136.0') 69.5 bags (35%) Note: Lapis Lustre Sand			
122											
123											
124											
125											
126	RB-4-VAS-136-141 (<0.17 U ppb) 4/13/2019 17:18	Topock - Alluvium Deposits	GM			(5.0 - 136.0') Cemex #3 MESH (8x10)	(5.0 - 136.0') 51.4 bags	(5.0 - 136.0') 69.5 bags (35%) Note: Lapis Lustre Sand			
127											
128		Topock - Alluvium Deposits	SM						(136.0 - 146.0') Plastering Sand	(136.0 - 146.0') 3.9 bags	(136.0 - 146.0') 4 bags (3%) Note: Wildcat Washed
129											
130											
131											
132											
133											
134											
135											
136											
137											
138											
139											
140											

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
141		Topock - Alluvium Deposits	SM				
142		Topock - Weathered Bedrock - conglomerate	SM		(136.0 - 146.0') Plastering Sand	(136.0 - 146.0') 3.9 bags	(136.0 - 146.0') 4 bags (3%) Note: Wildcat Washed
143							
144							
145			NR				
146							
147							
148							
149							
150					(3.5 - 161.0') 6" Borehole		
151							
152							
153		Topock - Weathered Bedrock - conglomerate	SM		(146.0 - 161.0') Bentonite seal chips	(146.0 - 161.0') 4.1 bags	(146.0 - 161.0') 4 bags (-2%) Note: Puregold Medium Chips
154							
155							
156							
157	RB-4-VAS-155-160 (<0.17 U ppb) 4/17/2019 12:48						
158							
159							
160							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/11/2019	Surface Elevation:	466.0 ft amsl	Well ID: RB-4 Pilot
Date Completed:	04/24/2019	Northing (NAD83):	2102908.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616336.4	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	161 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.98 ft bgs	
Logger:	D. Maurer / G. Jeffers	Editor:	S. McGrane / G. Willford	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
161			SM		(146.0 - 161.0') Bentonite seal chips	(3.5 - 161.0') 6" Borehole	(146.0 - 161.0') 4.1 bags	(146.0 - 161.0') 4 bags (-2%) Note: Puregold Medium Chips
162								
163								
164								
165								
166								
167								
168								
169								
170								
171								
172								
173								
174								
175								
176								
177								
178								
179								
180								

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Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
1		SP			(0.0 - 2.0') Topock - Fill; Poorly graded sand (SP); (10YR5/3)	(0.0 - 20.0') Smooth drilling	(0.0 - 40.0') 4176 gallons of water used; 2800 gallons of water recovered; 1376 gallons of water lost
2					(2.0 - 6.0') No recovery (NR)		
3							
4		NR					
5							
6					(6.0 - 8.0') Topock - Fill; Poorly graded sand (SP); (10YR5/3)		
7		SP					
8					(8.0 - 16.0') No recovery (NR)		
9							
10	(0.0 - 20.0) 2.25 mins/ft			(0.0 - 20.0') 18.0" Steel Casing		(10.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
11							
12		NR					
13							
14							
15							
16					(16.0 - 17.5') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		
17		SP					
18					(17.5 - 20.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 4/2) (18') brown (7.5YR 4/3)		
19		SP-SM					
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: RB-4
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	








Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
21					(20.0 - 26.0') No recovery (NR)	(20.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log) (20.1 - 40.0') Drilling became a little rougher (21.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(0.0 - 40.0') 4176 gallons of water used; 2800 gallons of water recovered; 1376 gallons of water lost
22							
23		NR					
24							
25							
26					(26.0 - 34.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 4/2)		
27							
28							
29							
30	(20.0 - 40.0) 3.75 mins/ft	SP-SM		(20.0 - 40.0') 18.0" Steel Casing		(30.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
31							
32							
33							
34					(34.0 - 36.0') No recovery (NR)		
35		NR					
36					(36.0 - 40.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/3)		
37							
38		SP					
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: RB-4
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
41		GW			(40.0 - 41.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (7.5YR 5/4)	(40.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(40.0 - 85.0') 21600 gallons of water used; 12960 gallons of water recovered; 8640 gallons of water lost
42					(41.0 - 46.0') No recovery (NR)	(40.1 - 60.0') Rough drilling	
43		NR					
44							
45							
46					(46.0 - 52.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/3)		
47							
48							
49		SP					
50	(40.0 - 60.0) 7.01 mins/ft			(40.0 - 60.0') 18.0" Steel Casing		(50.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
51							
52		SP-SM			(52.0 - 53.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3)		
53					(53.0 - 56.0') No recovery (NR)		
54		NR					
55							
56					(56.0 - 58.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3)		
57		SP-SM					
58							
59		SM			(58.0 - 60.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)		
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: RB-4
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	



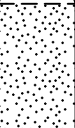



Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid	
61	(60.0 - 80.0) 5.90 mins/ft	SP		(60.0 - 80.0') 18.0" Steel Casing	(60.0 - 60.1') Topock - Fluvial Deposits; Poorly graded sand (SP); yellowish brown / moderate yellowish brown(10YR 5/4)	(60.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(40.0 - 85.0') 21600 gallons of water used; 12960 gallons of water recovered; 8640 gallons of water lost	
		SC						
		CL						
62		SP			(60.1 - 60.4') Topock - Fluvial Deposits; Clayey sand (SC); brown (7.5YR 4/4)			
					(60.4 - 60.7') Topock - Fluvial Deposits; Lean clay (CL); dark brown (7.5YR 3/4)			
63						(60.7 - 65.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4)		
64								
65		SP			(65.0 - 67.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)			
66								
67		SP			(67.0 - 69.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4)			
68								
69		GP			(69.0 - 69.5') Topock - Fluvial Deposits; Poorly graded gravel with sand (GP); brown (7.5YR 5/4)			
70	SP		(69.5 - 71.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)	(70.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)				
71	ML		(71.0 - 73.0') Topock - Fluvial Deposits; Silt with sand (ML); dark brown (7.5YR 3/3)					
72								
73	NR		(73.0 - 76.0') No recovery (NR)					
74								
75								
76	SP		(76.0 - 80.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/3)	(75.0 - 80.0') Rough drilling				
77								
78								
79								
80								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: RB-4
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

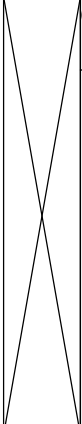
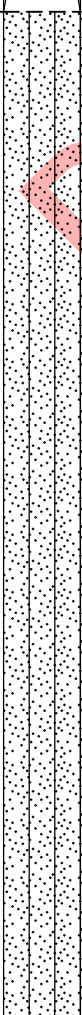
Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
81	(80.0 - 85.0) 2.80 mins/ft	GW		(80.0 - 85.0') 18.0" Steel Casing	(80.0 - 83.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (7.5YR 4/3)	(80.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log) (80.1 - 85.0') Rough drilling	(40.0 - 85.0') 21600 gallons of water used; 12960 gallons of water recovered; 8640 gallons of water lost
82							
83							
84	(85.0 - 91.0) 28.07 mins/ft	NR		(85.0 - 91.0') 18.0" Steel Casing	(83.0 - 86.0') No recovery (NR)		; gallons recovered; gallons lost
85							
86							
87							
88							
89							
90	(90.0 - 91.0) 28.07 mins/ft	SP		(85.0 - 91.0') 18.0" Steel Casing	(86.0 - 88.5') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		
91							
92							
93	(91.0 - 101.0) 11.69 mins/ft	GM		(91.0 - 101.0') 16.0" Steel Casing	(88.5 - 90.0') Topock - Fluvial Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3)		(91.0 - 106.0') 14625 gallons of water used; 11375 gallons of water recovered; 3250 gallons of water lost
94							
95							
96							
97							
98	(91.0 - 101.0) 11.69 mins/ft	SP		(91.0 - 101.0') 16.0" Steel Casing	(90.0 - 90.3') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); black (5Y 2.5/2)	(90.0 - 101.0') Rough drilling	
99							
100							
	(91.0 - 101.0) 11.69 mins/ft	GW-GM		(91.0 - 101.0') 16.0" Steel Casing	(90.3 - 90.7') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); yellowish brown (10YR 5/6)	(91.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>	
Date Completed:	08/21/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs		
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
101	(91.0 - 101.0) 11.69 mins/ft	NR		(91.0 - 101.0') 16.0" Steel Casing	(100.0 - 106.0') No recovery (NR)	(90.0 - 101.0') Rough drilling (91.1 - 106.0') Rough drilling (91.1 - 106.0') Rough drilling	(91.0 - 106.0') 14625 gallons of water used; 11375 gallons of water recovered; 3250 gallons of water lost
102						(101.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
103							
104	(101.0 - 106.0) 7.35 mins/ft			(101.0 - 106.0') 16.0" Steel Casing			
105		SM					
106					(106.0 - 130.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark brown (7.5YR 3/3)		(106.0 - 146.0') 4875 gallons of water used; 8125 gallons of water recovered; 3250 gallons of water gained
107							
108							
109							
110							
111						(110.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
112							
113	(106.0 - 120.0) 3.59 mins/ft			(106.0 - 120.0') 16.0" Steel Casing			
114							
115							
116							
117							
118							
119							
120							

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Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>	
Date Completed:	08/21/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 inch Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs		
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
121						(120.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(106.0 - 146.0') 4875 gallons of water used; 8125 gallons of water recovered; 3250 gallons of water gained
122							
123							
124							
125		SM					
126							
127							
128							
129							
130	(120.0 - 140.0) 1.32 mins/ft			(120.0 - 140.0') 16.0" Steel Casing	(130.0 - 132.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); dark brown (7.5YR 3/3)	(130.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
131		GM					
132					(132.0 - 141.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark brown (7.5YR 3/3)		
133							
134							
135							
136		SM					
137							
138							
139							
140							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>	
Date Completed:	08/21/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches		
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 inch Tricone	Project Number:	RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs		
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
141	(140.0 - 146.0) 1.95 mins/ft	SM		(140.0 - 146.0') 15.5" Steel Casing		(140.0') Observed plastering sand in drill cuttings (see photo log)	(106.0 - 146.0') 4875 gallons of water used; 8125 gallons of water recovered; 3250 gallons of water gained
142					(141.0 - 144.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4)		
143		SM					
144					(144.0 - 146.0') No recovery (NR)		
145		NR					
146					End of Boring at 146.0' bgs.		
147							
148							
149							
150							
151							
152							
153							
154							
155							
156							
157							
158							
159							
160							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
1		SP			(0.0 - 2.0') Topock - Fill; Poorly graded sand (SP); (10YR5/3)	(0.0 - 20.0') Smooth drilling	(0.0 - 40.0') 4176 gallons of water used; 2800 gallons of water recovered; 1376 gallons of water lost
2					(2.0 - 6.0') No recovery (NR)		
3							
4		NR					
5							
6					(6.0 - 8.0') Topock - Fill; Poorly graded sand (SP); (10YR5/3)		
7		SP					
8					(8.0 - 16.0') No recovery (NR)		
9							
10	(0.0 - 20.0) 2.25 mins/ft			(0.0 - 20.0') 18.0" Steel Casing		(10.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
11							
12		NR					
13							
14							
15							
16					(16.0 - 17.5') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		
17		SP					
18					(17.5 - 20.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 4/2) (18') brown (7.5YR 4/3)		
19		SP-SM					
20							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	








Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
21					(20.0 - 26.0') No recovery (NR)	(20.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log) (20.1 - 40.0') Drilling became a little rougher (21.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(0.0 - 40.0') 4176 gallons of water used; 2800 gallons of water recovered; 1376 gallons of water lost
22							
23		NR					
24							
25							
26					(26.0 - 34.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 4/2)		
27							
28							
29							
30	(20.0 - 40.0) 3.75 mins/ft	SP-SM		(20.0 - 40.0') 18.0" Steel Casing		(30.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
31							
32							
33							
34					(34.0 - 36.0') No recovery (NR)		
35		NR					
36					(36.0 - 40.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/3)		
37							
38		SP					
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: RB-4
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
41		GW			(40.0 - 41.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (7.5YR 5/4)	(40.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(40.0 - 85.0') 21600 gallons of water used; 12960 gallons of water recovered; 8640 gallons of water lost
42					(41.0 - 46.0') No recovery (NR)	(40.1 - 60.0') Rough drilling	
43		NR					
44							
45							
46					(46.0 - 52.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/3)		
47							
48							
49		SP					
50	(40.0 - 60.0) 7.01 mins/ft			(40.0 - 60.0') 18.0" Steel Casing		(50.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
51							
52		SP-SM			(52.0 - 53.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3)		
53					(53.0 - 56.0') No recovery (NR)		
54		NR					
55							
56					(56.0 - 58.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3)		
57		SP-SM					
58							
59		SM			(58.0 - 60.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3)		
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: RB-4
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	


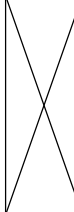

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid	
61	(60.0 - 80.0) 5.90 mins/ft	SP		(60.0 - 80.0') 18.0" Steel Casing	(60.0 - 60.1') Topock - Fluvial Deposits; Poorly graded sand (SP); yellowish brown / moderate yellowish brown(10YR 5/4)	(60.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(40.0 - 85.0') 21600 gallons of water used; 12960 gallons of water recovered; 8640 gallons of water lost	
		SC						
		CL						
62		SP			(60.1 - 60.4') Topock - Fluvial Deposits; Clayey sand (SC); brown (7.5YR 4/4)			
					(60.4 - 60.7') Topock - Fluvial Deposits; Lean clay (CL); dark brown (7.5YR 3/4)			
63						(60.7 - 65.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4)		
64								
65		SP			(65.0 - 67.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)			
66								
67		SP			(67.0 - 69.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4)			
68								
69		GP			(69.0 - 69.5') Topock - Fluvial Deposits; Poorly graded gravel with sand (GP); brown (7.5YR 5/4)			
70	SP		(69.5 - 71.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)	(70.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)				
71	ML		(71.0 - 73.0') Topock - Fluvial Deposits; Silt with sand (ML); dark brown (7.5YR 3/3)					
72								
73	NR		(73.0 - 76.0') No recovery (NR)					
74								
75								
76	SP		(76.0 - 80.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/3)	(75.0 - 80.0') Rough drilling				
77								
78								
79								
80								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: RB-4
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	


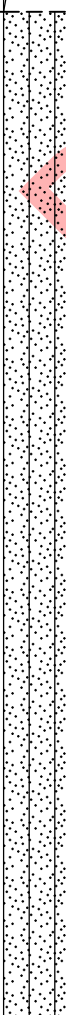
Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid	
81	(80.0 - 85.0) 2.80 mins/ft	GW		(80.0 - 85.0') 18.0" Steel Casing	(80.0 - 83.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (7.5YR 4/3)	(80.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log) (80.1 - 85.0') Rough drilling	(40.0 - 85.0') 21600 gallons of water used; 12960 gallons of water recovered; 8640 gallons of water lost	
82								
83								
84	(85.0 - 91.0) 28.07 mins/ft	NR		(85.0 - 91.0') 18.0" Steel Casing	(83.0 - 86.0') No recovery (NR)		; gallons recovered; gallons lost	
85								
86								
87								
88								
89								
90	(91.0 - 101.0) 11.69 mins/ft	GW-GM		(91.0 - 101.0') 16.0" Steel Casing	(86.0 - 88.5') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		(91.0 - 106.0') 14625 gallons of water used; 11375 gallons of water recovered; 3250 gallons of water lost	
91								
92								
93					(88.5 - 90.0') Topock - Fluvial Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3)			
94					(90.0 - 90.3') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); black (5Y 2.5/2)			
95					(90.3 - 90.7') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); yellowish brown (10YR 5/6)			
96					(90.7 - 100.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); brown (7.5YR 4/3)	(91.0 - 101.0') Rough drilling, observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)		
97								
98								
99								
100								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
101	(91.0 - 101.0) 11.69 mins/ft	NR		(91.0 - 101.0') 16.0" Steel Casing	(100.0 - 106.0') No recovery (NR)	(91.0 - 101.0') Rough drilling, observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(91.0 - 106.0') 14625 gallons of water used; 11375 gallons of water recovered; 3250 gallons of water lost
102						(101.0 - 106.0') Rough drilling, Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
103							
104	(101.0 - 106.0) 7.35 mins/ft			(101.0 - 106.0') 16.0" Steel Casing			
105		SM					(106.0 - 146.0') 4875 gallons of water used; 8125 gallons of water recovered; 3250 gallons of water gained
106					(106.0 - 130.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark brown (7.5YR 3/3)		
107							
108							
109							
110							
111						(110.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	
112							
113	(106.0 - 120.0) 3.59 mins/ft			(106.0 - 120.0') 16.0" Steel Casing			
114							
115							
116							
117							
118							
119							
120							

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Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
121	(120.0 - 140.0) 1.32 mins/ft	SM		(120.0 - 140.0') 16.0" Steel Casing		(120.0') Observed Cemex #3 MESH (8x10) sand in drill cuttings (see photo log)	(106.0 - 146.0') 4875 gallons of water used; 8125 gallons of water recovered; 3250 gallons of water gained
122							
123							
124							
125							
126							
127							
128							
129							
130						GM	
131							
132	SM		(132.0 - 141.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); dark brown (7.5YR 3/3)				
133							
134							
135							
136							
137							
138							
139							
140							

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Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons

Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation






Date Started:	08/06/2019	Surface Elevation:	N/A	Boring No.: <u>RB-4</u>
Date Completed:	08/21/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	146 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 inch Tricone	Project Number: RC000753.0051
Tool-Pusher:	Scott Johnson	Depth to First Water:	10.98 ft bgs	
Rig Geologist:	E. Nygaard / A. Mack	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
141	(140.0 - 146.0) 1.95 mins/ft	SM		(140.0 - 146.0') 15.5" Steel Casing		(140.0') Observed plastering sand in drill cuttings (see photo log)	(106.0 - 146.0') 4875 gallons of water used; 8125 gallons of water recovered; 3250 gallons of water gained
142					(141.0 - 144.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4)		
143		SM					
144					(144.0 - 146.0') No recovery (NR)		
145		NR					
146					End of Boring at 146.0' bgs.		
147							
148							
149							
150							
151							
152							
153							
154							
155							
156							
157							
158							
159							
160							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval for RB-4 Pilot; Gallons Gained/Lost: (+) = water gained from the formation, (-) = water lost to the formation

Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Boring No.: <u>RB-5 Pilot</u>	
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.04 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	S. McGrane / D. Maurer	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Jeffers	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
1	0			Topock - Fill	SP		(0.0 - 4.0') Topock - Fill; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to medium grained, subround to round; trace silt; dry; logged from cuttings in hoppers from conductor casing clean out run.	(0.0 - 4.0') During the clean out run to set the conductor casing, soil core was put into the hopper and not bagged	(0.0 - 17.0') No water used
2									
3									
4									
5	48			Topock - Fill	SP		(4.0 - 6.0') Topock - Fill; Poorly graded sand (SP); brown (10YR 5/3); very fine grained to medium grained, subangular to round; trace clay; trace organics; dry; trace silt nodules		
6							(5'); moist		
7							(6.0 - 7.0') Topock - Fill; Clayey sand (SC); brown (7.5YR 5/4); very fine grained to fine grained, subangular to round; little clay; trace silt; trace organics; moist		
8							(7.0 - 8.0') Topock - Fill; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to fine grained, subround to round; trace silt; trace clay; moist		
9	84	RB-5-SS-7.0-12.0 4/10/2019 14:10		Topock - Fill	SP-SM		(8.0 - 10.5') Topock - Fill; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3); very fine grained to medium grained, subangular to round; little silt; trace clay; trace organics; moist	(8.0 - 17.0') Poor recovery, core fell out of core barrel, 5 ft recovered and 2 ft retrieved with second run, actual depths of contacts unclear due to loss of core (10.0') Approximate depth to water table	
10									
11							(10.5 - 11.8') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to fine grained, subround to round; trace silt; moist to wet		
12							(11.8 - 12.0') Topock - Fluvial Deposits; Silty sand (SM); dark gray (7.5YR 4/1) with brown (7.5YR 5/3); very fine grained to fine grained, subround to round; little silt; trace clay; moist to wet; organic odor		
13	60	RB-5-SS-12.0-14.0 4/10/2019 10:00	RB-5-VAS-12.0-17.0 (0.125 J ppb) 4/4/2019 10:49	Topock - Fluvial Deposits	SM		(12.0 - 13.0') Topock - Fill; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3); very fine grained to medium grained, subangular to round; little silt; trace clay; trace organics; moist; slough from having to retrieve lost core		
14							(13.0 - 14.0') Topock - Fluvial Deposits; Silty sand (SM); dark gray (7.5YR 4/1) with brown (7.5YR 5/3); very fine grained to fine grained, subround to round; little silt; trace clay; moist to wet; organic odor		
15							(14.0 - 17.0') No recovery (NR); poor recovery when lost core was retrieved		
16									
17	60	RB-5 17.0-19.5 4/10/2019 10:05		Topock - Fluvial Deposits	SM		(17.0 - 19.5') Topock - Fluvial Deposits; Silty sand (SM); (7.5R 5/3) with dark gray (7.5YR 4/1); very fine grained to fine grained, subround to round; little silt; trace medium grained sand, subangular to subround; wet; organic odor (18'); trace clay; increase in sand	(17.0 - 22.0') Drilled with water had heaving sands	(17.0 - 22.0') 10 gallons of water used; 5 gallons of water recovered; 5 gallons of water lost
18									
19									
20							(19.5 - 21.0') Topock - Fluvial Deposits; Poorly graded sand with		





Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Boring No.: <u>RB-5 Pilot</u>	
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.04 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	S. McGrane / D. Maurer	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Jeffers	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
21	60	RB-5 19.5-22.0 4/10/2019 10:10		Topock - Fluvial Deposits	SP-SM		silt (SP-SM); brown (7.5YR 4/2) with dark gray (7.5YR 4/1); very fine grained to fine grained, subround to round; little silt; wet; organic odor; laminated	(17.0 - 22.0') Drilled with water had heaving sands	(17.0 - 22.0') 10 gallons of water used; 5 gallons of water recovered; 5 gallons of water lost
22				Topock - Fluvial Deposits	SP		(21.0 - 22.0') Topock - Fluvial Deposits; Poorly graded sand (SP); dark gray (7.5YR 4/1) with brown (7.5YR 5/3); very fine grained to medium grained, subround to round; trace silt; trace clay; wet; organic odor		
23					NR		(22.0 - 24.0') No recovery (NR)	(22.0') Change in logging geologist to D. Maurer	(22.0 - 77.0') No water used
24									
25							(24.0 - 47.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 4/2) with dark gray (7.5YR 4/1); very fine grained to fine grained, subround to round; trace silt; wet		
26									
27		RB-5 25.0-30.0 4/10/2019 10:15							
28									
29									
30	138								
31									
32		RB-5 30.0-35.0 4/10/2019 10:20		Topock - Fluvial Deposits	SP				
33									
34							(34') very fine grained to medium grained, subround to round		
35									
36									
37		RB-5 35.0-40.0 4/10/2019 10:25						(37.0 - 47.0') Soft drilling	
38									
39	120								
40									

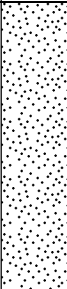
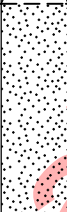



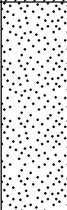
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Boring No.: <u>RB-5 Pilot</u>	
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.04 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	S. McGrane / D. Maurer	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Jeffers	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid					
41	120	RB-5 40.0-45.0 4/10/2019 10:30		Topock - Fluvial Deposits	SP			(37.0' - 47.0') Soft drilling	(22.0' - 77.0') No water used					
42														
43														
44														
45														
46		RB-5 45.0-47.0 4/10/2019 10:35	RB-5-VAS-42-47 (<0.033U ppb) 4/9/2019 10:15											
47														
48		RB-5 48.0-50.0 4/10/2019 10:40								Topock - Fluvial Deposits	GW		(47.0 - 48.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (7.5YR 5/4); granules to very large pebbles, subround to round; and very fine to medium grained sand; trace small cobbles, subround to round; wet	(47.0') Change of rig geologist to D. Maurer
49										Topock - Fluvial Deposits	SP		(48.0 - 50.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to medium grained, subround to round; trace granules to small, subround to round; trace silt; wet	
50										36				NR
51														
52														
53														
54														
55														
56														
57	156	RB-5 57.0-60.0 4/10/2019 10:45		Topock - Fluvial Deposits	SP		(57.0 - 64.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to coarse grained; trace granules to medium pebbles, subround to round; wet	(57.0 - 62.0') Drilled through loose sands, no indication of core loss from the core barrel						
58														
59														
60							(59'); little granules to large pebbles, subround to round							

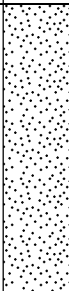




Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Boring No.: <u>RB-5 Pilot</u>	
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.04 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	S. McGrane / D. Maurer	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Jeffers	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid	
61	156	RB-5 60.0-64.0 4/10/2019 10:50		Topock - Fluvial Deposits	SP			(57.0 - 62.0') Drilled through loose sands, no indication of core loss from the core barrel	(22.0 - 77.0') No water used	
62										
63										
64				(64.0 - 66.0') No recovery (NR)	(64.0 - 66.0') Lost 2 feet of core in hopper during core collection					
65										
66										
67		RB-5 66.0-69.0 4/10/2019 10:55		Topock - Fluvial Deposits	SP		(66.0 - 69.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to coarse grained; little granules to large pebbles, subround to round; wet			
68										
69										
70				(69.0 - 73.0') No recovery (NR)	(69.0 - 73.0') Loss of core during collection					
71										
72										
73				Topock - Fluvial Deposits	SP		(73.0 - 75.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4); very fine grained to medium grained; little small to very large pebbles, subround to round; wet	(73.0 - 77.0') Drilling through loose sands, no indication of core loss from the core barrel, CL at 76.0 to 77.0 not collected per direction of on-site archaeologist		
74										
75										
76		Topock - Fluvial Deposits	SP		(75.0 - 76.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to medium grained; trace clay; wet					
77		Topock - Fluvial Deposits	CL		(76.0 - 77.0') Topock - Fluvial Deposits; Lean clay (CL); brown (7.5YR 4/2); medium plasticity; trace very fine to medium grained sand; wet					
78	96		Topock - Fluvial Deposits	SP		(77.0 - 84.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4); very fine grained to medium grained; trace silt; wet		(77.0 - 87.0') 10 gallons of water used; 0 gallons of water recovered; 10 gallons of water lost		
79										
80										

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Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Boring No.: <u>RB-5 Pilot</u>	
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7		
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Dan O'Mara	Depth to First Water:	10.04 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	S. McGrane / D. Maurer	Sampling Interval:	Continuous		
Editor:	S. McGrane / G. Jeffers	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81	96	RB-5-80.0-85.0 4/10/2019 11:10		Topock - Fluvial Deposits	SP				(77.0 - 87.0') 10 gallons of water used; 0 gallons of water recovered; 10 gallons of water lost
82									
83									
84		RB-5-VAS-82-87 (0.127 J ppb) 4/9/2019 14:05		Topock - Fluvial Deposits	GW		(84.0 - 85.0') Topock - Fluvial Deposits; Well graded gravel (GW); brown (7.5YR 5/4); granules to very large pebbles, subangular to round; trace very fine to very coarse grained sand, subangular to subround; wet	(85.0 - 87.0') Drilled through loose sands, no indication of core loss from the core barrel	
85						(85.0 - 87.0') No recovery (NR)			
86					NR				
87	120	RB-5-SS-87.0-89.0 4/10/2019 11:15		Topock - Weathered Bedrock - conglomerate	GM		(87.0 - 89.0') Topock - Weathered Bedrock - conglomerate; Silty gravel with sand (GM); dusky red (2.5YR 3/2); granules to very large pebbles, angular to subround; some very fine to medium grained sand; little silt; trace clay; wet; weak cementation		(87.0 - 97.0') No water used
88							(89.0 - 97.0') Topock - Competent Bedrock - conglomerate; dusky red (2.5YR 3/2); moist; friable		
89									
90				Topock - Competent Bedrock - conglomerate				(92.0 - 97.0') Rough drilling	
91									
92									
93									
94									
95									
96									
97									
End of Boring at 97.0 'bgs.									
98									
99									
100									

End of Boring at 97.0 'bgs.

