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September 10, 2019

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Subject: August 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_August_2019_20190910_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 August 2019 as well as activities planned for the next six weeks (September 1 through October 12, 2019), and presents available results from sampling and testing performed in August 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 eleventh monthly progress report. Please contact me at (760) 791-5884 if you have any questions or comments regarding this submittal.

Sincerely,

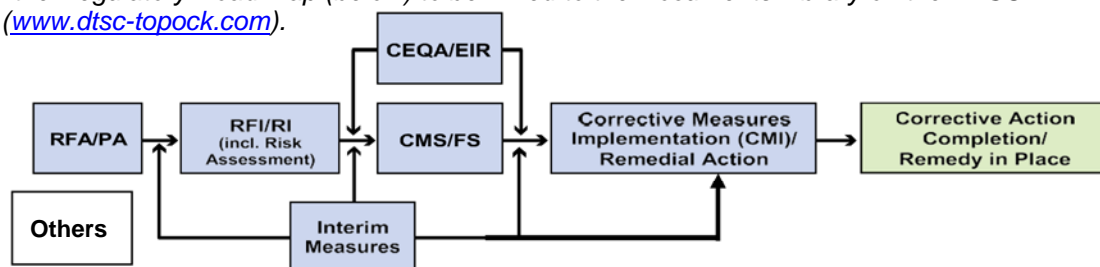
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Topock Project Executive Abstract

<p>Document Title: <i>August 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: 9/10/2019</p> <p>Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) PG&E</p>
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<p>Type of Document:</p> <p><input type="checkbox"/> Draft <input checked="" type="checkbox"/> Report <input type="checkbox"/> Letter <input type="checkbox"/> Memo</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Is this a Regulatory Requirement?</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If no, why is the document needed?</p>
<p>What does this information pertain to?</p> <p><input type="checkbox"/> Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA)</p> <p><input type="checkbox"/> RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment)</p> <p><input type="checkbox"/> Corrective Measures Study (CMS)/Feasibility Study (FS)</p> <p><input checked="" type="checkbox"/> Corrective Measures Implementation (CMI)/ Remedial Action(RA)</p> <p><input type="checkbox"/> California Environmental Quality Act (CEQA)/ Environmental Impact Report (EIR)</p> <p><input type="checkbox"/> Interim Measures</p> <p><input type="checkbox"/> Other / Explain:</p>	<p>Is this a Regulatory Requirement?</p> <p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If no, why is the document needed?</p>
<p>What is the consequence of NOT doing this item? What is the consequence of DOING this item?</p> <p>The consequence for not doing this item is PG&E will be out of compliance with the 1996 Corrective Action Consent Agreement (CACA) and the 2013 Remedial Design/ Remedial Action Consent Decree (CD), as well as the Construction/Remedial Action Work Plan (C/RAWP).</p>	<p>Other Justification/s:</p> <p><input type="checkbox"/> Permit <input type="checkbox"/> Other / Explain:</p>
<p>Brief Summary of attached document:</p> <p>This monthly report describes activities taken during August 2019 and activities planned for the next six weeks (September 1 through October 12, 2019) and presents available results from sampling and testing in August 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



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

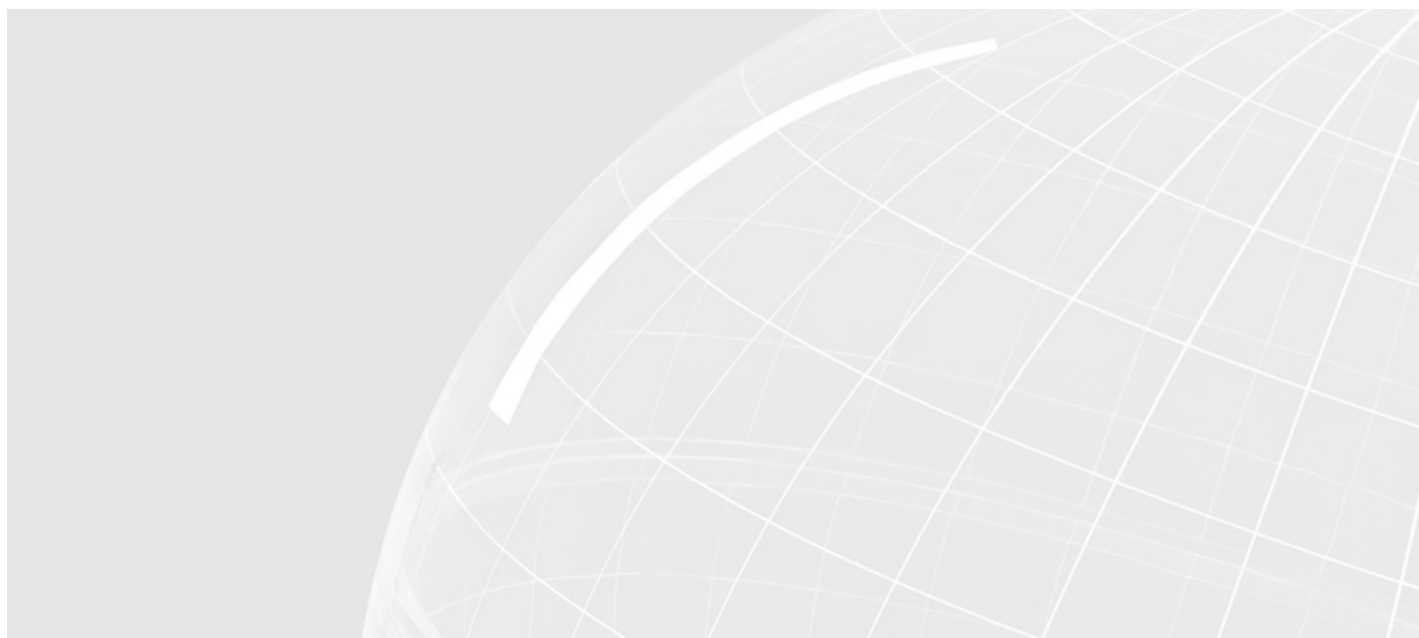
PG&E Topock Compressor Station
Needles, California

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September 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 eleventh 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 August 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 August 31, 2019, a total of 59 six-week look-ahead schedule emails have been sent. **Of those, four six-week look-ahead schedule emails were sent in August 2019 (on August 4, 11, 18, and 25).**
- On August 10, 2018, PG&E issued the first Environmental Release to Construct (ERTC) to contractors. As of August 31, 2019, a total of 47 ERTCs were issued for mobilization and construction activities (see Table 2-1). Although several ERTCs were renewed in August 2019, **no new ERTC was issued during the month of August.**
- 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 August 2019, a total of 25 daily construction activities lists were published and discussed at the morning tailboards.**
- In August 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**):
 - **Non-Well Construction Activities:**
 - a) Repaired a portion of the access matting under the BNSF bridge.
 - b) Maintain/repair spill control Best Management Practices (BMPs) at work sites along the river bank and at the MW-20 Bench. For example, to replace straw wattles/fiber rolls that were destroyed by wildlife in the area and to reposition the sand bags that are used to anchor the straw wattles/fiber rolls.
 - **Pilot Boring/Well Installation Activities (Rotosonic drilling):**
 - a) Complete well installation at MW-C, MW-H, and MW-X.
 - **Remedy Well Installation Activities (Dual Rotary drilling):**
 - a) Completed remedy well installation at RB-4.
 - b) Completed the temporary service water and wastewater pipelines for dual rotary drilling at RB well locations.
 - c) Completed specific capacity test at IRZ-21 (MW-20 Bench).
 - 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]), two soil samples were collected at approximately 1 foot below ground surface (bgs) at AOC-9 and AOC-10, near Pipeline B/J alignment (sampled on August 12, 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 August 31, 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. Two air sampling events occurred on August 12 and 13, 2019, along Pipeline B/J alignment and in the vicinity of AOCs 9 and 10.
 - 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 August 31, 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 August 31, 2019, PG&E has started and will continue to perform the following activities:

- Complete installation of well at MW-Y' and MW-D.
- Continue to install remedy well RB-3 (dual rotary rig).
- Complete the abandonment of the shallower and damaged well MW-B-267 and drilling of a replacement well.
- Continue to install Pipeline B.
- Start 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 August 31, 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 3,278,550 gallons (10.1 acre-feet) of freshwater was used, of which an approximate 12.4 percent was for pilot boring/well installation and general construction, 0.9 percent for hydrostatic testing of pipeline, and 86.7 percent was for fugitive dust suppression. Of this amount, 474,500 gallons of freshwater was used in August 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 and August 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 August 2019, an approximate 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).
- An approximate total of 312,795 gallons of wastewater generated from drilling operations were discharged to Compressor Station evaporation pond #4. In August 2019, 138,568 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 359.3 cubic yards of drill cuttings were generated from well drilling and geotechnical investigation. 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.
 - The clay collected from the Pipeline F geotechnical investigation is stockpiled at the SPY, separate from the other clean soil, in accordance with the revised clay handling protocol in Addendum to the Soil Management Plan (dated May 28, 2019).
- During sonic drilling of MW-O, fat clay with sand (CH) was encountered at 26.8 to 27.8 feet below ground. The clay material retrieved from drill cores was put in a zip lock bag and characterized in accordance with the Soil Management Plan. The clay material was provided to the Tribes at their request on August 7, 2019.
- Approximately 40 cubic yards of displaced soil was generated from the potholing activities along remedy pipeline alignments 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.
- 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 August 2019, approximately 72 cubic yards of general construction waste and 8.81 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.

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 August 31, 2019, a total of 102 health and safety training sessions were held and 347 employees and contractors received the training. **Of those, in August 2019, five sessions were conducted and 10 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 August 31, 2019, a total of 105 WEAT sessions were conducted and 395 employees and contractors received the training. **Of those, in August 2019, 6 sessions were conducted (on 8/6, 8/8, 8/12, 8/22, 8/26, and 8/29) and 13 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 August 31, 2019, a total of 11 FCR training sessions were conducted and 55 employees and contractors received the training. **Of those, in August 2019, 1 session was conducted and 1 employee/contractor was trained.**
- 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)

PG&E did not propose any new work variance in August 2019. See Table 2-2 for information regarding activities related to previously proposed WVRs (i.e., material deviations from the design documents, the C/RAWP, or other approved work plans), and agencies' actions on those requests.

2.1.6 Use of Future Activity Allowance

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

2.1.7 Issues Encountered and Actions Taken to Rectify Issues/Problems

- During the week of August 23, 2019, it was observed that the matted area under the drill rig and support trucks at MW-Y' has settled excessively. Steel plates were brought out to stabilize the area under the rig and support equipment.
- During potholing to locate utilities at the MW-20 Bench, twelve existing pipes/conduits (associated with IM3) were found at various depths that range from approximately 29 to 47 inches below ground surface. This would require excavation to about 7.5 feet bgs for the entire C6 extent (over 100 feet in length) atop the MW-20 Bench to allow for undercrossing and installation alongside the existing IM3 utilities. PG&E is discussing with the agencies about options to install C6 safely while minimizing impacts to mature plants at the toe of the MW-20 Bench slope.
- On August 6, 2019, two DTSC representatives noted a diesel leak in the containment area for a fuel tank near a RB well location. The diesel was immediately cleaned up with absorbent pads and spill kits. The absorbent pads and Dri-zit were collected and stored in a sealed bucket where it was

transported to the IM-3 station for proper disposal. Inspections were conducted on the pump's fuel cap and the area surrounding the pump's containment. No diesel breached the containment and all diesel was absorbed.

- **Root cause** – The diesel stored in the fuel tank of a 4" trash pump had expanded and breached through the cap on the top of the tank. The pump was staged on a slope and the diesel slid across the tank and landed in the containment that the pump was sitting on.
- **Corrective action to prevent reoccurrence** – BMPs will continue to be inspected. Fuel tanks should not be filled to their maximum capacity in high temperature environments.
- On August 7, 2019, at the RB-4 well location, the discharge hose connected to a discharge line on the wastewater service pipeline was observed to be leaking. Less than 0.5 gallons of wastewater (mixture of freshwater and groundwater) spilled from the banded portion of the hose and landed in the underlying sand. CrT and Cr6 concentrations were non-detect and 56 ug/L, respectively in groundwater samples from RB-4. Due to the low level of Cr in the groundwater samples, the wet sand was not removed.
 - **Root cause** – At a closer examination, Clean Harbors personnel determined that a small leak had formed at the metal band that secured the King Nipple fitting inside the hose.
 - **Corrective action to prevent reoccurrence** – Installed catch/spill containment that will encompass all hose-connections and fittings at their connection points at this work area. Installed a tee to allow for the discharge hose to connect at a 90-degree angle (instead of 180-degree) to the discharge line.
- On August 27, 2019, at the RB-3 well location, a spill of about five gallons of wastewater (mixture of freshwater and groundwater) occurred while an operator was trying to vacuum a transfer hose after a pin hole leak in the mid-section of the hose was discovered.
 - **Root cause** – The operator unclamped one locking ear on the hose cam to introduce air into the line. At this time, wastewater escaped from the hose, spilling into the pump containment area. The wastewater then traveled down grade in the containment and eventually breached the containment (consists of fiber rolls and plastic). The breach was due to a separation between two fiber rolls in the containment wall.
 - **Corrective action to prevent reoccurrence** – Reinstalled the fiber rolls to ensure that they overlap. A stand down for the drill crew/well support crew occurred on August 28, 2019 to re-emphasize on spill prevention/control and BMPs. In addition, the drill/well support crew was required to attend a SWPPP refresher on September 4, 2019 to review and re-emphasize the proper technique to install, maintain, and inspect spill prevention/control BMPs at all drill sites.
- 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 continues to work with Frontier to resolve the conflict between their telecom line and Pipeline C segments C13, C15, and C16, in the shoulder of NTH.
- 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 August 2019.

2.2 Communication with the Public

PG&E did not have any key communications with the public in August 2019:

2.3 Planned Activities for Next Six Weeks

The planned activities for next six weeks (September 1 through October 12, 2019) include the following:

- Complete installation of well at MW-Y' and MW-D.
- Start drilling and install well at MW-S and MW-11D.
- Continue to install remedy well at RB-2 and RB-3 (dual rotary rig).
- Complete installation of pilot boreholes at IRZ-19, IRZ-29, and IRZ-31
- Complete well installation at IRZ-39.
- Complete the abandonment of well MW-B-267 and drilling of a replacement well.
- Continue to conduct well testing at IRZ-20, IRZ-21, IRZ-25, RB-4, and RB-5.
- Complete well development at MW-C, MW-D, MW-H, MW-Y', RB-4, and RB-5.
- Continue to install Pipeline B.
- Start installation of Pipeline C6 on the MW-20 Bench or C5/C7 in the floodplain.
- Drilling of pilot boring at IRZ-37 did not occur as previously forecasted due to the availability of spider rig. This activity will be added to a six-week look ahead schedule when rig availability is known.
- Non-well construction activities:
 - Continue to install Pipeline B and J.
 - Start installation of Pipeline C Segment C6 or C5/C7.
 - 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 G 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 August 31, 2019. An update to Phase 1 construction schedule will be presented in the next monthly progress report.

In addition, an update of Phase 1 construction schedule was presented at the August 7, 2019 CWG meeting in Lake Havasu City. The update shows a forecast completion date for Phase 1 construction at the end of June 2021, an approximate nine-month delay. The update also shows a forecast completion of a) heavy construction outside TCS in July 2020, b) heavy construction inside TCS in December 2020, and c) system integration and functional testing in June 2021. The updated summary schedule is attached and can also be downloaded from the project website at <https://dtsc-topock.com/documents/project-schedule/current-project-schedule>.

The schedule delay reflects the temporary shutdown of project in Jan 2019 due to PG&E Chapter 11 bankruptcy filing, all approved work variance requests to date, and implementation challenges as documented in the monthly progress reports. PG&E has been communicating with the agencies about schedule delays since the temporary project shutdown and has made every effort to mitigate further delays. An example is the approved Work Variance Request #5 where the construction of the remedy

wastewater conditioning system will be phased to allow for the necessary infrastructure for Phase 1 to be constructed expeditiously and in a shorter amount of time.

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 H**).

3. References

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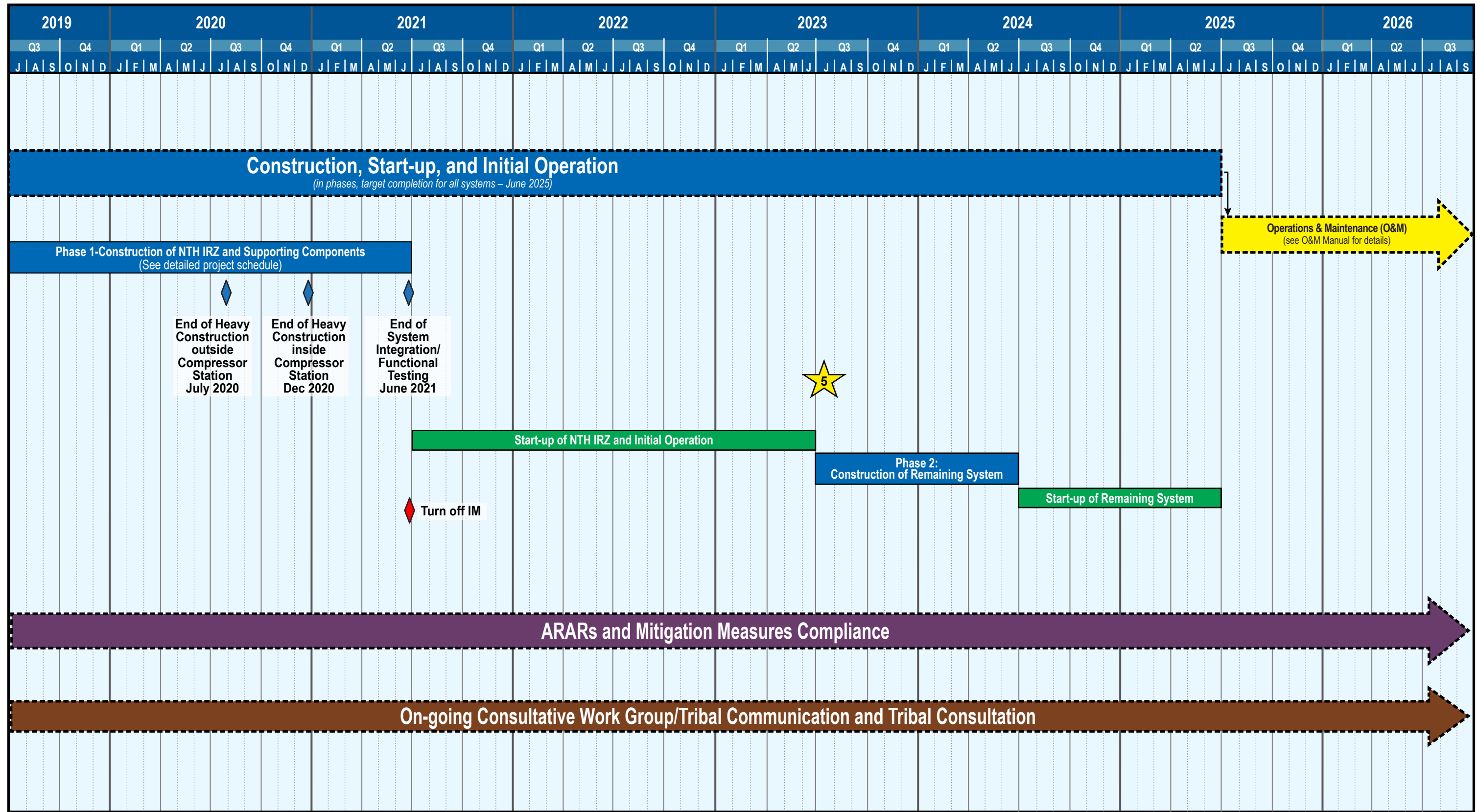
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United States Department of the Interior (DOI). 2018. *Approval of PG&E Topock Compressor Station Remediation Site – Basis of Design Report/Final (100%) Design Submittal and Construction/Remedial Action Work Plan for the Final Groundwater Remedy and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

Groundwater Remedy Construction, Start-up, and Initial O&M Schedule



LEGEND

★ Agencies
5-year Review

Tables

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

August 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*August 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

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

August 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.