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Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Well ID: RB-5 Pilot
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.04 ft bgs	
Logger:	S. McGrane / D. Maurer	Editor:	S. McGrane / G. Jeffers	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
1					(0.0 - 0.5') Steel plate with BMPs		
2		Topock - Fill	SP		(0.0 - 4.0') 12" Borehole		
3					(0.5 - 5.0') Washed Plastering Sand	(0.5 - 5.0') 6.7 bags	(0.5 - 5.0') 5.5 bags (-18%) Note: Wildcat Washed
4							
5		Topock - Fill	SP				
6							
7		Topock - Fill	SC				
8		Topock - Fill	SP				
9							
10		Topock - Fill	SP-SM				
11							
12		Topock - Fluvial Deposits	SP				
13		Topock - Fluvial Deposits	SM				
14		Topock - Fill	SP-SM		(5.0 - 86.0') Pea Gravel	(5.0 - 86.0') 31.8 bags	(5.0 - 86.0') 33 bags (4%) Note: Cal-Silica 3/8"x1/4"
15							
16		Topock - Fluvial Deposits	SM				
17							
18							
19		Topock - Fluvial Deposits	SM				
20							
			SP-SM				

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Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Well ID: RB-5 Pilot
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.04 ft bgs	
Logger:	S. McGrane / D. Maurer	Editor:	S. McGrane / G. Jeffers	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
21		Topock - Fluvial Deposits	SP-SM				
22		Topock - Fluvial Deposits	SP				
23			NR				
24							
25							
26							
27							
28							
29							
30					(5.0 - 86.0') Pea Gravel	(4.0 - 97.0') 6" Borehole	(5.0 - 86.0') 31.8 bags
31							
32		Topock - Fluvial Deposits	SP				(5.0 - 86.0') 33 bags (4%) Note: Cal-Silica 3/8"x1/4"
33							
34							
35							
36							
37							
38							
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Temporary Backfill Log

Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Well ID: RB-5 Pilot
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.04 ft bgs	
Logger:	S. McGrane / D. Maurer	Editor:	S. McGrane / G. Jeffers	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41							
42							
43							
44	RB-5-VAS-42-47 (<0.033U ppb) 4/9/2019 10:15	Topock - Fluvial Deposits	SP				
45							
46							
47		Topock - Fluvial Deposits	GW				
48							
49		Topock - Fluvial Deposits	SP				
50					(5.0 - 86.0') Pea Gravel	(4.0 - 97.0') 6" Borehole	(5.0 - 86.0') 31.8 bags
51							
52							
53							
54							
55							
56							
57							
58							
59		Topock - Fluvial Deposits	SP				
60							

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Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Well ID: RB-5 Pilot
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.04 ft bgs	
Logger:	S. McGrane / D. Maurer	Editor:	S. McGrane / G. Jeffers	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed									
61		Topock - Fluvial Deposits	SP														
62																	
63																	
64			NR														
65																	
66																	
67		Topock - Fluvial Deposits	SP														
68																	
69																	
70			NR														
71																	
72																	
73		Topock - Fluvial Deposits	SP														
74																	
75																	
76		Topock - Fluvial Deposits	SP														
77		Topock - Fluvial Deposits	CL														
78		Topock - Fluvial Deposits	SP														
79																	
80																	

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	04/03/2019	Surface Elevation:	464.7 ft amsl	Well ID: RB-5 Pilot
Date Completed:	04/10/2019	Northing (NAD83):	2102420.7	
Drilling Co.:	Cascade	Easting (NAD83):	7616398.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	97 ft bgs	Project: Final GW Remedy Phase 1
Driller Name:	Dan O'Mara	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Depth to First Water:	10.04 ft bgs	
Logger:	S. McGrane / D. Maurer	Editor:	S. McGrane / G. Jeffers	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
81	RB-5-VAS-82-87 (0.127 J ppb) 4/9/2019 14:05	Topock - Fluvial Deposits	SP		(5.0 - 86.0') Pea Gravel	(5.0 - 86.0') 31.8 bags	(5.0 - 86.0') 33 bags (4%) Note: Cal-Silica 3/8"x1/4"
82		Topock - Fluvial Deposits	GW				
83			NR				
84		Topock - Weathered Bedrock - conglomerate	GM		(4.0 - 97.0') 6" Borehole	(86.0 - 97.0') 4.3 bags	(86.0 - 97.0') 4 bags (-7%) Note: Lapis Lustre Sand
85							
86		Topock - Competent Bedrock - conglomerate					
87							
88							
89							
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							
100							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	07/11/2019	Surface Elevation:	N/A	Boring No.: RB-5
Date Completed:	07/28/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	99.25 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24 HD	Conductor Casing Diameter:	24 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	18 inches	
Drilling Asst:	H. & A. Amezcua	Drill Bit:	17 inch tricone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	10.04 ft bgs	
Rig Geologist:	Drew Martzolf	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
1					(0.0 - 4.0') Topock - Fill; Poorly graded sand (SP); brown (7.5YR 5/4)		(0.0 - 20.0') 237.9 gallons of water used; 70 gallons of water recovered; 167.9 gallons of water lost
2		SP					
3							
4					(4.0 - 6.0') Topock - Fill; Poorly graded sand (SP); brown (10YR 5/3)		
5		SP					
6					(6.0 - 7.0') Topock - Fill; Clayey sand (SC); brown (7.5YR 5/4)		
7		SC					
8		SP			(7.0 - 8.0') Topock - Fill; Poorly graded sand (SP); brown (7.5YR 5/4)		
9					(8.0 - 10.5') Topock - Fill; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3)		
10	(0.0 - 20.0) 2.10 mins/ft	SP-SM		(0.0 - 20.0') 24.0" Steel Casing		(10.0') Observed pea gravel in drill cuttings (see photo log).	
11		SP			(10.5 - 11.8') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		
12		SM			(11.8 - 12.0') Topock - Fluvial Deposits; Silty sand (SM); dark gray (7.5YR 4/1)		
13		SP-SM			(12.0 - 13.0') Topock - Fill; Poorly graded sand with silt (SP-SM); brown (7.5YR 5/3)		
14		SM			(13.0 - 14.0') Topock - Fluvial Deposits; Silty sand (SM); dark gray (7.5YR 4/1)		
15					(14.0 - 17.0') No recovery (NR)	(15.0') Water generated by formation after reaching water table approximate 15 feet bgs.	
16		NR					
17					(17.0 - 19.5') Topock - Fluvial Deposits; Silty sand (SM); (7.5R 5/3)		
18		SM					
19							
20		SP-SM			(19.5 - 21.0') Topock - Fluvial		

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from

RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Boring No.: RB-5
Date Completed:	07/28/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	99.25 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24 HD	Conductor Casing Diameter:	24 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	18 inches	
Drilling Asst:	H. & A. Amezquita	Drill Bit:	17 inch tricone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	10.04 ft bgs	
Rig Geologist:	Drew Martzolf	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
21		SP-SM			Deposits; Poorly graded sand with silt (SP-SM); brown (7.5YR 4/2)	(20.0') Heaving sands at 20 feet bgs following installation of 18-inch casing to 41.46 fts, see Drilling Notes from 41.5-61.5 ft., observed pea gravel in drill cuttings (see photo log)	(20.0 - 41.5') 1789.74 gallons of water used; 1683.5 gallons of water recovered; 106.24 gallons of water lost
22		SP			(21.0 - 22.0') Topock - Fluvial Deposits; Poorly graded sand (SP); dark gray (7.5YR 4/1)		
23		NR			(22.0 - 24.0') No recovery (NR)		
24					(24.0 - 47.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 4/2)		
25							
26							
27							
28							
29							
30	(20.0 - 41.5) 2.13 mins/ft			(20.0 - 41.5') 24.0" Steel Casing		(30.0') Observed pea gravel in drill cuttings (see photo log).	
31							
32		SP					
33							
34							
35							
36							
37							
38							
39							
40							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from

RB-5 Pilot

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater
Remarks: NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Boring No.: RB-5
Date Completed:	07/28/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	99.25 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24 HD	Conductor Casing Diameter:	24 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	18 inches	
Drilling Asst:	H. & A. Amezquita	Drill Bit:	17 inch tricone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	10.04 ft bgs	
Rig Geologist:	Drew Martzolf	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

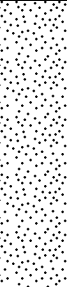




Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
61	(41.5 - 61.5) 2.75 mins/ft			(41.5 - 61.5') 18.0" Steel Casing		(60.0') Observed pea gravel in drill cuttings (see photo log).	(41.5 - 61.5') 2971.92 gallons of water used; 3399.66 gallons of water recovered; 427.74 gallons of water gained
62		SP					(61.5 - 80.0') 5565.59 gallons of water used; 5656.11 gallons of water recovered; 90.519999999995 gallons of water gained
63							
64					(64.0 - 66.0') No recovery (NR)		
65		NR					
66					(66.0 - 69.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		
67		SP					
68							
69					(69.0 - 73.0') No recovery (NR)		
70							
71	(61.5 - 80.0) 5.25 mins/ft	NR		(61.5 - 80.0') 18.0" Steel Casing		(70.0') Observed pea gravel in drill cuttings (see photo log).	
72						(71.0') Tri-cone drill bit was ahead of the 18" casing, sands heaved into the outer casing above the tri-cone bit and locked it up the bit in the casing.	
73					(73.0 - 75.0') Topock - Fluvial Deposits; Poorly graded sand with gravel (SP); brown (7.5YR 5/4)		
74		SP					
75					(75.0 - 76.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		
76		SP					
77		CL			(76.0 - 77.0') Topock - Fluvial Deposits; Lean clay (CL); brown (7.5YR 4/2)		
78					(77.0 - 84.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/4)		
79		SP					
80							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from

RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Boring No.: RB-5	
Date Completed:	07/28/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Dual Rotary	Total Depth:	99.25 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24 HD	Conductor Casing Diameter:	24 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	18 inches		
Drilling Asst:	H. & A. Amezcua	Drill Bit:	17 inch tricone	Project Number:	RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	10.04 ft bgs		
Rig Geologist:	Drew Martzolf	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

Depth (ft)	Drilling Run and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling Notes	Drilling Fluid
81	(80.0 - 84.0) 2.50 mins/ft	SP		(80.0 - 84.0') 18.0" Steel Casing		(80.0 - 90.0') Observed Cemex #3 MESH (8x10) Lapis Luster Sand and pea gravel in drill cuttings (see photo log). Approximately 2100 gallons of water was used and 2130 gallons were recovered to remove sand from the casing.	(80.0 - 84.0') 5400 gallons of water used; 5590 gallons of water recovered; 190 gallons of water gained
82							
83							
84	(84.0 - 87.0) 22.67 mins/ft	GW		(84.0 - 87.0') 18.0" Steel Casing	(84.0 - 85.0') Topock - Fluvial Deposits; Well graded gravel (GW); brown (7.5YR 5/4)	(84.0') On 7/15/2019, approximately 2725 gallons of water was used and 2775 gallons were recovered to remove heaving sands in drill casing at 84 feet bgs. On 7/16/19, approximately 350 gallons of water was used and 7703.59 gallons were recovered to remove heaving sands in drill casing at 84 feet bgs. Volumes used and recovered are included in the Drilling Fluid notes.	(84.0 - 87.0') 3267.68 gallons of water used; 11380.33 gallons of water recovered; 8112.65 gallons of water gained
85					(85.0 - 87.0') No recovery (NR)		
86		NR					
87	(87.0 - 99.3) 13.96 mins/ft	GM		(87.0 - 99.3') 18.0" Steel Casing	(87.0 - 89.0') Topock - Weathered Bedrock - conglomerate; Silty gravel with sand (GM); dusky red (2.5YR 3/2)	(87.0 - 99.3') 5939.8 gallons of water used; 6148.42 gallons of water recovered; 208.62 gallons of water gained	
88							
89					(89.0 - 99.3') Topock - Competent Bedrock - conglomerate; dusky red (2.5YR 3/2)	(90.0') Observed Cemex #3 MESH (8x10) Lapis Luster Sand in drill cuttings (see photo log)	
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							
End of Boring at 99.3 'bgs.							
100							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater

Remarks: NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from

RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Well ID: RB-5
Date Completed:	07/28/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	H. & A. Amezcuita	Borehole Diameter:	18-24 inches	
Logger:	Drew Martzolf	Water Level Start:	10.04 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	99.25 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
1					(0.0 - 24.0') 8" Suregrip 17 Casing		
2		Topock - Fill	SP		(0.0 - 3.9') Cemex #60 Mesh (40/70) and Cemex #0/30 Mesh (30x50)	(0.0 - 3.9') 21.8 bags	(0.0 - 3.9') 26 bags (19%) Note: Lapis Lustre Sand
3							
4							
5		Topock - Fill	SP				
6							
7		Topock - Fill	SC				
8		Topock - Fill	SP		(3.9 - 12.0') Portland cement and up to 3% Bentonite	(3.9 - 12.0') 168.1 gallons	(3.9 - 12.0') 153 gallons (-9%) Note: Type I, II, and V Portland Cement and Hydrogel
9		Topock - Fill	SP-SM				
10					(0.0 - 20.0') 24.0" Borehole		
11		Topock - Fluvial Deposits	SP				
12		Topock - Fluvial Deposits	SM				
13		Topock - Fill	SP-SM		(12.0 - 13.2') Bentonite seal chips	(12.0 - 13.2') 2.4 bags	(12.0 - 13.2') 5 bags (108%) Note: Puregold Medium Chips
14		Topock - Fluvial Deposits	SM				
15	RB-5-VAS-12.0-17.0 (0.125 J ppb) 4/4/2019 10:49				(13.2 - 16.1') Cemex #60 (40x70) Mesh	(13.2 - 16.1') 8.2 bags	(13.2 - 16.1') 16 bags (95%) Note: Lapis Lustre Sand
16			NR				
17							
18		Topock - Fluvial Deposits	SM		(16.1 - 47.1') Cemex #0/30 Mesh (30x50)	(16.1 - 47.1') 87.9 bags	(16.1 - 47.1') 121 bags (38%) Note: Lapis Lustre Sand, swabbed filter pack for 74 minutes prior to installation of transition sand
19							
20			SP-SM				

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Well ID: RB-5
Date Completed:	07/28/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	H. & A. Amezcuita	Borehole Diameter:	18-24 inches	
Logger:	Drew Martzolf	Water Level Start:	10.04 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	99.25 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
21		Topock - Fluvial Deposits	SP-SM		(0.0 - 24.0') 8" Suregrip 17 Casing		
22		Topock - Fluvial Deposits	SP				
23			NR				
24							
25					(24.0 - 44.0') 8" Stainless Steel 316 (10-slot) Screen		
26							
27							
28							
29							
30					(16.1 - 47.1') Cemex #0/30 Mesh (30x50)	(16.1 - 47.1') 87.9 bags	(16.1 - 47.1') 121 bags (38%) Note: Lapis Lustre Sand, swabbed filter pack for 74 minutes prior to installation of transition sand
31					(20.0 - 41.5') 24.0" Borehole		
32		Topock - Fluvial Deposits	SP				
33							
34							
35							
36							
37							
38							
39							
40							





















Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Well ID: RB-5
Date Completed:	07/28/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	H. & A. Amezcua	Borehole Diameter:	18-24 inches	
Logger:	Drew Martzolf	Water Level Start:	10.04 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	99.25 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
41	RB-5-VAS-42-47 ($<0.033\text{U}$ ppb) 4/9/2019 10:15	Topock - Fluvial Deposits	SP		(24.0 - 44.0') 8" Stainless Steel 316 (10-slot) Screen		
42					(16.1 - 47.1') Cemex #0/30 Mesh (30x50)		
43					(44.0 - 64.0') 8" Suregrip 17 Casing		
44					(20.0 - 41.5') 24.0" Borehole		
45					(16.1 - 47.1') 87.9 bags		
46		Topock - Fluvial Deposits	GW		(47.1 - 47.7') Cemex #60 (40x70) Mesh	(47.1 - 47.7') 1.6 bags	(47.1 - 47.7') 2 bags (25%) Note: Lapis Lustre Sand
47							
48		Topock - Fluvial Deposits	SP				
49							
50		NR			(41.5 - 61.5') 18.0" Borehole		
51					(47.7 - 55.2') Bentonite seal chips	(47.7 - 55.2') 14.9 bags	(47.7 - 55.2') 8 bags (-46%) Note: Puregold Medium Chips, difference in calculated volume compared to actual volume is $<80\%$ of design volume due to coarse loose formation displacing chips during installation
52							
53							
54					(55.2 - 56.2') Cemex #0/30 Mesh (30x50)	(55.2 - 56.2') 2.7 bags	(55.2 - 56.2') 2 bags (-26%) Note: Lapis Lustre Sand
55		Topock - Fluvial Deposits	SP				
56							
57							
58					(56.2 - 99.3') Cemex 2/12 Mesh (12x20)	(56.2 - 99.3') 125.2 bags	(56.2 - 99.3') 114 bags (-9%) Note: Lapis Lustre Sand, swabbed filter pack for ~98 minutes prior to installation of transition sand
59							
60							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Well ID: RB-5
Date Completed:	07/28/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	H. & A. Amezcuita	Borehole Diameter:	18-24 inches	
Logger:	Drew Martzolf	Water Level Start:	10.04 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	99.25 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction			Calculated Material Volumes	Material Volumes Installed
61		Topock - Fluvial Deposits	SP		(44.0 - 64.0') 8" Suregrip 17 Casing				
62									
63									
64			NR		(64.0 - 89.0') 8" Stainless Steel 316 (30-slot) Screen				
65									
66									
67		Topock - Fluvial Deposits	SP						
68									
69									
70			NR		(56.2 - 99.3') Cemex 2/12 Mesh (12x20)				
71									
72									
73			SP						
74									
75									
76		Topock - Fluvial Deposits	SP						
77		Topock - Fluvial Deposits	CL						
78		Topock - Fluvial Deposits	SP						
79									
80									

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from RB-5 Pilot

Date Started:	07/11/2019	Surface Elevation:	N/A	Well ID: RB-5
Date Completed:	07/28/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Dual Rotary	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Jon Martinez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	H. & A. Amezcuita	Borehole Diameter:	18-24 inches	
Logger:	Drew Martzolf	Water Level Start:	10.04 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	N/A	
Total Depth:	99.25 ft bgs	Well Completion:	<input checked="" type="checkbox"/> Flush <input type="checkbox"/> Stick-up	

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
81	RB-5-VAS-82-87 (0.127 J ppb) 4/9/2019 14:05	Topock - Fluvial Deposits	SP		(64.0 - 89.0') 8" Stainless Steel 316 (30-slot) Screen		
82							
83		Topock - Fluvial Deposits	GW		(80.0 - 84.0') 18.0" Borehole		
84							
85			NR		(84.0 - 87.0') 18.0" Borehole		
86							
87		Topock - Weathered Bedrock - conglomerate	GM				
88							
89					(56.2 - 99.3') Cemex 2/12 Mesh (12x20)	(56.2 - 99.3') 125.2 bags	(56.2 - 99.3') 114 bags (-9%) Note: Lapis Lustre Sand, swabbed filter pack for ~98 minutes prior to installation of transition sand
90							
91							
92		Topock - Competent Bedrock - conglomerate					
93					(87.0 - 99.3') 18.0" Borehole		
94							
95							
96							
97							
98							
99							
100					End of Boring at 99.3' bgs.		

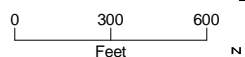
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents approximate depth to water during the first VAS sample collected from RB-5 Pilot

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



LEGEND

- Soil Sample Collected from this Location in September 2019
- Soil Sample Location



Baseline and Opportunistic Soil Sampling Locations

Monthly Progress Report
Groundwater Remedy Phase 1 Construction
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 September 2019, 146 real time dust observation/monitoring events were conducted at the perimeter of the work areas (outside of the exclusion zone). There was no exceedance of the action level for fugitive dust monitoring ($100 \mu\text{g}/\text{m}^3$) in September 2019.

No perimeter air sampling occurred in September 2019. Table 1 presents analytical results from prior air sampling events.

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Table 1. Perimeter Air Sampling Results

September 2019 Monthly Progress Report for the Final Groundwater Remedy Construction and Startup
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)
AOC30-IRZ-23-D1	AOC30-IRZ-23 Downwind 1	2/20/2019	N	ND (0.0000859)
AOC30-IRZ-23-D2	AOC30-IRZ-23 Downwind 2	2/20/2019	N	ND (0.0000862)
AOC30-IRZ-23-U1	AOC30-IRZ-23 Upwind	2/20/2019	N	0.000104 J
AOC4-D1	AOC4 Downwind 1	5/14/2019	N	ND (0.000148)
AOC4-D2	AOC4 Downwind 2	5/14/2019	N	ND (0.000155)
AOC4-U	AOC4 Upwind	5/14/2019	N	ND (0.000148)
AOC11-D1	AOC11 Downwind 1	5/15/2019	N	ND (0.0000392)
AOC11-D2	AOC11 Downwind 2	5/15/2019	N	0.0001262 J
AOC11-U	AOC11 Upwind	5/15/2019	N	ND (0.0000386)
AOC4-D1	AOC4 Downwind 1	5/16/2019	N	0.0000423 J
AOC4-D2	AOC4 Downwind 2	5/16/2019	N	ND (0.0000385)
AOC4-U	AOC4 Upwind	5/16/2019	N	ND (0.0000378)
AOC30-D1	AOC30 Downwind 1	6/17/2019	N	ND (0.0000633)
AOC30-D2	AOC30 Downwind 2	6/17/2019	N	ND (0.0000636)
AOC30-U1	AOC30 Upwind	6/17/2019	N	ND (0.0000589)
AOC30-D1	AOC30 Downwind 1	6/18/2019	N	0.0000407 J
AOC30-D2	AOC30 Downwind 2	6/18/2019	N	ND (0.0000313)
AOC30-U1	AOC30 Upwind	6/18/2019	N	ND (0.000031)
PIPE B-D1	PIPE B Downwind 1	8/12/2019	N	ND (0.0000278)
PIPE B-D2	PIPE B Downwind 2	8/12/2019	N	0.000035 J
PIPE B-U1	PIPE B Upwind	8/12/2019	N	ND (0.0000279)
PIPE B-D1	PIPE B Downwind 1	8/13/2019	N	ND (0.0000276)
PIPE B-D2	PIPE B Downwind 2	8/13/2019	N	ND (0.0000276)
PIPE B-U1	PIPE B Upwind	8/13/2019	N	ND (0.0000276)

Notes:

ug/m³ micrograms per cubic meter
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 attending 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 A-weighted decibels [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 September 2019, the following monitoring events were conducted:

- Twenty-two (22) events at a location west of the mobile home park at Moabi Regional Park. Construction activities closest to this monitoring location include activities at the SPY and CHQ, as well as construction traffic on NTH. The sound level typically varied between 38 and 51 dBA, with an average of 45 dBA and a median of 47 dBA.
- Twenty-one (21) events at a location in the Upland just off the IM-3 access road, and near the top of the hill closest to the NTH and MW-20 Bench. Construction activities closest to this monitoring location include activities at MW-20 Bench, and construction traffic on the access road. The sound levels varied between 45 and 57 dBA, with an average and median of about 51 dBA.
- Twenty-two (22) events at the old restaurant location west of NTH. Construction activities closest to this monitoring location include construction traffic on NTH, pipeline and access road construction activities in the northern end of the floodplain. The sound level varied between 44 and 68 dBA, with an average and median of 50-51 dBA. The maximum sound level of 68 dBA was recorded on September 20, 2019. The technician noted a high level of river traffic and that construction-related noise was not audible while the sound was recorded.
- Six (6) events at a location along the edge of the Colorado River within the mobile home park at Topock Marina. Construction activities closest to this monitoring location are associated with drilling at MW-X and MW-Y. The sound level typically varied between 45 and 62 dBA, with an average and median of 55 dBA. Sound levels spiked when there are boat traffic, train traffic, and bird activities around the mobile homes. When there were limited river traffic, limited wildlife noise, and no trains, the sound level was about 62 dBA.
- Fourteen (14) events on the MW-24 bench below and east of the Compressor Station. Construction activities closest to this monitoring location are associated with Pipeline B construction and MW-S drilling. The sound level typically varied between 50 and 58 dBA, with an average and median of 55

dBA. The technician noted that most of the sound was from I-40 and/or TCS, and that construction-related noise was audible.