Note:

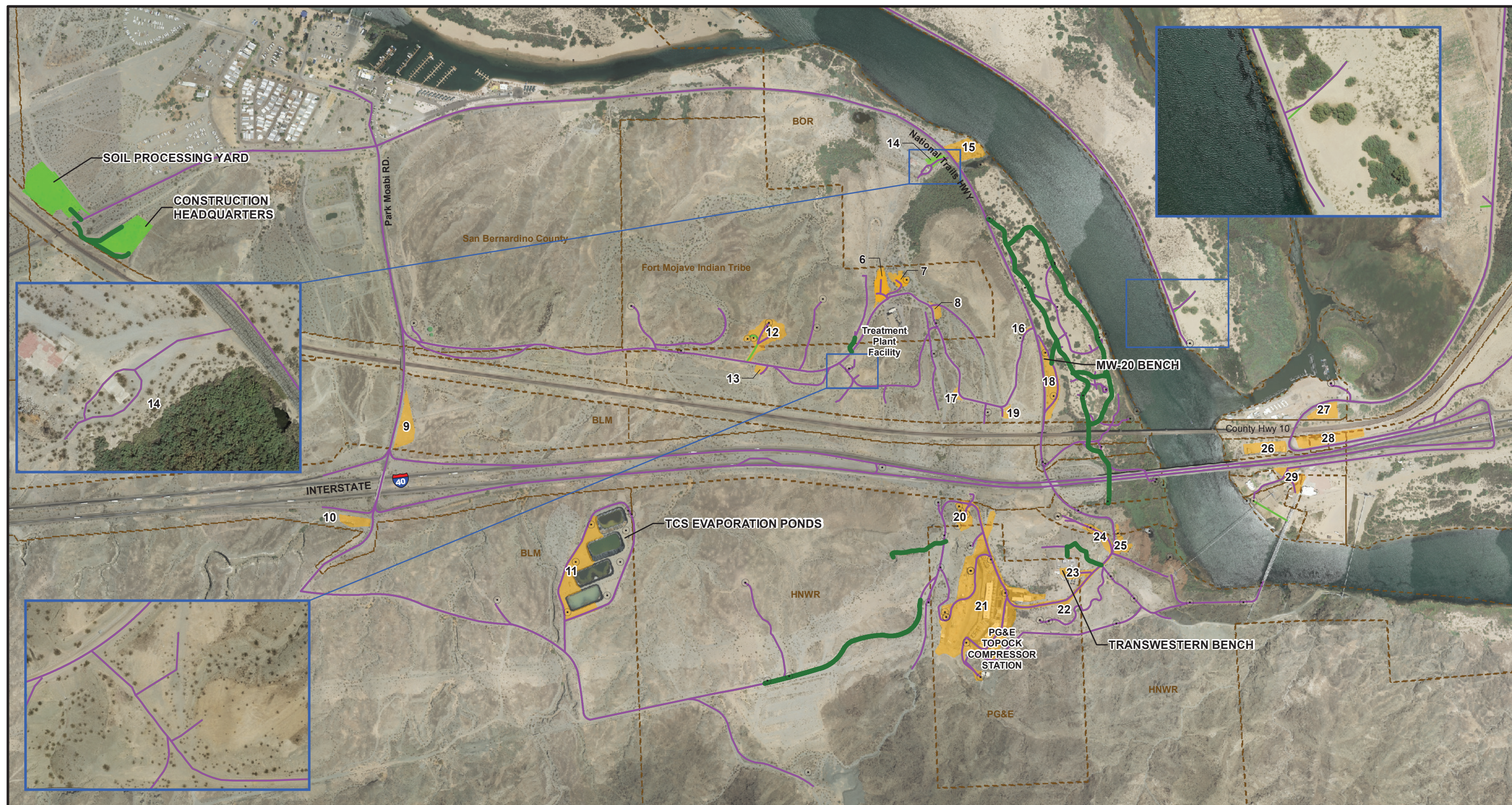
* CH2M HILL, Inc. (CH2M). 2015a. *Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy, PG&E Topock Compressor Station, Needles, California*. November 18.

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

*August 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 August 31, 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, 10D, M, R	100%	Complete.
MW-F, MW-G, MW-X, MW-H	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)	Not Available	Started well abandonment.
MW-D, MW-Y'	Not Available	Underway
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-4, RB-5	Not Available	Well construction complete. Well development in September.
IRZ-20 remedy well	Not Available	Well construction and development complete. Specific capacity testing conducted in July. Injection testing in September.
IRZ-21 and IRZ-23 remedy wells	Not Available	Well construction complete. Well testing in August/September.
Pipeline C Segments C3, C4, C5	Not Available	Substantially complete. Testing of 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:

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

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

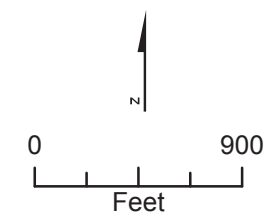


FIGURE 2.1-1 CONSTRUCTION SITE PLAN AND ACCESS ROUTES

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.

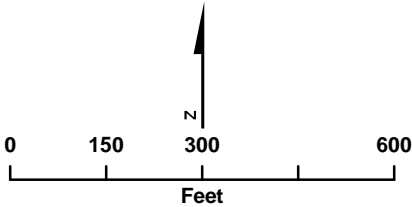


FIGURE 2-2
WELL AND PIPELINE LOCATIONS
GROUNDWATER REMEDY PHASE 1 CONSTRUCTION
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Attachment A

Photographs



Trenching at Pipeline B (Station 9+75)



HDPE Pipe Fusing at Pipeline B Work Area



Breaking Dense Rock at Pipeline B



Installed HDPE piping within Pipeline B Trench



Remedy Well Installation at RB-4



MW-Y Well Installation



MW-D Well Installation



MW-H Well Installation

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

Table B-1. Groundwater Sampling Results

August 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-C	MW-C-VAS-26-31	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-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	Data not yet available	<0.66 U
MW-D	MW-D-VAS-141-146	08/22/19	141-146	Data not yet available	<0.17 U

Table B-1. Groundwater Sampling Results

August 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-D	MW-D-VAS-151-156	08/22/19	151 - 156	Data not yet available	< 0.17 U
MW-D	MW-D-VAS-161-166	08/23/19	161 - 166	Data not yet available	< 0.17 U
MW-D	MW-D-VAS-171-176	08/23/19	171 - 176	Data not yet available	< 0.17 U
MW-D	MW-D-VAS-181-186	08/24/19	181 - 186	Data not yet available	< 0.17 U
MW-D	MW-D-VAS-191-196	08/25/19	191 - 196	Data not yet available	< 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	Data not yet available	<0.17 U
MW-H	MW-H-VAS-152-157	08/10/19	152-157	Data not yet available	<0.17 U
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

Table B-1. Groundwater Sampling Results*August 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-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
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

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-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	Data not yet available	<0.033 U
MW-Y'	MW-Y-VAS-52-57	08/21/19	52-57	Data not yet available	<0.033 U
MW-Y'	MW-Y-VAS-92-97	08/22/19	92 - 97	Data not yet available	0.31
MW-Y'	MW-Y-VAS-98-103	08/23/19	98 - 103	Data not yet available	< 0.033 U
MW-Y'	MW-Y-VAS-112-117	08/23/19	112 - 117	Data not yet available	< 0.033 U
MW-U	MW-U-VAS-137-142	04/12/19	137 - 142	0.818 J	1.4
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

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)
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
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

Table B-1. Groundwater Sampling Results

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Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
IRZ-17	IRZ-17-VAS-172-177	03/05/19	172 - 177	< 0.13 U	< 0.17 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
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

Table B-1. Groundwater Sampling Results

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Location	Sample ID	Sample Date	Depth Interval (ft bgs)	Total Dissolved Chromium (µg/L)	Hexavalent Chromium (µg/L)
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

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval	
Tested -	Lower Screen (137-155 ft)
Packer Set Depth -	124.3-128.3 ft BTOC
Packer Seal Test -	Packer tested for leaks at top of well casing - no leaks
Tests Conducted -	4 step Specific Capacity Test (6.5, 13, 19.5, 33.5 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 2.01-2.07 GPM/FT
Notes -	<p>The IM3 system was turned off before starting specific capacity test causing water levels to rise at the start of the test</p> <p>Final step was interrupted due to breaker box failure and pump was shut off</p> <p>Final step continued ~30 minutes after breaker failure and pump shut off</p>

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within	49-
71 (Specify Screen Interval) -	42.63
Initial Water Level Within	
137-155 (Specify Screen	43.83
Initial Totalizer Reading -	0
Final Totalizer Reading -	4788.36
Approx. Pumped Volume (gal) -	4788.36
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	6.5,13,19.5

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
8:10:00	0.0	0.0	0	0.00	43.83	0
8:10:20	0.3	0.3	6.42	2.14	47.73	3.9
8:10:40	0.3	0.7	6.42	4.28	47.15	3.32
8:11:00	0.3	1.0	6.36	6.40	46.72	2.89
8:12:00	1.0	2.0	6.15	12.55	46.75	2.92
8:13:00	1.0	3.0	--	12.55	--	--
8:14:00	1.0	4.0	6.45	19.00	46.93	3.1
8:15:00	1.0	5.0	6.44	25.44	46.84	3.01
8:16:00	1.0	6.0	--	25.44	46.8	2.97
8:17:00	1.0	7.0	--	25.44	46.71	2.88
8:18:00	1.0	8.0	6.85	32.29	47.02	3.19
8:19:00	1.0	9.0	6.77	39.06	47	3.17
8:20:00	1.0	10.0	6.7	45.76	46.9	3.07
8:22:00	2.0	12.0	6.69	59.14	46.97	3.14
8:24:00	2.0	14.0	6.7	72.54	46.98	3.15
8:26:00	2.0	16.0	6.62	85.78	46.96	3.13
8:28:00	2.0	18.0	6.57	98.92	46.94	3.11
8:30:00	2.0	20.0	6.5	111.92	46.91	3.08
8:32:00	2.0	22.0	6.44	124.80	46.91	3.08
8:34:00	2.0	24.0	6.32	137.44	46.8	2.97
8:36:00	2.0	26.0	7	151.44	47.12	3.29
8:38:00	2.0	28.0	6.94	165.32	47.1	3.27
8:40:00	2.0	30.0	6.9	179.12	47.08	3.25
8:42:00	2.0	32.0	6.87	192.86	47.05	3.22
8:44:00	2.0	34.0	6.85	206.56	47.06	3.23
8:46:00	2.0	36.0	6.78	220.12	47.03	3.2
8:48:00	2.0	38.0	6.78	233.68	47.03	3.2
8:50:00	2.0	40.0	6.74	247.16	47.01	3.18
8:55:00	5.0	45.0	6.71	280.71	47.02	3.19
9:00:00	5.0	50.0	6.69	314.16	47.02	3.19
9:05:00	5.0	55.0	6.64	347.36	47.02	3.19
9:10:00	5.0	60.0	6.64	380.56	47.02	3.19
9:15:00	5.0	65.0	6.6	413.56	47.02	3.19
9:20:00	5.0	70.0	6.58	446.46	47.02	3.19
9:30:00	10.0	80.0	6.62	512.66	47.02	3.19
9:40:00	10.0	90.0	6.57	578.36	47.02	3.19
9:50:00	10.0	100.0	6.89	647.26	47.09	3.26
10:00:00	10.0	110.0	6.75	714.76	47.08	3.25
10:10:00	10.0	120.0	6.75	782.26	47.09	3.26
Total Volume Pumped (GAL):		782.26				
Average Pumping Rate (GPM):		6.65				
Specific Capacity (GPM/FT):		2.04				

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within	49-
71 (Specify Screen Interval) -	42.63
Initial Water Level Within	
137-155 (Specify Screen	43.83
Initial Totalizer Reading -	0
Final Totalizer Reading -	4788.36
Approx. Pumped Volume (gal) -	4788.36
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	6.5,13,19.5

Step 2

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:10:20	0.3	120.3	12.02	786.27	48.5	4.67	0.3
10:10:40	0.3	120.7	12.92	790.57	49.79	5.96	0.7
10:11:00	0.3	121.0	12.61	794.78	49.72	5.89	1.0
10:12:00	1.0	122.0	12.77	807.55	49.94	6.11	2.0
10:13:00	1.0	123.0	13.01	820.56	50.03	6.2	3.0
10:14:00	1.0	124.0	13.12	833.68	50.14	6.31	4.0
10:15:00	1.0	125.0	13.06	846.74	50.11	6.28	5.0
10:16:00	1.0	126.0	13.32	860.06	50.31	6.48	6.0
10:17:00	1.0	127.0	13.66	873.72	50.42	6.59	7.0
10:18:00	1.0	128.0	13.7	887.42	50.44	6.61	8.0
10:19:00	1.0	129.0	13.68	901.10	50.44	6.61	9.0
10:20:00	1.0	130.0	13.66	914.76	50.3	6.47	10.0
10:22:00	2.0	132.0	13.42	941.60	50.35	6.52	12.0
10:24:00	2.0	134.0	13.41	968.42	50.33	6.5	14.0
10:26:00	2.0	136.0	13.4	995.22	50.33	6.5	16.0
10:28:00	2.0	138.0	13.4	1022.02	50.33	6.5	18.0
10:30:00	2.0	140.0	13.4	1048.82	50.33	6.5	20.0
10:32:00	2.0	142.0	13.34	1075.50	50.32	6.49	22.0
10:34:00	2.0	144.0	13.28	1102.06	50.27	6.44	24.0
10:36:00	2.0	146.0	13.26	1128.58	50.27	6.44	26.0
10:38:00	2.0	148.0	13.25	1155.08	50.28	6.45	28.0
10:40:00	2.0	150.0	13.26	1181.60	50.28	6.45	30.0
10:45:00	5.0	155.0	13.31	1248.15	50.32	6.49	35.0
10:50:00	5.0	160.0	13.28	1314.55	50.3	6.47	40.0
10:55:00	5.0	165.0	13.3	1381.05	50.31	6.48	45.0
11:00:00	5.0	170.0	13.28	1447.45	50.35	6.52	50.0
11:10:00	10.0	180.0	13.26	1580.05	50.32	6.49	60.0
11:20:00	10.0	190.0	12.96	1709.65	50.19	6.36	70.0
11:30:00	10.0	200.0	13.07	1840.35	50.37	6.54	80.0
11:40:00	10.0	210.0	13.1	1971.35	50.26	6.43	90.0
11:50:00	10.0	220.0	13.19	2103.25	50.3	6.47	100.0
12:00:00	10.0	230.0	13.1	2234.25	50.24	6.41	110.0
12:10:00	10.0	240.0	13.1	2365.25	50.28	6.45	120.0

Total Volume Pumped (GAL):	1582.74
Average Pumping Rate (GPM):	13.21
Specific Capacity (GPM/FT):	2.05

Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within	49-
71 (Specify Screen Interval) -	42.63
Initial Water Level Within	
137-155 (Specify Screen	43.83
Initial Totalizer Reading -	0
Final Totalizer Reading -	4788.36
Approx. Pumped Volume (gal) -	4788.36
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	6.5,13,19.5

Step 3

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:10:20	0.3	240.3	19.57	2371.77	52.5	8.67	0.3
12:10:40	0.3	240.7	19.57	2378.29	53.08	9.25	0.7
12:11:00	0.3	241.0	19.57	2384.82	53.18	9.35	1.0
12:12:00	1.0	242.0	19.57	2404.39	53.32	9.49	2.0
12:13:00	1.0	243.0	19.66	2424.05	53.38	9.55	3.0
12:14:00	1.0	244.0	19.52	2443.57	53.39	9.56	4.0
12:15:00	1.0	245.0	19.42	2462.99	53.39	9.56	5.0
12:16:00	1.0	246.0	19.59	2482.58	53.43	9.6	6.0
12:17:00	1.0	247.0	19.46	2502.04	53.3	9.47	7.0
12:18:00	1.0	248.0	19.4	2521.44	53.39	9.56	8.0
12:19:00	1.0	249.0	19.67	2541.11	53.47	9.64	9.0
12:20:00	1.0	250.0	19.69	2560.80	53.49	9.66	10.0
12:22:00	2.0	252.0	19.66	2600.12	53.5	9.67	12.0
12:24:00	2.0	254.0	19.52	2639.16	53.37	9.54	14.0
12:26:00	2.0	256.0	19.77	2678.70	53.52	9.69	16.0
12:28:00	2.0	258.0	19.62	2717.94	53.54	9.71	18.0
12:30:00	2.0	260.0	19.66	2757.26	53.55	9.72	20.0
12:32:00	2.0	262.0	19.72	2796.70	53.56	9.73	22.0
12:34:00	2.0	264.0	19.75	2836.20	53.56	9.73	24.0
12:36:00	2.0	266.0	19.74	2875.68	53.56	9.73	26.0
12:38:00	2.0	268.0	19.72	2915.12	53.57	9.74	28.0
12:40:00	2.0	270.0	19.71	2954.54	53.57	9.74	30.0
12:45:00	5.0	275.0	19.76	3053.34	53.57	9.74	35.0
12:50:00	5.0	280.0	19.72	3151.94	53.58	9.75	40.0
12:55:00	5.0	285.0	19.72	3250.54	53.58	9.75	45.0
13:00:00	5.0	290.0	19.71	3349.09	53.58	9.75	50.0
13:05:00	5.0	295.0	19.66	3447.39	53.58	9.75	55.0
13:10:00	5.0	300.0	19.59	3545.34	53.55	9.72	60.0
13:20:00	10.0	310.0	19.69	3742.24	53.55	9.72	70.0
13:30:00	10.0	320.0	19.62	3938.44	53.55	9.72	80.0
13:40:00	10.0	330.0	19.63	4134.74	53.55	9.72	90.0
13:50:00	10.0	340.0	19.62	4330.94	53.55	9.72	100.0
14:00:00	10.0	350.0	19.67	4527.64	53.55	9.72	110.0
14:10:00	10.0	360.0	19.69	4724.54	53.6	9.77	120.0

Total Volume Pumped (GAL):	2359.29
Average Pumping Rate (GPM):	19.64
Specific Capacity (GPM/FT):	2.01

Step 4

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
14:10:20	0.3	360.3	24.35	4732.65	55.78	11.95	0.3
14:10:40	0.3	360.7	25.63	4741.20	56.29	12.46	0.7
14:11:00	0.3	361.0	26.14	4749.91	56.7	12.87	1.0
14:11:30							

Pump off due to breaker failure

Total Volume Pumped (GAL):	25.37
Average Pumping Rate (GPM):	25.37
Specific Capacity (GPM/FT):	1.97

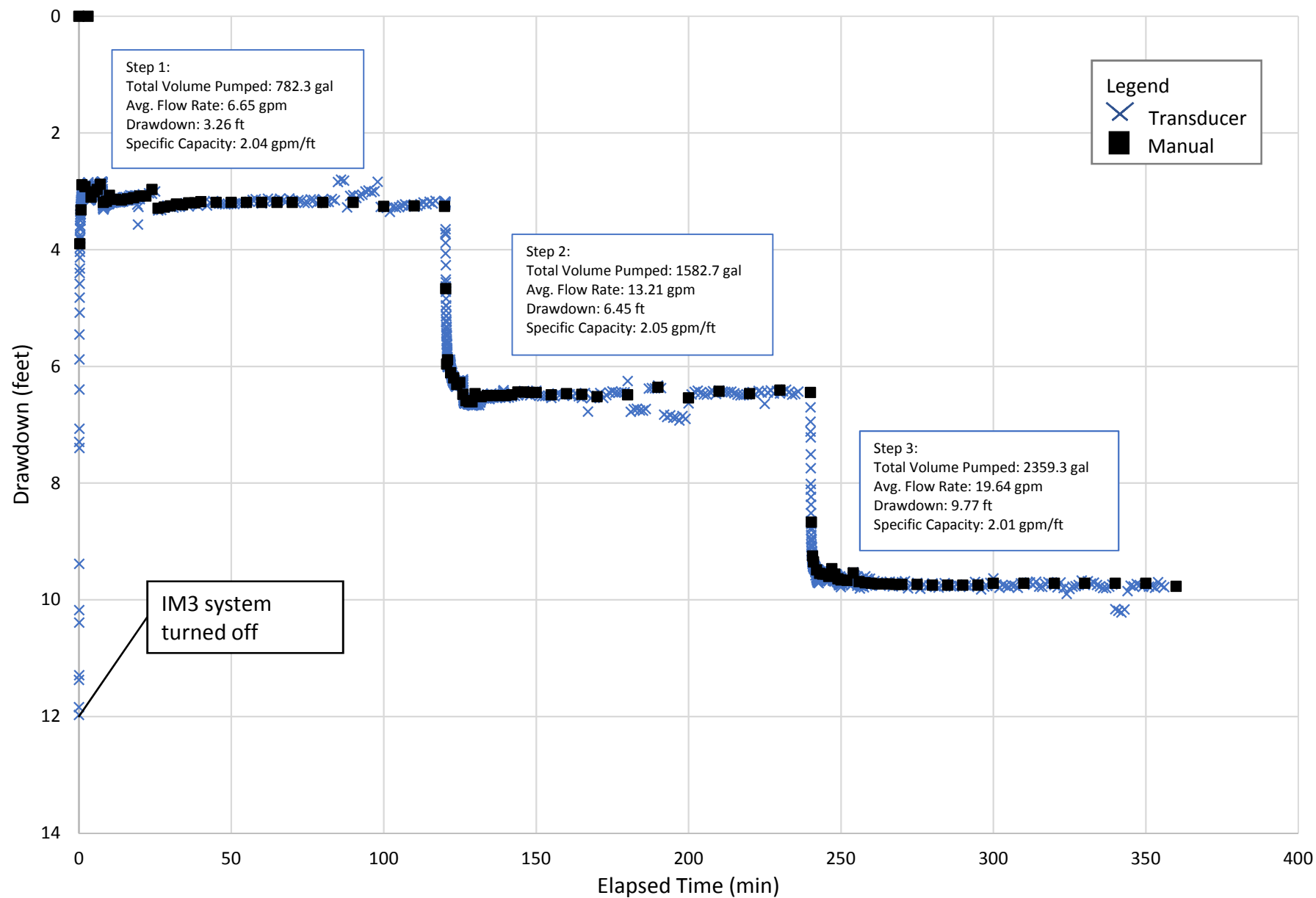
Specific Capacity Testing

Location/Well ID-	IRZ-20
Date -	6/30/2019
Screened Interval -	137-155
Initial Water Level Within	49-
71 (Specify Screen Interval) -	42.64
Initial Water Level Within	
137-155 (Specify Screen	44.06
Initial Totalizer Reading -	0
Final Totalizer Reading -	4104.04
Approx. Pumped Volume (gal) -	4104.04
Number of Specific Capacity Steps -	1
Pumping Rates (List In Order) -	~33.5

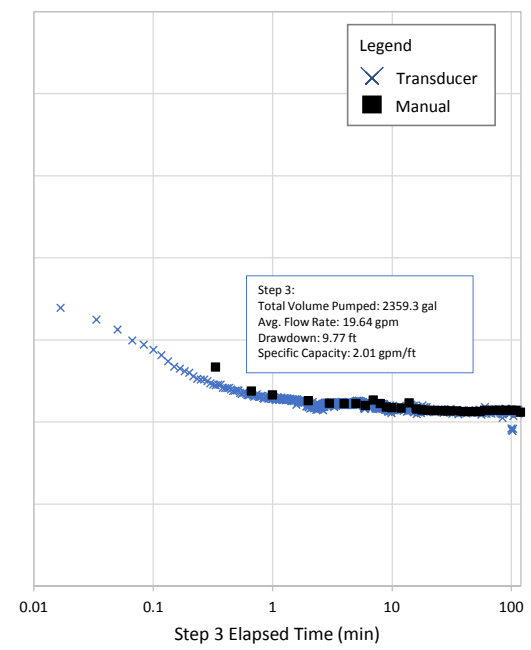
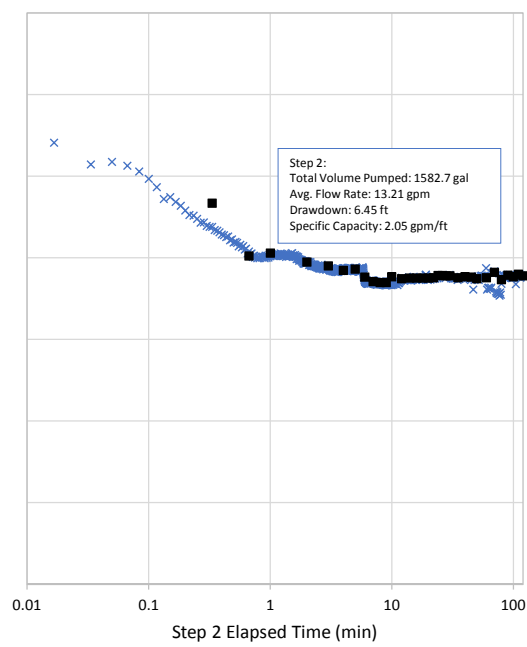
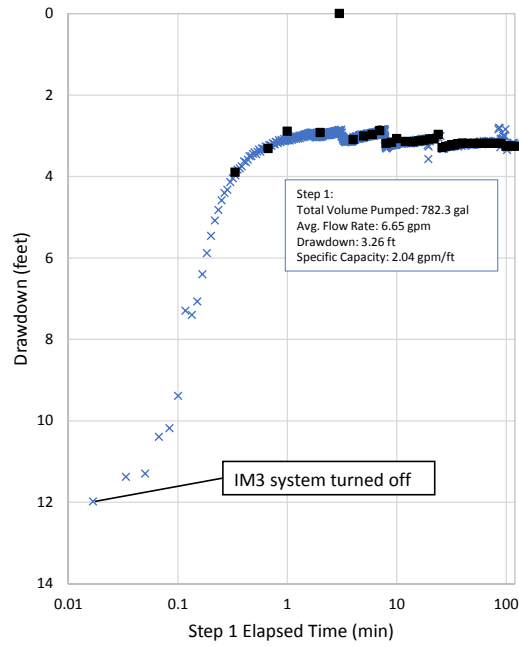
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 4 (Continued)						
14:40:00	0.0	0.0	0	0.00	44.06	0
14:40:20	0.3	0.3	34.43	11.48	--	--
14:40:40	0.3	0.7	34.43	22.95	58.3	14.24
14:41:00	0.3	1.0	34.41	34.42	59.18	15.12
14:42:00	1.0	2.0	34.4	68.82	59.97	15.91
14:43:00	1.0	3.0	34.38	103.20	60.43	16.37
14:44:00	1.0	4.0	34.38	137.58	60.55	16.49
14:45:00	1.0	5.0	34.36	171.94	60.62	16.56
14:46:00	1.0	6.0	34.36	206.30	60.67	16.61
14:47:00	1.0	7.0	34.36	240.66	60.71	16.65
14:48:00	1.0	8.0	34.36	275.02	60.73	16.67
14:49:00	1.0	9.0	34.36	309.38	60.75	16.69
14:50:00	1.0	10.0	34.36	343.74	60.76	16.7
14:52:00	2.0	12.0	33.62	410.98	60.41	16.35
14:54:00	2.0	14.0	33.6	478.18	60.41	16.35
14:56:00	2.0	16.0	33.6	545.38	60.41	16.35
14:58:00	2.0	18.0	33.58	612.54	60.42	16.36
15:00:00	2.0	20.0	33.58	679.70	60.42	16.36
15:02:00	2.0	22.0	33.58	746.86	60.45	16.39
15:04:00	2.0	24.0	33.6	814.06	60.44	16.38
15:06:00	2.0	26.0	33.58	881.22	60.45	16.39
15:08:00	2.0	28.0	33.58	948.38	60.44	16.38
15:10:00	2.0	30.0	33.58	1015.54	60.44	16.38
15:15:00	5.0	35.0	33.58	1183.44	60.44	16.38
15:20:00	5.0	40.0	33.58	1351.34	60.47	16.41
15:25:00	5.0	45.0	33.58	1519.24	60.48	16.42
15:30:00	5.0	50.0	33.58	1687.14	60.46	16.4
15:35:00	5.0	55.0	33.58	1855.04	60.44	16.38
15:40:00	5.0	60.0	33.58	2022.94	60.45	16.39
15:50:00	10.0	70.0	33.58	2358.74	60.45	16.39
16:00:00	10.0	80.0	33.58	2694.54	60.46	16.4
16:10:00	10.0	90.0	33.58	3030.34	60.46	16.4
16:20:00	10.0	100.0	33.58	3366.14	60.46	16.4
16:30:00	10.0	110.0	33.58	3701.94	60.45	16.39
16:42:00	12.0	122.0	33.58	4104.90	60.45	16.39
16:43:00			Stop pump - Test Complete			

Total Volume Pumped (GAL):	4104.90
Average Pumping Rate (GPM):	33.87
Specific Capacity (GPM/FT):	2.07

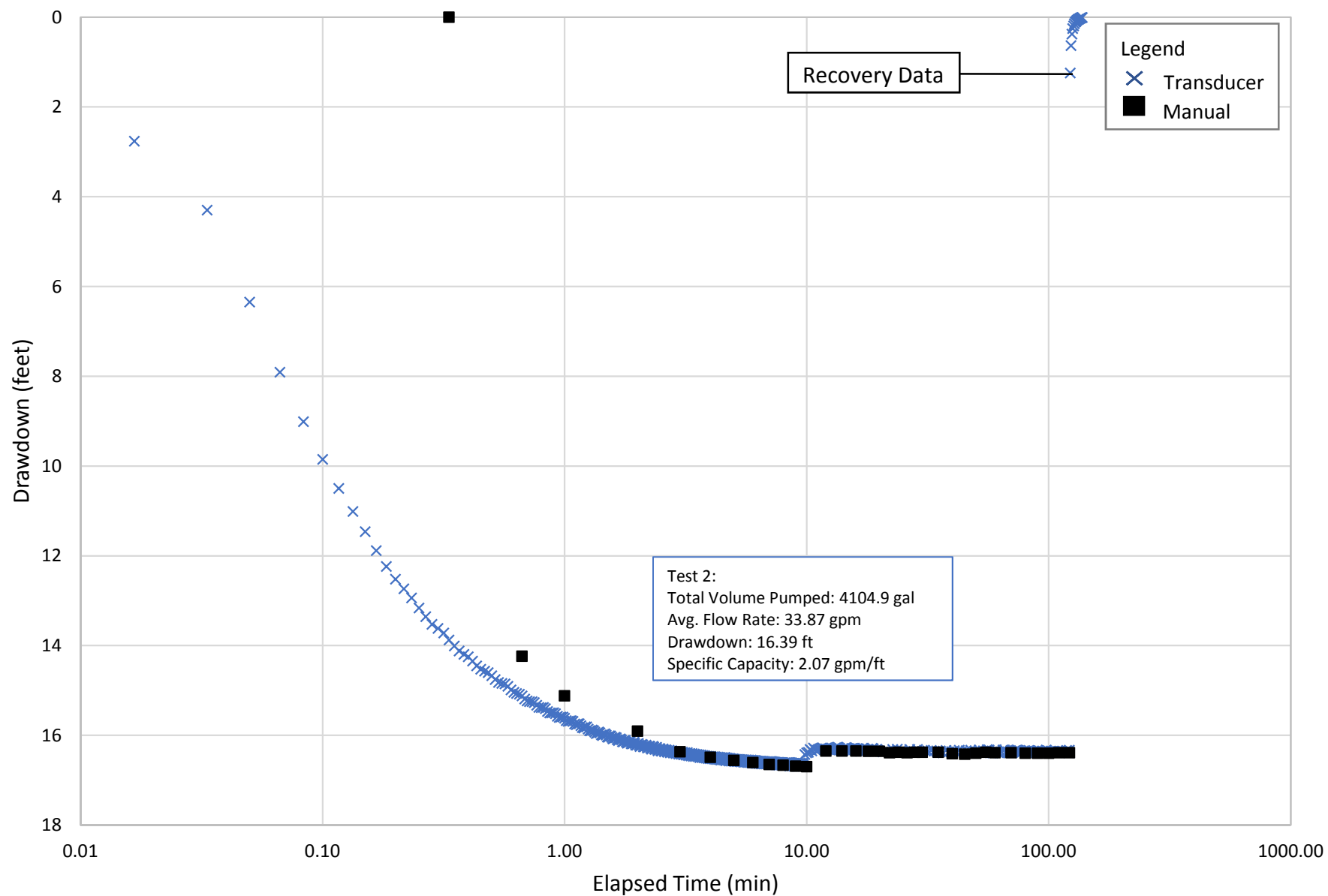
IRZ-20 Lower Screen (137-155 ft) Linear Drawdown Plot



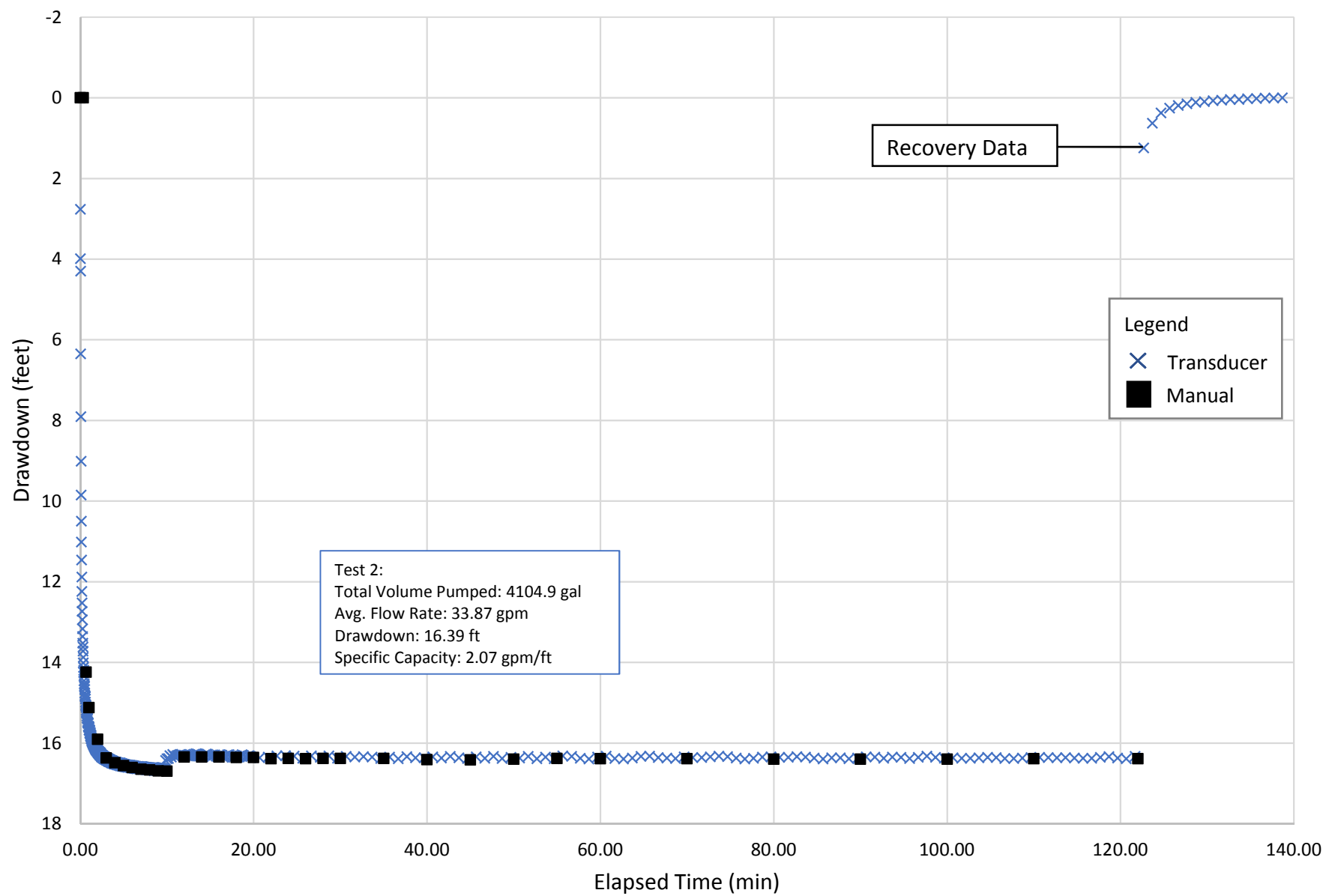
IRZ-20 Lower Screen (137-155 ft)
Semi-Log Drawdown Plot



IRZ-20 Lower Screen (137-155 ft) Semi-Log Drawdown Plot



IRZ-20 Lower Screen (137-155 ft) Linear Drawdown Plot



Specific Capacity Testing

Location/Well ID -	IRZ-20
Date -	7/11/2019-7/12/2019
Screened Interval	
Tested -	Upper Screen (49-71 ft)
Packer Set Depth -	76.7-80.7
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (6.5, 13, 19.5, 33 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 9.59-9.88 GPM/FT
Notes -	<p>Step 1 had an inconsistent pumping rate at the beginning of the test</p> <p>Final step performed the next day</p>

Specific Capacity Testing

Location/Well ID-	IRZ-20 Upper Screen
Date -	7/11/2019
Screened Interval -	49-71
Initial Water Level Within	
49-71 (Specify Screen Interval)	42.36
Initial Water Level Within	
137-155 (Specify Screen)	41.8
Initial Totalizer Reading -	0
Final Totalizer Reading -	4871.02
Approx. Pumped Volume (gal) -	4871.02
Number of Specific Capacity Steps -	3
Pumping Rates (List in Order) -	6.5, 13, 19.5

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
10:50:00	0.0	0.0	0	0.00	42.36	0
10:50:20	0.3	0.3	4.5	1.50	42.93	0.57
10:50:40	0.3	0.7	5.5	3.33	42.7	0.34
10:51:00	0.3	1.0	6.6	5.53	42.81	0.45
10:52:00	1.0	2.0	5.88	11.41	42.83	0.47
10:53:00	1.0	3.0	6.84	18.25	42.89	0.53
10:54:00	1.0	4.0	6.58	24.83	42.91	0.55
10:55:00	1.0	5.0	6.46	31.29	42.91	0.55
10:56:00	1.0	6.0	6.42	37.71	42.91	0.55
10:57:00	1.0	7.0	6.32	44.03	42.91	0.55
10:58:00	1.0	8.0	6.3	50.33	42.91	0.55
10:59:00	1.0	9.0	6.24	56.57	42.91	0.55
11:00:00	1.0	10.0	6.24	62.81	42.91	0.55
11:02:00	2.0	12.0	6.26	75.33	42.91	0.55
11:04:00	2.0	14.0	6.12	87.57	42.91	0.55
11:06:00	2.0	16.0	6.07	99.71	42.91	0.55
11:08:00	2.0	18.0	7.43	114.57	43.01	0.65
11:10:00	2.0	20.0	7.28	129.13	43.01	0.65
11:12:00	2.0	22.0	7.25	143.63	43.01	0.65
11:14:00	2.0	24.0	7.04	157.71	43.01	0.65
11:16:00	2.0	26.0	7.04	171.79	43.01	0.65
11:18:00	2.0	28.0	7.04	185.87	43.01	0.65
11:20:00	2.0	30.0	6.78	199.43	43.01	0.65
11:25:00	5.0	35.0	6.75	233.18	43.01	0.65
11:30:00	5.0	40.0	6.69	266.63	43.01	0.65
11:35:00	5.0	45.0	6.6	299.63	43.01	0.65
11:40:00	5.0	50.0	6.78	333.53	43.01	0.65
11:45:00	5.0	55.0	6.67	366.88	43.01	0.65
11:50:00	5.0	60.0	6.5	399.38	43.01	0.65
12:00:00	10.0	70.0	6.42	463.58	43.01	0.65
12:10:00	10.0	80.0	6.42	527.78	43	0.64
12:20:00	10.0	90.0	6.37	591.48	43	0.64
12:30:00	10.0	100.0	6.92	660.68	43.01	0.65
12:40:00	10.0	110.0	6.87	729.38	43.04	0.68
Total Volume Pumped (GAL):		729.38				
Average Pumping Rate (GPM):		6.52				
Specific Capacity (GPM/FT):		9.59				

Step 2							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
12:50:00	10.0	120.0	12.03	849.68	43.09	0.73	0.0
12:50:20	0.3	120.3	12.87	853.97	43.3	0.94	0.3
12:50:40	0.3	120.7	12.98	858.30	43.36	1	0.7
12:51:00	0.3	121.0	12.92	862.61	43.41	1.05	1.0
12:52:00	1.0	122.0	12.9	875.51	43.42	1.06	2.0
12:53:00	1.0	123.0	12.93	888.44	43.47	1.11	3.0
12:54:00	1.0	124.0	12.93	901.37	43.49	1.13	4.0
12:55:00	1.0	125.0	12.93	914.30	43.51	1.15	5.0
12:56:00	1.0	126.0	12.92	927.22	43.53	1.17	6.0
12:57:00	1.0	127.0	12.93	940.15	43.54	1.18	7.0
12:58:00	1.0	128.0	12.92	953.07	43.54	1.18	8.0
12:59:00	1.0	129.0	12.92	965.99	43.55	1.19	9.0
13:00:00	1.0	130.0	12.9	978.89	43.55	1.19	10.0
13:02:00	2.0	132.0	13.3	1005.49	43.58	1.22	12.0
13:04:00	2.0	134.0	13.34	1032.17	43.6	1.24	14.0
13:06:00	2.0	136.0	13.34	1058.85	43.61	1.25	16.0
13:08:00	2.0	138.0	13.32	1085.49	43.61	1.25	18.0
13:10:00	2.0	140.0	13.31	1112.11	43.61	1.25	20.0
13:12:00	2.0	142.0	13.32	1138.75	43.61	1.25	22.0
13:14:00	2.0	144.0	13.32	1165.39	43.61	1.25	24.0
13:16:00	2.0	146.0	13.34	1192.07	43.61	1.25	26.0
13:18:00	2.0	148.0	13.32	1218.71	43.61	1.25	28.0
13:20:00	2.0	150.0	13.31	1245.33	43.61	1.25	30.0
13:25:00	5.0	155.0	13.34	1312.03	43.62	1.26	35.0
13:30:00	5.0	160.0	13.32	1378.63	43.62	1.26	40.0
13:35:00	5.0	165.0	13.32	1445.23	43.64	1.28	45.0
13:40:00	5.0	170.0	13.34	1511.93	43.65	1.29	50.0
13:45:00	5.0	175.0	13.32	1578.53	43.65	1.29	55.0
13:50:00	5.0	180.0	13.32	1645.13	43.65	1.29	60.0
14:00:00	10.0	190.0	13.32	1778.33	43.66	1.3	70.0
14:10:00	10.0	200.0	13.32	1911.53	43.66	1.3	80.0
14:20:00	10.0	210.0	13.34	2044.93	43.67	1.31	90.0
14:30:00	10.0	220.0	13.32	2178.13	43.67	1.31	100.0
14:40:00	10.0	230.0	13.32	2311.33	43.69	1.33	110.0
Total Volume Pumped (GAL):		1581.95					
Average Pumping Rate (GPM):		13.14					
Specific Capacity (GPM/FT):		9.88					