On September 18, 2019, PG&E submitted a request to DTSC to cease noise monitoring at the approved location during installation of Pipeline B/J. The request was based on the level of existing noise, the distance to the Pipeline B/J construction activities, and the technician's observation that construction noise is neither dominate nor distinctly audible at the approved, and that a sound barrier is anticipated to be of no or minor benefit. DTSC provided concurrence with the request for Pipeline B, but not Pipeline J due to the shorter distance between Pipeline J and the approved noise monitoring location.

Sound monitoring will continue as work progresses and moves into new areas to identify when an acoustical barrier needs to be considered.

Attachment F
Discharge Monitoring Record in
compliance with Monitoring and Reporting
Program for Order No. 2003-0003-DWQ
(Table 2)

Dishcharge Monitoring Record



PIVOX
Corporation

PGE Project / Property Name: Topock Final Remedy

Project Number: ARC-18-T46

Affected System: Pipeline C5 STA 17+80 to C3 14+85

Discharge Date	C6 Discharge Location - Approximate QTY (gal)	C5 Discharge Location - Approximate QTY (gal)	Discharge Monitor Initials*
5/17/2019	6,300	--	ST
5/20/2019	1,800	5400	ST
5/21/2019	2,700	--	ST
5/22/2019	3,100	3,000	ST
5/23/2019	--	4,500	ST
5/24/2019	--	4,500	ST
5/28/2019	--	300	ST
6/4/2019	--	300	DZ
6/5/2019	--	800	DZ

* By signing this record form, I acknowledge that all ground discharge has been observed and monitored for the following compliance requirements:

- a.No ponding of discharge water
- b.No attracting wildlife
- c.No channelizing of discharge water and runoff outside of work area
- d.No water discharged to washes or jurisdictional waters

Injectivity Testing

Location/Well ID- IRZ-21

Date - 9/7/2019

Screened Interval Tested - Upper Screen (48-66 ft)

Packer Set Depth - 75-79 ft bgs

Packer Seal Test - Confirmed packer to be watertight before test

Tests Conducted - 4 step Injectivity Test (7.7, 15.2, 22.4, 30.6 GPM)

Purpose - Well Performance Test

Summary - Specific Injectivity: 7.93-8.15 GPM/FT

Notes -

IM3 system shut off before test started and was brought back online during the first step of test.

Possible data drift from transducer or physical transducer placement shift during Step 2.

Oversight Signature -



Date - 10/8/2019

Injectivity Testing

Location/Well ID-	IRZ-21 (Upper)
Date -	9/7/2019
Screened Interval -	48-66
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	150 ft bgs
Depth to Packer -	75 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	44.19
Initial Totalizer Reading -	0
Final Totalizer Reading -	9110.72
Approx. Injection Volume (gal) -	9110.72
Calculated Injection Volume (gal) -	9190.89
Calculated and Totalizer Volume Difference (gal) -	80.17
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.7, 15.2, 22.4, 30.6

IM3 system shut off before test started and was brought back online during the first step of

Notes: test.

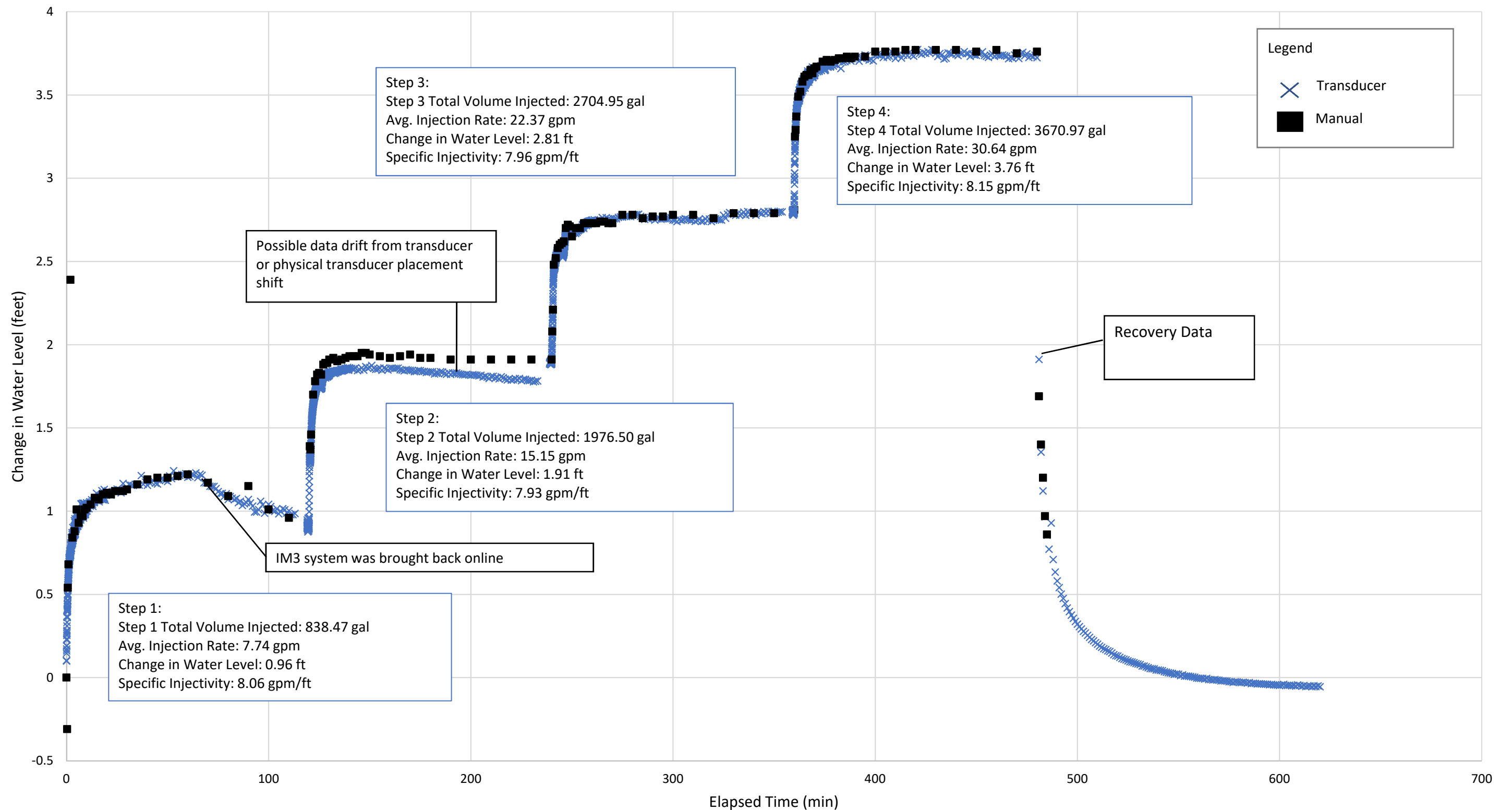
Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
8:40:00	0.00	0.00	0.00	44.19	0.00
8:40:20	0.33	11.20	3.73	44.50	-0.31
8:40:40	0.67	6.90	6.03	43.65	0.54
8:41:00	1.00	7.86	8.65	43.51	0.68
8:42:00	2.00	7.71	16.36	41.80	2.39
8:43:00	3.00	7.69	24.05	43.35	0.84
8:44:00	4.00	7.68	31.73	43.31	0.88
8:45:00	5.00	7.66	39.39	43.18	1.01
8:46:00	6.00	7.68	47.07	43.26	0.93
8:47:00	7.00	7.66	54.73	43.22	0.97
8:48:00	8.00	7.66	62.39	43.22	0.97
8:49:00	9.00	7.66	70.05	43.18	1.01
8:50:00	10.00	7.64	77.69	43.17	1.02
8:52:00	12.00	7.66	93.01	43.15	1.04
8:54:00	14.00	7.66	108.33	43.11	1.08
8:56:00	16.00	7.68	123.69	43.12	1.07
8:58:00	18.00	7.68	139.05	43.09	1.10
9:00:00	20.00	7.66	154.37	43.08	1.11
9:02:00	22.00	7.66	169.69	43.09	1.10
9:04:00	24.00	7.66	185.01	43.07	1.12
9:06:00	26.00	7.66	200.33	43.07	1.12
9:08:00	28.00	7.66	215.65	43.07	1.12
9:10:00	30.00	7.66	230.97	43.06	1.13
9:15:00	35.00	7.66	269.27	43.03	1.16
9:20:00	40.00	7.66	307.57	43.00	1.19
9:25:00	45.00	7.66	345.87	42.99	1.20
9:30:00	50.00	7.64	384.07	42.99	1.20
9:35:00	55.00	7.66	422.37	42.98	1.21
9:40:00	60.00	7.66	460.67	42.97	1.22
9:50:00	70.00	7.64	537.07	43.02	1.17
10:00:00	80.00	7.54	612.47	43.10	1.09
10:10:00	90.00	7.54	687.87	43.04	1.15
10:20:00	100.00	7.54	763.27	43.18	1.01
10:30:00	110.00	7.52	838.47	43.23	0.96
Total Volume Injected During Step (GAL):		838.47			
Average Injection Rate (GPM):		7.74			
Specific Injectivity (GPM/FT):		8.06			

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
10:40:20	120.33	14.46	987.89	42.80	1.39	0.0
10:40:40	120.67	12.16	991.95	42.82	1.37	0.3
10:41:00	121.00	14.48	996.77	42.73	1.46	0.7
10:42:00	122.00	15.36	1012.13	42.49	1.70	1.7
10:43:00	123.00	15.46	1027.59	42.41	1.78	2.7
10:44:00	124.00	15.48	1043.07	42.37	1.82	3.7
10:45:00	125.00	14.72	1057.79	42.36	1.83	4.7
10:46:00	126.00	14.81	1072.60	42.37	1.82	5.7
10:47:00	127.00	15.67	1088.27	42.31	1.88	6.7
10:48:00	128.00	15.36	1103.63	42.30	1.89	7.7
10:49:00	129.00	15.36	1118.99	42.30	1.89	8.7
10:50:00	130.00	15.34	1134.33	42.28	1.91	9.7
10:52:00	132.00	15.34	1165.01	42.27	1.92	11.7
10:54:00	134.00	15.34	1195.69	42.29	1.90	13.7
10:56:00	136.00	15.28	1226.25	42.28	1.91	15.7
10:58:00	138.00	15.30	1256.85	42.27	1.92	17.7
11:00:00	140.00	15.32	1287.49	42.26	1.93	19.7
11:02:00	142.00	15.34	1318.17	42.26	1.93	21.7
11:04:00	144.00	15.28	1348.73	42.26	1.93	23.7
11:06:00	146.00	15.34	1379.41	42.24	1.95	25.7
11:08:00	148.00	15.34	1410.09	42.24	1.95	27.7
11:10:00	150.00	15.34	1440.77	42.25	1.94	29.7
11:15:00	155.00	15.32	1517.37	42.26	1.93	34.7
11:20:00	160.00	15.32	1593.97	42.27	1.92	39.7
11:25:00	165.00	15.27	1670.32	42.26	1.93	44.7
11:30:00	170.00	15.30	1746.82	42.25	1.94	49.7
11:35:00	175.00	15.32	1823.42	42.27	1.92	54.7
11:40:00	180.00	15.27	1899.77	42.27	1.92	59.7
11:50:00	190.00	15.27	2052.47	42.28	1.91	69.7
12:00:00	200.00	15.27	2205.17	42.28	1.91	79.7
12:10:00	210.00	15.24	2357.57	42.28	1.91	89.7
12:20:00	220.00	15.22	2509.77	42.28	1.91	99.7
12:30:00	230.00	15.26	2662.37	42.28	1.91	109.7
12:40:00	240.00	15.26	2814.97	42.28	1.91	119.7
Total Volume Injected During Step (GAL):		1976.50				
Average Injection Rate (GPM):		15.15				
Specific Injectivity (GPM/FT):		7.93				

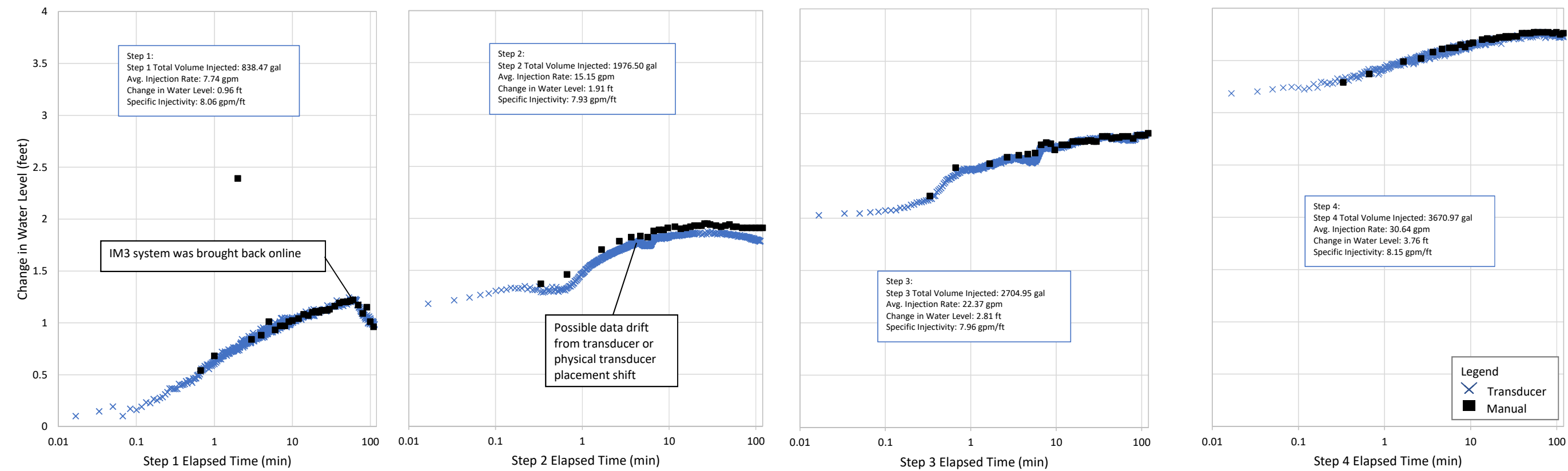
Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
12:40:20	240.33	19.24	2821.39	42.11	2.08	0.0
12:40:40	240.67	20.40	2828.19	41.98	2.21	0.3
12:41:00	241.00	23.76	2836.11	41.71	2.48	0.7
12:42:00	242.00	22.32	2858.43	41.67	2.52	1.7
12:43:00	243.00	22.34	2880.77	41.61	2.58	2.7
12:44:00	244.00	21.94	2902.71	41.59	2.60	3.7
12:45:00	245.00	21.88	2924.59	41.58	2.61	4.7
12:46:00	246.00	22.36	2946.95	41.57	2.62	5.7
12:47:00	247.00	23.04	2969.99	41.49	2.70	6.7
12:48:00	248.00	23.04	2993.03	41.47	2.72	7.7
12:49:00	249.00	22.26	3015.29	41.48	2.71	8.7
12:50:00	250.00	22.33	3037.62	41.54	2.65	9.7
12:52:00	252.00	22.32	3082.26	41.49	2.70	11.7
12:54:00	254.00	22.34	3126.94	41.49	2.70	13.7
12:56:00	256.00	22.30	3171.54	41.46	2.73	15.7
12:58:00	258.00	22.61	3216.76	41.46	2.73	17.7
13:00:00	260.00	22.61	3261.98	41.46	2.73	19.7
13:02:00	262.00	22.62	3307.22	41.46	2.73	21.7
13:04:00	264.00	22.64	3352.50	41.45	2.74	23.7
13:06:00	266.00	22.54	3397.58	41.45	2.74	25.7
13:08:00	268.00	22.54	3442.66	41.46	2.73	27.7
13:10:00	270.00	22.56	3487.78	41.46	2.73	29.7
13:15:00	275.00	22.56	3600.58	41.41	2.78	34.7
13:20:00	280.00	22.62	3713.68	41.41	2.78	39.7
13:25:00	285.00	22.34	3825.38	41.43	2.76	44.7
13:30:00	290.00	22.41	3937.43	41.42	2.77	49.7
13:35:00	295.00	22.43	4049.58	41.42	2.77	54.7
13:40:00	300.00	22.41	4161.63	41.41	2.78	59.7
13:50:00	310.00	22.36	4385.23	41.41	2.78	69.7
14:00:00	320.00	22.33	4608.53	41.43	2.76	79.7
14:10:00	330.00	22.71	4835.63	41.4	2.79	89.7
14:20:00	340.00	22.74	5063.03	41.4	2.79	99.7
14:30:00	350.00	22.81	5291.13	41.4	2.79	109.7
14:40:00	360.00	22.88	5519.93	41.38	2.81	119.7
Total Volume Injected During Step (GAL):		2704.95				
Average Injection Rate (GPM):		22.37				
Specific Injectivity (GPM/FT):		7.96				

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
14:40:20	360.33	30.70	5530.16	40.94	3.25	0.0
14:40:40	360.67	30.70	5540.39	40.90	3.29	0.3
14:41:00	361.00	30.72	5550.63	40.82	3.37	0.7
14:42:00	362.00	30.70	5581.33	40.70	3.49	1.7
14:43:00	363.00	30.70	5612.03	40.67	3.52	2.7
14:44:00	364.00	30.72	5642.75	40.61	3.58	3.7
14:45:00	365.00	30.70	5673.45	40.58	3.61	4.7
14:46:00	366.00	30.70	5704.15	40.57	3.62	5.7
14:47:00	367.00	30.69	5734.84	40.57	3.62	6.7
14:48:00	368.00	30.69	5765.53	40.54	3.65	7.7
14:49:00	369.00	30.69	5796.22	40.56	3.63	8.7
14:50:00	370.00	30.68	5826.90	40.53	3.66	9.7
14:51:00	371.00	30.66	5857.56	40.52	3.67	10.7
14:54:00	374.00	30.66	5949.54	40.49	3.70	13.7
14:56:00	376.00	30.66	6010.86	40.48	3.71	15.7
14:58:00	378.00	30.64	6072.14	40.49	3.70	17.7
15:00:00	380.00	30.62	6133.38	40.48	3.71	19.7
15:02:00	382.00	30.64	6194.66	40.47	3.72	21.7
15:04:00	384.00	30.62	6255.90	40.47	3.72	23.7
15:06:00	386.00	30.64	6317.18	40.46	3.73	25.7
15:08:00	388.00	30.62	6378.42	40.47	3.72	27.7
15:10:00	390.00	30.66	6439.74	40.46	3.73	29.7
15:15:00	395.00	30.64	6592.94	40.46	3.73	34.7
15:20:00	400.00	30.62	6746.04	40.43	3.76	39.7
15:25:00	405.00	30.66	6899.34	40.43	3.76	44.7
15:30:00	410.00	30.64	7052.54	40.43	3.76	49.7
15:35:00	415.00	30.66	7205.84	40.42	3.77	54.7
15:40:00	420.00	30.69	7359.29	40.42	3.77	59.7
15:50:00	430.00	30.62	7665.49	40.42	3.77	69.7
16:00:00	440.00	30.59	7971.39	40.42	3.77	79.7
16:10:00	450.00	30.54	8276.79	40.43	3.76	89.7
16:20:00	460.00	30.49	8581.69	40.42	3.77	99.7
16:30:00	470.00	30.46	8886.29	40.44	3.75	109.7
16:40:00	480.00	30.46	9190.89	40.43	3.76	119.7
16:41:00	481.00	0.00	9190.89	42.50	1.69	120.7
16:42:00	482.00	0.00	9190.89	42.79	1.40	121.7
16:43:00	483.00	0.00	9190.89	42.99	1.20	122.7
16:44:00	484.00	0.00	9190.89	43.22	0.97	123.7
16:45:00	485.00	0.00	9190.89	43.33	0.86	124.7
Total Volume Injected During Step (GAL):		3670.97				
Average Injection Rate (GPM):		30.64				
Specific Injectivity (GPM/FT):		8.15				

IRZ-21 Upper Screen (48-66 ft) Linear Change in Water Level Plot




IRZ-21 Upper Screen (48-66 ft)
Semi-Log Change in Water Level Plot





Injectivity Testing

Location/Well ID-	IRZ-20
Date -	9/9/2019
Screened Interval	
Tested -	Lower Screen (136-155 ft)
Packer Set Depth -	86.5-90.5 ft bgs
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Injectivity Test (7.9, 15.0, 22.1, 30.2 GPM)
Purpose -	Well Performance Test
Summary -	Specific Injectivity: 1.80-1.98 GPM/FT
Notes -	Step 1 had an inconsistent injection rate at the beginning of the test Possible equipment (water level meter) malfunction during Step 1 of test
Oversight Signature -	
Date -	10/8/2019

Injectivity Testing

Location/Well ID-	IRZ-20 (Lower)
Date -	9/9/2019
Screened Interval -	136-155
Injection Water Source -	Fresh water from construction water supply system
Injection Outlet Depth -	144.5 ft bgs
Depth to Packer -	86.5 ft bgs
Packer Leak Test (Pass/Fail) -	Pass
Water Level Prior to Injection -	44.28
Initial Totalizer Reading -	0
Final Totalizer Reading -	9055.14
Approx. Injection Volume (gal) -	9055.14
Calculated Injection Volume (gal) -	8919.78
Calculated and Totalizer Volume Difference (gal) -	135.36
Number of Injection Steps -	4
Injection Rates (List In Order) -	7.9, 15.0, 22.1, and 30.2