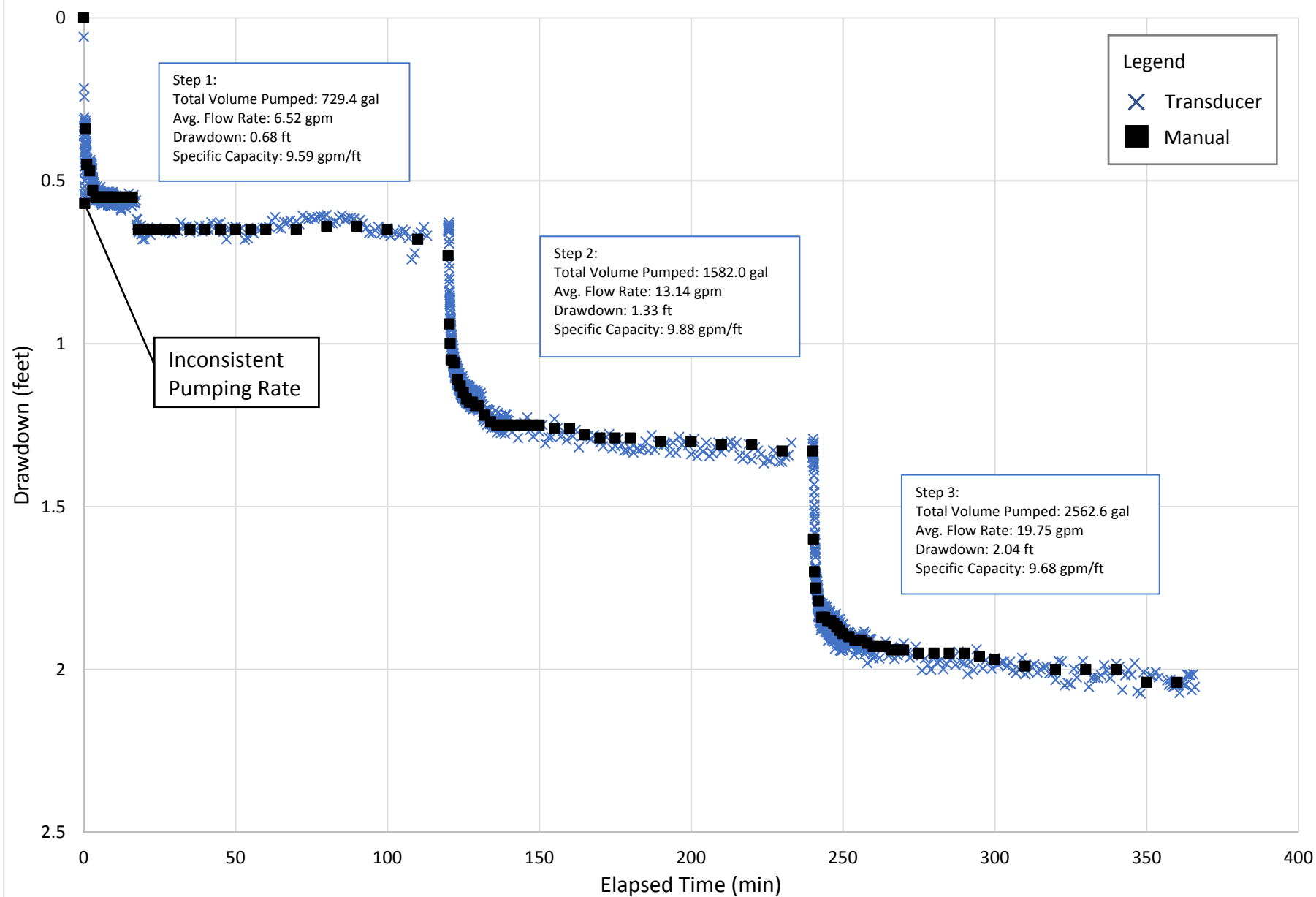
Step 3							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
14:50:00	10.0	240.0	20.24	2513.73	43.69	1.33	0.0
14:50:20	0.3	240.3	20.24	2520.47	43.96	1.6	0.3
14:50:40	0.3	240.7	20.18	2527.20	44.06	1.7	0.7
14:51:00	0.3	241.0	20.18	2533.93	44.11	1.75	1.0
14:52:00	1.0	242.0	20.17	2554.10	44.15	1.79	2.0
14:53:00	1.0	243.0	19.72	2573.82	44.2	1.84	3.0
14:54:00	1.0	244.0	19.7	2593.52	44.2	1.84	4.0
14:55:00	1.0	245.0	19.69	2613.21	44.21	1.85	5.0
14:56:00	1.0	246.0	19.69	2632.90	44.21	1.85	6.0
14:57:00	1.0	247.0	19.67	2652.57	44.22	1.86	7.0
14:58:00	1.0	248.0	19.69	2672.26	44.23	1.87	8.0
14:59:00	1.0	249.0	19.7	2691.96	44.24	1.88	9.0
15:00:00	1.0	250.0	19.7	2711.66	44.25	1.89	10.0
15:02:00	2.0	252.0	19.69	2751.04	44.26	1.9	12.0
15:04:00	2.0	254.0	19.7	2790.44	44.27	1.91	14.0
15:06:00	2.0	256.0	19.7	2829.84	44.27	1.91	16.0
15:08:00	2.0	258.0	19.7	2869.24	44.28	1.92	18.0
15:10:00	2.0	260.0	19.7	2908.64	44.29	1.93	20.0
15:12:00	2.0	262.0	19.67	2947.98	44.29	1.93	22.0
15:14:00	2.0	264.0	19.69	2987.36	44.29	1.93	24.0
15:16:00	2.0	266.0	19.69	3026.74	44.3	1.94	26.0
15:18:00	2.0	268.0	19.6	3065.94	44.3	1.94	28.0
15:20:00	2.0	270.0	19.66	3105.26	44.3	1.94	30.0
15:25:00	5.0	275.0	19.69	3203.71	44.31	1.95	35.0
15:30:00	5.0	280.0	19.66	3302.01	44.31	1.95	40.0
15:35:00	5.0	285.0	19.69	3400.46	44.31	1.95	45.0
15:40:00	5.0	290.0	19.64	3498.66	44.31	1.95	50.0
15:45:00	5.0	295.0	19.67	3597.01	44.32	1.96	55.0
15:50:00	5.0	300.0	19.67	3695.36	44.33	1.97	60.0
16:00:00	10.0	310.0	19.66	3891.96	44.35	1.99	70.0
16:10:00	10.0	320.0	19.66	4088.56	44.36	2	80.0
16:20:00	10.0	330.0	19.67	4285.26	44.36	2	90.0
16:30:00	10.0	340.0	19.69	4482.16	44.36	2	100.0
16:40:00	10.0	350.0	19.54	4677.56	44.4	2.04	110.0
16:50:00	10.0	360.0	19.64	4873.96	44.4	2.04	120.0
16:51:00	Complete Test						
Total Volume Pumped (GAL):		2562.63					
Average Pumping Rate (GPM):		19.75					
Specific Capacity (GPM/FT):		9.68					

Specific Capacity Testing

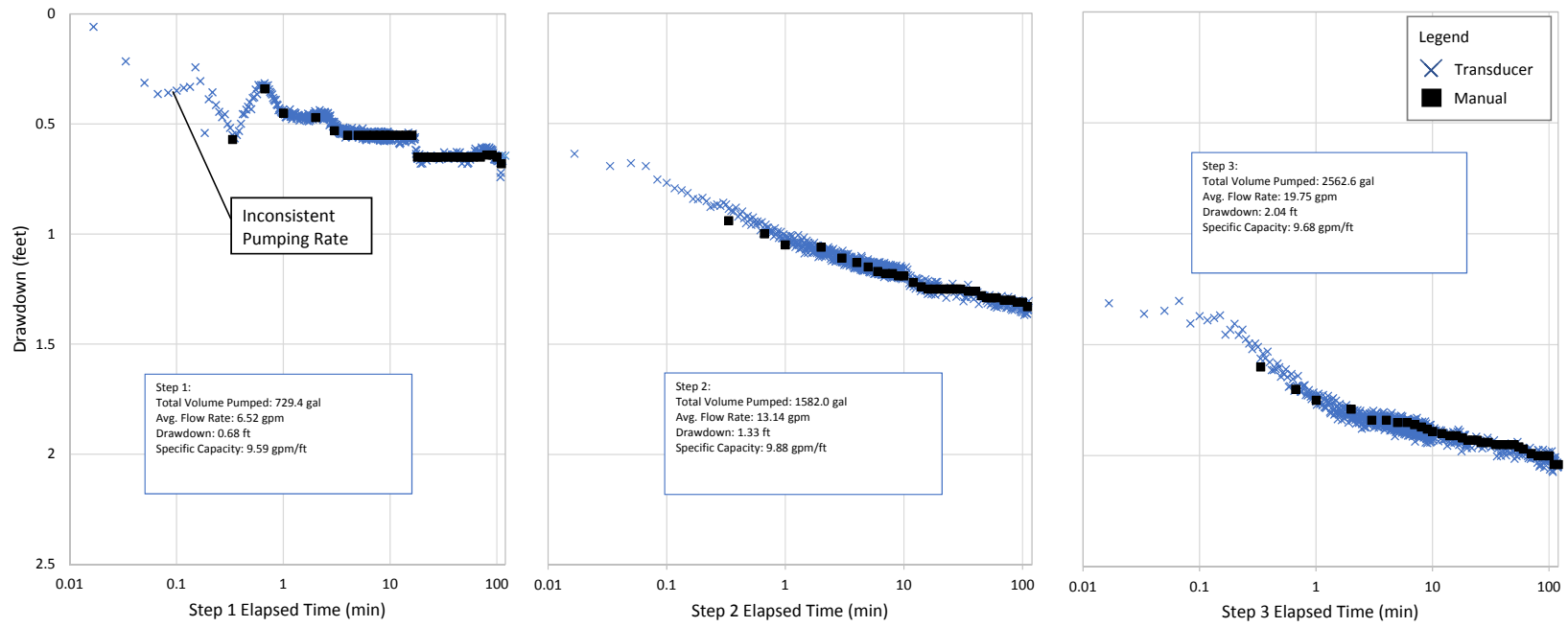
Location/Well ID -	IRZ-20 Upper Screen
Date -	7/12/2019
Screened Interval -	49-71
Initial Water Level Within	
49-71 (Specify Screen Interval)	42.12
Initial Water Level Within	
137-155 (Specify Screen)	41.55
Initial Totalizer Reading -	0
Final Totalizer Reading -	4198.63 gallons
Approx. Pumped Volume (gal) -	4198.63 gallons
Number of Specific Capacity Steps -	1
Pumping Rates (List in Order) -	Full Pump (~33 GPM)

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 4						
8:25:00	0.0	0.0	0	0.00	42.15	0
8:25:20	0.3	0.3	33.15	11.05	42.9	0.78
8:25:40	0.3	0.7	33.2	22.12	43.91	1.79
8:26:00	0.3	1.0	33.25	33.20	44.01	1.89
8:27:00	1.0	2.0	33.25	66.45	44.2	2.08
8:28:00	1.0	3.0	33	99.45	44.61	2.49
8:29:00	1.0	4.0	33.08	132.53	44.75	2.63
8:30:00	1.0	5.0	33.02	165.55	44.82	2.7
8:31:00	1.0	6.0	33	198.55	44.89	2.77
8:32:00	1.0	7.0	32.9	231.45	44.95	2.83
8:33:00	1.0	8.0	32.94	264.39	44.99	2.87
8:34:00	1.0	9.0	32.95	297.34	45.02	2.9
8:35:00	1.0	10.0	32.95	330.29	45.04	2.92
8:37:00	2.0	12.0	32.94	396.17	45.09	2.97
8:39:00	2.0	14.0	32.88	461.93	45.12	3
8:41:00	2.0	16.0	32.95	527.83	45.16	3.04
8:43:00	2.0	18.0	32.92	593.67	45.18	3.06
8:45:00	2.0	20.0	32.94	659.55	45.21	3.09
8:47:00	2.0	22.0	33.02	725.59	45.23	3.11
8:49:00	2.0	24.0	32.97	791.53	45.25	3.13
8:51:00	2.0	26.0	32.95	857.43	45.26	3.14
8:53:00	2.0	28.0	32.95	923.33	45.27	3.15
8:55:00	2.0	30.0	32.92	989.17	45.28	3.16
9:00:00	5.0	35.0	32.94	1153.87	45.31	3.19
9:05:00	5.0	40.0	32.94	1318.57	45.32	3.2
9:10:00	5.0	45.0	32.88	1482.97	45.35	3.23
9:15:00	5.0	50.0	32.88	1647.37	45.36	3.24
9:20:00	5.0	55.0	32.97	1812.22	45.38	3.26
9:25:00	5.0	60.0	32.94	1976.92	45.4	3.28
9:35:00	10.0	70.0	32.98	2306.72	45.41	3.29
9:45:00	10.0	80.0	32.92	2635.92	45.43	3.31
9:55:00	10.0	90.0	32.87	2964.62	45.45	3.33
10:05:00	10.0	100.0	32.92	3293.82	45.47	3.35
10:15:00	10.0	110.0	32.9	3622.82	45.48	3.36
10:25:00	10.0	120.0	32.95	3952.32	45.49	3.37
Total Volume Pumped (GAL):		3952.32				
Average Pumping Rate (GPM):		32.98				
Specific Capacity (GPM/FT):		9.79				

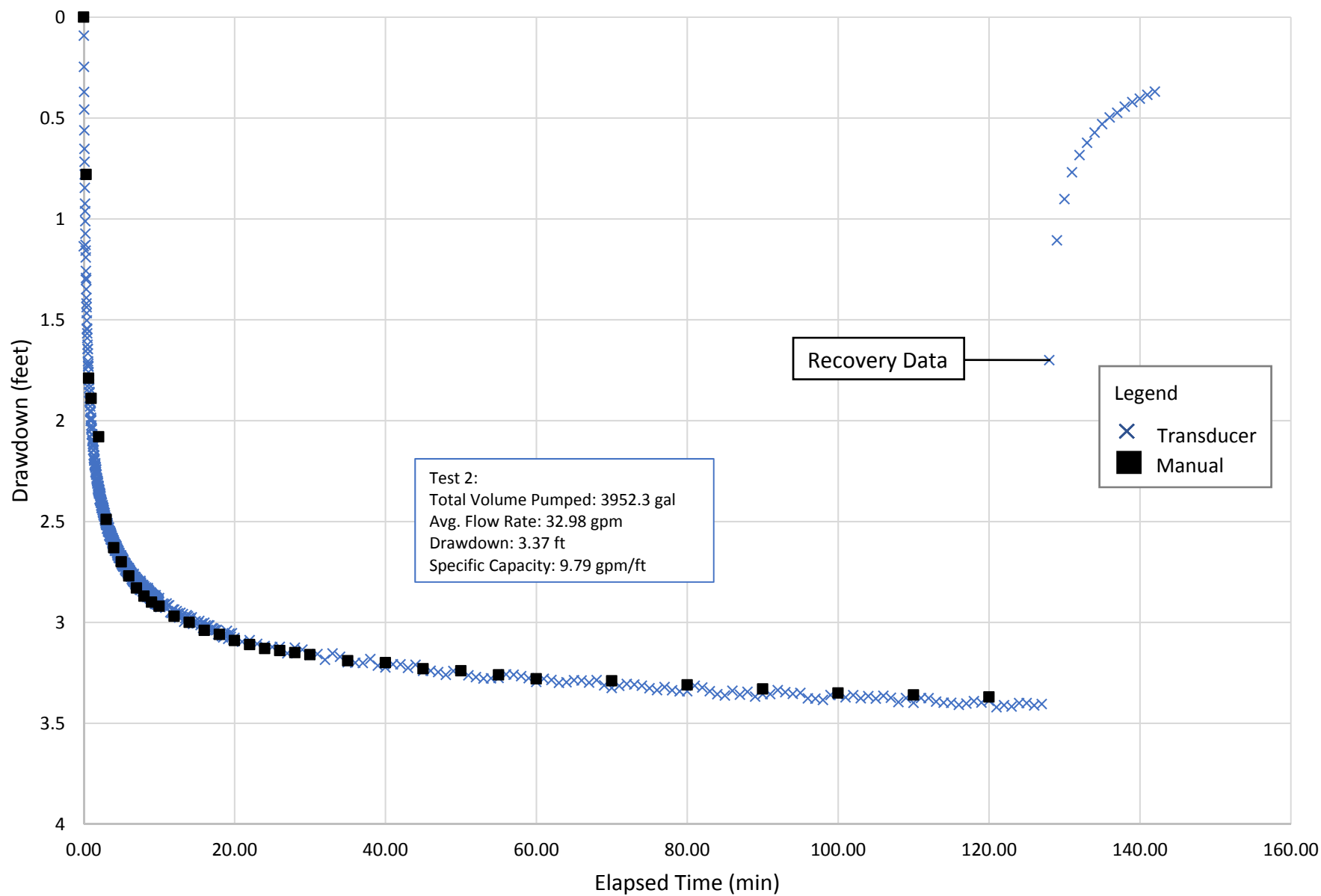
IRZ-20 Upper Screen (49-71 ft) Linear Drawdown Plot



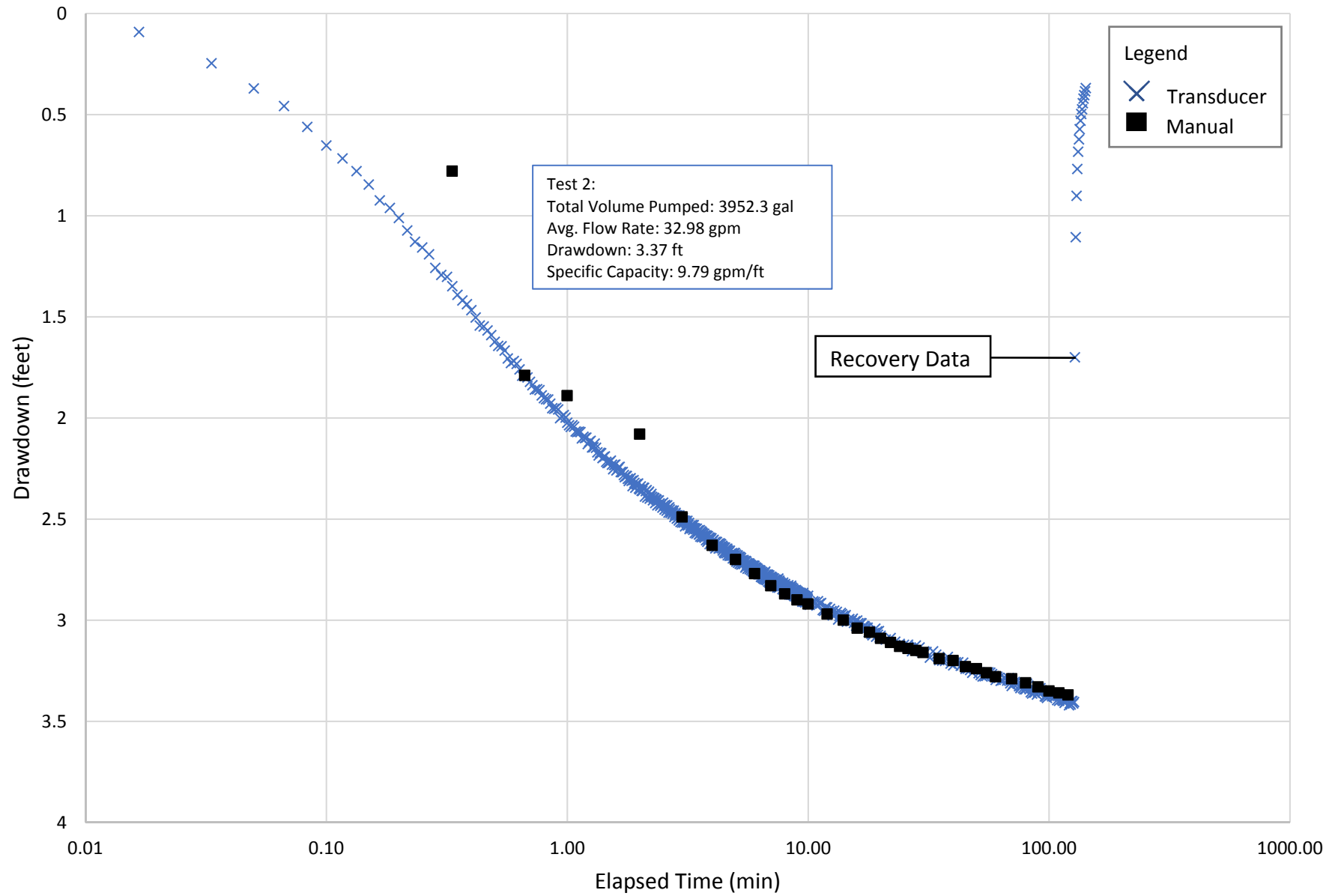
IRZ-20 Upper Screen (49-71 ft)
Semi-Log Drawdown Plot



IRZ-20 Upper Screen (49-71 ft) Linear Drawdown Plot



IRZ-20 Upper Screen (49-71 ft) Semi-Log Drawdown Plot



Specific Capacity Testing

Location/Well ID-	IRZ-21
Date -	8/24/2019
Screened Interval	
Tested -	Lower Screen (141-158 ft)
Packer Set Depth -	~80 ft BGS (not documented)
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (6.5, 15, 22.5, 30 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 0.56-0.61 GPM/FT
Notes -	Inconsistent pumping rate at beginning of Step 1 Temporary pump shutdown during Step 3

Specific Capacity Testing

Location/Well ID-	IRZ-21 Upper
Date -	8/26/2019
Screened Interval -	48' - 66'
Initial Water Level Within 48' - 66' bgs -	44.43
Initial Water Level Within 141-158 bgs -	47.82
Initial Totalizer Reading -	0
Final Totalizer Reading -	9538.24
Approx. Pumped Volume (gal) -	9538.24
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, Open Pump

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
14:00:00	0.0	0.0	24.98	0.00	44.43	0
14:00:20	0.3	0.3	17.35	5.78	45.33	0.90
14:00:40	0.3	0.7	8.03	8.46	45.17	0.74
14:01:00	0.3	1.0	7.53	10.97	45.45	1.02
14:02:00	1.0	2.0	7.55	18.52	45.22	0.79
14:03:00	1.0	3.0	7.53	26.05	45.27	0.84
14:04:00	1.0	4.0	7.52	33.57	45.30	0.87
14:05:00	1.0	5.0	7.52	41.09	45.34	0.91
14:06:00	1.0	6.0	7.48	48.57	45.35	0.92
14:07:00	1.0	7.0	7.44	56.01	45.38	0.95
14:08:00	1.0	8.0	7.44	63.45	45.38	0.95
14:09:00	1.0	9.0	7.44	70.89	45.39	0.96
14:10:00	1.0	10.0	7.43	78.32	45.39	0.96
14:12:00	2.0	12.0	7.42	93.16	45.42	0.99
14:14:00	2.0	14.0	7.42	108.00	45.43	1.00
14:16:00	2.0	16.0	7.42	122.84	45.44	1.01
14:18:00	2.0	18.0	7.40	137.64	45.44	1.01
14:20:00	2.0	20.0	7.38	152.40	45.45	1.02
14:22:00	2.0	22.0	7.30	167.00	45.45	1.02
14:24:00	2.0	24.0	7.68	182.36	45.49	1.06
14:26:00	2.0	26.0	7.66	197.68	45.50	1.07
14:28:00	2.0	28.0	7.68	213.04	45.50	1.07
14:30:00	2.0	30.0	7.68	228.40	45.51	1.08
14:35:00	5.0	35.0	7.73	267.05	45.53	1.10
14:40:00	5.0	40.0	7.73	305.70	45.55	1.12
14:45:00	5.0	45.0	7.73	344.35	45.56	1.13
14:50:00	5.0	50.0	7.72	382.95	45.57	1.14
14:55:00	5.0	55.0	7.73	421.60	45.57	1.14
15:00:00	5.0	60.0	7.73	460.25	45.58	1.15
15:10:00	10.0	70.0	7.73	537.55	45.59	1.16
15:20:00	10.0	80.0	7.72	614.75	45.60	1.17
15:30:00	10.0	90.0	7.70	691.75	45.61	1.18
15:40:00	10.0	100.0	7.72	768.95	45.61	1.18
15:50:00	10.0	110.0	7.73	846.25	45.62	1.19
16:00:00	10.0	120.0	7.72	923.45	45.63	1.20
Total Volume Pumped for Step 1 (GAL):			923.45			
Average Pumping Rate (GPM):			7.88			
Specific Capacity (GPM/FT):			6.57			

Specific Capacity Testing

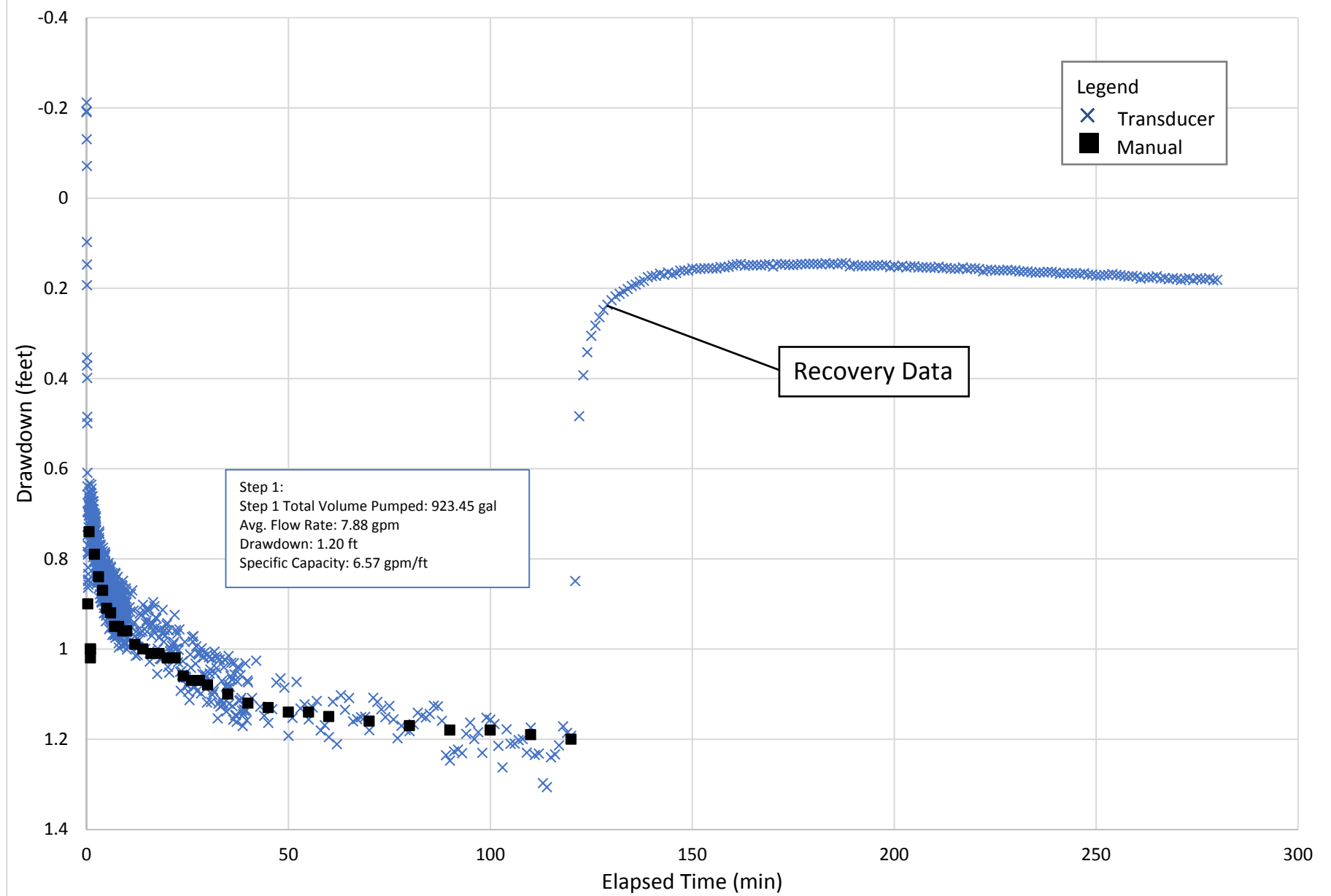
Location/Well ID-	IRZ-21 Upper
Date -	8/27/2019
Screened Interval -	48' - 66'
Initial Water Level Within 48' - 66' bgs -	44.43
Initial Water Level Within 141-158 bgs -	47.82
Initial Totalizer Reading -	0
Final Totalizer Reading -	9538.24
Approx. Pumped Volume (gal) -	9538.24
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5,15, 22.5, Open Pump

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 2						
8:00:00	0.0	0.0	23.51	0.00	44.39	0
8:00:20	0.3	0.3	14.30	4.77	45.47	1.04
8:00:40	0.3	0.7	14.80	9.70	45.62	1.19
8:01:00	0.3	1.0	14.89	14.66	45.77	1.34
8:02:00	1.0	2.0	15.14	29.80	45.97	1.54
8:03:00	1.0	3.0	15.12	44.92	46.07	1.64
8:04:00	1.0	4.0	15.14	60.06	46.20	1.77
8:05:00	1.0	5.0	15.14	75.20	46.26	1.83
8:06:00	1.0	6.0	15.14	90.34	46.31	1.88
8:07:00	1.0	7.0	15.14	105.48	46.35	1.92
8:08:00	1.0	8.0	15.16	120.64	46.38	1.95
8:09:00	1.0	9.0	15.14	135.78	46.42	1.99
8:10:00	1.0	10.0	15.12	150.90	46.44	2.01
8:12:00	2.0	12.0	15.12	181.14	46.46	2.03
8:14:00	2.0	14.0	15.11	211.36	46.50	2.07
8:16:00	2.0	16.0	15.11	241.58	46.52	2.09
8:18:00	2.0	18.0	15.11	271.80	46.55	2.12
8:20:00	2.0	20.0	15.09	301.98	46.55	2.12
8:22:00	2.0	22.0	15.09	332.16	46.56	2.13
8:24:00	2.0	24.0	15.09	362.34	46.58	2.15
8:26:00	2.0	26.0	15.09	392.52	46.59	2.16
8:28:00	2.0	28.0	15.09	422.70	46.60	2.17
8:30:00	2.0	30.0	15.08	452.86	46.61	2.18
8:35:00	5.0	35.0	15.08	528.26	46.63	2.20
8:40:00	5.0	40.0	15.09	603.71	46.65	2.22
8:45:00	5.0	45.0	15.08	679.11	46.67	2.24
8:50:00	5.0	50.0	15.08	754.51	46.68	2.25
8:55:00	5.0	55.0	15.04	829.71	46.70	2.27
9:00:00	5.0	60.0	15.02	904.81	46.71	2.28
9:10:00	10.0	70.0	15.06	1055.41	46.72	2.29
9:20:00	10.0	80.0	15.08	1206.21	46.75	2.32
9:30:00	10.0	90.0	15.04	1356.61	46.76	2.33
9:40:00	10.0	100.0	15.04	1507.01	46.76	2.33
9:50:00	10.0	110.0	15.08	1657.81	46.77	2.34
10:00:00	10.0	120.0	15.08	1808.61	46.80	2.37
Total Volume Pumped for Step 1 (GAL):			1808.61			
Average Pumping Rate (GPM):			15.06			
Specific Capacity (GPM/FT):			6.35			

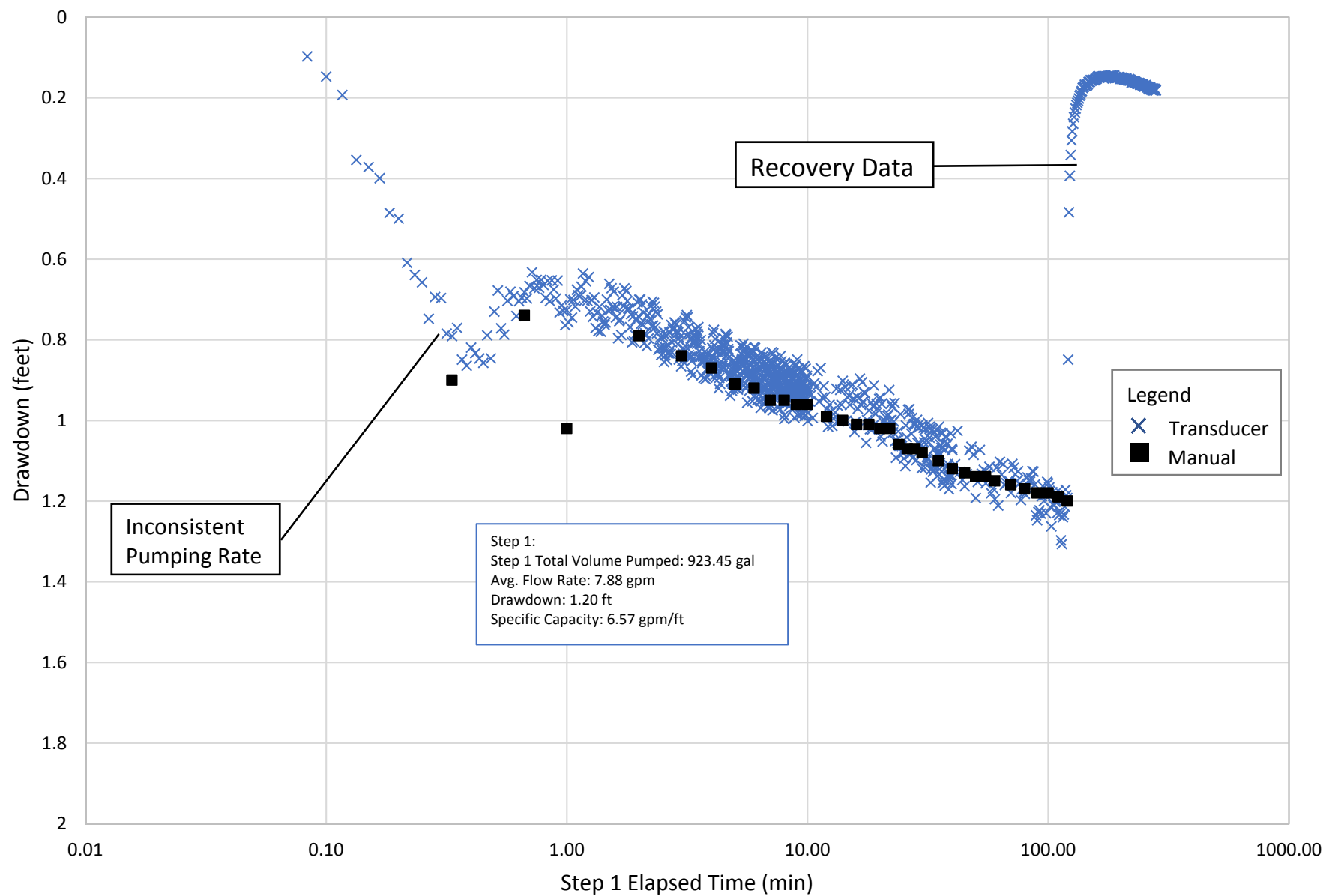
Step 3							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
10:00:20	0.3	120.3	22.20	1816.01	47.19	2.76	0.3
10:00:40	0.3	120.7	22.25	1823.43	47.33	2.90	0.7
10:01:00	0.3	121.0	22.52	1830.94	47.45	3.02	1.0
10:02:00	1.0	122.0	22.74	1853.68	47.56	3.13	2.0
10:03:00	1.0	123.0	22.78	1876.46	47.76	3.33	3.0
10:04:00	1.0	124.0	22.72	1899.18	47.83	3.40	4.0
10:05:00	1.0	125.0	22.74	1921.92	47.87	3.44	5.0
10:06:00	1.0	126.0	22.71	1944.63	47.91	3.48	6.0
10:07:00	1.0	127.0	22.72	1967.35	47.93	3.50	7.0
10:08:00	1.0	128.0	22.74	1990.09	47.95	3.52	8.0
10:09:00	1.0	129.0	22.71	2012.80	47.96	3.53	9.0
10:10:00	1.0	130.0	22.74	2035.54	47.97	3.54	10.0
10:12:00	2.0	132.0	22.74	2081.02	48.01	3.58	12.0
10:14:00	2.0	134.0	22.76	2126.54	48.03	3.60	14.0
10:16:00	2.0	136.0	22.74	2172.02	48.04	3.61	16.0
10:18:00	2.0	138.0	22.72	2217.46	48.05	3.62	18.0
10:20:00	2.0	140.0	22.74	2262.94	48.07	3.64	20.0
10:22:00	2.0	142.0	22.71	2308.36	48.07	3.64	22.0
10:24:00	2.0	144.0	22.72	2353.80	48.08	3.65	24.0
10:26:00	2.0	146.0	22.72	2399.24	48.10	3.67	26.0
10:28:00	2.0	148.0	22.76	2444.76	48.12	3.69	28.0
10:30:00	2.0	150.0	22.76	2490.28	48.12	3.69	30.0
10:35:00	5.0	155.0	22.76	2604.08	48.13	3.70	35.0
10:40:00	5.0	160.0	22.74	2717.78	48.14	3.71	40.0
10:45:00	5.0	165.0	22.74	2831.48	48.16	3.73	45.0
10:50:00	5.0	170.0	22.78	2945.38	48.19	3.76	50.0
10:55:00	5.0	175.0	22.79	3059.33	48.20	3.77	55.0
11:00:00	5.0	180.0	22.79	3173.28	48.20	3.77	60.0
11:10:00	10.0	190.0	22.82	3401.48	48.22	3.79	70.0
11:20:00	10.0	200.0	22.86	3630.08	48.25	3.82	80.0
11:30:00	10.0	210.0	22.84	3858.48	48.26	3.83	90.0
11:40:00	10.0	220.0	22.82	4086.68	48.28	3.85	100.0
11:50:00	10.0	230.0	22.86	4315.28	48.30	3.87	110.0
12:00:00	10.0	240.0	22.89	4544.18	48.30	3.87	120.0
Total Volume Pumped for Step 2 (GAL):			2735.56				
Average Pumping Rate (GPM):			22.72				
Specific Capacity (GPM/FT):			5.87				

Step 4							
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
12:00:20	0.3	240.3	33.70	4555.41	48.79	4.36	0.3
12:00:40	0.3	240.7	33.68	4566.64	49.18	4.75	0.7
12:01:00	0.3	241.0	33.68	4577.86	49.27	4.84	1.0
12:02:00	1.0	242.0	33.66	4611.52	49.68	5.25	2.0
12:03:00	1.0	243.0	33.68	4645.20	49.85	5.42	3.0
12:04:00	1.0	244.0	33.66	4678.86	49.96	5.53	4.0
12:05:00	1.0	245.0	33.65	4712.51	50.03	5.60	5.0
12:06:00	1.0	246.0	33.68	4746.19	50.07	5.64	6.0
12:07:00	1.0	247.0	33.72	4779.91	50.11	5.68	7.0
12:08:00	1.0	248.0	33.70	4813.61	50.15	5.72	8.0
12:09:00	1.0	249.0	33.70	4847.31	50.18	5.75	9.0
12:10:00	1.0	250.0	33.68	4880.99	50.19	5.76	10.0
12:12:00	2.0	252.0	33.72	4948.43	50.24	5.81	12.0
12:14:00	2.0	254.0	33.70	5015.83	50.27	5.84	14.0
12:16:00	2.0	256.0	33.72	5083.27	50.29	5.86	16.0
12:18:00	2.0	258.0	33.75	5150.77	50.32	5.89	18.0
12:20:00	2.0	260.0	33.66	5218.09	50.33	5.90	20.0
12:24:00	4.0	264.0	33.75	5353.09	50.36	5.93	24.0
12:26:00	2.0	266.0	33.73	5420.55	50.39	5.96	26.0
12:28:00	2.0	268.0	33.73	5488.01	50.40	5.97	28.0
12:30:00	2.0	270.0	33.73	5555.47	50.41	5.98	30.0
12:35:00	5.0	275.0	33.73	5724.12	50.43	6.00	35.0
12:40:00	5.0	280.0	33.73	5892.77	50.46	6.03	40.0
12:45:00	5.0	285.0	33.72	6061.37	50.47	6.04	45.0
12:50:00	5.0	290.0	33.70	6229.87	50.48	6.05	50.0
12:55:00	5.0	295.0	33.66	6398.17	50.49	6.06	55.0
13:10:00	15.0	310.0	33.72	6903.97	50.55	6.12	70.0
13:20:00	10.0	320.0	33.56	7239.57	50.56	6.13	80.0
13:30:00	10.0	330.0	33.56	7575.17	50.58	6.15	90.0
13:40:00	10.0	340.0	33.54	7910.57	50.59	6.16	100.0
13:50:00	10.0	350.0	33.00	8240.57	50.62	6.19	110.0
14:00:00	10.0	360.0	33.58	8576.37	50.66	6.23	120.0
Total Volume Pumped for Step 3 (GAL):			4032.2				
Average Pumping Rate (GPM):			33.66				
Specific Capacity (GPM/FT):			5.40				

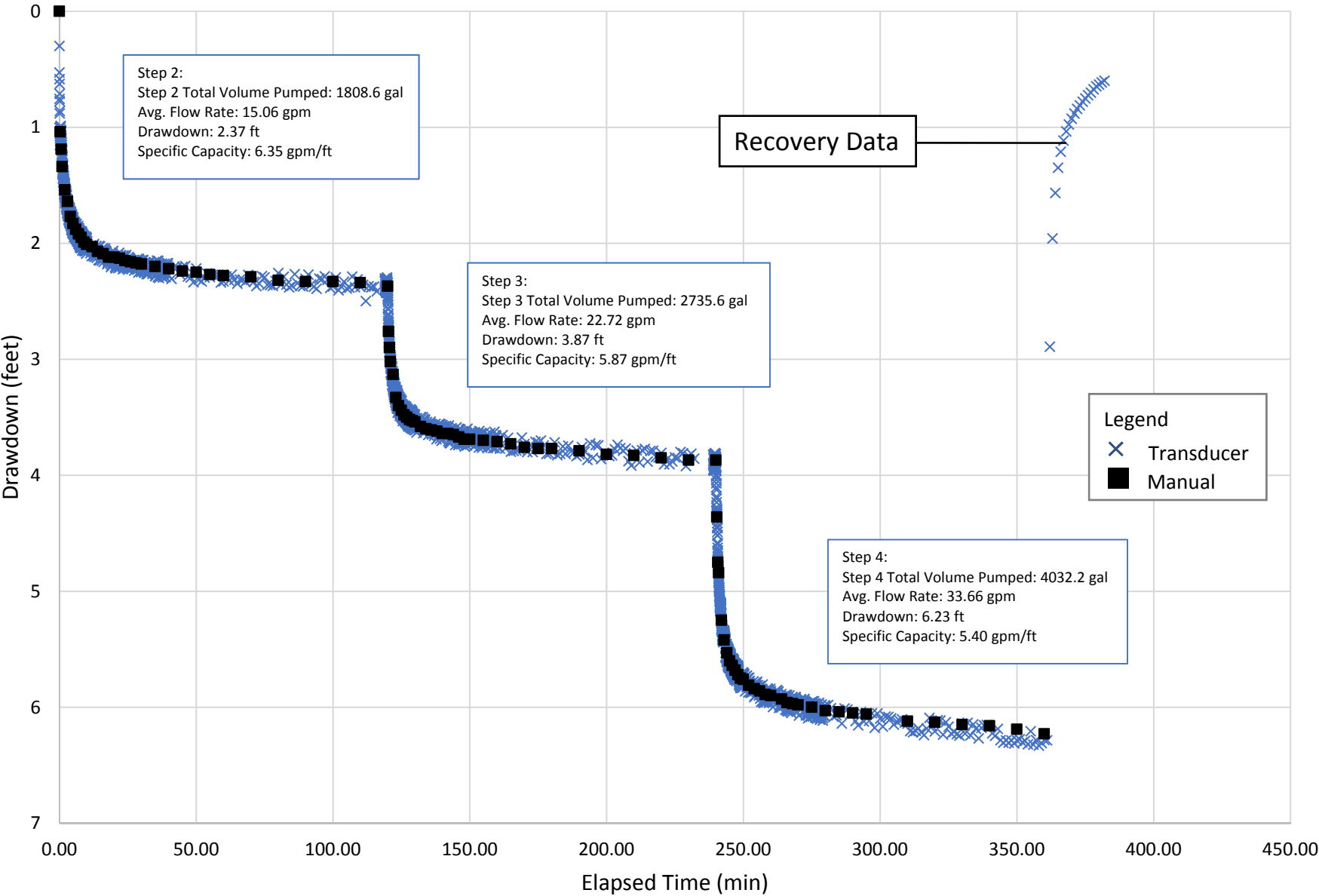
IRZ-21 Upper Screen (48-66 ft) Linear Drawdown Plot