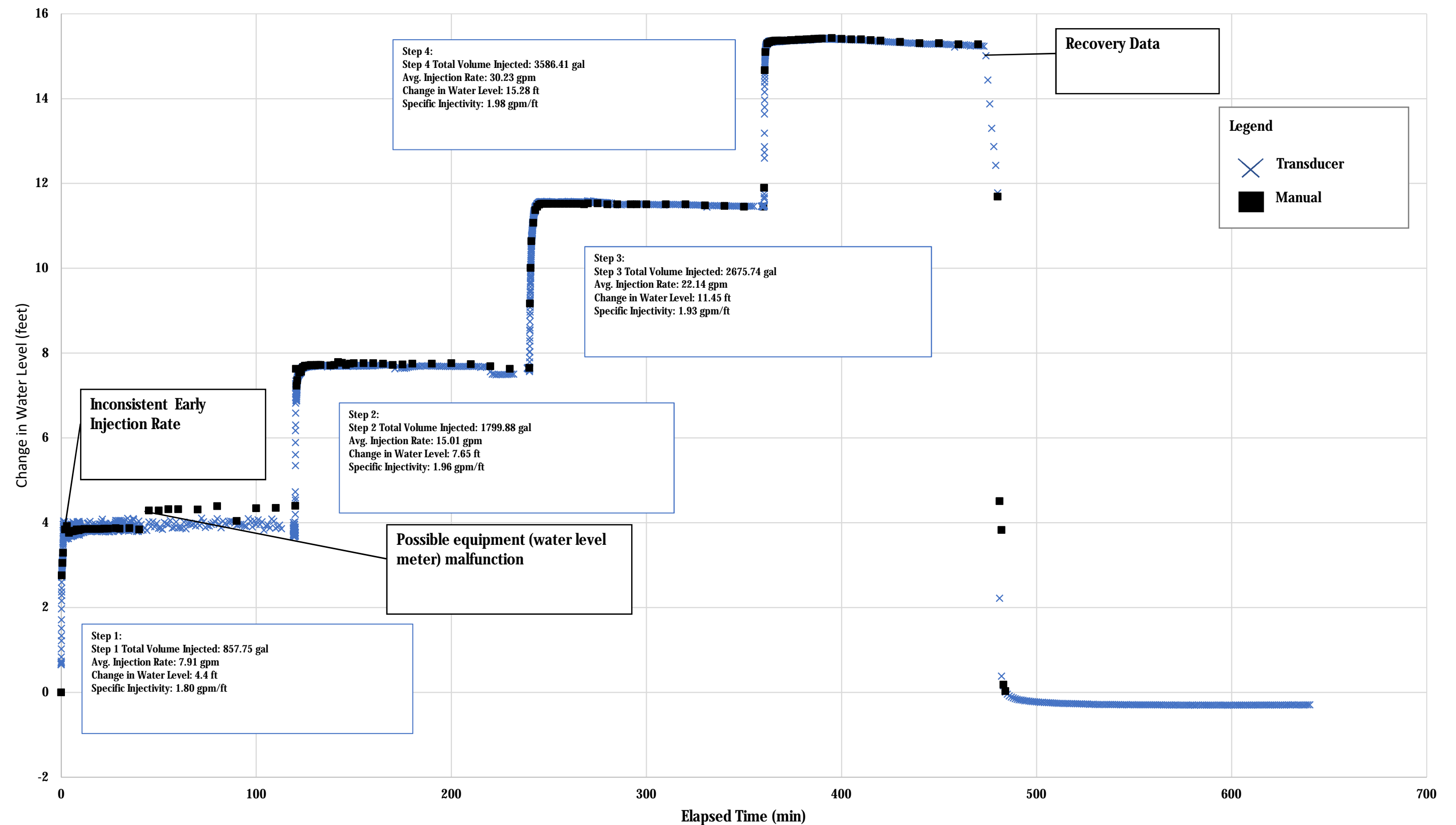
Step 1					
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)
9:10:00	0	0	0	44.28	0
9:10:20	0.33	9.88	3.29	41.52	2.76
9:10:40	0.67	8.43	6.10	41.23	3.05
9:11:00	1.00	7.77	8.69	40.99	3.29
9:12:00	2.00	7.86	16.55	40.44	3.84
9:13:00	3.00	7.86	24.41	40.36	3.92
9:14:00	4.00	7.86	32.27	40.52	3.76
9:15:00	5.00	7.9	40.17	40.48	3.8
9:16:00	6.00	7.87	48.04	40.48	3.8
9:17:00	7.00	7.86	55.90	40.47	3.81
9:18:00	8.00	7.87	63.77	40.44	3.84
9:19:00	9.00	7.86	71.63	40.46	3.82
9:20:00	10.00	7.86	79.49	40.44	3.84
9:22:00	12.00	7.86	95.21	40.43	3.85
9:24:00	14.00	7.86	110.93	40.43	3.85
9:26:00	16.00	7.98	126.89	40.43	3.85
9:28:00	18.00	7.84	142.57	40.43	3.85
9:30:00	20.00	7.84	158.25	40.43	3.85
9:32:00	22.00	7.84	173.93	40.42	3.86
9:34:00	24.00	7.82	189.57	40.42	3.86
9:38:00	28.00	7.82	220.85	40.41	3.87
9:40:00	30.00	7.8	236.45	40.42	3.86
9:45:00	35.00	7.82	275.55	40.41	3.87
9:50:00	40.00	7.82	314.65	40.44	3.84
9:55:00	45.00	7.8	353.65	39.99	4.29
10:00:00	50.00	7.92	393.25	39.99	4.29
10:05:00	55.00	7.82	432.35	39.96	4.32
10:10:00	60.00	7.84	471.55	39.96	4.32
10:20:00	70.00		471.55	39.97	4.31
10:30:00	80.00	7.8	549.55	39.89	4.39
10:40:00	90.00	7.82	627.75	40.24	4.04
10:50:00	100.00	7.74	705.15	39.94	4.34
11:00:00	110.00	7.72	782.35	39.93	4.35
11:10:00	120.00	7.54	857.75	39.88	4.4
Total Volume Injected During Step (GAL):		857.75			
Average Injection Rate (GPM):		7.91			
Specific Injectivity (GPM/FT):		1.80			

Step 2						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 2 Start (Min)
11:10:20	120.33	15	862.75	36.65	7.63	0.0
11:10:40	120.67	14.33	867.53	37.05	7.23	0.3
11:11:00	121.00	14.9	872.50	36.92	7.36	0.7
11:12:00	122.00	14.9	887.40	36.74	7.54	1.7
11:13:00	123.00	14.98	902.38	36.72	7.56	2.7
11:14:00	124.00	15.06	917.44	36.61	7.67	3.7
11:15:00	125.00	15.06	932.50	36.58	7.7	4.7
11:16:00	126.00	15.07	947.57	36.58	7.7	5.7
11:17:00	127.00	15.07	962.64	36.57	7.71	6.7
11:18:00	128.00	15.09	977.73	36.56	7.72	7.7
11:19:00	129.00	15.07	992.80	36.57	7.71	8.7
11:20:00	130.00	15.09	1007.89	36.57	7.71	9.7
11:21:00	131.00	15.09	1022.98	36.56	7.72	10.7
11:22:00	132.00	15.09	1038.07	36.56	7.72	11.7
11:23:00	133.00	15.07	1053.14	36.56	7.72	12.7
11:28:00	138.00	15.07	1128.49	36.57	7.71	17.7
11:30:00	140.00	15.07	1158.63	36.56	7.72	19.7
11:32:00	142.00	15.07	1188.77	36.49	7.79	21.7
11:34:00	144.00	15.07	1218.91	36.51	7.77	23.7
11:36:00	146.00	15.06	1249.03	36.56	7.72	25.7
11:38:00	148.00	15.06	1279.15	36.53	7.75	27.7
11:40:00	150.00	15.07	1309.29	36.52	7.76	29.7
11:45:00	155.00	15.07	1384.64	36.52	7.76	34.7
11:50:00	160.00	15.06	1459.94	36.52	7.76	39.7
11:55:00	165.00	15.07	1535.29	36.53	7.75	44.7
12:00:00	170.00	15.06	1610.59	36.56	7.72	49.7
12:05:00	175.00	15.07	1685.94	36.55	7.73	54.7
12:10:00	180.00	15.06	1761.24	36.53	7.75	59.7
12:20:00	190.00	15.06	1911.84	36.53	7.75	69.7
12:30:00	200.00	15.04	2062.24	36.52	7.76	79.7
12:40:00	210.00	15.04	2212.64	36.54	7.74	89.7
12:50:00	220.00	15.04	2363.04	36.59	7.69	99.7
13:00:00	230.00	14.72	2510.24	36.65	7.63	109.7
13:10:00	240.00	14.74	2657.64	36.63	7.65	119.7
Total Volume Injected During Step (GAL):		1799.88				
Average Injection Rate (GPM):		15.01				
Specific Injectivity (GPM/FT):		1.96				

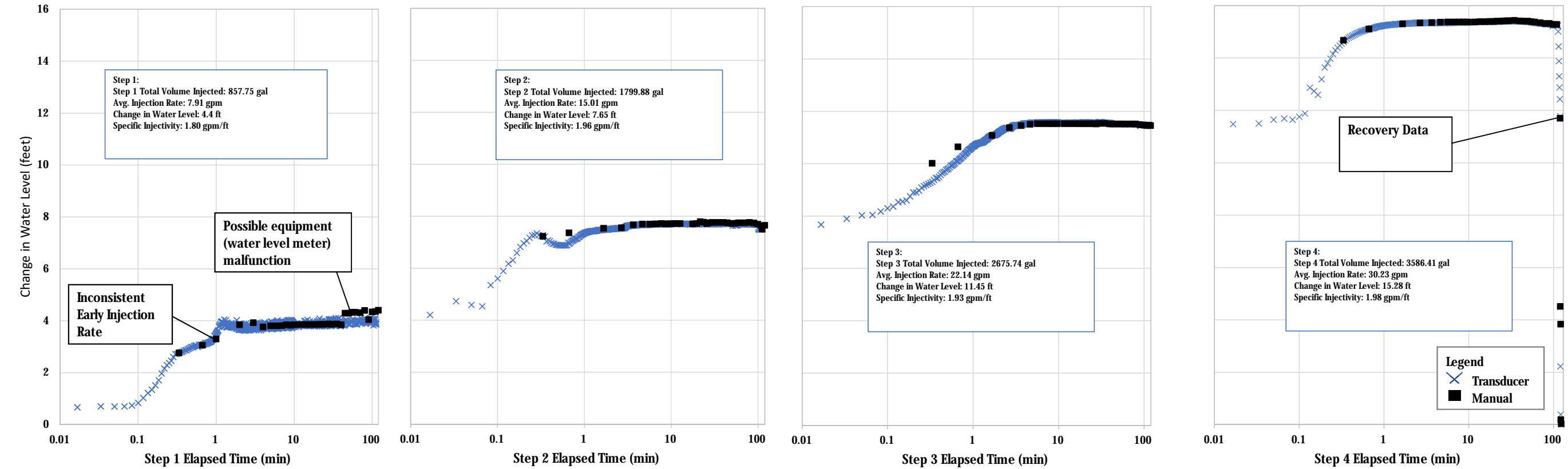
Step 3						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 3 Start (Min)
13:10:20	240.33	18.68	2663.86	35.11	9.17	0.0
13:10:40	240.67	20.22	2670.60	34.27	10.01	0.3
13:11:00	241.00	21.09	2677.63	33.64	10.64	0.7
13:12:00	242.00	21.9	2699.53	33.21	11.07	1.7
13:13:00	243.00	22.24	2721.77	32.91	11.37	2.7
13:14:00	244.00	22.34	2744.11	32.83	11.45	3.7
13:15:00	245.00	22.41	2766.52	32.78	11.5	4.7
13:16:00	246.00	22.41	2788.93	32.76	11.52	5.7
13:17:00	247.00	22.41	2811.34	32.76	11.52	6.7
13:18:00	248.00	22.43	2833.77	32.76	11.52	7.7
13:19:00	249.00	22.41	2856.18	32.76	11.52	8.7
13:20:00	250.00	22.41	2878.59	32.76	11.52	9.7
13:22:00	252.00	22.41	2923.41	32.76	11.52	11.7
13:24:00	254.00	22.43	2968.27	32.76	11.52	13.7
13:26:00	256.00	22.41	3013.09	32.76	11.52	15.7
13:28:00	258.00	22.43	3057.95	32.76	11.52	17.7
13:30:00	260.00	22.43	3102.81	32.76	11.52	19.7
13:32:00	262.00	22.43	3147.67	32.76	11.52	21.7
13:34:00	264.00	22.43	3192.53	32.76	11.52	23.7
13:36:00	266.00	22.43	3237.39	32.76	11.52	25.7
13:38:00	268.00	22.43	3282.25	32.77	11.51	27.7
13:40:00	270.00	22.41	3327.07	32.75	11.53	29.7
13:45:00	275.00	22.41	3439.12	32.75	11.53	34.7
13:50:00	280.00	22.41	3551.17	32.77	11.51	39.7
13:55:00	285.00	22.4	3663.17	32.77	11.51	44.7
14:02:00	292.00	21.38	3812.83	32.77	11.51	51.7
14:05:00	295.00	22.38	3879.97	32.77	11.51	54.7
14:10:00	300.00	22.38	3991.87	32.77	11.51	59.7
14:20:00	310.00	22.4	4215.87	32.77	11.51	69.7
14:30:00	320.00	22.38	4439.67	32.77	11.51	79.7
14:40:00	330.00	22.36	4663.27	32.8	11.48	89.7
14:50:00	340.00	22.34	4886.67	32.81	11.47	99.7
15:00:00	350.00	22.33	5109.97	32.83	11.45	109.7
15:10:00	360.00	22.34	5333.37	32.83	11.45	119.7
Total Volume Injected During Step (GAL):		2675.74				
Average Injection Rate (GPM):		22.14				
Specific Injectivity (GPM/FT):		1.93				

Step 4						
Time (HR:MN:SEC)	Elapsed Time (Min)	Injection Rate (GPM)	Total Volume Injected (Gallons)	Depth to Water (ft)	Water Level Change (ft)	Elapsed Time from Step 4 Start (Min)
15:10:20	360.33	30.36	5343.49	32.38	11.9	0.0
15:10:40	360.67	30.34	5353.61	29.61	14.67	0.3
15:11:00	361.00	30.32	5363.71	29.18	15.1	0.7
15:12:00	362.00	30.34	5394.05	28.98	15.3	1.7
15:13:00	363.00	30.34	5424.39	28.95	15.33	2.7
15:14:00	364.00	30.36	5454.75	28.93	15.35	3.7
15:15:00	365.00	30.38	5485.13	28.92	15.36	4.7
15:16:00	366.00	30.38	5515.51	28.91	15.37	5.7
15:17:00	367.00	30.39	5545.90	28.91	15.37	6.7
15:18:00	368.00	30.39	5576.29	28.91	15.37	7.7
15:19:00	369.00	30.41	5606.70	28.91	15.37	8.7
15:20:00	370.00	30.41	5637.11	28.91	15.37	9.7
15:22:00	372.00	30.42	5697.95	28.91	15.37	11.7
15:24:00	374.00	30.42	5758.79	28.9	15.38	13.7
15:26:00	376.00	30.44	5819.67	28.9	15.38	15.7
15:28:00	378.00	30.44	5880.55	28.89	15.39	17.7
15:30:00	380.00	30.46	5941.47	28.89	15.39	19.7
15:32:00	382.00	30.48	6002.43	28.88	15.4	21.7
15:34:00	384.00	30.49	6063.41	28.88	15.4	23.7
15:36:00	386.00	30.49	6124.39	28.87	15.41	25.7
15:38:00	388.00	30.5	6185.39	28.87	15.41	27.7
15:40:00	390.00	30.52	6246.43	28.86	15.42	29.7
15:45:00	395.00	30.5	6398.93	28.85	15.43	34.7
15:50:00	400.00	30.5	6551.43	28.87	15.41	39.7
15:55:00	405.00	30.48	6703.83	28.88	15.4	44.7
16:00:00	410.00	30.46	6856.13	28.88	15.4	49.7
16:05:00	415.00	30.44	7008.33	28.9	15.38	54.7
16:10:00	420.00	30.41	7160.38	28.91	15.37	59.7
16:20:00	430.00	30.36	7463.98	28.94	15.34	69.7
16:30:00	440.00	30.31	7767.08	28.97	15.31	79.7
16:40:00	450.00	30.24	8069.48	28.97	15.31	89.7
16:50:00	460.00	30.2	8371.48	29	15.28	99.7
17:00:00	470.00	30.12	8672.68	29	15.28	109.7
17:10:00	480.00	24.71	8919.78	32.59	11.69	119.7
17:11:00	481.00	--	--	39.77	4.51	120.7
17:12:00	482.00	--	--	40.45	3.83	121.7
17:13:00	483.00	--	--	44.1	0.18	122.7
17:14:00	484.00	--	--	44.25	0.03	123.7
Total Volume Injected During Step (GAL):		3586.41				
Average Injection Rate (GPM):		30.23				
Specific Injectivity (GPM/FT):		1.98				

IRZ-20 Lower Screen (136-155 ft) Linear Change in Water Level Plot



IRZ-20 Lower Screen (136-155 ft)
Semi-Log Change in Water Level Plot



Attachment G Reports of Releases



ER Safety and Compliance Event Form

Event Details

Project Name: PG&E Topock Final Groundwater Remedy Phase 1

Location: Topock

Contract Number: SWA-PIV-C10665-044

Date of Occurrence: 8/27/2019 12:00 AM

Date Identified: 8/27/2019 11:05 AM

Description: A small amount of generated waste water from the RB-3 well leaked out of the from the pump connection whilst vacuuming of the hose after a manufactures defect was discovered in the mid hose region.

Event Type: Environmental - Hazardous Materials Release (Minor)

Event Categories: Environmental (spill, release, etc.)

Activity Types: Other

Event Cause

Cause: RC 8 - Engineering or design deficiency

Description: On RB3 it was observed that water was leaking from the plastic covering around the suction hose acting as a catch basin. The water was leaking into the containment for the 4x4 suction pump on the waste water side. The CHESI team first shut the valve leading from the waste tank. Then moved the defective hose into the containment where the solids bin is housed. This prevented any further chance of water leaking out of the plastic catch basin. Next the team turned on the pump to vacuum the hose dry. This process is achieved by introducing air into the line in order to ensure a solid vacuum. During this process an operator unclamps one locking ear on the hose cam to introduce air into the line. At that time a minor /small amount of waste water escaped from the hose spilling into the pump containment area. The water then traveled down grade in the containment and escaped out of the man-made containment. This was due to the hay wattles being used along with a plastic barrier had separated and were no longer overlapping creating a reservoir for the water to escape onto the ground. Total spill estimated approximately 5 gallons.

Responsible Party: Subcontractor

Prime Contractor: Pivox

Subcontractor: Clean Harbors

Third Party: N/A

Corrective Actions/Lessons Learned

Immediate Actions Taken (if applicable): Work was stopped immediately. All valves were shut and the source of the leak was located. The hose was immediately moved into a larger containment. The separated hay wattles were closed once identified. The affected ground/sand was collected in a five gallon bucket. It was labeled and dated appropriately and stored within the containment until further instructions are given for disposal.

ER Safety and Compliance Event Form

Corrective Actions Taken to Prevent Recurrence (if applicable): Replace hose. Replace catch basin on hose. Realign hay wattles to ensure complete containment at the 4x4 pump. Better Visual inspections of hoses when brought into service. Replace hay wattles.
Completion Date: Pending

Report Details

Report Completed By: Jeff Woodruff

Report Date: 8/27/2019

ER Safety and Compliance Event Form





ER Safety and Compliance Event Form

Event Details

Project Name: Topock Groundwater Remediation Project

Contract Number: SWA-C8128-041

Location: Pipeline B-1, STA: 16+60

Date of Occurrence: 9/6/2019 12:30 PM

Date Identified: 9/6/2019 12:30 PM

Description: Minor Hydraulic Leak - A three-man crew was working on trench excavation activities at Pipeline B-1. The crew lead was spotting the John Deere 135G excavator when he noticed a fluid drip from one of the hydraulic lines close to the bucket of the excavator. The crew lead immediately had the excavator operator place the excavator on visqueen sheeting and turn the machine off. The crew lead called the Health & Safety Officer to report the leak. Upon investigation it was determined the source of the hydraulic oil leak was coming from the connection fitting on the hydraulic line used to connect the excavator's hydraulic lines to an attachment's hydraulic lines. The cause of the leak was determined to be that the fitting's mechanism to prevent passage of oil while not connected to an attachment had failed. In addition to the excavator being placed on visqueen sheeting, the connection fitting was wrapped in absorbent pads and secured to prevent any other potential leaking while the machine was pending repair. The Site Superintendent called the equipment vendor to dispatch a mechanic to replace the fitting. The estimated amount of hydraulic oil that hit the ground is 2-4 oz. The impacted soil was less than one shovel full. The impacted soil was placed in a five-gallon bucket with a lid, properly labeled, and taken to IM-3 for proper disposal.

Event Type: Environmental - Hazardous Materials Release (Minor)

Event Categories: Environmental (spill, release, etc.)

Activity Types: Trenching/excavation/grading

Event Cause

Cause: RC 9 - Uncontrollable (external factor, USE RARELY)

Description: Minor hydraulic leak on excavator hose.

Responsible Party: Prime Contractor

Prime Contractor: Pivox

Subcontractor: N/A

Third Party: N/A

Corrective Actions/Lessons Learned

Immediate Actions Taken (if applicable): Crew lead contacted the Health & Safety Officer, placed the machine on visqueen sheeting and shut the machine down. The leak was identified and covered with absorbent pads to prevent any further dripping. The impacted soil was placed into five-gallon bucket, properly labeled and taken to IM-3 for proper disposal. The mechanic replaced the fitting and verified the leak had been fixed. Pivox H&S lead notified on-site project compliance and H&S teams for proper reporting.

Corrective Actions Taken to Prevent Recurrence (if applicable): The safety topic for the next



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morning's safety meeting was equipment inspections and situational awareness to ensure that any potential leaks are identified and addressed properly.

Completion Date: 9/6/2019

Report Details

Report Completed By: Colton Garrard

Report Date: 9/7/2019



ER Safety and Compliance Event Form

Event Details

Project Name: Topock Groundwater Remediation Project

Contract Number: SWA-C8128-041

Location: CHQ Equipment Laydown Area

Date of Occurrence: 9/11/2019 7:20 AM

Date Identified: 9/11/2019 7:20 AM

Description: Minor Hydraulic Leak – A Biological Monitor, conducting morning area clearances at the CHQ, was checking underneath equipment when they noticed that the visqueen beneath the dump truck had been moved around by the wind leaving a large portion of the ground under the dump truck exposed. Upon closer inspection, the Biologist saw two small damp spots on the gravel rock underneath the dump truck. The Biologist notified compliance personnel which in turn notified the Pivox Health & Safety Officer. Upon investigation it was found that the source for the leak was a loose seal on the hydraulic cylinder that raises/lowers the dump bed, and a loose coupler on the line leaving the hydraulic oil reservoir tank. The leaks were secured with absorbent pads to prevent further leaking while the contaminated rock was picked up. Once all the contaminated rock had been collected, a crew replaced the visqueen and secured it with sandbags to prevent movement from wind. The crew also placed a containment under the dump truck to catch any residual drips while waiting for repair. The Site Superintendent called the rental equipment vendor to dispatch a mechanic to fix the leaks. Area was properly clean up, containerized, labeled and transported to IM3 for proper handling.

Event Categories: Environmental (spill, release, etc.)

Activity Types: Vehicle/equipment movement

Event Cause

Cause: RC 3 - Not following procedures or directions

Description: Minor hydraulic leak on dump truck. Visqueen was not secured and blown out of place by wind.

Responsible Party: Prime Contractor

Prime Contractor: Pivox

Subcontractor: N/A

Third Party: N/A

Corrective Actions/Lessons Learned

Immediate Actions Taken (if applicable): The Biologist reported the leak to the compliance team and the compliance team reported the leak to the Pivox Health & Safety Officer. The leak was secured with absorbent pads, impacted rock was placed in five-gallon bucket with a lid, properly labeled and taken to IM-3 for disposal. The crew replaced the visqueen under the dump truck and secured it with sandbags and placed a containment under the truck until it could be repaired. The Site Superintendent called the equipment rental vendor and dispatched a mechanic to fix the leaks. Pivox Health & Safety Officer notified on-site project compliance

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and Health & Safety teams for proper reporting. The estimated volume of hydraulic oil that hit the ground is 3-5 oz. The volume of impacted rock was approximately one square shovel full. The impacted rock was placed in a five-gallon bucket with a lid, properly labeled, and taken to IM-3 for disposal.

Corrective Actions Taken to Prevent Recurrence (if applicable): The equipment rental vendor fixed the leaks and ran the truck to verify no more hydraulic oil was leaking. In the next morning's safety meeting, the topic was BMP inspections and ensuring that all BMPs are secured with sand bags to prevent movement by wind or other external forces.

Completion Date: 9/12/2019

Report Details

Report Completed By: Colton Garrard

Report Date: 9/12/2019



ER Safety and Compliance Event Form

Event Details

Project Name: Topock Groundwater Remediation Project

Contract Number: SWA-C8128-041

Location: Pipeline B-1, STA: 20+20

Date of Occurrence: 9/18/2019 6:35 AM

Date Identified: 9/18/2019 6:35 AM

Description: Minor engine oil leak – A Biological Monitor, conducting morning area clearances at Pipeline B-1, noticed some black spots in a place where a subcontractor pickup truck had previously been parked. The Biological monitor reported the leak to compliance personnel which in turn notified the Pivox Health and Safety Officer. Upon inspection it was confirmed that the leak was engine oil from the subcontractor's pickup truck. The pickup truck was moved from Pipeline B-1 to CHQ and was placed on visqueen and had a drip pan placed beneath the truck. The impacted soil was double bagged and later transferred into a five-gallon bucket with lid, labeled, and properly disposed of. The estimated amount of oil released is 2 oz. The estimated amount of impacted soil is less than half of a shovel full. Area was properly cleaned up, containerized, labeled and transported to IM-3 for proper handling.

Event Type: Environmental - Hazardous Materials Release (Minor)

Event Categories: Environmental (spill, release, etc.)

Activity Types: Vehicle/equipment movement

Event Cause

Cause: RC 9 - Uncontrollable (external factor, USE RARELY)

Description: Minor engine oil leak on subcontractor pickup truck

Responsible Party: Prime Contractor

Prime Contractor: Pivox

Subcontractor: N/A

Third Party: N/A

Corrective Actions/Lessons Learned

Immediate Actions Taken (if applicable): The Biologist reported the leak to the compliance team and the compliance team reported the leak to the Pivox Health & Safety Officer. The pickup truck was moved to the CHQ laydown yard, placed on visqueen, and had an oil pan placed underneath until it can be repaired/replaced. The impacted soil was double bagged then placed in five-gallon bucket with a lid, properly labeled and taken to IM-3 for disposal. Pivox Health & Safety Officer notified on-site project compliance and Health & Safety teams for proper reporting.

Corrective Actions Taken to Prevent Recurrence (if applicable): The subcontractor's pickup truck was removed from service and placed on visqueen with a drip pan underneath until it can be repaired/replaced. In the next morning meeting the Health & Safety Officer discussed best practices regarding identification of leaks and proper clean up and disposal procedures.