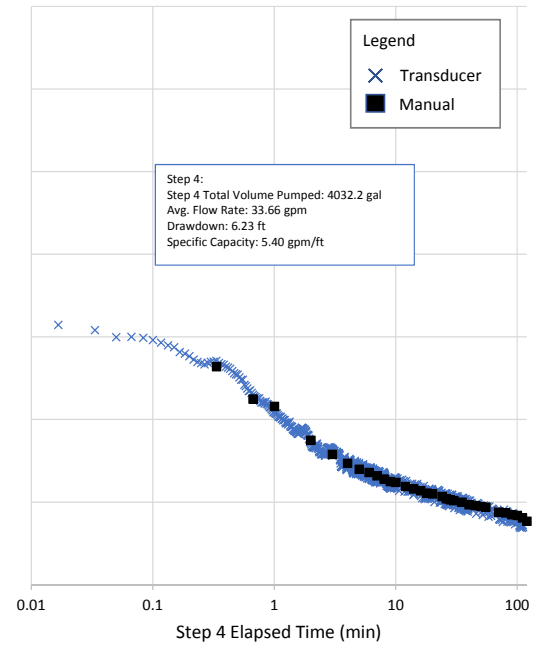
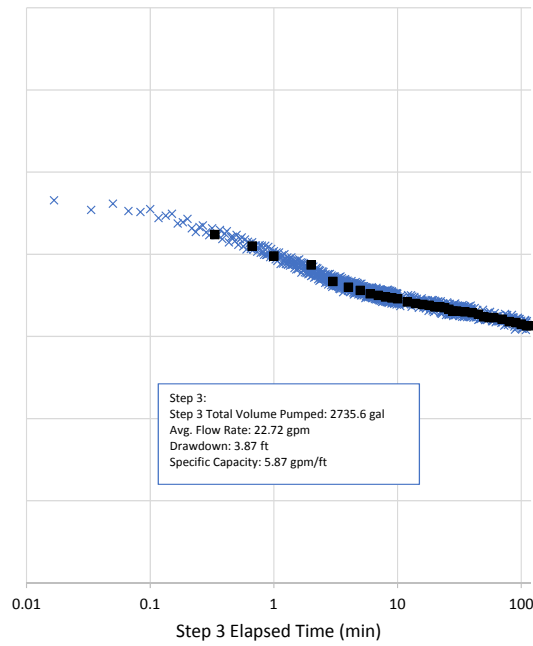
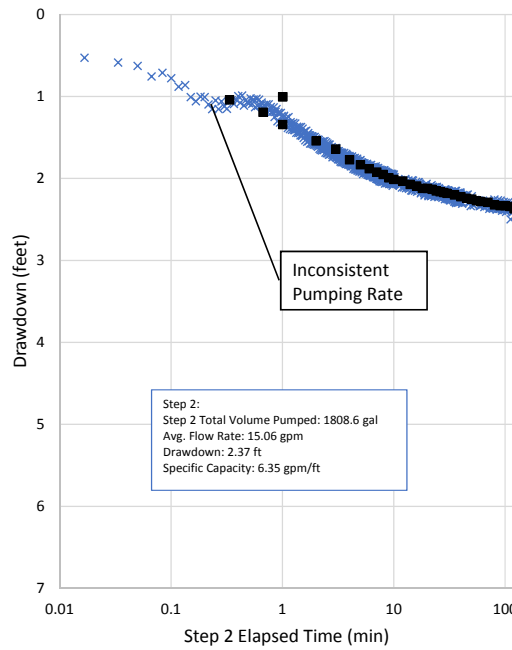
IRZ-21 Upper Screen (48-66 ft) Semi-Log Drawdown Plot



IRZ-21 Upper Screen (48-66 ft) Linear Drawdown Plot



IRZ-21 Upper Screen (48-66 ft)
Semi-Log Drawdown Plot



Specific Capacity Testing

Location/Well ID-	IRZ-21
Date -	8/24/2019
Screened Interval	
Tested -	Lower Screen (141-158 ft)
Packer Set Depth -	~80 ft BGS (not documented)
Packer Seal Test -	Confirmed packer to be watertight before test
Tests Conducted -	4 step Specific Capacity Test (6.5, 15, 22.5, 30 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 0.56-0.61 GPM/FT
Notes -	Inconsistent pumping rate at beginning of Step 1 Temporary pump shutdown during Step 3 due to generator issues

Specific Capacity Testing

Location/Well ID-	IRZ-21 Lower
Date -	8/24/2019
Screened Interval -	141' - 158' bgs
Initial Water Level Within 141' - 158' -	47.52
Initial Water Level Within 48' - 66' -	44.34
Initial Totalizer Reading -	0
Final Totalizer Reading -	9216.78
Approx. Pumped Volume -	9216.78
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, open pump (~31)

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
9:27:00	0.0	0.0	0	0.00	47.56	0
9:30:00	3.0	0.0	0	0.00	47.53	0.01
9:30:20	0.3	0.3	3.44	1.15	54.81	7.29
9:30:40	0.3	0.7	6.94	3.46	54.33	6.81
9:31:00	0.3	1.0	7.16	5.85	57.5	9.98
9:32:00	1.0	2.0	7.56	13.41	59.09	11.57
9:33:00	1.0	3.0	7.52	20.93	59.24	11.72
9:34:00	1.0	4.0	7.5	28.43	59.33	11.81
9:35:00	1.0	5.0	7.48	35.91	59.42	11.9
9:36:00	1.0	6.0	7.48	43.39	59.38	11.86
9:37:00	1.0	7.0	7.8	51.19	59.72	12.2
9:38:00	1.0	8.0	7.8	58.99	59.8	12.28
9:39:00	1.0	9.0	7.76	66.75	59.86	12.34
9:40:00	1.0	10.0	7.76	74.51	59.9	12.38
9:42:00	2.0	12.0	7.74	89.99	59.82	12.3
9:44:00	2.0	14.0	7.74	105.47	59.84	12.32
9:46:00	2.0	16.0	7.74	120.95	59.82	12.3
9:48:00	2.0	18.0	7.74	136.43	59.83	12.31
9:50:00	2.0	20.0	7.73	151.89	59.82	12.3
9:52:00	2.0	22.0	7.72	167.33	59.82	12.3
9:54:00	2.0	24.0	7.68	182.69	59.82	12.3
9:56:00	2.0	26.0	7.68	198.05	59.81	12.29
9:58:00	2.0	28.0	7.7	213.45	59.81	12.29
10:00:00	2.0	30.0	7.68	228.81	59.81	12.29
10:05:00	5.0	35.0	7.68	267.21	59.83	12.31
10:10:00	5.0	40.0	7.68	305.61	59.82	12.3
10:15:00	5.0	45.0	7.63	343.76	59.8	12.28
10:20:00	5.0	50.0	7.63	381.91	59.78	12.26
10:25:00	5.0	55.0	7.62	420.01	59.84	12.32
10:30:00	5.0	60.0	7.62	458.11	59.82	12.3
10:40:00	10.0	70.0	7.62	534.31	59.8	12.28
10:50:00	10.0	80.0	7.62	610.51	59.83	12.31
11:00:00	10.0	90.0	7.62	686.71	59.85	12.33
11:10:00	10.0	100.0	7.62	762.91	59.84	12.32
11:20:00	10.0	110.0	7.6	838.91	59.85	12.33
11:30:00	10.0	120.0	7.62	915.11	59.86	12.34
Total Volume Pumped for Step 1 (GAL):			915.11			
Average Pumping Rate (GPM):			7.50			
Specific Capacity (GPM/FT):			0.61			

Specific Capacity Testing

Location/Well ID-	IRZ-21 Lower
Date -	8/24/2019
Screened Interval -	141' - 158' bgs
Initial Water Level Within 141' - 158' -	47.52
Initial Water Level Within 48' - 66' -	44.34
Initial Totalizer Reading -	0
Final Totalizer Reading -	9216.78
Approx. Pumped Volume -	9216.78
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, open pump (~31)

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
Step 2							
11:30:20	0.3	120.3	16.08	920.47	70.47	22.95	0.3
11:30:40	0.3	120.7	15.44	925.61	73.18	25.66	0.7
11:31:00	0.3	121.0	15.18	930.67	73.28	25.76	1.0
11:32:00	1.0	122.0	15.29	945.96	73.77	26.25	2.0
11:33:00	1.0	123.0	15.24	961.20	73.95	26.43	3.0
11:34:00	1.0	124.0	15.28	976.48	73.97	26.45	4.0
11:35:00	1.0	125.0	15.28	991.76	73.99	26.47	5.0
11:36:00	1.0	126.0	15.29	1007.05	74.03	26.51	6.0
11:37:00	1.0	127.0	15.26	1022.31	74.08	26.56	7.0
11:38:00	1.0	128.0	15.26	1037.57	74.07	26.55	8.0
11:39:00	1.0	129.0	15.24	1052.81	74.08	26.56	9.0
11:40:00	1.0	130.0	15.24	1068.05	74.04	26.52	10.0
11:42:00	2.0	132.0	15.24	1098.53	74.08	26.56	12.0
11:44:00	2.0	134.0	15.24	1129.01	74.07	26.55	14.0
11:46:00	2.0	136.0	15.24	1159.49	74.08	26.56	16.0
11:48:00	2.0	138.0	15.22	1189.93	74.08	26.56	18.0
11:50:00	2.0	140.0	15.24	1220.41	74.1	26.58	20.0
11:52:00	2.0	142.0	15.24	1250.89	74.11	26.59	22.0
11:54:00	2.0	144.0	15.24	1281.37	74.18	26.66	24.0
11:56:00	2.0	146.0	15.24	1311.85	74.18	26.66	26.0
11:58:00	2.0	148.0	15.26	1342.37	74.18	26.66	28.0
12:00:00	2.0	150.0	15.24	1372.85	74.16	26.64	30.0
12:05:00	5.0	155.0	15.24	1449.05	74.2	26.68	35.0
12:10:00	5.0	160.0	15.24	1525.25	74.2	26.68	40.0
12:15:00	5.0	165.0	15.22	1601.35	74.2	26.68	45.0
12:20:00	5.0	170.0	15.22	1677.45	74.18	26.66	50.0
12:25:00	5.0	175.0	15.24	1753.65	74.22	26.7	55.0
12:30:00	5.0	180.0	15.26	1829.95	74.26	26.74	60.0
12:40:00	10.0	190.0	15.24	1982.35	74.24	26.72	70.0
12:50:00	10.0	200.0	15.22	2134.55	74.23	26.71	80.0
13:00:00	10.0	210.0	15.21	2286.65	74.24	26.72	90.0
13:10:00	10.0	220.0	15.26	2439.25	74.28	26.76	100.0
13:20:00	10.0	230.0	15.26	2591.85	74.99	27.47	110.0
13:30:00	10.0	240.0	15.24	2744.25	74.34	26.82	120.0
Total Volume Pumped for Step 2 (GAL):			1829.15				
Average Pumping Rate (GPM):			15.27				
Specific Capacity (GPM/FT):			0.57				

Specific Capacity Testing

Location/Well ID-	IRZ-21 Lower
Date -	8/24/2019
Screened Interval -	141' - 158' bgs
Initial Water Level Within 141' - 158' -	47.52
Initial Water Level Within 48' - 66' -	44.34
Initial Totalizer Reading -	0
Final Totalizer Reading -	9216.78
Approx. Pumped Volume -	9216.78
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, open pump (~31)

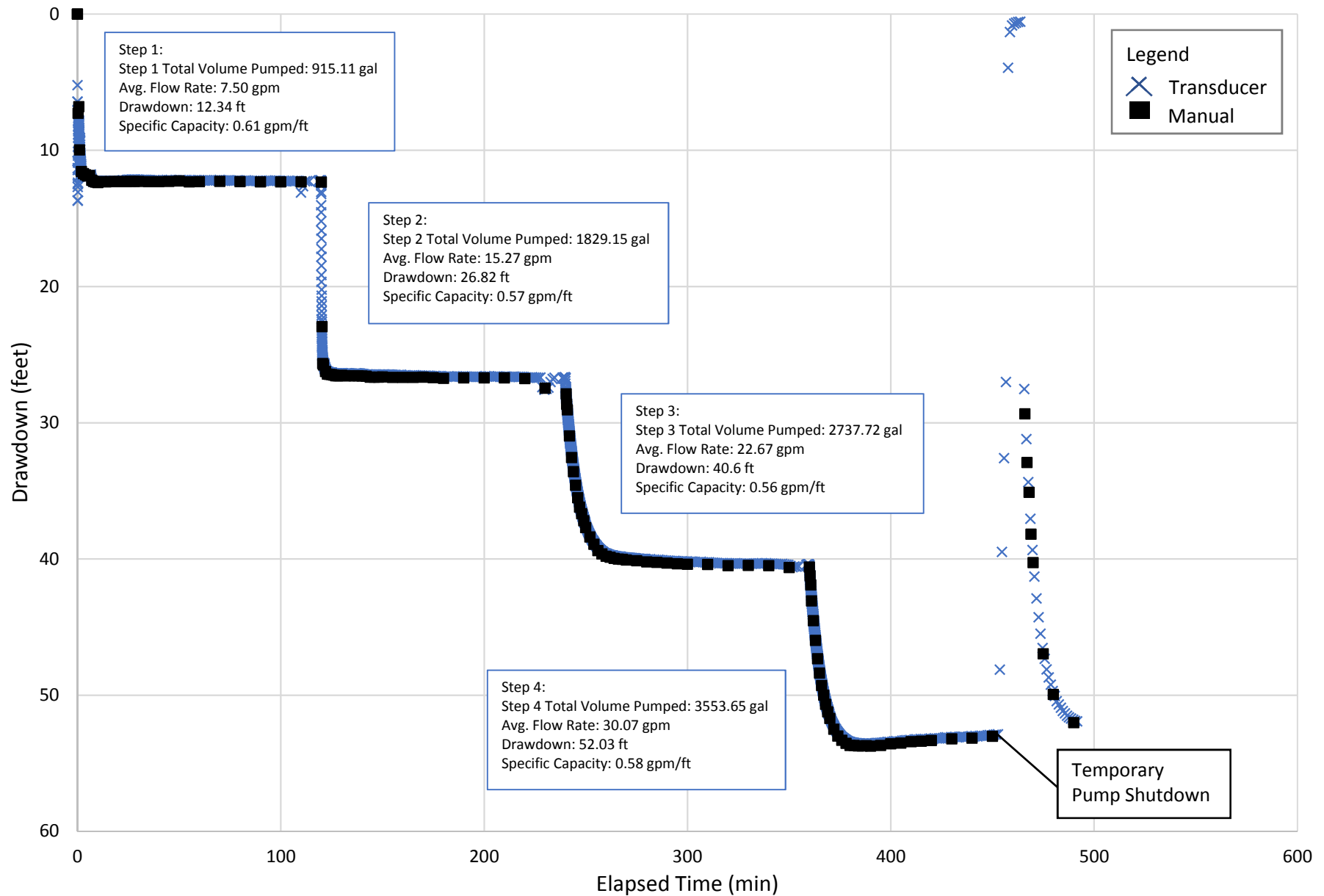
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
Step 3							
13:30:20	0.3	240.3	22.1	2751.62	75.4	27.88	0.3
13:30:40	0.3	240.7	22.1	2758.99	76.16	28.64	0.7
13:31:00	0.3	241.0	22.5	2766.49	76.58	29.06	1.0
13:32:00	1.0	242.0	22.59	2789.08	78.49	30.97	2.0
13:33:00	1.0	243.0	22.58	2811.66	80.08	32.56	3.0
13:34:00	1.0	244.0	22.61	2834.27	81.11	33.59	4.0
13:35:00	1.0	245.0	22.58	2856.85	82.11	34.59	5.0
13:36:00	1.0	246.0	22.56	2879.41	83.03	35.51	6.0
13:37:00	1.0	247.0	22.54	2901.95	83.72	36.2	7.0
13:38:00	1.0	248.0	22.54	2924.49	84.2	36.68	8.0
13:39:00	1.0	249.0	22.56	2947.05	84.73	37.21	9.0
13:40:00	1.0	250.0	22.52	2969.57	85.22	37.7	10.0
13:42:00	2.0	252.0	22.54	3014.65	85.91	38.39	12.0
13:44:00	2.0	254.0	22.56	3059.77	86.45	38.93	14.0
13:46:00	2.0	256.0	22.66	3105.09	86.91	39.39	16.0
13:48:00	2.0	258.0	22.69	3150.47	87.15	39.63	18.0
13:50:00	2.0	260.0	22.56	3195.59	87.32	39.8	20.0
13:52:00	2.0	262.0	22.64	3240.87	87.39	39.87	22.0
13:54:00	2.0	264.0	22.62	3286.11	87.48	39.96	24.0
13:56:00	2.0	266.0	22.69	3331.49	87.53	40.01	26.0
13:58:00	2.0	268.0	22.66	3376.81	87.55	40.03	28.0
14:00:00	2.0	270.0	22.66	3422.13	87.61	40.09	30.0
14:05:00	5.0	275.0	22.89	3536.58	87.65	40.13	35.0
14:10:00	5.0	280.0	22.84	3650.78	87.74	40.22	40.0
14:15:00	5.0	285.0	22.92	3765.38	87.78	40.26	45.0
14:20:00	5.0	290.0	22.92	3879.98	87.83	40.31	50.0
14:25:00	5.0	295.0	22.92	3994.58	87.88	40.36	55.0
14:30:00	5.0	300.0	22.94	4109.28	87.91	40.39	60.0
14:40:00	10.0	310.0	22.98	4339.08	87.94	40.42	70.0
14:50:00	10.0	320.0	22.33	4568.48	88.02	40.5	80.0
15:00:00	10.0	330.0	22.89	4797.38	88	40.48	90.0
15:10:00	10.0	340.0	23	5027.38	88.02	40.5	100.0
15:20:00	10.0	350.0	22.5	5252.38	88.15	40.63	110.0
15:30:00	10.0	360.0	22.96	5481.98	88.12	40.6	120.0
Total Volume Pumped for Step 3 (GAL):			2737.72				
Average Pumping Rate (GPM):			22.67				
Specific Capacity (GPM/FT):			0.56				

Specific Capacity Testing

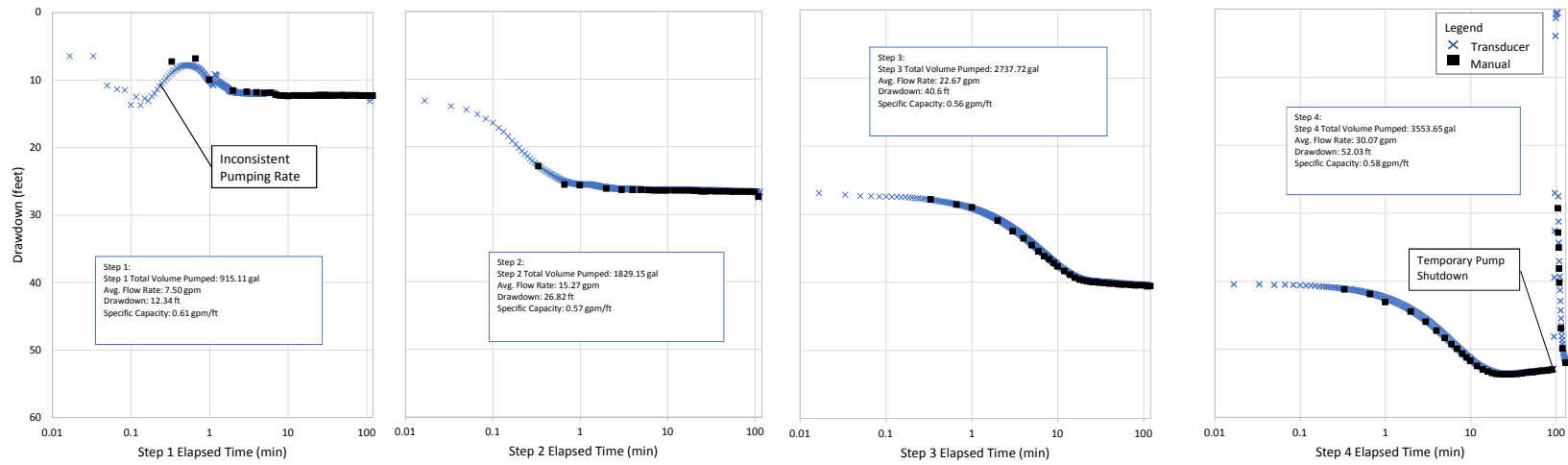
Location/Well ID-	IRZ-21 Lower
Date -	8/24/2019
Screened Interval -	141' - 158' bgs
Initial Water Level Within 141' - 158' -	47.52
Initial Water Level Within 48' - 66' -	44.34
Initial Totalizer Reading -	0
Final Totalizer Reading -	9216.78
Approx. Pumped Volume -	9216.78
Number of Specific Capacity Steps -	4
Pumping Rates (List In Order) -	7.5, 15, 22.5, open pump (~31)

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 4 Start (Min)
Step 4							
15:30:20	0.3	360.3	30.62	5492.18	88.76	41.24	0.3
15:30:40	0.3	360.7	30.54	5502.36	89.44	41.92	0.7
15:31:00	0.3	361.0	30.53	5512.54	90.61	43.09	1.0
15:32:00	1.0	362.0	30.54	5543.08	92.05	44.53	2.0
15:33:00	1.0	363.0	30.64	5573.72	93.51	45.99	3.0
15:34:00	1.0	364.0	30.61	5604.33	94.85	47.33	4.0
15:35:00	1.0	365.0	30.61	5634.94	95.91	48.39	5.0
15:36:00	1.0	366.0	30.56	5665.50	96.81	49.29	6.0
15:37:00	1.0	367.0	30.54	5696.04	97.52	50	7.0
15:38:00	1.0	368.0	30.54	5726.58	98.2	50.68	8.0
15:39:00	1.0	369.0	30.43	5757.01	98.75	51.23	9.0
15:40:00	1.0	370.0	30.46	5787.47	99.24	51.72	10.0
15:42:00	2.0	372.0	30.48	5848.43	100.03	52.51	12.0
15:44:00	2.0	374.0	30.46	5909.35	100.52	53	14.0
15:46:00	2.0	376.0	30.44	5970.23	100.84	53.32	16.0
15:48:00	2.0	378.0	30.44	6031.11	101.06	53.54	18.0
15:50:00	2.0	380.0	30.48	6092.07	101.22	53.7	20.0
15:52:00	2.0	382.0	30.44	6152.95	101.22	53.7	22.0
15:54:00	2.0	384.0	30.41	6213.77	101.26	53.74	24.0
15:56:00	2.0	386.0	30.44	6274.65	101.26	53.74	26.0
15:58:00	2.0	388.0	30.4	6335.45	101.23	53.71	28.0
16:00:00	2.0	390.0	30.43	6396.31	101.27	53.75	30.0
16:05:00	5.0	395.0	30.48	6548.71	101.22	53.7	35.0
16:10:00	5.0	400.0	30.62	6701.81	101.1	53.58	40.0
16:15:00	5.0	405.0	30.76	6855.61	101.04	53.52	45.0
16:20:00	5.0	410.0	30.81	7009.66	100.95	53.43	50.0
16:25:00	5.0	415.0	30.88	7164.06	100.91	53.39	55.0
16:30:00	5.0	420.0	30.8	7318.06	100.86	53.34	60.0
16:40:00	10.0	430.0	30.82	7626.26	100.73	53.21	70.0
16:50:00	10.0	440.0	30.84	7934.66	100.68	53.16	80.0
17:00:00	10.0	450.0	30.96	8244.26	100.55	53.03	90.0
17:15:00	15.0	465.0	0	8244.26	46.64	-0.88	105.0
17:16:00	1.0	466.0	32.16	8276.42	76.87	29.35	106.0
17:17:00	1.0	467.0	32.1	8308.52	80.44	32.92	107.0
17:18:00	1.0	468.0	32.06	8340.58	82.63	35.11	108.0
17:19:00	1.0	469.0	31.9	8372.48	85.7	38.18	109.0
17:20:00	1.0	470.0	31.9	8404.38	87.8	40.28	110.0
17:25:00	5.0	475.0	31.69	8562.83	94.49	46.97	115.0
17:30:00	5.0	480.0	31.58	8720.73	97.47	49.95	120.0
17:40:00	10.0	490.0	31.49	9035.63	99.55	52.03	130.0
Total Volume Pumped for Step 4 (GAL):			3553.65				
Average Pumping Rate (GPM):			30.07				
Specific Capacity (GPM/FT):			0.58				

IRZ-21 Lower Screen (141-158 ft) Linear Drawdown Plot



IRZ-21 Lower Screen (141-158 ft)
Semi-Log Drawdown Plot



**ARCADIS**Design & Consultancy
for natural and
built assets

Specific Capacity Testing

Location/Well ID-	IRZ-23
Date -	8/12/2019
Screened Interval	
Tested -	93-143 ft
Packer Set Depth -	N/A
Packer Seal Test -	N/A
Tests Conducted -	3 step Specific Capacity Test (32.5, 65, 97.5 GPM)
Purpose -	Well Performance Test
Summary -	Specific Capacity: 9.02-9.58 GPM/FT
Notes -	Inconsistent pumping rate during start of Step 1 Transducer inadvertently adjusted during Step 2

Specific Capacity Testing

Location/Well ID-	IRZ-23
Date -	8/12/2019
Screened Interval -	93-143
Initial Water Level Within 93-143 -	45.18
Initial Totalizer Reading -	0
Final Totalizer Reading -	23361.8
Approx. Pumped Volume (gal) -	23361.8
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	32.5, 65, and 97.5 Respectfully

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)
Step 1						
9:00:00	0.0	0.0	0.00	0.00	45.18	0
9:00:20	0.3	0.3	36.48	12.16	47.80	2.62
9:00:40	0.3	0.7	27.25	21.24	48.19	3.01
9:01:00	0.3	1.0	31.89	31.87	48.05	2.87
9:02:00	1.0	2.0	32.82	64.69	48.40	3.22
9:03:00	1.0	3.0	32.82	97.51	48.48	3.3
9:04:00	1.0	4.0	32.70	130.21	48.50	3.32
9:05:00	1.0	5.0	32.70	162.91	48.50	3.32
9:06:00	1.0	6.0	32.58	195.49	48.50	3.32
9:07:00	1.0	7.0	32.46	227.95	48.50	3.32
9:08:00	1.0	8.0	32.58	260.53	48.50	3.32
9:09:00	1.0	9.0	32.34	292.87	48.50	3.32
9:10:00	1.0	10.0	32.34	325.21	48.50	3.32
9:12:00	2.0	12.0	32.34	389.89	48.51	3.33
9:14:00	2.0	14.0	32.34	454.57	48.51	3.33
9:16:00	2.0	16.0	32.46	519.49	48.51	3.33
9:18:00	2.0	18.0	32.34	584.17	48.51	3.33
9:20:00	2.0	20.0	32.34	648.85	48.51	3.33
9:22:00	2.0	22.0	32.34	713.53	48.51	3.33
9:24:00	2.0	24.0	32.46	778.45	48.52	3.34
9:26:00	2.0	26.0	32.34	843.13	48.52	3.34
9:28:00	2.0	28.0	32.34	907.81	48.52	3.34
9:30:00	2.0	30.0	32.34	972.49	48.52	3.34
9:35:00	5.0	35.0	32.34	1134.19	48.52	3.34
9:40:00	5.0	40.0	32.46	1296.49	48.53	3.35
9:45:00	5.0	45.0	32.34	1458.19	48.53	3.35
9:50:00	5.0	50.0	32.34	1619.89	48.54	3.36
9:55:00	5.0	55.0	32.34	1781.59	48.54	3.36
10:00:00	5.0	60.0	32.34	1943.29	48.54	3.36
10:10:00	10.0	70.0	32.34	2266.69	48.53	3.35
10:20:00	10.0	80.0	32.34	2590.09	48.54	3.36
10:30:00	10.0	90.0	32.34	2913.49	48.55	3.37
10:40:00	10.0	100.0	32.34	3236.89	48.55	3.37
10:50:00	10.0	110.0	32.34	3560.29	48.55	3.37
11:00:00	10.0	120.0	32.34	3883.69	48.56	3.38
Total Volume Pumped for Step 1 (GAL):			3883.69			
Average Pumping Rate (GPM):			32.38			
Specific Capacity (GPM/FT):			9.58			

Specific Capacity Testing

Location/Well ID-	IRZ-23
Date -	8/12/2019
Screened Interval -	93-143
Initial Water Level Within 93-143 -	45.18
Initial Totalizer Reading -	0
Final Totalizer Reading -	23361.8
Approx. Pumped Volume (gal) -	23361.8
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	32.5, 65, and 97.5 Respectfully

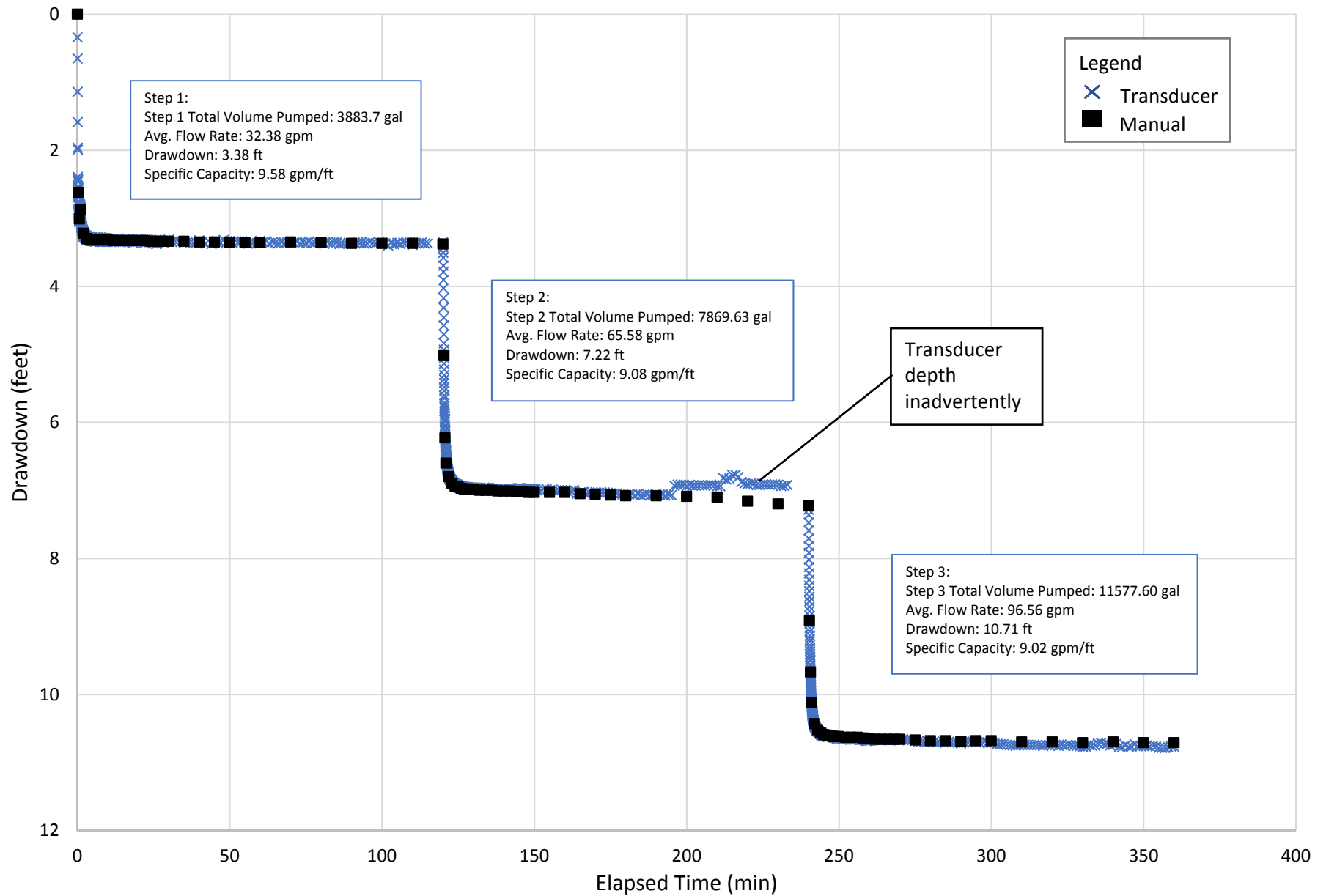
Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 2 Start (Min)
Step 2							
11:00:20	0.3	120.3	71.53	3907.54	50.20	5.02	0.3
11:00:40	0.3	120.7	65.50	3929.37	51.41	6.23	0.7
11:01:00	0.3	121.0	65.27	3951.13	51.78	6.6	1.0
11:02:00	1.0	122.0	65.27	4016.40	51.98	6.8	2.0
11:03:00	1.0	123.0	65.27	4081.67	52.08	6.9	3.0
11:04:00	1.0	124.0	65.39	4147.06	52.12	6.94	4.0
11:05:00	1.0	125.0	65.50	4212.56	52.13	6.95	5.0
11:06:00	1.0	126.0	65.39	4277.95	52.15	6.97	6.0
11:07:00	1.0	127.0	65.39	4343.34	52.16	6.98	7.0
11:08:00	1.0	128.0	65.39	4408.73	52.16	6.98	8.0
11:09:00	1.0	129.0	65.39	4474.12	52.17	6.99	9.0
11:10:00	1.0	130.0	65.27	4539.39	52.17	6.99	10.0
11:12:00	2.0	132.0	65.15	4669.69	52.18	7	12.0
11:14:00	2.0	134.0	65.15	4799.99	52.18	7	14.0
11:16:00	2.0	136.0	65.27	4930.53	52.18	7	16.0
11:18:00	2.0	138.0	65.15	5060.83	52.19	7.01	18.0
11:20:00	2.0	140.0	65.27	5191.37	52.19	7.01	20.0
11:22:00	2.0	142.0	65.27	5321.91	52.19	7.01	22.0
11:24:00	2.0	144.0	65.27	5452.45	52.20	7.02	24.0
11:26:00	2.0	146.0	65.27	5582.99	52.20	7.02	26.0
11:28:00	2.0	148.0	65.15	5713.29	52.21	7.03	28.0
11:30:00	2.0	150.0	65.27	5843.83	52.21	7.03	30.0
11:35:00	5.0	155.0	65.15	6169.58	52.21	7.03	35.0
11:40:00	5.0	160.0	65.15	6495.33	52.21	7.03	40.0
11:45:00	5.0	165.0	65.50	6822.83	52.23	7.05	45.0
11:50:00	5.0	170.0	65.50	7150.33	52.24	7.06	50.0
11:55:00	5.0	175.0	65.50	7477.83	52.25	7.07	55.0
12:00:00	5.0	180.0	65.50	7805.33	52.26	7.08	60.0
12:10:00	10.0	190.0	65.50	8460.33	52.26	7.08	70.0
12:20:00	10.0	200.0	65.50	9115.33	52.27	7.09	80.0
12:30:00	10.0	210.0	65.50	9770.33	52.28	7.1	90.0
12:40:00	10.0	220.0	65.98	10430.13	52.34	7.16	100.0
12:50:00	10.0	230.0	66.10	11091.13	52.38	7.2	110.0
13:00:00	10.0	240.0	66.22	11753.33	52.40	7.22	120.0
Total Volume Pumped for Step 2 (GAL):			7869.63				
Average Pumping Rate (GPM):			65.58				
Specific Capacity (GPM/FT):			9.08				

Specific Capacity Testing

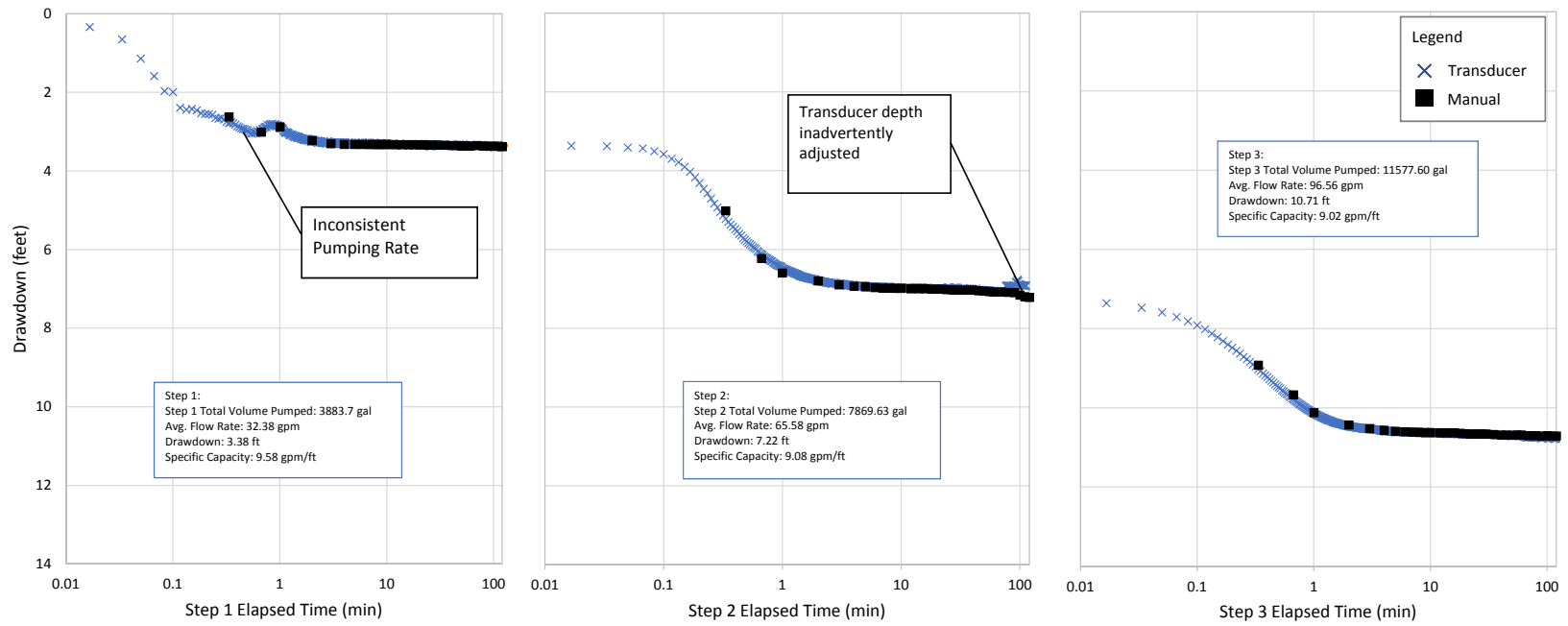
Location/Well ID-	IRZ-23
Date -	8/12/2019
Screened Interval -	93-143
Initial Water Level Within 93-143 -	45.18
Initial Totalizer Reading -	0
Final Totalizer Reading -	23361.8
Approx. Pumped Volume (gal) -	23361.8
Number of Specific Capacity Steps -	3
Pumping Rates (List In Order) -	32.5, 65, and 97.5 Respectfully

Time (HR:MN:SEC)	Change in Time between measurements (Min)	Elapsed Time from Test Start (Min)	Pumping Rate (GPM)	Total Volume pumped (Gallons)	Depth to Water (Ft.)	Drawdown (Ft.)	Elapsed Time from Step 3 Start (Min)
Step 3							
13:00:20	0.3	240.3	96.79	11785.59	54.10	8.92	0.3
13:00:40	0.3	240.7	96.56	11817.78	54.85	9.67	0.7
13:01:00	0.3	241.0	96.56	11849.96	55.30	10.12	1.0
13:02:00	1.0	242.0	96.56	11946.52	55.61	10.43	2.0
13:03:00	1.0	243.0	96.56	12043.08	55.70	10.52	3.0
13:04:00	1.0	244.0	96.90	12139.98	55.74	10.56	4.0
13:05:00	1.0	245.0	96.67	12236.65	55.77	10.59	5.0
13:06:00	1.0	246.0	96.67	12333.32	55.78	10.6	6.0
13:07:00	1.0	247.0	96.56	12429.88	55.79	10.61	7.0
13:08:00	1.0	248.0	96.56	12526.44	55.80	10.62	8.0
13:09:00	1.0	249.0	96.67	12623.11	55.80	10.62	9.0
13:10:00	1.0	250.0	96.79	12719.90	55.80	10.62	10.0
13:12:00	2.0	252.0	96.67	12913.24	55.81	10.63	12.0
13:14:00	2.0	254.0	96.67	13106.58	55.81	10.63	14.0
13:16:00	2.0	256.0	96.67	13299.92	55.81	10.63	16.0
13:18:00	2.0	258.0	96.67	13493.26	55.82	10.64	18.0
13:20:00	2.0	260.0	96.56	13686.38	55.83	10.65	20.0
13:22:00	2.0	262.0	96.56	13879.50	55.84	10.66	22.0
13:24:00	2.0	264.0	96.44	14072.38	55.84	10.66	24.0
13:26:00	2.0	266.0	96.44	14265.26	55.84	10.66	26.0
13:28:00	2.0	268.0	96.44	14458.14	55.84	10.66	28.0
13:30:00	2.0	270.0	96.44	14651.02	55.84	10.66	30.0
13:35:00	5.0	275.0	96.56	15133.82	55.85	10.67	35.0
13:40:00	5.0	280.0	96.67	15617.17	55.86	10.68	40.0
13:45:00	5.0	285.0	96.44	16099.37	55.86	10.68	45.0
13:50:00	5.0	290.0	96.67	16582.72	55.87	10.69	50.0
13:55:00	5.0	295.0	96.32	17064.32	55.86	10.68	55.0
14:00:00	5.0	300.0	96.32	17545.92	55.86	10.68	60.0
14:10:00	10.0	310.0	96.67	18512.62	55.88	10.7	70.0
14:20:00	10.0	320.0	96.44	19477.02	55.88	10.7	80.0
14:30:00	10.0	330.0	96.67	20443.72	55.89	10.71	90.0
14:40:00	10.0	340.0	96.08	21404.52	55.88	10.7	100.0
14:50:00	10.0	350.0	96.32	22367.72	55.89	10.71	110.0
15:00:00	10.0	360.0	96.32	23330.92	55.89	10.71	120.0
Total Volume Pumped for Step 3 (GAL):			11577.60				
Average Pumping Rate (GPM):			96.56				
Specific Capacity (GPM/FT):			9.02				