ER Safety and Compliance Event Form

Completion Date: 9/19/2019

Report Details

Report Completed By: Colton Garrard

Report Date: 9/19/2019



ER Safety and Compliance Event Form

Event Details

Project Name: Topock Groundwater Remediation Project

Contract Number: SWA-C8128-041

Location: RB Road (RB-5 to RB-2)

Date of Occurrence: 9/20/2019 4:00 PM

Date Identified: 9/21/2019 6:30 AM

Description: Minor Hydraulic Oil leak – A Biological Monitor, conducting morning area clearances on the RB road on the floodplain, found what appeared to be hydraulic oil spots on the RB road running from RB-5 to RB-2. The Biological monitor reported the leak to compliance personnel which in turn notified the Pivox Site Construction Manager. Upon inspection the leak was traced to the RTS roll off truck that had been transporting a roll off bin to RB-2 via the RB road the previous afternoon. Once the leak was identified, the roll off truck driver immediately moved the vehicle onto a containment and cleaned the truck of any residual hydraulic oil. The roll off truck driver had performed a pre use inspection of the truck and had proper documentation. The impacted soil on the RB road and the absorbent pads used to clean the composite road mats was placed into a five-gallon bucket with lid and labeled. The estimated amount of hydraulic oil released is 3-4 oz. The estimated amount of impacted soil is 4 cubic feet (All material fit in 1-5 gallon bucket). The area was properly cleaned up, containerized, labeled and transported to IM-3 for proper handling.

Event Type: Environmental - Hazardous Materials Release (Minor)

Event Categories: Environmental (spill, release, etc.)

Activity Types: Vehicle/equipment movement

Event Cause

Cause: RC 9 - Uncontrollable (external factor, USE RARELY)

Description: Minor hydraulic oil leak on roll off truck.

Responsible Party: Prime Contractor

Prime Contractor: Pivox

Subcontractor: Remedial Transportation Service (RTS)

Third Party: N/A

Corrective Actions/Lessons Learned

Immediate Actions Taken (if applicable): The Biologist reported the leak to the compliance team and the compliance team reported the leak to the Pivox Site Construction Manager. The roll off truck was moved into a containment at the CHQ pending the repair of the hydraulic PTO pump. The composite mats were cleaned and impacted soil placed in five-gallon bucket with a lid, properly labeled and taken to IM-3 for disposal. The roll off truck driver reported the PTO pump failure to his management who dispatched a mechanic to replace the pump. The leak was not identified during the morning walk around inspections, due to the fact that the truck needed to be in operation under pressure to activate a small

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leak. AEG Health & Safety Officer notified on-site project compliance and Health & Safety teams for proper reporting.

Corrective Actions Taken to Prevent Recurrence (if applicable): The PTO pump was replaced by the mechanic and inspected by PG&E on site management (10:30 am 9/23/19) who gave the approval to put the truck back into service. In the next morning meeting (9/22/19) the Pivox Site Construction Manager discussed best practices regarding identification of leaks, proper inspections of all equipment, and importance of inspecting the work area before leaving to ensure no leaks have occurred during the workday.

Completion Date: 9/23/2019

Report Details

Report Completed By: Colton Garrard

Report Date: 9/23/2019

Attachment H
Six-Week Look-Ahead Schedule
(September 29 through November 9, 2019)

PG&E Topock Final Groundwater Remedy	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Primary Planned Activities	9/29/2019	9/30/2019	10/1/2019	10/2/2019	10/3/2019	10/4/2019	10/5/2019
Start Time (PDT)			7:15 AM	7:15 AM	7:15 AM	7:15 AM	7:15 AM
Pipeline C Installation E5, F5	No Work	No Work	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	--
TCS Approach Pipeline Installation F5, G5, G6			Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	--
Well Installation			MW-S (G5), MW-B-267 (E5), IRZ-37 site prep (F5), RB-2 (E5)	MW-S (G5), IRZ-37 pilot (F5), RB-2 (E5)	MW-S (G5), MW-11D site setup (F5), IRZ-37 pilot (F5), RB-2 (E5)	MW-S (G5), MW-11D site setup (F5), IRZ-37 pilot (F5), RB-2 (E5)	MW-S (G5), MW-11D site setup (F5), IRZ-37 pilot (F5), RB-2 (E5)
Well Development			MW-D (E5)	MW-D (E5)	MW-D (E5)	MW-B (E5)	MW-B (E5)
Well Testing			IRZ-25 (F5) - Injection Testing	IRZ-25 (F5) - Injection Testing	IRZ-25 (F5) - Injection Testing	IRZ-25 (F5) - Injection Testing	IRZ-25 (F5) - Injection Testing
Primary Planned Activities	10/6/2019	10/7/2019	10/8/2019	10/9/2019	10/10/2019	10/11/2019	10/12/2019
Start Time (PDT)	7:15 AM	7:15 AM	7:15 AM	7:15 AM	7:15 AM		
Pipeline C Installation E5, F5	--	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	No Work	No Work
TCS Approach Pipeline Installation F5, G5, G6	--	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J		
Well Installation	MW-11D (F5), IRZ-37 pilot (F5), RB-2 (E5)	MW-11D (F5), IRZ-37 pilot (F5), RB-2 (E5)	MW-11D (F5), IRZ-37 pilot (F5), IRZ-39 site setup (F5), MW-70BR site setup (G5), RB-2 (E5)	MW-11D (F5), IRZ-39 pilot (F5), MW-70BR site setup (G5), RB-2 (E5)	MW-11D (F5), IRZ-39 pilot (F5), MW-70BR site setup (G5), RB-2 (E5)		
Well Development	MW-B (E5)	MW-B (E5), IRZ-21 (E5)	MW-S (G5), IRZ-21 (E5)	MW-S (G5), IRZ-21 (E5)	RB-5 (E5), RB-4 (E5)		
Well Testing	IRZ-25 (F5) - Injection Testing	--	--	--	--		
Primary Planned Activities	10/13/2019	10/14/2019	10/15/2019	10/16/2019	10/17/2019	10/18/2019	10/19/2019
Start Time (PDT)			7:30 AM	7:30 AM	7:30 AM	7:30 AM	7:30 AM
Soil Processing Yard D1	No Work	No Work	Fence installation	Fence installation	Fence installation	Fence installation	--
Pipeline C Installation E5, F5			Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	Pipeline installation @C5 and C7	--
TCS Approach Pipeline Installation F5, G5, G6			Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	--
Well Installation			MW-11D (F5), IRZ-39 pilot (F5), MW-70BR site setup (G5), RB-2 (E5)	MW-11D (F5), IRZ-39 pilot (F5), MW-70BR site setup (G5), IRZ-17 (E5)	MW-11D (F5), MW-70BR (G5), IRZ-17 (E5)	MW-11D (F5), MW-70BR (G5), IRZ-17 (E5)	MW-11D (F5), MW-70BR (G5), IRZ-17 (E5)
Well Development			RB-5 (E5), RB-4 (E5)	RB-5 (E5), RB-4 (E5)	MW-X (E6), RB-4 (E5)	MW-X (E6), RB-4 (E5)	MW-X (E6), RB-4 (E5)
Well Testing			--	--	--	--	--
Primary Planned Activities	10/20/2019	10/21/2019	10/22/2019	10/23/2019	10/24/2019	10/25/2019	10/26/2019
Start Time (PDT)	7:30 AM	7:30 AM	7:30 AM	7:30 AM	7:30 AM		
Pipeline C Installation E5, F5	--	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	No Work	No Work
TCS Approach Pipeline Installation F5, G5, G6	--	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J		
Well Installation	MW-11D (F5), MW-70BR (G5), IRZ-17 (E5)	MW-11D (F5), MW-70BR (G5), IRZ-17 (E5)	MW-11D (F5), MW-70BR (G5), IRZ-17 (E5)	MW-70BR (G5), IRZ-17 (E5)	MW-70BR (G5), IRZ-17 (E5)		
Well Development	MW-X (E6), RB-4 (E5)	MW-X (E6), RB-3 (E5)	MW-X (E6), RB-3 (E5)	MW-Y (E6), RB-3 (E5)	MW-Y (E6), RB-3 (E5)		
Well Testing	--	--	--	--	--		
Primary Planned Activities	10/27/2019	10/28/2019	10/29/2019	10/30/2019	10/31/2019	11/1/2019	11/2/2019
Start Time (PDT)			7:30 AM	7:30 AM	7:30 AM	7:30 AM	7:30 AM
Soil Processing Yard D1	No Work	No Work	Fence installation	Fence installation	Fence installation	Fence installation	--
Pipeline C Installation E5, F5			Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	--
TCS Approach Pipeline Installation F5, G5, G6			Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	--
Well Installation			MW-70BR (G5), IRZ-17 (E5)	MW-70BR (G5), IRZ-17 (E5)	MW-70BR (G5), IRZ-17 (E5)	MW-70BR (G5), IRZ-17 (E5)	MW-70BR (G5), IRZ-17 (E5)
Well Development			MW-Y (E6), RB-3 (E5)	MW-Y (E6), RB-3 (E5)	MW-Y (E6), RB-3 (E5)	MW-Y (E6), RB-3 (E5)	IRZ-39 (F5)
Well Testing			--	--	--	--	RB-3 (E5)
Primary Planned Activities	11/3/2019	11/4/2019	11/5/2019	11/6/2019	11/7/2019	11/8/2019	11/9/2019
Start Time (PST)	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM		
Pipeline C Installation E5, F5	--	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	Pipeline installation @C5, C7 and C14 Tentative: Pipeline installation @ C6	No Work	No Work
TCS Approach Pipeline Installation F5, G5, G6	--	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J	Pipeline installation @ B and J		
Well Installation	MW-70BR (G5), IRZ-16 (E5)	MW-70BR (G5), IRZ-16 (E5)	IRZ-16 (E5)	IRZ-16 (E5)	IRZ-16 (E5)		
Well Development	IRZ-39 (F5)	IRZ-39 (F5)	IRZ-39 (F5)	IRZ-39 (F5)	IRZ-39 (F5)		
Well Testing	RB-3 (E5)	RB-3 (E5)	RB-3 (E5)	RB-3 (E5)	RB-3 (E5)		

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.

"G5" - Intrusive work location as described on the project grid map. See Project Grid Map tab for location of grid positions provided on the lookahead

Attachment I
Available Groundwater Monitoring Data
(DTSC Condition of Approval xi)

Attachment I. Available 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 initially 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 since included validated data in each monthly progress report starting with the November 2018 report.

TMP 2019-06 Baseline Sampling

ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
Alkalinity, total as CaCO3	Aluminum	Aluminum, dissolved	Antimony	Antimony, dissolved	Arsenic	Arsenic, dissolved	Barium	Barium, dissolved	Beryllium	Beryllium, dissolved
SM 2320 B mg/L	SW 6010B ug/L	SW 6010B ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L
64	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.2	1	120	120	ND (0.5)	ND (0.5)
130	1,400	ND (50)	ND (0.5)	ND (0.5)	1.5	1.1	130	80	ND (0.5)	ND (0.5)
79	110	ND (50)	ND (0.5)	ND (0.5)	2.1	2	98	95	ND (2.5)	ND (0.5)
82	610	ND (50)	ND (0.5)	ND (0.5)	3.2	2.8	93	88	ND (0.5)	ND (0.5)
82	400	ND (50)	ND (0.5)	ND (0.5)	3.3	3.1	93	95	ND (0.5)	ND (0.5)
130	560	ND (50)	ND (0.5)	ND (0.5)	4.7	4.6	77	69	ND (2.5)	ND (2.5)
84	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.4	1.3	90	84	ND (0.5)	ND (0.5)
85	340	ND (50)	ND (0.5)	ND (0.5)	1.3	1.4	92	89	ND (0.5)	ND (0.5)
120	880 J	ND (50)	ND (0.5)	ND (0.5)	3.7	3.3	51 J	39	ND (0.5)	ND (0.5)
41	100	ND (50)	ND (0.5)	ND (0.5)	3.1	3	53	50	ND (2.5)	ND (2.5)
31	520	ND (50)	ND (0.5)	ND (0.5)	4.6	4.4	45	45	ND (2.5)	ND (2.5)
97	540	ND (50 J)	ND (0.5)	ND (0.5)	0.87	0.72	69	66	ND (0.5)	ND (0.5)
68	1,300	ND (50)	ND (0.5)	ND (0.5)	2.5	2	190	210	ND (2.5)	ND (2.5)
50	1,600	72	ND (0.5)	ND (0.5)	2.7	2.5	120	130	ND (2.5)	ND (2.5)
89	930	94	ND (0.5)	ND (0.5)	1.2	1.1	44	42	ND (0.5)	ND (0.5)
66	320	ND (50)	ND (0.5)	ND (0.5)	2.2	2.1	340	330	ND (0.5)	ND (0.5)
160	290	ND (50)	ND (0.5)	ND (0.5)	1.2	1	56	56	ND (0.5)	ND (0.5)
170	290	ND (50)	ND (0.5)	ND (0.5)	1.2	1.1	56	56	ND (0.5)	ND (0.5)
62	340	ND (50)	ND (0.5)	ND (0.5)	6.7	6.3	42	40	ND (2.5)	ND (2.5)
46	420	ND (50)	ND (0.5)	ND (0.5)	4.9	4.6	98	85	ND (2.5)	ND (2.5)
54	210	ND (50)	ND (0.5)	ND (0.5)	1.1	1.1	150	150	ND (0.5)	ND (0.5)
60	270	52	ND (0.5)	ND (0.5)	5.4	5	43	39	ND (2.5)	ND (0.5)
820	640 J	ND (50)	ND (0.5)	ND (0.5)	5.5	5.5	130	130	ND (0.5)	ND (0.5)

TMP 2019-06 Baseline Sampling

							ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Boron	Boron, dissolved	Bromide	Cadmium	Cadmium, dissolved	Calcium	Calcium, dissolved	Chloride	Chromium, Hexavalent	Chromium, total
							SW 6010B ug/L	SW 6010B mg/L	EPA 300.0 mg/L	SW 6020 ug/L	SW 6020 ug/L	SW 6010B ug/L	SW 6010B mg/L	EPA 300.0 mg/L	EPA 218.6 ug/L	SW 6020 ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled										
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N			GW	6/30/2019	620	0.63	ND (2.5)	ND (0.5)	ND (0.5)	320,000	320	2,300	240	250
MW-10D	MW-10D-0619	N	LF		GW	6/26/2019	1,200	1.1	ND (2.5)	ND (0.5)	ND (0.5)	150,000	140	1,000	230	230
MW-B-117	MW-B-117-0619	N	LF		GW	6/27/2019	760	0.75	ND (2.5)	ND (0.5)	ND (0.5)	200,000	190	3,300	ND (0.2)	ND (1.0)
MW-B-33	MW-921-Q219	FD	LF	MW-B-33-0619	GW	6/27/2019	530	0.54	ND (2.5)	ND (0.5)	ND (0.5)	170,000	170	1,400	4	6.3
MW-B-33	MW-B-33-0619	N	LF		GW	6/27/2019	550	0.55	ND (2.5)	ND (0.5)	ND (0.5)	170,000	170	1,400	3.9	6.1
MW-F-104	MW-F-104-0619	N	LF		GW	6/26/2019	1,600	1.6	ND (2.5)	ND (0.5)	ND (0.5)	160,000	150	2,200	2,900	2,900
MW-F-60	MW-F-60-3V-0619	N	3V		GW	6/26/2019	610	0.59	ND (2.5)	ND (0.5)	ND (0.5)	190,000	180	760	2,100	2,200
MW-F-60	MW-F-60-LF-0619	N	LF		GW	6/26/2019	620	0.62	ND (2.5)	ND (0.5)	ND (0.5)	190,000	190	760	1,800	2,000
MW-G-57	MW-G-57-0619	N	LF		GW	6/24/2019	860 J	0.83	1.2	ND (0.5)	ND (0.5)	100,000	97	1,300	660	700
MW-L-180	MW-L-180-0619	N	LF		GW	6/25/2019	1,300	1.4	ND (2.5)	ND (0.5)	ND (0.5)	300,000	300	3,600	ND (1.0)	2.1
MW-L-225	MW-L-225-0619	N	LF		GW	6/25/2019	1,800	1.8	ND (2.5)	ND (0.5)	ND (0.5)	440,000	420	5,300	490	470
MW-L-90	MW-L-90-0619	N			GW	6/25/2019	290	0.27 J	ND (2.5)	ND (0.5)	ND (0.5)	160,000	150	550	35	37
MW-M-132	MW-M-132-0619	N			GW	6/25/2019	960	0.96	ND (2.5)	ND (0.5)	ND (0.5)	280,000	270	2,700	ND (0.2)	2.9
MW-M-193	MW-M-193-0619	N	LF		GW	6/25/2019	1,500	1.5	ND (2.5)	ND (0.5)	ND (0.5)	220,000	210	3,900	ND (1.0)	4.2
MW-M-57	MW-M-57-0619	N			GW	6/26/2019	400	0.37	ND (1.0)	ND (0.5)	ND (0.5)	81,000	77	490	2.8	7.6
MW-M-95	MW-M-95-0619	N	LF		GW	6/26/2019	470	0.43	ND (2.5)	ND (0.5)	ND (0.5)	310,000	270	1,700	ND (0.2)	1.2
MW-N-129	MW-922-Q219	FD	LF	MW-N-129-0619	GW	6/25/2019	450	0.44	ND (2.5)	ND (0.5)	ND (0.5)	120,000	120	380	140	130
MW-N-129	MW-N-129-0619	N	LF		GW	6/25/2019	440	0.43	ND (1.0)	ND (0.5)	ND (0.5)	120,000	120	380	140	130
MW-N-217	MW-N-217-0619	N	LF		GW	6/25/2019	1,900	1.9	ND (2.5)	ND (0.5)	ND (0.5)	250,000	220	3,800	870	900
MW-N-237	MW-N-237-0619	N	LF		GW	6/25/2019	2,100	2.2	ND (2.5)	ND (0.5)	ND (0.5)	440,000	440	5,800	1,200	1,400
MW-U-183	MW-U-183-0619	N	LF		GW	6/26/2019	740	0.69	ND (2.5)	ND (0.5)	ND (0.5)	380,000	340	2,200	ND (0.2)	2.3
MW-U-273	MW-U-273-0619	N	LF		GW	6/26/2019	1,200	1.1	ND (2.5)	ND (0.5)	ND (0.5)	140,000	140	2,200	0.52	3.2
MW-W-31	MW-W-31-0619	N	LF		GW	6/24/2019	1,500 J	1.6	ND (2.5)	ND (0.5)	ND (0.5)	390,000	390	4,000	ND (1.0)	ND (1.0)

TMP 2019-06 Baseline Sampling

ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
Chromium, total dissolved	Cobalt	Cobalt, dissolved	Copper	Copper, dissolved	Fluoride	Iron	Iron, dissolved	Lead	Lead, dissolved	Magnesium							
SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	EPA 300.0 mg/L	SW 6010B ug/L	SW 6010B ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6010B ug/L							
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled											
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N			GW	6/30/2019	230	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.5	59	35	ND (1.0)	ND (1.0)	46,000
MW-10D	MW-10D-0619	N	LF		GW	6/26/2019	210	0.63	ND (0.5)	ND (1.0)	ND (1.0)	1	2,600	ND (20)	ND (1.0)	ND (1.0)	31,000
MW-B-117	MW-B-117-0619	N	LF		GW	6/27/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	3.1	310	160	ND (1.0)	ND (1.0)	34,000
MW-B-33	MW-921-Q219	FD	LF	MW-B-33-0619	GW	6/27/2019	4.7	ND (0.5)	ND (0.5)	ND (1.0 J)	ND (1.0)	2.7	630	46 J	ND (1.0)	ND (1.0)	33,000
MW-B-33	MW-B-33-0619	N	LF		GW	6/27/2019	4.2	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0 J)	2.6	530	62 J	ND (1.0)	ND (1.0)	34,000
MW-F-104	MW-F-104-0619	N	LF		GW	6/26/2019	3,000	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.3	690	ND (20)	ND (1.0)	ND (1.0)	15,000
MW-F-60	MW-F-60-3V-0619	N	3V		GW	6/26/2019	2,000	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1.1	64	ND (20)	ND (1.0)	ND (1.0)	37,000
MW-F-60	MW-F-60-LF-0619	N	LF		GW	6/26/2019	1,800	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	0.91	350	ND (20)	ND (1.0)	ND (1.0)	38,000
MW-G-57	MW-G-57-0619	N	LF		GW	6/24/2019	690	ND (0.5)	ND (0.5)	ND (1.0 J)	ND (1.0 J)	3	1,300 J	23	ND (1.0)	ND (1.0)	15,000 J
MW-L-180	MW-L-180-0619	N	LF		GW	6/25/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.5	150	22	ND (1.0)	ND (1.0)	18,000
MW-L-225	MW-L-225-0619	N	LF		GW	6/25/2019	470	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.4	490	ND (20)	ND (1.0)	ND (1.0)	18,000
MW-L-90	MW-L-90-0619	N			GW	6/25/2019	33	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1.4	660	ND (20)	ND (1.0)	ND (1.0)	27,000
MW-M-132	MW-M-132-0619	N			GW	6/25/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	3.6	2,100	700	ND (1.0)	ND (1.0)	32,000
MW-M-193	MW-M-193-0619	N	LF		GW	6/25/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.3	2,000	310	ND (1.0)	ND (1.0)	12,000
MW-M-57	MW-M-57-0619	N			GW	6/26/2019	3.4	ND (0.5)	ND (0.5)	17	ND (1.0)	1.9	1,100	120	1.3	ND (1.0)	16,000
MW-M-95	MW-M-95-0619	N	LF		GW	6/26/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	3.4	1,200	680	ND (1.0)	ND (1.0)	52,000
MW-N-129	MW-922-Q219	FD	LF	MW-N-129-0619	GW	6/25/2019	130	ND (0.5)	ND (0.5)	ND (1.0 J)	ND (1.0)	0.58	290 J	ND (20)	ND (1.0)	ND (1.0)	24,000
MW-N-129	MW-N-129-0619	N	LF		GW	6/25/2019	130	ND (0.5)	ND (0.5)	20 J	ND (1.0)	0.54	400 J	ND (20)	ND (1.0)	ND (1.0)	23,000
MW-N-217	MW-N-217-0619	N	LF		GW	6/25/2019	900	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.8	420	ND (20)	ND (1.0)	ND (1.0)	9,300
MW-N-237	MW-N-237-0619	N	LF		GW	6/25/2019	1,400	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.7	580	ND (20)	ND (1.0)	ND (1.0)	12,000
MW-U-183	MW-U-183-0619	N	LF		GW	6/26/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	3.1	230	33	ND (1.0)	ND (1.0)	57,000
MW-U-273	MW-U-273-0619	N	LF		GW	6/26/2019	1	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.8	320	50	ND (1.0)	ND (1.0)	8,000
MW-W-31	MW-W-31-0619	N	LF		GW	6/24/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0 J)	1.8	10,000 J	9,500	ND (1.0)	ND (1.0)	210,000 J

TMP 2019-06 Baseline Sampling


							ASSET Magnesium, dissolved SW 6010B mg/L	ASSET Manganese SW 6020 ug/L	ASSET Manganese, dissolved SW 6020 ug/L	ASSET Mercury EPA 7470A ug/L	ASSET Mercury, dissolved EPA 7470A ug/L	ASSET Molybdenum SW 6020 ug/L	ASSET Molybdenum, dissolved SW 6020 ug/L	ASSET Nickel SW 6020 ug/L	ASSET Nickel, dissolved SW 6020 ug/L	ASSET Nitrate/Nitrite as Nitrogen SM 4500-NO3 F mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled										
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N			GW	6/30/2019	46	3.4	ND (0.5)	ND (0.2)	ND (0.2)	16	15	53	51	2.5
MW-10D	MW-10D-0619	N	LF		GW	6/26/2019	29	350	53	ND (0.2)	ND (0.2)	4.4	5	1.7	ND (1.0)	11
MW-B-117	MW-B-117-0619	N	LF		GW	6/27/2019	34	1,100	1,100	ND (0.2)	ND (0.2)	44	40	ND (1.0)	ND (1.0)	0.69
MW-B-33	MW-921-Q219	FD	LF	MW-B-33-0619	GW	6/27/2019	33	780 J	760	ND (0.2)	ND (0.2)	14	13	ND (1.0)	ND (1.0)	0.59
MW-B-33	MW-B-33-0619	N	LF		GW	6/27/2019	34	770 J	900	ND (0.2)	ND (0.2)	14	14	ND (1.0)	ND (1.0)	0.61
MW-F-104	MW-F-104-0619	N	LF		GW	6/26/2019	14	210	180	ND (0.2)	ND (0.2)	27	28	1.3	ND (1.0)	15
MW-F-60	MW-F-60-3V-0619	N	3V		GW	6/26/2019	37	260	200	ND (0.2)	ND (0.2)	13	13	1.2	ND (1.0)	8.2
MW-F-60	MW-F-60-LF-0619	N	LF		GW	6/26/2019	38	280	250	ND (0.2)	ND (0.2)	13	14	ND (1.0)	ND (1.0)	7.5
MW-G-57	MW-G-57-0619	N	LF		GW	6/24/2019	14	9.9	ND (0.5)	ND (0.2)	ND (0.2)	33	34	1.1	ND (1.0)	14
MW-L-180	MW-L-180-0619	N	LF		GW	6/25/2019	18	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	32	31	ND (1.0)	ND (1.0)	0.38
MW-L-225	MW-L-225-0619	N	LF		GW	6/25/2019	17	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	45	47	ND (1.0)	ND (1.0)	0.55
MW-L-90	MW-L-90-0619	N			GW	6/25/2019	25 J	22	ND (0.5)	ND (0.2)	ND (0.2)	4	3.8	2.6	1.4	4
MW-M-132	MW-M-132-0619	N			GW	6/25/2019	31	1,000	960	ND (0.2)	ND (0.2)	22	21	ND (1.0)	ND (1.0)	0.11
MW-M-193	MW-M-193-0619	N	LF		GW	6/25/2019	11	440	390	ND (0.2)	ND (0.2)	44	49	1.5	ND (1.0)	0.25
MW-M-57	MW-M-57-0619	N			GW	6/26/2019	16	330	270	ND (0.2)	ND (0.2)	21	22	6.5	1.5	5.6
MW-M-95	MW-M-95-0619	N	LF		GW	6/26/2019	47	2,100	1,800	ND (0.2)	ND (0.2)	20	20	ND (1.0)	ND (1.0)	0.35
MW-N-129	MW-922-Q219	FD	LF	MW-N-129-0619	GW	6/25/2019	24	1.1 J	ND (0.5)	ND (0.2)	ND (0.2)	3.9	3.8	7.2	6	17
MW-N-129	MW-N-129-0619	N	LF		GW	6/25/2019	23	4.9 J	ND (0.5)	ND (0.2)	ND (0.2)	3.6	3.6	7.7	6.1	16
MW-N-217	MW-N-217-0619	N	LF		GW	6/25/2019	8.4	80	77	ND (0.2)	ND (0.2)	97	93	ND (1.0)	ND (1.0)	6.7
MW-N-237	MW-N-237-0619	N	LF		GW	6/25/2019	12	290	250	ND (0.2)	ND (0.2)	78	83	2.2	ND (1.0)	3.1
MW-U-183	MW-U-183-0619	N	LF		GW	6/26/2019	52	470	400	ND (0.2)	ND (0.2)	13	13	1.1	ND (1.0)	1.8
MW-U-273	MW-U-273-0619	N	LF		GW	6/26/2019	7.4	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	38	36	1.8	1	2.7
MW-W-31	MW-W-31-0619	N	LF		GW	6/24/2019	220	350	310	ND (0.2)	ND (0.2)	14	15	ND (1.0)	ND (1.0)	0.088

TMP 2019-06 Baseline Sampling

ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
Potassium, dissolved	Selenium	Selenium, dissolved	Silver	Silver, dissolved	Sodium, dissolved	Sulfate	Thallium	Thallium, dissolved	Total dissolved solids							
SW 6010B mg/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6020 ug/L	SW 6010B mg/L	EPA 300.0 mg/L	SW 6020 ug/L	SW 6020 ug/L	SM 2540 C mg/L							
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled										
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N			GW	6/30/2019	13	1.6	1.5	ND (0.5)	ND (0.5)	1,300	340	ND (0.5)	ND (0.5)	4,700
MW-10D	MW-10D-0619	N	LF		GW	6/26/2019	13	7.7	7	ND (0.5)	ND (0.5)	670	350	ND (0.5)	ND (0.5)	2,300
MW-B-117	MW-B-117-0619	N	LF		GW	6/27/2019	17	0.64	0.55	ND (0.5)	ND (0.5)	1,600	480	ND (0.5)	ND (0.5)	6,600
MW-B-33	MW-921-Q219	FD	LF	MW-B-33-0619	GW	6/27/2019	11	0.79	0.75	ND (0.5)	ND (0.5)	730	240	ND (0.5)	ND (0.5)	3,100
MW-B-33	MW-B-33-0619	N	LF		GW	6/27/2019	11	0.58	0.73	ND (0.5)	ND (0.5)	690	250	ND (0.5)	ND (0.5)	3,200
MW-F-104	MW-F-104-0619	N	LF		GW	6/26/2019	17	77	79	ND (0.5)	ND (0.5)	1,500	860	ND (0.5)	ND (0.5)	4,800
MW-F-60	MW-F-60-3V-0619	N	3V		GW	6/26/2019	14	9.8	10	ND (0.5)	ND (0.5)	390	390	ND (0.5)	ND (0.5)	1,800
MW-F-60	MW-F-60-LF-0619	N	LF		GW	6/26/2019	15	9.7	9.4	ND (0.5)	ND (0.5)	390	390	ND (0.5)	ND (0.5)	1,900
MW-G-57	MW-G-57-0619	N	LF		GW	6/24/2019	12	30	28	ND (0.5)	ND (0.5)	1,100	490	ND (0.5)	ND (0.5)	3,000
MW-L-180	MW-L-180-0619	N	LF		GW	6/25/2019	19	0.68	0.8	ND (0.5)	ND (0.5)	2,300	490	ND (0.5)	ND (0.5)	7,100
MW-L-225	MW-L-225-0619	N	LF		GW	6/25/2019	26	0.66	0.68	ND (0.5)	ND (0.5)	4,000	680	ND (0.5)	ND (0.5)	10,000
MW-L-90	MW-L-90-0619	N			GW	6/25/2019	9.6	2.9	3	ND (0.5)	ND (0.5)	220	160	ND (0.5)	ND (0.5)	1,400
MW-M-132	MW-M-132-0619	N			GW	6/25/2019	19	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,700	310	ND (0.5)	ND (0.5)	5,200
MW-M-193	MW-M-193-0619	N	LF		GW	6/25/2019	27	0.65	0.58	ND (0.5)	ND (0.5)	2,700	460	ND (0.5)	ND (0.5)	8,800
MW-M-57	MW-M-57-0619	N			GW	6/26/2019	9	3.1	3.3	ND (0.5)	ND (0.5)	270	170	ND (0.5)	ND (0.5)	1,100
MW-M-95	MW-M-95-0619	N	LF		GW	6/26/2019	14	0.5	ND (0.5)	ND (0.5)	ND (0.5)	700	210	ND (0.5)	ND (0.5)	3,000
MW-N-129	MW-922-Q219	FD	LF	MW-N-129-0619	GW	6/25/2019	8.3	9.2	9.3	ND (0.5)	ND (0.5)	290	200	ND (0.5)	ND (0.5)	1,200
MW-N-129	MW-N-129-0619	N	LF		GW	6/25/2019	8.2	8.6	9.6	ND (0.5)	ND (0.5)	270	200	ND (0.5)	ND (0.5)	1,200
MW-N-217	MW-N-217-0619	N	LF		GW	6/25/2019	26	6.5	6.5	ND (0.5)	ND (0.5)	2,700	1,000	ND (0.5)	ND (0.5)	7,200
MW-N-237	MW-N-237-0619	N	LF		GW	6/25/2019	38	2.9	2.7	ND (0.5)	ND (0.5)	4,300	890	ND (0.5)	ND (0.5)	11,000 J
MW-U-183	MW-U-183-0619	N	LF		GW	6/26/2019	14	2	1.6	ND (0.5)	ND (0.5)	990	440	ND (0.5)	ND (0.5)	4,100
MW-U-273	MW-U-273-0619	N	LF		GW	6/26/2019	16	4.1	3.5	ND (0.5)	ND (0.5)	1,500	480	ND (0.5)	ND (0.5)	4,000
MW-W-31	MW-W-31-0619	N	LF		GW	6/24/2019	15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2,900	1,400	ND (0.5)	ND (0.5)	8,300

TMP 2019-06 Baseline Sampling

							ASSET Total organic carbon SM 5310 C mg/L	ASSET TPH as diesel SW 8015B ug/L	ASSET TPH as motor oil SW 8015B ug/L	ASSET Vanadium SW 6020 ug/L	ASSET Vanadium, dissolved SW 6020 ug/L	ASSET Zinc SW 6020 ug/L	ASSET Zinc, dissolved SW 6020 ug/L	BC Labs Ammonia as nitrogen SM 4500-NH3 G mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled								
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N			GW	6/30/2019	ND (1.0)	ND (54)	ND (54)	4.4	3.2	60	61	ND (0.2)
MW-10D	MW-10D-0619	N	LF		GW	6/26/2019	ND (1.0)			8.2	5.4 J	ND (10)	ND (10)	ND (0.2)
MW-B-117	MW-B-117-0619	N	LF		GW	6/27/2019	ND (1.0)			ND (1.0 J)	ND (1.0)	ND (10)	ND (10)	ND (0.2)
MW-B-33	MW-921-Q219	FD	LF	MW-B-33-0619	GW	6/27/2019	ND (1.0)			1.5 J	ND (1.0)	ND (10)	ND (10)	ND (0.2)
MW-B-33	MW-B-33-0619	N	LF		GW	6/27/2019	ND (1.0)			1.5 J	ND (1.0)	ND (10)	ND (10)	ND (0.2)
MW-F-104	MW-F-104-0619	N	LF		GW	6/26/2019	ND (1.0)			3.9	3.1 J	ND (10)	ND (10)	ND (0.2)
MW-F-60	MW-F-60-3V-0619	N	3V		GW	6/26/2019	ND (1.0)			2.7	2.5 J	ND (10)	ND (10)	ND (0.2)
MW-F-60	MW-F-60-LF-0619	N	LF		GW	6/26/2019	ND (10)			2.7	2.1 J	ND (10)	ND (10)	ND (0.2)
MW-G-57	MW-G-57-0619	N	LF		GW	6/24/2019	ND (1.0)			5.6 J	3.8 J	ND (10)	ND (10)	ND (2.0)
MW-L-180	MW-L-180-0619	N	LF		GW	6/25/2019	ND (1.0)			7.4	6.8	ND (10)	ND (10)	ND (0.2)
MW-L-225	MW-L-225-0619	N	LF		GW	6/25/2019	ND (1.0)			8.1	6.9	13	ND (10)	ND (0.2)
MW-L-90	MW-L-90-0619	N			GW	6/25/2019	ND (10)			3.2	2.5	ND (10)	ND (10)	ND (0.2)
MW-M-132	MW-M-132-0619	N			GW	6/25/2019	ND (1.0)			2.6	ND (1.0)	ND (10)	ND (10)	ND (0.2)
MW-M-193	MW-M-193-0619	N	LF		GW	6/25/2019	ND (1.0)			4.8	2.2	ND (10)	ND (10)	ND (0.2)
MW-M-57	MW-M-57-0619	N			GW	6/26/2019	ND (1.0)			3.6	2.3 J	51	ND (10)	ND (0.2)
MW-M-95	MW-M-95-0619	N	LF		GW	6/26/2019	ND (1.0)			1.2	ND (1.0)	ND (10)	ND (10)	ND (0.2)
MW-N-129	MW-922-Q219	FD	LF	MW-N-129-0619	GW	6/25/2019	ND (1.0)			7.2	6.9	ND (10)	ND (10)	ND (0.2)
MW-N-129	MW-N-129-0619	N	LF		GW	6/25/2019	ND (10)			7.4	6.7	13	ND (10)	ND (0.2)
MW-N-217	MW-N-217-0619	N	LF		GW	6/25/2019	ND (1.0)			6.6	5.7	ND (10)	ND (10)	ND (0.2)
MW-N-237	MW-N-237-0619	N	LF		GW	6/25/2019	ND (1.0)			4	2.9	ND (10)	ND (10)	ND (0.2)
MW-U-183	MW-U-183-0619	N	LF		GW	6/26/2019	ND (1.0)			2.1	2.2 J	ND (10)	ND (10)	ND (0.2)
MW-U-273	MW-U-273-0619	N	LF		GW	6/26/2019	ND (1.0)			15	13 J	ND (10)	ND (10)	ND (0.2)
MW-W-31	MW-W-31-0619	N	LF		GW	6/24/2019	ND (2.0)			3.7 J	2.6 J	ND (10)	ND (10)	9.5

<div><div><div>Design & Consultancy for natural and built assets</div></div><div><div>Lab</div><div>Description</div><div>Method</div><div>Units</div></div></div>					ASSET Alkalinity, total as CaCO3	ASSET Calcium, dissolved	ASSET Chloride	ASSET Chromium, Hexavalent	ASSET Chromium, total dissolved	ASSET Iron, dissolved	ASSET Magnesium, dissolved	ASSET Manganese, dissolved	ASSET Nitrate/Nitrite as Nitrogen	ASSET pH	ASSET Sodium, dissolved	ASSET Specific conductance	ASSET Sulfate	ASSET Total dissolved solids
PMP 2019-07 Sampling					SM 2320 B	EPA 200.7	EPA 300.0	EPA 218.6	EPA 200.8	EPA 200.7	EPA 200.7	EPA 200.8	SM 4500-NO3 F	SM 4500-H+ B PHUNITS	EPA 200.7	EPA 120.1	EPA 300.0	SM 2540 C
					mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L		mg/L	uS/cm	mg/L	mg/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled														
PE-01	PE-01-0719	N	GW	7/24/2019	250	140	810	ND (0.2)	ND (1.0)	ND (20)	37	450	ND (0.05)	7.3	510	3,300	310	2,000
TW-03D	TW-03D-0719	N	GW	7/24/2019	160	180	2,100	450	430	ND (20)	27	ND (0.5)	2.7	7.2	1,400	7,200	470	4,300

TMP 2019-07 Baseline Sampling

							Lab Description Method Units	ASSET Alkalinity, total as CaCO3 SM 2320 B mg/L	ASSET Aluminum SW 6010B ug/L	ASSET Aluminum, dissolved SW 6010B ug/L	ASSET Antimony SW 6020 ug/L	ASSET Antimony, dissolved SW 6020 ug/L	ASSET Arsenic SW 6020 ug/L	ASSET Arsenic, dissolved SW 6020 ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled								
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019	72	ND (50)	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	1.5	1.6
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019	120	200	ND (50)	4.3	4.5	4.5	1.9	1.6
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019	80	69	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	2.1	2.1
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019	86	620	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	3.2	2.9
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019	85	620	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	3.2	3.1
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019	82	150	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	1.2	1.1
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019	83	400	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	1.3	1.2
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019	37	460	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	3.9	3.1
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019	38	390	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	3.8	3.1
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019	62	1,500	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	2.5	2.3
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019	49	2,100	70	ND (0.5)	ND (0.5)	ND (0.5)	3.5	2.8
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019	80	890	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	1.2	1.1
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019	55	220	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	1.2	1.1
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019	110	430	54	2.7	1	1	4.6	4.6
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019	73	ND (50)	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	1.5	1.4
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019	45	760	83	ND (0.5)	ND (0.5)	ND (0.5)	1.6	1.7
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019	49	320	52	ND (0.5)	ND (0.5)	ND (0.5)	3	2.7
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019	53	350	ND (50)	ND (0.5)	ND (0.5)	ND (0.5)	1.2	1.1
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019	58	2,100	51	ND (0.5)	ND (0.5)	ND (0.5)	6.4	5.4

= Preliminary result

TMP 2019-07 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Barium	Barium, dissolved	Beryllium	Beryllium, dissolved	Boron	Boron, dissolved
							Method	SW 6020	SW 6020	SW 6020	SW 6020	SW 6010B	SW 6010B
							Units	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
							ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Barium	Barium, dissolved	Beryllium	Beryllium, dissolved	Boron	Boron, dissolved	Bromide
							SW 6020	SW 6020	SW 6020	SW 6020	SW 6010B	SW 6010B	EPA 300.0
							ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled							
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019	69	73	ND (0.5)	ND (0.5)	440	0.5	ND (2.5)
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019	120	110	ND (0.5)	ND (0.5)	1,100	1.1	ND (2.5)
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019	100	94	ND (2.5)	ND (0.5)	880	0.88	ND (2.5)
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019	96	86	ND (0.5)	ND (0.5)	560	0.61	ND (2.5)
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019	99	86	ND (0.5)	ND (0.5)	620	0.58	ND (2.5)
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019	87	92	ND (0.5)	ND (0.5)	640	0.65	ND (2.5)
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019	94	91	ND (0.5)	ND (0.5)	640	0.67	ND (2.5)
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019	56	54	ND (0.5)	ND (0.5)	1,400	0.7 J	ND (2.5)
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019	55	55	ND (0.5)	ND (0.5)	1,400	1.5 J	ND (2.5)
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019	180	170	ND (2.5)	ND (0.5)	1,000	0.99	ND (2.5)
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019	110	98	ND (2.5)	ND (0.5)	1,700	1.7	ND (2.5)
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019	49	42	ND (0.5)	ND (0.5)	420	0.4	ND (1.0)
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019	290	270	ND (0.5)	ND (0.5)	450	0.42	ND (2.5)
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019	45	37	ND (0.5)	ND (0.5)	1,000	1	ND (1.0)
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019	51	46	ND (0.5)	ND (0.5)	350	0.35	ND (1.0)
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019	190	190	ND (2.5)	ND (0.5)	1,100	1.1	ND (2.5)
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019	230	220	ND (2.5)	ND (0.5)	1,500	1.5	ND (2.5)
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019	170	170	ND (0.5)	ND (0.5)	720	1.5	ND (2.5)
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019	53	41	ND (0.5)	ND (0.5)	1,200	1.3	ND (2.5)


= Preliminary result

TMP 2019-07 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Cadmium	Cadmium,	Calcium	Calcium,	Chloride	Chromium,
							Method	SW 6020	dissolved	SW 6010B	dissolved	EPA 300.0	Hexavalent
							Units	ug/L	SW 6020	ug/L	SW 6010B	mg/L	EPA 218.6
									ug/L		mg/L		ug/L
													Chromium, total
													SW 6020
													ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled							
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019	ND (0.5)	ND (0.5)	180,000	200	1,200	87	93
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019	ND (0.5)	ND (0.5)	100,000	99	880	31	33
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	200,000	200	3,400	0.6	4.6
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019	ND (0.5)	ND (0.5)	170,000	180	1,500	8.3	9.5
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	190,000	170	1,400	8.3	9.6
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019	ND (0.5)	ND (0.5)	200,000	190	760	2,400	2,400
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019	ND (0.5)	ND (0.5)	190,000	200	770	2,000	2,300
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019	ND (0.5)	ND (0.5)	270,000	310	3,600	ND (1.0)	12
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019	ND (0.5)	ND (0.5)	280,000	280	3,700	ND (1.0)	10
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	270,000	260	2,700	ND (0.2)	7
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	200,000	210	4,100	ND (1.0)	61
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	84,000	82	450	12	15
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	290,000	270	1,700	ND (0.2)	ND (1.0)
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	71,000	70	1,200	0.66	24
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	88,000	87	430	11	10
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	240,000	240	2,700	ND (0.2)	1.8
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	250,000	240	3,500	ND (1.0)	24
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019	ND (0.5)	ND (0.5)	360,000	290	2,200	0.4	2.9
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019	ND (0.5)	ND (0.5)	130,000	140	2,200	0.41	56

= Preliminary result

TMP 2019-07 Baseline Sampling



Design & Consultancy

for natural and built assets

TMP 2019-07 Baseline Sampling

Lab

Description

Method

Units

ASSET
Chromium, total
dissolved
SW 6020
ug/L

ASSET
Cobalt
SW 6020
ug/L

ASSET
Cobalt, dissolved
SW 6020
ug/L

ASSET
Copper
SW 6020
ug/L

ASSET
Copper,
dissolved
SW 6020
ug/L

ASSET
Fluoride
EPA 300.0
mg/L

ASSET
Iron
SW 6010B
ug/L

Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled							
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019	90	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0 J)	2.4	64
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019	29	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2	330 J
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.9	130
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019	6.7 J	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.7	790
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019	8.3 J	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.6	800
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019	2,400	0.62	ND (0.5)	ND (1.0)	ND (1.0)	1.7	290
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019	2,000	0.99	ND (0.5)	ND (1.0)	ND (1.0)	0.76	620
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019	1.1	0.53	ND (0.5)	ND (1.0)	ND (1.0)	4.3	710
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019	1.3	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.2	640
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019	ND (1.0)	1.9	ND (0.5)	ND (1.0)	ND (1.0)	3.4	2,700
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019	1.2	21	1.3	14	ND (1.0)	4	3,400
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019	11	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	1.8	1,300
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.7	580
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019	2.8	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	4.4	610
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019	10	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	2.1	53
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	3.5	830
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019	2	8.1	1.3	3.6	ND (1.0)	4.3	880
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)	3	370
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019	1	5.2	0.63	9.5	ND (1.0)	4.8	4,000

= Preliminary result

TMP 2019-07 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Iron, dissolved	Lead	Lead, dissolved	Magnesium	Magnesium, dissolved	Manganese
							Method	SW 6010B	SW 6020	SW 6020	SW 6010B	SW 6010B	SW 6020
							Units	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled							
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019	35	ND (1.0)	ND (1.0)	29,000	33	ND (0.5)	ND (0.5)
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019	60	ND (1.0)	ND (1.0)	25,000	24	130	ND (0.5)
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019	71	ND (1.0)	ND (1.0)	40,000	40	1,000	1,100
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019	44	ND (1.0)	ND (1.0)	33,000	36	470	500
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019	53	ND (1.0)	ND (1.0)	38,000	35	480	470
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019	43	ND (1.0)	ND (1.0)	41,000	41	170	170
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019	110	ND (1.0)	ND (1.0)	41,000	43	170	160
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019	43	ND (5.0)	ND (1.0)	19,000	19	ND (0.5)	ND (0.5)
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019	25	ND (5.0)	ND (5.0)	20,000	20	ND (0.5)	ND (0.5)
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019	480	ND (1.0)	ND (1.0)	32,000	31	730	740
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019	180	ND (1.0)	ND (1.0)	12,000	11	350	320
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019	48	ND (1.0)	ND (1.0)	15,000	15	190	180
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019	230	ND (1.0)	ND (1.0)	53,000	51	1,400	1,400
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019	97	ND (1.0)	ND (1.0)	6,800	6.7	27	26
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019	23	ND (1.0)	ND (1.0)	15,000	15	ND (0.5)	ND (0.5)
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019	300	ND (1.0)	ND (1.0)	27,000	27	480	540
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019	260	ND (1.0)	ND (1.0)	23,000	22	500	500
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019	31	ND (1.0)	ND (1.0)	62,000	20	140	120
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019	60	ND (1.0)	ND (1.0)	8,800	8.4	17	ND (0.5)

= Preliminary result

TMP 2019-07 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Mercury	Mercury,	Molybdenum	Molybdenum,	Nickel	Nickel,
							Method	EPA 7470A	dissolved	SW 6020	dissolved	SW 6020	dissolved
							Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
													Nitrate/Nitrite as Nitrogen
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled							SM 4500-NO3 F
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019	ND (0.2)	ND (0.2)	8	8.1	6.4	6.7 J	2.8
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019	ND (0.2)	ND (0.2)	37	34	1.3	ND (1.0)	5.1
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019	ND (0.2)	ND (0.2)	44	43	ND (1.0)	ND (1.0)	0.51
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019	ND (0.2)	ND (0.2)	11	11	ND (1.0)	ND (1.0)	0.77
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019	ND (0.2)	ND (0.2)	11	11	ND (1.0)	ND (1.0)	0.78
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019	ND (0.2)	ND (0.2)	13	14	7.9	2.7	8.1
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019	ND (0.2)	ND (0.2)	14	14	12	3.2	9.8
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019	ND (0.2)	ND (0.2)	36	35	3.8	ND (1.0)	0.37
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019	ND (0.2)	ND (0.2)	35	35	2.8	ND (1.0)	0.44
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019	ND (0.2)	ND (0.2)	24	24	6.7	ND (1.0)	0.13
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019	ND (0.2)	ND (0.2)	73	52	110	8.4	0.4
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019	ND (0.2)	ND (0.2)	18	18	1.8	ND (1.0)	7.3
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019	ND (0.2)	ND (0.2)	11	10	ND (1.0)	ND (1.0)	0.45
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019	ND (0.2)	ND (0.2)	58	58	3.5	ND (1.0)	ND (0.05)
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019	ND (0.2)	ND (0.2)	14	14	ND (1.0)	ND (1.0)	6.6
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019	ND (0.2)	ND (0.2)	27	27	ND (1.0)	ND (1.0)	0.19
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019	ND (0.2)	ND (0.2)	63	57	32	6.1	ND (0.05)
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019	ND (0.2)	ND (0.2)	12	12	1.3	ND (1.0)	1.8
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019	ND (0.2)	ND (0.2)	50	44	40	8.6	2.6

= Preliminary result

TMP 2019-07 Baseline Sampling

							Lab						
							Description	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Method	Potassium, dissolved SW 6010B	Selenium SW 6020	Selenium, dissolved SW 6020	Silver SW 6020	Silver, dissolved SW 6020	Sodium, dissolved SW 6010B
							Units	mg/L	ug/L	ug/L	ug/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled							
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019		9.2	1.4	2	ND (0.5)	ND (0.5)	670
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019		15	5	4.6	ND (0.5)	ND (0.5)	610
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019		17	0.77	0.52	ND (0.5)	ND (0.5)	2,200
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019		11	0.7	0.56	ND (0.5)	ND (0.5)	830
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019		11	0.77	1.1	ND (0.5)	ND (0.5)	830
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019		15	11	11	4.1	ND (0.5)	420
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019		15	10	10	7.7	ND (0.5)	430
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019		15 J	0.71	0.52	1.8	ND (0.5)	1,100 J
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019		19 J	0.66	0.55	1.2	ND (0.5)	2,100 J
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019		17	ND (0.5)	ND (0.5)	2	ND (0.5)	1,500
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019		29	0.94	0.69	53	0.85	2,700
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019		9.1	3.7	3.9	ND (0.5)	ND (0.5)	300
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019		13	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	770
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019		17	0.72	ND (0.5)	ND (0.5)	ND (0.5)	910
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019		11	5.4	4.5	ND (0.5)	ND (0.5)	310
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019		16	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,600
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019		23	ND (0.5)	ND (0.5)	26	2.2	2,200
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019		20	2.2	1.9	ND (0.5)	ND (0.5)	2,400
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019		17	4	3.8	42	1.1	1,500

= Preliminary result

TMP 2019-07 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Thallium	Thallium,	Total dissolved	Total organic	TPH as diesel	TPH as motor oil
							Method	SW 6020	dissolved	solids	carbon	SW 8015B	SW 8015B
							Units	ug/L	SW 6020	SM 2540 C	SM 5310 C	ug/L	ug/L
								ug/L	ug/L	mg/L	mg/L		ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled							
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019	ND (0.5)	ND (0.5)	2,800	ND (1.0)	ND (50)	ND (50)	6.5
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019	ND (0.5)	ND (0.5)	2,100	ND (1.0)			3.2
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	6,100	ND (1.0)			ND (1.0)
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019	ND (0.5)	ND (0.5)	3,200	ND (1.0)			2.4
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	3,100	ND (1.0)			2.4
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019	ND (0.5)	ND (0.5)	2,100	ND (1.0)			3.4
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019	ND (0.5)	ND (0.5)	2,100	ND (1.0)			3.3
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019	ND (2.5)	ND (0.5)	6,800	ND (1.0)			8.4
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019	ND (2.5)	ND (2.5)	7,000	ND (1.0)			8
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	5,400	ND (1.0)			2.6
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	7,200	ND (1.0)			7.7
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	1,200	ND (1.0)			6.3
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019	ND (0.5)	ND (0.5)	4,300	ND (1.0)			1.3
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	2,600	ND (1.0)			1.7
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	950	ND (1.0)			2.4
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	5,100	ND (1.0)			1.4
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019	ND (0.5)	ND (0.5)	6,600	ND (1.0)			1.4
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019	ND (0.5)	ND (0.5)	5,100	ND (1.0)			3.2
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019	ND (0.5)	ND (0.5)	4,300	ND (1.0)			20

= Preliminary result

TMP 2019-07 Baseline Sampling

							Lab				
							Description	ASSET	ASSET	ASSET	BCLabs
							Method	Vanadium, dissolved	Zinc	Zinc, dissolved	Ammonia as nitrogen
							Units	SW 6020	SW 6020	SW 6020	SM 4500-NH3 G
								ug/L	ug/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled					
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N			GW	7/11/2019		6.6	40	40	ND (2.0)
MW-10D	MW-10D-0719	N	LF		GW	7/24/2019		2.6	42	30 J	ND (2.0)
MW-B-117	MW-B-117-0719	N	LF		GW	7/23/2019		ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-B-33	MW-906-Q319	FD	LF	MW-B-33-0719	GW	7/23/2019		1.4	ND (10)	ND (10)	ND (2.0)
MW-B-33	MW-B-33-0719	N	LF		GW	7/23/2019		1.6	ND (10)	ND (10)	ND (2.0)
MW-F-60	MW-F-60-3V-0719	N	LF		GW	7/25/2019		3	ND (10)	ND (10)	ND (2.0)
MW-F-60	MW-F-60-LF-0719	N	LF		GW	7/25/2019		2.2	ND (10)	ND (10)	ND (2.0)
MW-L-180	MW-907-Q319	FD	LF	MW-L-180-0719	GW	7/25/2019		6.8	ND (10)	ND (10)	ND (2.0)
MW-L-180	MW-L-180-0719	N	LF		GW	7/25/2019		6.7	ND (10)	ND (10)	ND (2.0)
MW-M-132	MW-M-132-0719	N	LF		GW	7/22/2019		ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-M-193	MW-M-193-0719	N	LF		GW	7/22/2019		3	18	ND (10)	ND (2.0)
MW-M-57	MW-M-57-0719	N	LF		GW	7/22/2019		4.7	ND (10)	ND (10)	ND (2.0)
MW-M-95	MW-M-95-0719	N	LF		GW	7/22/2019		ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-N-217	MW-N-217-0719	N	LF		GW	7/23/2019		ND (1.0)	32	ND (10)	ND (2.0)
MW-R-109	MW-R-109-0719	N	LF		GW	7/23/2019		2.4	ND (10)	ND (10)	ND (2.0)
MW-R-192	MW-R-192-0719	N	LF		GW	7/23/2019		ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-R-275	MW-R-275-0719	N	LF		GW	7/23/2019		ND (1.0)	38	12	ND (2.0)
MW-U-183	MW-U-183-0719	N	LF		GW	7/24/2019		2.6	ND (10)	ND (10)	ND (2.0)
MW-U-273	MW-U-273-0719	N	LF		GW	7/24/2019		14	32	ND (10)	ND (2.0)

= Preliminary result



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TMP 2019-07 Post-Development Sampling

					Lab Description Method Units	ASSET Chromium, Hexavalent EPA 218.6 ug/L	ASSET Chromium, total dissolved SW 6020 ug/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled			
MW-O-120	MW-O-120-072319	N	GW	7/23/2019		ND (1.0)	ND (1.0)
MW-O-140	MW-O-140-071819	N	GW	7/18/2019		ND (1.0)	ND (1.0)
MW-O-30	MW-O-30-071719	N	GW	7/17/2019		ND (0.2)	ND (1.0)
MW-O-66	MW-O-66-071519	N	GW	7/15/2019		ND (0.2)	ND (1.0)
MW-R-139	MW-R-139-071319	N	GW	7/13/2019		ND (0.2)	ND (1.0)
MW-R-192	MW-R-192-070219	N	GW	7/2/2019		ND (0.2)	ND (1.0)
MW-R-275	MW-R-275-070919	N	GW	7/9/2019		ND (1.0)	ND (1.0)

TMP 2019-07 Pilot Test Location Sampling

					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
					Description	Arsenic, dissolved	Chromium, Hexavalent	Chromium, total dissolved	Iron, dissolved	Manganese, dissolved	Molybdenum, dissolved	Nitrate/Nitrite as Nitrogen	Selenium, dissolved	Sulfate
					Method	SW 6020	EPA 218.6	SW 6020	SW 6010B	SW 6020	SW 6020	F	SW 6020	EPA 300.0
					Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled										
PT8D	PT8D-Q319	N	GW	7/24/2019	1.2	1,300	1,200	39	41	46	7.7	8.6	1,000	ND (1.0)
PT8M	PT8M-Q319	N	GW	7/24/2019	5.3	ND (0.2)	38	9,900	6,000	7	0.12	ND (0.5)	890	ND (1.0)
PT8S	PT8S-Q319	N	GW	7/24/2019	7.7	ND (0.2)	1.6	120	660	33	0.58	0.76	300	ND (1.0)
PT9D	PT9D-Q319	N	GW	7/24/2019	3.9	9,500	9,300	69	ND (0.5)	75	9.1	8.9	1,300	ND (1.0)
PT9M	PT9M-Q319	N	GW	7/24/2019	0.82	200	210	65	ND (0.5)	5	0.48	4.9	740	ND (2.0)
PT9S	PT9S-Q319	N	GW	7/24/2019	3	65	63	79	700	21	2.8	2.4	300	ND (1.0)



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GMP 2019-08 AZ Sampling

					Lab Description Method Units	EMXT Chromium, Hexavalent EPA 218.6 ug/L	EMXT Chromium, total dissolved SW 6020A ug/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled			
MW-54-195	MW-54-195-1FF-0819	N	GW	8/22/2019		ND (0.5)	ND (2.0)
MW-54-195	MW-54-195-2FF-0819	N	GW	8/22/2019		ND (0.5)	ND (2.0)

GMP 2019-09 Sampling

							Lab							
							Description	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Method	Arsenic, dissolved	Chromium, Hexavalent	Chromium, total dissolved	Manganese, dissolved	Molybdenum, dissolved	Nitrate/Nitrite as Nitrogen	Selenium, dissolved
							Units	SW 6020	EPA 218.6	SW 6020	SW 6020	SW 6020	SM 4500-NO3 F	SW 6020
								ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled								
MW-58BR	MW-58BR-Q319	N	LF		GW	8/19/2019	1.9	90	88 J	230	22	1.5	2.7	7,500
MW-58BR	MW-901-Q319	FD		MW-58BR-Q319	GW	8/19/2019	1.9	90	89 J	220	23	1.4	2.6	7,600
MW-64BR	MW-64BR-Q319	N	LF		GW	8/22/2019	3.6	ND (1.0)	ND (1.0)	840	62	ND (0.05)	ND (0.5)	13,000
MW-72-080	MW-72-080-Q319	N	LF		GW	8/22/2019	13	93	91	ND (0.5)	77	0.71	1.4	15,000
MW-72BR-200	MW-72BR-200-Q319	N	LF		GW	8/22/2019	9.8	ND (1.0)	ND (1.0)	130	61	ND (0.05)	ND (0.5)	14,000
MW-73-080	MW-73-080-Q319	N	LF		GW	8/22/2019	1.7	20	18	ND (0.5)	29	2.9	3.2	11,000

 = Preliminary result

PMP 2019-08 Sampling

Lab						ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
Description						Alkalinity, total as CaCO3	Calcium, dissolved	Chloride	Chromium, Hexavalent	Chromium, total dissolved	Iron, dissolved	Magnesium, dissolved	Manganese, dissolved	Nitrate/Nitrite as Nitrogen	pH	Sodium, dissolved	Specific conductance	Sulfate
Method						SM 2320 B	EPA 200.7	EPA 300.0	EPA 218.6	EPA 200.8	EPA 200.7	EPA 200.7	EPA 200.8	SM 4500-NO3 F	SM 4500-H+ B PHUNITS	EPA 200.7	EPA 120.1	EPA 300.0
Units						mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L		mg/L	uS/cm	mg/L
Location ID	Sample ID	Sample Type	Sample Method	Matrix	Date Sampled													
PE-01	PE-01-0819	N	G	GW	8/22/2019	230	110	510	ND (0.2)	ND (1.0)	47	30	390	ND (0.05)	7.4	290	2,400	260
TW-03D	TW-03D-0819	N	G	GW	8/22/2019	160	190	2,000	410	430	ND (20)	26	ND (0.5)	2.6	7.2	1,400	6,900	480

= Preliminary result

RMP 2019-07 SURFACEWAT Sampling

Lab							ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	
Description							Arsenic, dissolved SW 6020 ug/L	Barium, dissolved SW 6020 ug/L	Chromium, Hexavalent EPA 218.6 ug/L	Chromium, total dissolved SW 6020 ug/L	Iron SW 6010B ug/L	Iron, dissolved SW 6010B ug/L	Manganese, dissolved SW 6020 ug/L	Molybdenum, dissolved SW 6020 ug/L	Nitrate/Nitrite as Nitrogen SM 4500-NO3 F mg/L	pH SM 4500-H+ B PHUNITS	Selenium, dissolved SW 6020 ug/L	Specific conductance EPA 120.1 uS/cm	ASSET Total Suspended Solids (TSS) SM 2540 D mg/L
Method Units																			
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled													
C-BNS	C-BNS-Q319	N	R		GW	8/21/2019	2.2	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.4	0.35	8	1.3	920	ND (5.0)
C-CON-D	C-CON-D-Q319	N	R		GW	8/22/2019	2.4	110	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.5	0.36	8	1.6	870	ND (5.0)
C-CON-S	C-CON-S-Q319	N	R		GW	8/22/2019	2.4	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.8	0.36	8	1.6	860	ND (5.0)
C-I-3-D	C-I-3-D-Q319	N	R		GW	8/21/2019	2.3	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.6	0.39	8	1.3	900	ND (5.0)
C-I-3-D	MW-904-Q319	FD		C-I-3-D-Q319	GW	8/21/2019	2.4	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.7	0.39	8	1.7	910	ND (5.0)
C-I-3-S	C-I-3-S-Q319	N	R		GW	8/21/2019	2.4	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.5	0.35	8	1.7	910	ND (5.0)
C-MAR-D	C-MAR-D-Q319	N	R		GW	8/22/2019	2.3	110	ND (0.2)	ND (1.0)	290	55	2.6	4.6	0.66	8.1	1.6	860	12
C-MAR-S	C-MAR-S-Q319	N	R		GW	8/22/2019	2.3	110	ND (0.2)	ND (1.0)	220	ND (20)	5.5	4.5	0.36	8	1.6	860	12
C-NR1-D	C-NR1-D-Q319	N	R		GW	8/22/2019	2.4	110	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.6	0.35	8	1.5	870	ND (5.0)
C-NR1-S	C-NR1-S-Q319	N	R		GW	8/22/2019	2.4	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.7	0.34	8	1.6	870	ND (5.0)
C-NR3-D	C-NR3-D-Q319	N	R		GW	8/22/2019	2.2	110	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.6	0.34	8	1.7	880	ND (5.0)
C-NR3-S	C-NR3-S-Q319	N	R		GW	8/22/2019	2.2	110	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.6	0.34	7.9	1.4	870	ND (5.0)
C-NR4-D	C-NR4-D-Q319	N	R		GW	8/22/2019	2.2	110	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.4	0.42	7.9	1.6	880	ND (5.0)
C-NR4-S	C-NR4-S-Q319	N	R		GW	8/22/2019	2.3	110	ND (0.2)	ND (1.0)	91	ND (20)	ND (0.5)	4.4	0.34	8	1.5	880	ND (5.0)
C-R22A-D	C-R22A-D-Q319	N	R		GW	8/21/2019	2.3	120	ND (0.2)	ND (1.0)	43	ND (20)	ND (0.5)	4.5	0.37	8	1.5	910	ND (5.0)
C-R22A-S	C-R22A-S-Q319	N	R		GW	8/21/2019	2.3	120	ND (0.2)	ND (1.0)	27	ND (20)	ND (0.5)	4.5	0.34	8.1	1.5	920	ND (5.0)
C-R27-D	C-R27-D-Q319	N	R		GW	8/21/2019	2.4	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.6	0.37	8	0.87	920	ND (5.0)
C-R27-D	MW-905-Q319	FD		C-R27-D-Q319	GW	8/21/2019	2.4	120	ND (0.2)	ND (1.0)	23	ND (20)	ND (0.5)	4.8	0.35	8	1.9	920	ND (5.0)
C-R27-S	C-R27-S-Q319	N	R		GW	8/21/2019	2.3	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.4	0.37	8	1.7	920	ND (5.0)
C-TAZ-D	C-TAZ-D-Q319	N	R		GW	8/21/2019	2.4	120	ND (0.2)	ND (1.0)	36	ND (20)	ND (0.5)	4.5	1.8	8	1.5	890	ND (5.0)
C-TAZ-S	C-TAZ-S-Q319	N	R		GW	8/21/2019	2.4	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.6	0.39	8	1.3	900	ND (5.0)
R-19	R-19-Q319	N	R		GW	8/22/2019	2.3	110	ND (0.2)	ND (1.0)	35	34	ND (0.5)	4.6	0.31	8	1.4	880	ND (5.0)
R-28	R-28-Q319	N	R		GW	8/21/2019	2.1	120	ND (0.2)	ND (1.0)	ND (20)	ND (20)	ND (0.5)	4.4	0.33	8.1	1.2	920	ND (5.0)
R63	R63-Q319	N	R		GW	8/21/2019	2.3	120	ND (0.2)	ND (1.0)	33	ND (20)	ND (0.5)	4.5	0.38	7.9	1.7	910	ND (5.0)
RRB	RRB-Q319	N	Tap		GW	8/22/2019	2.3	120	ND (0.2)	ND (1.0)	35	ND (20)	13	4.5	0.32	7.7	1.6	900	ND (5.0)
SW1	SW1-Q319	N	Tap		GW	8/21/2019			ND (0.2)	ND (1.0)						7.6		950	
SW2	SW2-Q319	N	Tap		GW	8/21/2019			ND (0.2)	ND (1.0)						7.6		960	

= Preliminary result

SCT 2019-08 Sampling

					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
					Description	Alkalinity, total as CaCO3	Aluminum	Aluminum, dissolved	Antimony	Antimony, dissolved	Arsenic	Arsenic, dissolved	Barium	Barium, dissolved	Beryllium	Beryllium, dissolved	Boron
					Method	SM 2320 B	SW 6010B	SW 6010B	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6010B
					Units	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled													
IRZ-23-SC-93-143	IRZ-23-SC-93-143	N	GW	8/12/2019	100	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.9	1.9	39	41	ND (0.5)	ND (0.5)	870	0.85

SCT 2019-08 Sampling

					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
					Description	Bromide	Cadmium	Cadmium, dissolved	Calcium	Calcium, dissolved	Chloride	Chromium, Hexavalent	Chromium, total	Chromium, total dissolved	Cobalt	Cobalt, dissolved	Copper
					Method	EPA 300.0	SW 6020	SW 6020	SW 6010B	SW 6010B	EPA 300.0	EPA 218.6	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020
					Units	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled													
IRZ-23-SC-93-143	IRZ-23-SC-93-143	N	GW	8/12/2019	ND (2.5)	ND (0.5)	ND (0.5)	170,000	160	1,200	670	640	620	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)

SCT 2019-08 Sampling					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
					Description	Fluoride	Iron	Iron, dissolved	Lead	Lead, dissolved	Magnesium	Magnesium, dissolved	Manganese	Manganese, dissolved	Mercury	Mercury, dissolved	Molybdenum
					Method	EPA 300.0	SW 6010B	SW 6010B	SW 6020	SW 6020	SW 6010B	SW 6010B	SW 6020	SW 6020	EPA 7470A	EPA 7470A	SW 6020
					Units	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled													
IRZ-23-SC-93-143	IRZ-23-SC-93-143	N	GW	8/12/2019	2	27	ND (20)	ND (1.0)	ND (1.0)	25,000	24	ND (0.5)	ND (0.5)	ND (0.2)	ND (0.2)	9.2	11


SCT 2019-08 Sampling

					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
					Description	Nickel	Nickel, dissolved	Nitrate/Nitrite as Nitrogen SM 4500-NO3 F	Potassium, dissolved	Selenium	Selenium, dissolved	Silver	Silver, dissolved	Sodium, dissolved	Sulfate	Thallium	Thallium, dissolved
					Method	SW 6020	SW 6020	SW 6020	SW 6010B	SW 6020	SW 6020	SW 6020	SW 6020	SW 6010B	EPA 300.0	SW 6020	SW 6020
					Units	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled													
IRZ-23-SC-93-143	IRZ-23-SC-93-143	N	GW	8/12/2019	18	17	7.5	11	9	8.4	ND (0.5)	ND (0.5)	670	370	ND (0.5)	ND (0.5)	2,700

SCT 2019-08 Sampling

					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	BCLabs
Description						Total organic carbon	TPH as diesel	TPH as motor oil	Vanadium	Vanadium, dissolved	Zinc	Zinc, dissolved	Ammonia as nitrogen SM 4500-NH3 G
Method						SM 5310 C	SW 8015B	SW 8015B	SW 6020	SW 6020	SW 6020	SW 6020	
Units						mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Matrix	Date Sampled									
IRZ-23-SC-93-143	IRZ-23-SC-93-143	N	GW	8/12/2019	ND (10)	ND (50 J)	ND (50)	7.9 J	8.3 J	55	38	ND (2.0)	

TMP 2019-08 Baseline Sampling



Design & Consultancy

for natural and built assets

TMP 2019-08 Baseline Sampling

Lab

Description

Method

Units

ASSET

Alkalinity, total as CaCO3

SM 2320 B

mg/L

ASSET

Aluminum

SW 6010B

ug/L

ASSET

Aluminum, dissolved

SW 6010B

ug/L

ASSET

Antimony

SW 6020

ug/L

ASSET

Antimony, dissolved

SW 6020

ug/L

ASSET

Arsenic

SW 6020

ug/L

ASSET

Arsenic, dissolved

SW 6020

ug/L

ASSET

Barium

SW 6020

ug/L

ASSET

Barium, dissolved

SW 6020

ug/L

Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled									
IRZ-21-L-SC	IRZ-21-L-SC-082419	N			GW	8/24/2019	54	100	ND (50)	ND (0.5)	ND (0.5)	2.3	2.1	130	120
IRZ-21-U-SC	IRZ-21-U-SC-082719	N			GW	8/27/2019	94	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.9	1.7	45	43
MW-B-117	MW-B-117-0819	N	3V		GW	8/19/2019	71	ND (50)	230	ND (0.5)	ND (0.5)	1.6	1.6	110	100
MW-B-33	MW-B-33-0819	N	LF		GW	8/19/2019	85	ND (50)	100	ND (0.5)	ND (0.5)	2.5	2.5	92	88
MW-C-156	MW-C-156-0819	N	LF		GW	8/23/2019	52	1,100	ND (50)	ND (0.5)	ND (0.5)	3.6	3.3	270	250
MW-C-181	MW-C-181-0819	N	LF		GW	8/23/2019	61	280	ND (250)	ND (0.5)	ND (0.5)	2.6	2.1	320	310
MW-C-218	MW-911-Q319	FD		MW-C-218-0819	GW	8/23/2019	58	1,600	ND (250)	ND (0.5)	ND (0.5)	4.9	4.5	350	320
MW-C-218	MW-C-218-0819	N	LF		GW	8/23/2019	60	2,400	ND (250)	ND (0.5)	ND (0.5)	5.3	4.5	360	330
MW-L-180	MW-L-180-0819	N	LF		GW	8/22/2019	39	60	ND (50)	ND (0.5)	ND (0.5)	3.8	3.4	58	51
MW-M-132	MW-M-132-0819	N	LF		GW	8/20/2019	58	290	64	ND (0.5)	ND (0.5)	2.2	1.9	160	160
MW-M-193	MW-M-193-0819	N	LF		GW	8/20/2019	45	340	ND (50)	ND (0.5)	ND (0.5)	3.7	3.4	87	86
MW-M-57	MW-M-57-0819	N	LF		GW	8/20/2019	83	240	ND (50)	ND (0.5)	ND (0.5)	1.4	1.4	48	44
MW-M-95	MW-M-95-0819	N	LF		GW	8/20/2019	65	5,900	ND (50)	ND (0.5)	ND (0.5)	2.2	1.1	280	260
MW-N-217	MW-N-217-0819	N	LF		GW	8/22/2019	59	740	ND (50)	ND (0.5)	ND (0.5)	6.4	5.7	41	35
MW-O-120	MW-912-Q319	FD	LF	MW-O-120-0819	GW	8/21/2019	89	1,000	ND (50)	ND (0.5)	ND (0.5)	1.9	1.4	120	84
MW-O-120	MW-O-120-0819	N	LF		GW	8/21/2019	56	760	ND (50)	ND (0.5)	ND (0.5)	1.7	1.5	100	85
MW-O-140	MW-O-140-0819	N	LF		GW	8/21/2019	84	130	ND (50)	ND (0.5)	ND (0.5)	2.3	2.2	130	120
MW-O-30	MW-O-30-0819	N	LF		GW	8/21/2019	250	1,600	ND (50)	ND (0.5)	ND (0.5)	5.3	3.9	100	77
MW-O-66	MW-O-66-0819	N	LF		GW	8/21/2019	210	ND (50)	ND (50)	ND (0.5)	ND (0.5)	3.5	3.4	76	79
MW-R-109	MW-R-109-0819	N	LF		GW	8/20/2019	84	570	ND (50)	ND (0.5)	ND (0.5)	1.5	1.5	64	60
MW-R-139	MW-R-139-0819	N	LF		GW	8/20/2019	52	460	ND (50)	ND (0.5)	ND (0.5)	0.92	0.78	330	310
MW-R-192	MW-R-192-0819	N	LF		GW	8/20/2019	48	500	ND (50)	ND (0.5)	ND (0.5)	1.9	1.9	170	170
MW-R-275	MW-R-275-0819	N	LF		GW	8/20/2019	43	200	ND (50)	ND (0.5)	ND (0.5)	3.2	2.9	180	170
MW-U-183	MW-U-183-0819	N	LF		GW	8/21/2019	56	2,300	ND (50)	ND (0.5)	ND (0.5)	1.7	1.1	170	160

= Preliminary result

TMP 2019-08 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Beryllium	Beryllium, dissolved	Boron	Boron, dissolved	Bromide	Cadmium	Cadmium, dissolved	Calcium
							Method	SW 6020	SW 6020	SW 6010B	SW 6010B	EPA 300.0	SW 6020	SW 6020	SW 6010B
							Units	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled									
IRZ-21-L-SC	IRZ-21-L-SC-082419	N			GW	8/24/2019	ND (2.5)	ND (12)	1,300	1.3	ND (2.5)	ND (0.5)	ND (0.5)	430,000	430
IRZ-21-U-SC	IRZ-21-U-SC-082719	N			GW	8/27/2019	ND (0.5)	ND (2.5)	380	0.42	ND (0.5)	ND (0.5)	ND (0.5)	100,000	100
MW-B-117	MW-B-117-0819	N	3V		GW	8/19/2019	ND (2.5)	ND (0.5)	860	0.85	ND (2.5)	ND (0.5)	ND (0.5)	220,000	210
MW-B-33	MW-B-33-0819	N	LF		GW	8/19/2019	ND (0.5)	ND (0.5)	650	0.64	ND (2.5)	ND (0.5)	ND (0.5)	190,000	180
MW-C-156	MW-C-156-0819	N	LF		GW	8/23/2019	ND (12)	ND (12)	1,300	1.3	ND (2.5)	ND (0.5)	ND (0.5)	410,000	400
MW-C-181	MW-C-181-0819	N	LF		GW	8/23/2019	ND (12)	ND (12)	1,200	1.5	ND (2.5)	ND (0.5)	ND (0.5)	570,000	600
MW-C-218	MW-911-Q319	FD		MW-C-218-0819	GW	8/23/2019	ND (12)	ND (12)	2,300	2.3	ND (2.5)	ND (0.5)	ND (0.5)	270,000	260
MW-C-218	MW-C-218-0819	N	LF		GW	8/23/2019	ND (12)	ND (12)	2,300	2.3	ND (2.5)	ND (0.5)	ND (0.5)	260,000	260
MW-L-180	MW-L-180-0819	N	LF		GW	8/22/2019	ND (2.5)	ND (2.5)	1,300	1.5	ND (2.5)	ND (0.5)	ND (0.5)	310,000	300
MW-M-132	MW-M-132-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	960	1.1	ND (2.5)	ND (0.5)	ND (0.5)	290,000	290
MW-M-193	MW-M-193-0819	N	LF		GW	8/20/2019	ND (2.5)	ND (2.5)	1,600	1.8	ND (2.5)	ND (0.5)	ND (0.5)	240,000	230
MW-M-57	MW-M-57-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	380	0.43	ND (0.5)	ND (0.5)	ND (0.5)	88,000	88
MW-M-95	MW-M-95-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	480	0.49	ND (2.5)	ND (0.5)	ND (0.5)	310,000	300
MW-N-217	MW-N-217-0819	N	LF		GW	8/22/2019	ND (2.5)	ND (2.5)	2,200	1.8	ND (2.5)	ND (0.5)	ND (0.5)	240,000	240
MW-O-120	MW-912-Q319	FD	LF	MW-O-120-0819	GW	8/21/2019	ND (2.5)	ND (2.5)	730	0.79	ND (2.5)	ND (0.5)	ND (0.5)	290,000	320
MW-O-120	MW-O-120-0819	N	LF		GW	8/21/2019	ND (2.5)	ND (2.5)	770	0.77	ND (2.5)	ND (0.5)	ND (0.5)	300,000	310
MW-O-140	MW-O-140-0819	N	LF		GW	8/21/2019	ND (2.5)	ND (2.5)	870	0.86	ND (2.5)	ND (0.5)	ND (0.5)	410,000	410
MW-O-30	MW-O-30-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (0.5)	190	0.17	ND (2.5)	ND (0.5)	ND (0.5)	100,000	95
MW-O-66	MW-O-66-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (0.5)	610	0.67	ND (2.5)	ND (0.5)	ND (0.5)	180,000	210
MW-R-109	MW-R-109-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	340	0.3	ND (0.5)	ND (0.5)	ND (0.5)	94,000	88
MW-R-139	MW-R-139-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	600	0.58	ND (2.5)	ND (0.5)	ND (0.5)	500,000	480
MW-R-192	MW-R-192-0819	N	LF		GW	8/20/2019	ND (2.5)	ND (0.5)	1,100	1	ND (2.5)	ND (0.5)	ND (0.5)	280,000	260
MW-R-275	MW-R-275-0819	N	LF		GW	8/20/2019	ND (2.5)	ND (2.5)	1,400	1.4	ND (2.5)	ND (0.5)	ND (0.5)	300,000	310
MW-U-183	MW-U-183-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (2.5)	690	0.68	ND (2.5)	ND (0.5)	ND (0.5)	390,000	400

= Preliminary result

TMP 2019-08 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Chloride	Chromium, Hexavalent	Chromium, total	Chromium, total dissolved	Cobalt	Cobalt, dissolved	Copper	Copper, dissolved
							Method	EPA 300.0	EPA 218.6	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020
							Units	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled									
IRZ-21-L-SC	IRZ-21-L-SC-082419	N			GW	8/24/2019		4,200	1,500	1,700	1,400	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
IRZ-21-U-SC	IRZ-21-U-SC-082719	N			GW	8/27/2019		550	160	160	140	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-B-117	MW-B-117-0819	N	3V		GW	8/19/2019		3,600	1.1	2.9	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-B-33	MW-B-33-0819	N	LF		GW	8/19/2019		1,500	5.2	5.6	4.9	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-C-156	MW-C-156-0819	N	LF		GW	8/23/2019		4,800	ND (1.0)	9.9	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-C-181	MW-C-181-0819	N	LF		GW	8/23/2019		5,800	9.5	67	23	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-C-218	MW-911-Q319	FD		MW-C-218-0819	GW	8/23/2019		6,100	ND (1.0)	11	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-C-218	MW-C-218-0819	N	LF		GW	8/23/2019		6,100	ND (1.0)	11	ND (1.0)	0.58	ND (0.5)	1.7	ND (1.0)
MW-L-180	MW-L-180-0819	N	LF		GW	8/22/2019		3,400	2.8	6.1	2.4	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-M-132	MW-M-132-0819	N	LF		GW	8/20/2019		2,600	ND (0.2)	2.4	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-M-193	MW-M-193-0819	N	LF		GW	8/20/2019		3,900	ND (1.0)	3.9	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-M-57	MW-M-57-0819	N	LF		GW	8/20/2019		400	16	18	17	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-M-95	MW-M-95-0819	N	LF		GW	8/20/2019		1,600	ND (0.2)	13	ND (1.0)	1.9	ND (0.5)	1.4	ND (1.0)
MW-N-217	MW-N-217-0819	N	LF		GW	8/22/2019		3,400	900	980	890	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-O-120	MW-912-Q319	FD	LF	MW-O-120-0819	GW	8/21/2019		3,400	ND (1.0)	2.5	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-O-120	MW-O-120-0819	N	LF		GW	8/21/2019		3,400	ND (1.0)	2.7	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-O-140	MW-O-140-0819	N	LF		GW	8/21/2019		4,300	ND (1.0)	ND (1.0)	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-O-30	MW-O-30-0819	N	LF		GW	8/21/2019		120	ND (0.2)	4	ND (1.0)	1.1	ND (0.5)	5	ND (1.0)
MW-O-66	MW-O-66-0819	N	LF		GW	8/21/2019		1,100	ND (0.2)	ND (1.0)	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-R-109	MW-R-109-0819	N	LF		GW	8/20/2019		450	18	20	18	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-R-139	MW-R-139-0819	N	LF		GW	8/20/2019		2,100	ND (1.0)	3.8	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-R-192	MW-R-192-0819	N	LF		GW	8/20/2019		2,500	ND (0.2)	1.9	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-R-275	MW-R-275-0819	N	LF		GW	8/20/2019		3,400	ND (1.0)	1.9	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-U-183	MW-U-183-0819	N	LF		GW	8/21/2019		2,000	0.29	6.7	ND (1.0)	0.63	ND (0.5)	ND (1.0)	ND (1.0)

= Preliminary result

TMP 2019-08 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Iron	Iron, dissolved	Lead	Lead, dissolved	Magnesium	ASSET Magnesium, dissolved	Manganese	ASSET Manganese, dissolved
							Method	SW 6010B	SW 6010B	SW 6020	SW 6020	SW 6010B	SW 6010B	SW 6020	SW 6020
							Units	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled									
IRZ-21-L-SC	IRZ-21-L-SC-082419	N			GW	8/24/2019	170	25	ND (5.0)	ND (5.0)	47,000	51	ND (0.5)	ND (0.5)	ND (0.2)
IRZ-21-U-SC	IRZ-21-U-SC-082719	N			GW	8/27/2019	33	ND (20)	ND (1.0)	ND (1.0)	23,000	25	ND (0.5)	ND (0.5)	ND (0.2)
MW-B-117	MW-B-117-0819	N	3V		GW	8/19/2019	110	300	ND (1.0)	ND (1.0)	42,000	41	1,300	1,300	ND (0.2)
MW-B-33	MW-B-33-0819	N	LF		GW	8/19/2019	34	130	ND (1.0)	ND (1.0)	32,000	32	260	260	ND (0.2)
MW-C-156	MW-C-156-0819	N	LF		GW	8/23/2019	2,100	260	ND (5.0)	ND (5.0)	37,000	37	970	880	ND (0.2)
MW-C-181	MW-C-181-0819	N	LF		GW	8/23/2019	960	320	ND (5.0)	ND (5.0)	71,000	87	1,300	1,200	ND (0.2)
MW-C-218	MW-911-Q319	FD		MW-C-218-0819	GW	8/23/2019	3,100	200	ND (5.0)	ND (5.0)	20,000	20	400	370	ND (0.2)
MW-C-218	MW-C-218-0819	N	LF		GW	8/23/2019	4,300	200	ND (5.0)	ND (5.0)	22,000	20	430	380	ND (0.2)
MW-L-180	MW-L-180-0819	N	LF		GW	8/22/2019	99	ND (20)	ND (1.0)	ND (1.0)	17,000	19	ND (0.5)	ND (0.5)	ND (0.2)
MW-M-132	MW-M-132-0819	N	LF		GW	8/20/2019	760	300	ND (1.0)	ND (1.0)	26,000	29	620	620	ND (0.2)
MW-M-193	MW-M-193-0819	N	LF		GW	8/20/2019	590	88	ND (1.0)	ND (1.0)	9,900	11	210	200	ND (0.2)
MW-M-57	MW-M-57-0819	N	LF		GW	8/20/2019	340	36	ND (1.0)	ND (1.0)	13,000	15	70	59	ND (0.2)
MW-M-95	MW-M-95-0819	N	LF		GW	8/20/2019	6,800	120	ND (1.0)	ND (1.0)	54,000	51	1,100	970	ND (0.2)
MW-N-217	MW-N-217-0819	N	LF		GW	8/22/2019	880	ND (20)	ND (1.0)	ND (1.0)	10,000	9.6	29	29	ND (0.2)
MW-O-120	MW-912-Q319	FD	LF	MW-O-120-0819	GW	8/21/2019	1,500	75	ND (1.0)	ND (1.0)	55,000	58	1,200	1,000	ND (0.2)
MW-O-120	MW-O-120-0819	N	LF		GW	8/21/2019	1,100	140	ND (1.0)	ND (1.0)	56,000	60	1,100	1,100	ND (0.2)
MW-O-140	MW-O-140-0819	N	LF		GW	8/21/2019	620	820	ND (1.0)	ND (1.0)	51,000	54	2,300	2,200	ND (0.2)
MW-O-30	MW-O-30-0819	N	LF		GW	8/21/2019	2,300	190	ND (1.0)	ND (1.0)	29,000	28	510	470	ND (0.2)
MW-O-66	MW-O-66-0819	N	LF		GW	8/21/2019	790	750	ND (1.0)	ND (1.0)	31,000	36	740	830	ND (0.2)
MW-R-109	MW-R-109-0819	N	LF		GW	8/20/2019	1,100	47	ND (1.0)	ND (1.0)	12,000	11	48	34	ND (0.2)
MW-R-139	MW-R-139-0819	N	LF		GW	8/20/2019	790	110	ND (1.0)	ND (1.0)	67,000	68	300	290	ND (0.2)
MW-R-192	MW-R-192-0819	N	LF		GW	8/20/2019	680	130	ND (1.0)	ND (1.0)	24,000	22	440	430	ND (0.2)
MW-R-275	MW-R-275-0819	N	LF		GW	8/20/2019	600	190	ND (1.0)	ND (1.0)	20,000	19	480	470	ND (0.2)
MW-U-183	MW-U-183-0819	N	LF		GW	8/21/2019	2,000	ND (20)	ND (1.0)	ND (1.0)	56,000	57	290	110	ND (0.2)

= Preliminary result

TMP 2019-08 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Mercury, dissolved	Molybdenum	Molybdenum, dissolved	Nickel	Nickel, dissolved	Nitrate/Nitrite as Nitrogen	Potassium, dissolved	Selenium
							Method	EPA 7470A	SW 6020	SW 6020	SW 6020	SW 6020	SM 4500-NO3 F	SW 6010B	SW 6020
							Units	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled									
IRZ-21-L-SC	IRZ-21-L-SC-082419	N			GW	8/24/2019	ND (0.2)	42	39	70	63	3	23	2.2	2.7
IRZ-21-U-SC	IRZ-21-U-SC-082719	N			GW	8/27/2019	ND (0.2)	7.3	6.6	3	2.8	4.1	7.2	3.1	3
MW-B-117	MW-B-117-0819	N	3V		GW	8/19/2019	ND (0.2)	44	43	ND (1.0)	ND (1.0)	0.78	18	1.1	1.1
MW-B-33	MW-B-33-0819	N	LF		GW	8/19/2019	ND (0.2)	12	12	ND (1.0)	ND (1.0)	0.8	11	0.72	0.76
MW-C-156	MW-C-156-0819	N	LF		GW	8/23/2019	ND (0.2)	70	65	4.2	ND (1.0)	0.056	34	ND (0.5)	ND (0.5)
MW-C-181	MW-C-181-0819	N	LF		GW	8/23/2019	ND (0.2)	56	54	ND (1.0)	ND (1.0)	0.6	39	0.56	0.62
MW-C-218	MW-911-Q319	FD		MW-C-218-0819	GW	8/23/2019	ND (0.2)	110	110	1.8	ND (1.0)	0.16	45	ND (0.5)	ND (0.5)
MW-C-218	MW-C-218-0819	N	LF		GW	8/23/2019	ND (0.2)	110	110	2.2	ND (1.0)	0.14	45	ND (0.5)	ND (0.5)
MW-L-180	MW-L-180-0819	N	LF		GW	8/22/2019	ND (0.2)	35	33	ND (1.0)	ND (1.0)	0.46	20	0.73	ND (0.5)
MW-M-132	MW-M-132-0819	N	LF		GW	8/20/2019	ND (0.2)	26	25	ND (1.0)	ND (1.0)	0.13	18	ND (0.5)	ND (0.5)
MW-M-193	MW-M-193-0819	N	LF		GW	8/20/2019	ND (0.2)	48	50	ND (1.0)	ND (1.0)	0.45	30	0.85	0.81
MW-M-57	MW-M-57-0819	N	LF		GW	8/20/2019	ND (0.2)	18	18	ND (1.0)	ND (1.0)	7.9	7.8	3.5	3.4
MW-M-95	MW-M-95-0819	N	LF		GW	8/20/2019	ND (0.2)	9	9	6.9	ND (1.0)	0.67	13	ND (0.5)	0.8
MW-N-217	MW-N-217-0819	N	LF		GW	8/22/2019	ND (0.2)	96	95	ND (1.0)	ND (1.0)	7.1	27	6.1	6.3
MW-O-120	MW-912-Q319	FD	LF	MW-O-120-0819	GW	8/21/2019	ND (0.2)	54	53	ND (1.0)	ND (1.0)	0.38	17	ND (0.5)	ND (0.5)
MW-O-120	MW-O-120-0819	N	LF		GW	8/21/2019	ND (0.2)	53	54	ND (1.0)	ND (1.0)	0.33	17	ND (0.5)	ND (0.5)
MW-O-140	MW-O-140-0819	N	LF		GW	8/21/2019	ND (0.2)	61	58	ND (1.0)	ND (1.0)	0.062	25	ND (0.5)	ND (0.5)
MW-O-30	MW-O-30-0819	N	LF		GW	8/21/2019	ND (0.2)	11	11	32	1.5	ND (0.05)	4.8	ND (0.5)	ND (0.5)
MW-O-66	MW-O-66-0819	N	LF		GW	8/21/2019	ND (0.2)	23	25	ND (1.0)	ND (1.0)	ND (0.05)	11	ND (0.5)	ND (0.5)
MW-R-109	MW-R-109-0819	N	LF		GW	8/20/2019	ND (0.2)	13	13	ND (1.0)	ND (1.0)	7.6	7.9	5.3	4.2
MW-R-139	MW-R-139-0819	N	LF		GW	8/20/2019	ND (0.2)	7.1	7.1	1.3	1.1	0.96	17	0.84	1
MW-R-192	MW-R-192-0819	N	LF		GW	8/20/2019	ND (0.2)	26	27	ND (1.0)	ND (1.0)	0.27	16	ND (0.5)	ND (0.5)
MW-R-275	MW-R-275-0819	N	LF		GW	8/20/2019	ND (0.2)	49	49	ND (1.0)	ND (1.0)	0.16	23	ND (0.5)	ND (0.5)
MW-U-183	MW-U-183-0819	N	LF		GW	8/21/2019	ND (0.2)	12	12	3.6	1.6	1.9	15	2.3	1.2

= Preliminary result

TMP 2019-08 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
							Description	Silver	Silver, dissolved	Sodium, dissolved	Sulfate	Thallium	Thallium, dissolved	Total dissolved solids	Total organic carbon
							Method	SW 6020	SW 6020	SW 6010B	EPA 300.0	SW 6020	SW 6020	SM 2540 C	SM 5310 C
							Units	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled									
IRZ-21-L-SC	IRZ-21-L-SC-082419	N			GW	8/24/2019	ND (0.5)	ND (0.5)	2,800	570	ND (2.5)	ND (2.5)	9,500	ND (1.0)	ND (50)
IRZ-21-U-SC	IRZ-21-U-SC-082719	N			GW	8/27/2019	ND (0.5)	ND (0.5)	350	160	ND (0.5)	ND (0.5)	1,400	ND (1.0)	ND (50)
MW-B-117	MW-B-117-0819	N	3V		GW	8/19/2019	ND (0.5)	ND (0.5)	2,300	540	ND (0.5)	ND (0.5)	7,200	ND (1.0)	
MW-B-33	MW-B-33-0819	N	LF		GW	8/19/2019	ND (0.5)	ND (0.5)	830	260	ND (0.5)	ND (0.5)	3,100	ND (1.0)	
MW-C-156	MW-C-156-0819	N	LF		GW	8/23/2019	ND (0.5)	ND (0.5)	3,500	710	ND (2.5)	ND (2.5)	10,000	ND (10)	
MW-C-181	MW-C-181-0819	N	LF		GW	8/23/2019	ND (2.5)	ND (0.5)	3,800	870	ND (2.5)	ND (2.5)	12,000	ND (1.0)	
MW-C-218	MW-911-Q319	FD		MW-C-218-0819	GW	8/23/2019	ND (0.5)	ND (0.5)	4,400	790	ND (2.5)	ND (2.5)	11,000	ND (1.0)	
MW-C-218	MW-C-218-0819	N	LF		GW	8/23/2019	ND (0.5)	ND (0.5)	4,200	790	ND (2.5)	ND (2.5)	12,000	ND (1.0)	
MW-L-180	MW-L-180-0819	N	LF		GW	8/22/2019	ND (0.5)	ND (0.5)	2,400	500	ND (0.5)	ND (0.5)	7,200	ND (1.0)	
MW-M-132	MW-M-132-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	1,800	340	ND (0.5)	ND (0.5)	5,500	ND (1.0)	
MW-M-193	MW-M-193-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	3,100	500	ND (0.5)	ND (0.5)	7,700	ND (1.0)	
MW-M-57	MW-M-57-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	310	160	ND (0.5)	ND (0.5)	1,100	ND (1.0)	
MW-M-95	MW-M-95-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	860	220	0.61	ND (0.5)	3,800	ND (1.0)	
MW-N-217	MW-N-217-0819	N	LF		GW	8/22/2019	ND (0.5)	ND (0.5)	2,800	990	ND (0.5)	ND (0.5)	7,600	ND (1.0)	
MW-O-120	MW-912-Q319	FD	LF	MW-O-120-0819	GW	8/21/2019	ND (0.5)	ND (0.5)	2,800	960	ND (0.5)	ND (0.5)	7,400	ND (1.0)	
MW-O-120	MW-O-120-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (0.5)	2,800	980	ND (0.5)	ND (0.5)	7,700	ND (1.0)	
MW-O-140	MW-O-140-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (0.5)	3,000	840	ND (0.5)	ND (0.5)	9,100	ND (1.0)	
MW-O-30	MW-O-30-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (0.5)	150	250	ND (0.5)	ND (0.5)	830	ND (1.0)	
MW-O-66	MW-O-66-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (0.5)	1,200	360	ND (0.5)	ND (0.5)	2,800	ND (1.0)	
MW-R-109	MW-R-109-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	300	160	ND (0.5)	ND (0.5)	1,200	ND (1.0)	
MW-R-139	MW-R-139-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	1,000	330	ND (0.5)	ND (0.5)	4,900	ND (1.0)	
MW-R-192	MW-R-192-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	1,700	330	ND (0.5)	ND (0.5)	5,400	ND (1.0)	
MW-R-275	MW-R-275-0819	N	LF		GW	8/20/2019	ND (0.5)	ND (0.5)	2,500	430	ND (0.5)	ND (0.5)	7,000	ND (1.0)	
MW-U-183	MW-U-183-0819	N	LF		GW	8/21/2019	ND (0.5)	ND (0.5)	1,200	450	ND (0.5)	ND (0.5)	5,100	ND (1.0)	

= Preliminary result

TMP 2019-08 Baseline Sampling

							Lab	ASSET	ASSET	ASSET	ASSET	ASSET	Calscience	EUROFINS
							Description	TPH as motor	Vanadium	Vanadium,	Zinc	Zinc, dissolved	Ammonia as	Ammonia as
							Method	oil	SW 6020	dissolved	SW 6020	SW 6020	nitrogen	nitrogen
							Units	SW 8015B	SW 6020	SW 6020	SW 6020	SW 6020	EPA 350.1	A4500NH
								ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L
Location ID	Sample ID	Sample Type	Sample Method	Parent Sample	Matrix	Date Sampled								
IRZ-21-L-SC	IRZ-21-L-SC-082419	N			GW	8/24/2019		ND (50)	3.8	3.9	18	19		
IRZ-21-U-SC	IRZ-21-U-SC-082719	N			GW	8/27/2019		ND (50)	9.2	8.6	16	15		
MW-B-117	MW-B-117-0819	N	3V		GW	8/19/2019			1.4	ND (1.0)	ND (10)	ND (10)	0.0824	
MW-B-33	MW-B-33-0819	N	LF		GW	8/19/2019			1.9	1.7	ND (10)	ND (10)	ND (0.05)	
MW-C-156	MW-C-156-0819	N	LF		GW	8/23/2019			3.3	ND (1.0)	ND (10)	ND (10)		
MW-C-181	MW-C-181-0819	N	LF		GW	8/23/2019			1.5	ND (1.0)	ND (10)	ND (10)		
MW-C-218	MW-911-Q319	FD		MW-C-218-0819	GW	8/23/2019			4.2	ND (1.0)	ND (10)	ND (10)		
MW-C-218	MW-C-218-0819	N	LF		GW	8/23/2019			6.1	ND (1.0)	13	ND (10)		
MW-L-180	MW-L-180-0819	N	LF		GW	8/22/2019			7.5	6.8	ND (10)	ND (10)		ND (0.02)
MW-M-132	MW-M-132-0819	N	LF		GW	8/20/2019			2.2	1	ND (10)	ND (10)	ND (0.05)	
MW-M-193	MW-M-193-0819	N	LF		GW	8/20/2019			5.9	4.9	ND (10)	ND (10)	0.0508 F1	
MW-M-57	MW-M-57-0819	N	LF		GW	8/20/2019			7.2	6.2	ND (10)	ND (10)	0.0517	
MW-M-95	MW-M-95-0819	N	LF		GW	8/20/2019			13	2.2	ND (10)	ND (10)	0.0526	
MW-N-217	MW-N-217-0819	N	LF		GW	8/22/2019			7.1	5.4	ND (10)	ND (10)		0.1
MW-O-120	MW-912-Q319	FD	LF	MW-O-120-0819	GW	8/21/2019			3.5	ND (1.0)	ND (10)	ND (10)	0.0805	
MW-O-120	MW-O-120-0819	N	LF		GW	8/21/2019			2.5	ND (1.0)	ND (10)	ND (10)	0.0598	
MW-O-140	MW-O-140-0819	N	LF		GW	8/21/2019			ND (1.0)	ND (1.0)	ND (10)	ND (10)	0.0642	
MW-O-30	MW-O-30-0819	N	LF		GW	8/21/2019			4	ND (1.0)	12	ND (10)	0.0912	
MW-O-66	MW-O-66-0819	N	LF		GW	8/21/2019			ND (1.0)	ND (1.0)	ND (10)	ND (10)	0.0507	
MW-R-109	MW-R-109-0819	N	LF		GW	8/20/2019			4	3	ND (10)	ND (10)	0.0656	
MW-R-139	MW-R-139-0819	N	LF		GW	8/20/2019			2.9	1.9	ND (10)	ND (10)	ND (0.05)	
MW-R-192	MW-R-192-0819	N	LF		GW	8/20/2019			2.4	1.6	ND (10)	ND (10)	ND (0.05)	
MW-R-275	MW-R-275-0819	N	LF		GW	8/20/2019			1.7	ND (1.0)	ND (10)	ND (10)	ND (0.05)	
MW-U-183	MW-U-183-0819	N	LF		GW	8/21/2019			6	2.6	ND (10)	ND (10)	ND (0.05)	

= Preliminary result



Design & Consultancy
for natural and
built assets

TMP 2019-08 Post-Development Sampling

						Lab	ASSET	ASSET	ASSET
						Description	Arsenic, dissolved	Chromium, Hexavalent	Chromium, total
						Method	SW 6020	EPA 218.6	dissolved
						Units	ug/L	ug/L	SW 6020
Location ID	Sample ID	Sample Type	Sample Method	Matrix	Date Sampled				ug/L
MW-C-156	MW-C-156-081519	N	LF	GW	8/15/2019			ND (1.0)	
MW-C-181	MW-C-181-082019	N	LF	GW	8/20/2019		2.6	280	280
MW-C-218	MW-C-218-082219	N		GW	8/22/2019			40	39