Well IRZ-23 Variable Rate Drawdown Plot



Well IRZ-23 Variable Rate Test Plot



Date Started:	08/10/2019	Surface Elevation:	N/A	Boring No.: MW-Xs	
Date Completed:	08/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	127 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Anthony Mack	Sampling Interval:	Screen Intervals		
Editor:	Grant Wilford	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 - 17.0') No recovery (NR); did not collect or log core, see MW-Xd for lithology	(0.0 - 17.0') Soft drilling	
2									
3									
4									
5									
6									
7									
8									
9	0				NR				
10		No Sieve Samples Collected							
11									
12									
13									
14									
15			MW-X-VAS-12-17 (<0.033 U ppb) 6/25/2019 15:10						
16									
17							(17.0 - 27.0') No recovery (NR)	(17.0 - 27.0') Loose fine grained sands did not stay in core barrel.	
18	0				NR				
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, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval at MW-Xd




Date Started:	08/10/2019	Surface Elevation:	N/A	Boring No.: MW-Xs	
Date Completed:	08/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	127 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	9.6 ft bgs	Project Number:	RC000753.0051
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 inch x 10 ft. Core Barrel		
Logger:	Anthony Mack	Sampling Interval:	Screen Intervals		
Editor:	Grant Wilford	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	0				NR			(17.0 - 27.0') Loose fine grained sands did not stay in core barrel.	
22									
23									
24									
25									
26	1440	No Sieve Samples Collected		Topock - Fill	SP		(27.0 - 36.0') Topock - Fill; Poorly graded sand (SP); dark yellowish brown (10YR 4/4); very fine grained to medium grained, subangular to round; trace silt; wet; no odor	(27.0 - 40.0') Soft drilling	
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
				Topock - Fluvial Deposits	SW		(36.0 - 46.5') Topock - Fluvial Deposits; Well graded sand with gravel (SW); grayish brown (10YR 5/2); fine grained to very coarse grained, subangular to subround; little granules to small pebbles, subangular to subround; trace silt; wet; no odor		

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 at MW-Xd

SOIL BORING LOG PG&E TOPOCK C:\USERS\MCGRANED\DOCUMENTS\PG&E TOPOCK\DRIFT BORING LOGS\GINT FILES\09.09.19\TOPOCK DATABASE FOR PLOG.GPJ TOPOCK DATA TEMPLATE FOR PLOG.GDT 09/09/19 17:17

Date Started:	08/10/2019	Surface Elevation:	N/A	Boring No.: MW-Xs	
Date Completed:	08/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	127 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Anthony Mack	Sampling Interval:	Screen Intervals		
Editor:	Grant Wilford	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	1440			Topock - Fluvial Deposits	SW		(44.5'); little granules to large pebbles; increase in pebble size	(40.0 - 127.0') rough drilling began at approx 95 ft. between 110-117, too much torque on drill, casing was pulled to approx 40 ft to use water to assist reaming 10" borehole	(40.0 - 127.0') 4960.4 gallons of water used; 2031.68 gallons of water recovered; 2928.72 gallons of water lost		
42											
43											
44											
45											
46	0	No Sieve Samples Collected		Topock - Fluvial Deposits	GW		(46.5 - 47.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); dark grayish brown / dark yellowish brown(10YR 4/2); angular to subangular; some fine to coarse grained sand, subangular to subround; trace silt; no odor				
47										(47.0 - 97.0') No recovery (NR); did not collect or log core, see MW-Xd for lithology	
48				NR	NR						
49											
50											
51											
52											
53											
54											
55											
56											
57											
58											
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, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval at MW-Xd

Date Started:	08/10/2019	Surface Elevation:	N/A	Boring No.: MW-Xs	
Date Completed:	08/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	127 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Anthony Mack	Sampling Interval:	Screen Intervals		
Editor:	Grant Wilford	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								(40.0 - 127.0') rough drilling began at approx 95 ft. between 110-117, too much torque on drill, casing was pulled to approx 40 ft to use water to assist reaming 10" borehole	(40.0 - 127.0') 4960.4 gallons of water used; 2031.68 gallons of water recovered; 2928.72 gallons of water lost
62									
63									
64									
65									
66									
67									
68									
69									
70	0	No Sieve Samples Collected			NR				
71									
72									
73			MW-X-VAS-71-76 (<0.033 U ppb) 6/27/2019 08:52						
74									
75									
76									
77									
78									
79									
80									






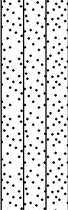
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured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

Date Started:	08/10/2019	Surface Elevation:	N/A	Boring No.: MW-Xs	
Date Completed:	08/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	127 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Anthony Mack	Sampling Interval:	Screen Intervals		
Editor:	Grant Wilford	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								(40.0 - 127.0') rough drilling began at approx 95 ft. between 110-117, too much torque on drill, casing was pulled to approx 40 ft to use water to assist reaming 10" borehole	(40.0 - 127.0') 4960.4 gallons of water used; 2031.68 gallons of water recovered; 2928.72 gallons of water lost
82									
83									
84									
85									
86									
87									
88									
89	0				NR				
90		No Sieve Samples Collected							
91									
92									
93									
94									
95									
96									
97									
98									
99	1440			Topock - Fluvial Deposits	SW		(97.0 - 107.0') Topock - Fluvial Deposits; Well graded sand (SW); brown (10YR 4/3); fine grained to very coarse grained, subangular to subround; trace granules, subangular to subround; wet; no odor		
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 at MW-Xd

Date Started:	08/10/2019	Surface Elevation:	N/A	Boring No.: MW-Xs
Date Completed:	08/12/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	127 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number: RC000753.0051
Logger:	Anthony Mack	Sampling Interval:	Screen Intervals	
Editor:	Grant Wilford	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

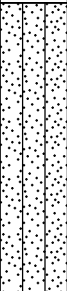
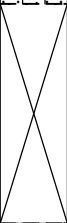
Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	1440	No Sieve Samples Collected		Topock - Fluvial Deposits	SW			(40.0 - 127.0') rough drilling began at approx 95 ft. between 110-117, too much torque on drill, casing was pulled to approx 40 ft to use water to assist reaming 10" borehole	(40.0 - 127.0') 4960.4 gallons of water used; 2031.68 gallons of water recovered; 2928.72 gallons of water lost
102									
103									
104									
105									
106	1440		MW-X-VAS-107-112 (<0.033 U ppb) 6/27/2019 15:04	Topock - Fluvial Deposits	GW		(107.0 - 108.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (10YR 4/3); granules to very large pebbles, angular to subround; some very fine to medium grained sand, subangular to subround; trace silt; no odor		
108							(108.0 - 112.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); dark grayish brown / dark yellowish brown(10YR 4/2); very fine grained to medium grained, subangular to subround; some granules to large pebbles, angular to subround; some silt; trace angular to subround; wet; no odor		
109				Topock - Fluvial Deposits	SM				
110									
111									
112		MW-X-VAS-112-117 (<0.033 U ppb) 6/28/2019 09:56	Topock - Fluvial Deposits	GW		(112.0 - 116.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); dark grayish brown / dark yellowish brown(10YR 4/2); granules to large cobbles, subangular to round; some fine to very coarse grained sand, subangular to subround; trace small cobbles; wet; no odor			
113									
114									
115									
116			Topock - Alluvium Deposits	GW-GM		(116.0 - 117.0') Topock - Alluvium Deposits; Well graded gravel with silt and sand (GW-GM); brown (7.5YR 4/4) trace weak red / pale reddish brown(10R 5/4); granules to small cobbles, angular to round; some very fine to medium grained sand, subangular to round; little silt; wet; no odor			
117	(117.0 - 124.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 4/3) trace red (10R 5/6); very fine grained to medium grained, subangular to subround; some granules to large pebbles, angular to subround; some silt; trace angular to subround; wet; no odor (118'); increase in granules and pebbles								
118	1008			Topock - Alluvium Deposits	SM				
119									
120									

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Boring Log

Sheet: 7 of 7

Date Started:	08/10/2019	Surface Elevation:	N/A	Boring No.: MW-Xs	
Date Completed:	08/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	127 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	10-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	Steve Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 inch x 10 ft. Core Barrel	Project Number:	RC000753.0051
Logger:	Anthony Mack	Sampling Interval:	Screen Intervals		
Editor:	Grant Wilford	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	1008			Topock - Alluvium Deposits	SM			(40.0 - 127.0') rough drilling began at approx 95 ft. between 110-117, too much torque on drill, casing was pulled to approx 40 ft to use water to assist reaming 10" borehole	(40.0 - 127.0') 4960.4 gallons of water used; 2031.68 gallons of water recovered; 2928.72 gallons of water lost
122									
123									
124									
125	0				NR		(124.0 - 127.0') No recovery (NR): Did not collect or log core, see MW-Xd for lithology		
126									
127									
128									
129									
130									
131									
132									
133									
134									
135									
136									
137									
138									
139									
140									

End of Boring at 127.0' bgs.

Draft 9/8/19

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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							(0.0 - 12.0') Topock - Fill; Poorly graded sand (SP); brown (10YR 5/3); fine grained to medium grained, angular to subround; trace mica; trace wood; dry; no odor		(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
2									
3									
4	96								
5									
6				Topock - Fill	SP				
7									
8							(8'); trace clay; trace organics; no wood particles. 3.0" lense of fat clay @ 8.0' bgs (5Y 4/1)	(8.0 - 17.0') Soft drilling. No recovery 12 to 17 ft bgs due to compaction of dredge sands	
9									
10		No Sieve Samples Collected					(10'); moist; no clay		
11							(11'); wet	(11.0') Approximate Depth to Water	
12							(12.0 - 19.0') No recovery (NR)		
13	48								
14			MW-X-VAS-12-17 (<0.033 U ppb) 6/25/2019 15:10						
15									
16						NR			
17									
18	24							(17.0 - 19.0') Casing pushed through dredge sand from weight of core barrel and casing. No recovery.	
19								(19.0 - 27.0') Soft drilling	
20	96			Topock - Fill	SW		(19.0 - 36.5') Topock - Fill; Well graded sand (SW); yellowish brown / moderate yellowish brown (10YR 5/4); fine grained to coarse grained, subangular to subround; little mica; trace		

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

Boring Log

Sheet: 2 of 21

Date Started: 06/20/2019	Surface Elevation: N/A	Boring No.: MW-Xd
Date Completed: 07/31/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 6-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / S. Vasquez	Depth to First Water: 9.6 ft bgs	
Drilling Asst: O. Flores / L. Amaya	Sampling Method: 4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger: GJ / SM / CS	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	96	No Sieve Samples Collected		Topock - Fill	SW		organics; wet; no odor; increase organics at 36.2-36.5' bgs	(19.0 - 27.0') Soft drilling	(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
22									
23									
24									
25									
26									
27									
28	120							(27.0 - 36.5') Soft drilling	
29									
30									
31									
32									
33	MW-X-VAS-32-37 (<0.033 U ppb) 6/26/2019 11:45	(32.0 - 37.0') Heaving sands							
34									
35									
36									
37									
38	36			Topock - Fluvial Deposits	SW		(36.5 - 40.0') Topock - Fluvial Deposits; Well graded sand (SW); grayish brown (10YR 5/2); fine grained to very coarse grained, subangular to round; little granules to very large pebbles, round; trace round; little mica; coarser clast consists of quartz and basalt; wet; organic odor (37"); no granules and pebbles		
39							(38.5'); trace granules to very large pebbles, subround to round		
40									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: <u>MW-Xd</u>	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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	36				NR		(40.0 - 47.0') No recovery (NR)		(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
42									
43									
44									
45									
46									
47									
48				Topock - Fluvial Deposits	SW		(47.0 - 48.2') Topock - Fluvial Deposits; Well graded sand (SW); grayish brown (10YR 5/2); fine grained to very coarse grained, subangular to round; trace granules to large pebbles, round; trace mica; coarser clast composed of quartz; wet		
49				Topock - Fluvial Deposits	GW		(48.2 - 50.5') Topock - Fluvial Deposits; Well graded gravel with sand (GW); grayish brown (10YR 5/2); granules to small cobbles, subangular to round; some fine to coarse grained sand, subangular to round; trace mica; coarser clast composed of granite and basalt; wet		
50		No Sieve Samples Collected							
51									
52	120			Topock - Fluvial Deposits	SW		(50.5 - 53.8') Topock - Fluvial Deposits; Well graded sand with gravel (SW); grayish brown (10YR 5/2); fine grained to very coarse grained, subangular to subround; little granules to very large pebbles, subangular to subround; trace round; trace mica; coarser clasts composed of granite and basalt; wet		
53									
54									
55				Topock - Fluvial Deposits	SP		(53.8 - 57.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (10YR 5/3); very fine grained to fine grained, subround to round; trace granules to very large pebbles, subround to round; wet		
56									
57									
58	120			Topock - Fluvial Deposits	SW		(57.0 - 62.2') Topock - Fluvial Deposits; Well graded sand (SW); brown (10YR 5/3); very fine grained to coarse grained, round; trace mica; wet		
59									
60									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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			Topock - Fluvial Deposits	SW				(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
62				Topock - Fluvial Deposits	SP		(62.2 - 63.5') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (10YR 5/3); very fine grained to fine grained, round; trace mica; wet		
63				Topock - Fluvial Deposits	SW		(63.5 - 75.5') Topock - Fluvial Deposits; Well graded sand with gravel (SW); brown (10YR 5/3); very fine grained to very coarse grained, subangular to round; little granules to very large pebbles, subangular to round; trace subangular to subround; trace mica; coarser clast composed of basalt, granite, and metadiorite; wet		
64	120	No Sieve Samples Collected		Topock - Fluvial Deposits	SW				
65				Topock - Fluvial Deposits	SW				
66				Topock - Fluvial Deposits	SW				
67	120		MW-X-VAS-71-76 (<0.033 U ppb) 6/27/2019 08:52	Topock - Fluvial Deposits	SW				
68				Topock - Fluvial Deposits	SW				
69				Topock - Fluvial Deposits	SW				
70	120			Topock - Fluvial Deposits	SW				
71				Topock - Fluvial Deposits	SW				
72				Topock - Fluvial Deposits	SW				
73	120			Topock - Fluvial Deposits	SP		(75.5 - 77.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (7.5YR 5/3); very fine grained to fine grained, subangular to round; trace mica; wet	(76.0 - 77.0') Heaving sands	
74				Topock - Fluvial Deposits	SP				
75				Topock - Fluvial Deposits	SP				
76	120			Topock - Fluvial Deposits	SW		(77.0 - 83.5') Topock - Fluvial Deposits; Well graded sand (SW); brown (10YR 5/3); very fine grained to very coarse grained, subangular to subround; trace mica; wet		
77				Topock - Fluvial Deposits	SW				
78				Topock - Fluvial Deposits	SW				
79	120			Topock - Fluvial Deposits	SW				
80				Topock - Fluvial Deposits	SW				

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:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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	120			Topock - Fluvial Deposits	SW				(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
82									
83									
84	108			Topock - Fluvial Deposits	SW		(83.5 - 87.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); brown (10YR 5/3); very fine grained to very coarse grained; little granules to very large pebbles, subangular to round; trace subround to round; trace mica; coarse clasts composed of granite, basalt, and quartz; wet; granules and pebbles increase with depth		
85									
86									
87	96	No Sieve Samples Collected		Topock - Fluvial Deposits	SW-SM		(87.0 - 93.0') Topock - Fluvial Deposits; Well graded sand with silt (SW-SM); brown (10YR 5/3); very fine grained to very coarse grained, subangular to round; little granules to large pebbles, subround to round; little silt; trace mica; coarser clasts composed of metadiorite; wet		
88									
89									
90	96			Topock - Fluvial Deposits	GW-GM		(93.0 - 94.0') Topock - Fluvial Deposits; Well graded gravel with silt and sand (GW-GM); brown (10YR 5/3); granules to small cobbles, subangular to round; and very fine to very coarse grained sand, subangular to subround; little silt; trace mica; coarser clasts composed of metadiorite; wet		
91				Topock - Fluvial Deposits	SP		(94.0 - 95.0') Topock - Fluvial Deposits; Poorly graded sand (SP); strong brown (7.5YR 4/6); very fine grained to fine grained, subround to round; trace silt; trace mica; wet		
92				Topock - Fluvial Deposits	SW		(95.0 - 96.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); brown (10YR 5/3); very fine grained to medium grained, subangular to round; some granules to very large pebbles, subround to round; trace subround to round; trace silt; trace mica; coarser clasts composed of metadiorite; wet; fractured cobble/boulder fragments within formation		
93	96				NR				
94									
95									
96	96			Topock - Fluvial Deposits	SW		(96.0 - 97.0') No recovery (NR)		
97							(97.0 - 104.0') Topock - Fluvial Deposits; Well graded sand (SW); brown (10YR 5/3); very fine grained to very coarse grained, subangular to subround; trace granules to small pebbles, subround to round; trace mica; wet		
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, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: <u>MW-Xd</u>	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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	96			Topock - Fluvial Deposits	SW				(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
102									
103									
104									
105	84			Topock - Fluvial Deposits	SW		(104.0 - 105.0') Topock - Fluvial Deposits; Well graded sand with gravel (SW); dark grayish brown / dark yellowish brown(10YR 4/2); very fine grained to very coarse grained, subround to round; and granules to very large pebbles, subangular to round; trace subround to round; trace silt; trace mica; coarser clasts composed of metadiorite; wet; fractured cobbles/ boulder fragments within formation	(102.0 - 105.0') Tight formation	
106				Topock - Fluvial Deposits	SW		(105.0 - 107.0') Topock - Fluvial Deposits; Well graded sand (SW); brown (10YR 5/3); very fine grained to very coarse grained, subangular to subround; little granules to small pebbles, subround to round; trace silt; trace mica; wet		
107				Topock - Fluvial Deposits	GW		(107.0 - 108.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); brown (10YR 4/3); granules to very large pebbles, subround to round; some very fine to very coarse grained sand, subangular to round; trace silt; trace mica; coarse clasts composed of metadiorite, granite, basalt, quartz; wet		
108				Topock - Fluvial Deposits	SM		(108.0 - 112.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); dark grayish brown / dark yellowish brown(10YR 4/2); very fine grained to coarse grained, subangular to round; some granules to very large pebbles, subround to round; trace mica; trace organics; wet; organic odor; coarser clasts composed of metadiorite and granite, pulverized cobble/boulder fragments observed (109') brown (10YR 5/3); little silt; no organics; increase in very fine to very coarse grained sand		
109	60		MW-X-VAS-107-112 (<0.033 U ppb) 6/27/2019 15:04						(112.0 - 117.0') Rough drilling
110									
111									
112									
113	120		MW-X-VAS-112-117 (<0.033 U ppb) 6/28/2019 09:56	Topock - Fluvial Deposits	GW		(112.0 - 114.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); dark gray (10YR 4/1); very fine grained to small cobbles, subangular to round; little very fine to very coarse grained sand, subangular to round; trace silt; trace clay; trace organics; coarser clasts composed of metadiorite; wet; organic odor		
114				Topock - Fluvial Deposits	SM		(114.0 - 116.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (10YR 4/3); very fine grained to very coarse grained, subangular to round; some granules to very large pebbles, subangular to round; little silt; trace subround to round; trace mica; trace organics; wet; organic odor; coarser clasts composed of metadiorite		
115									
116									
117	120			Topock - Alluvium Deposits	SM		(116.0 - 157.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/4) trace red / moderate reddish brown(10R 4/6); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; little silt; trace subangular; trace mica; coarser clasts composed of metadiorite; wet; mottled (117') reddish brown / moderate brown(5YR 4/4) little red / moderate reddish brown(10R 4/6); some silt; decrease in granules to very large pebbles, no cobbles (118'); little silt; increase in very fine to very coarse sand, weathered granules to very large pebbles		
118									
119									
120									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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									(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
122									
123									
124	120								
125									
126									
127									
128							(128'); some silt; little granules to very large pebbles, angular to subangular; decrease in very fine to very coarse sand		
129									
130		No Sieve Samples Collected		Topock - Alluvium Deposits	SM				
131									
132	120								
133									
134							(134'); little silt; increase in very fine to very coarse, increase in granules to very large pebbles		
135									
136									
137									
138									
139	120						(138'); some granules to very large pebbles, angular to subangular; slight decrease in silt		
140									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM	(148'); and silt; moist to wet; decrease in very fine to very coarse sand			(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost
142									
143									
144									
145									
146	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM	(148'); and silt; moist to wet; decrease in very fine to very coarse sand			
147									
148									
149									
150									
151	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM	(148'); and silt; moist to wet; decrease in very fine to very coarse sand			
152									
153									
154									
155									
156	72	No Sieve Samples Collected	MW-X-VAS-152-157 (<0.17 U ppb) 6/29/2019 09:19	Topock - Alluvium Deposits	NR	(155'); some granules to very large pebbles, angular to subangular; little silt; wet; increase in very fine to very coarse sand			(157.0 - 167.0') Loose sands fell out of core barrel into hopper when bagging core, 165 to 167 drilling got hard
157									
158									
159									
160									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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	72	No Sieve Samples Collected			NR		(161.0 - 174.5') Topock - Alluvium Deposits; Sandy lean clay with gravel (CL); brown (7.5YR 4/4); medium plasticity; some very fine to very coarse grained sand, angular to subangular; little granules to very large pebbles, angular to subangular; little silt; coarser clasts composed of metadiorite; moist; hard; blocky; some meta-diorite clasts are weathered	(157.0 - 167.0') Loose sands fell out of core barrel into hopper when bagging core, 165 to 167 drilling got hard	(0.0 - 177.0') 5100 gallons of water used; 1600 gallons of water recovered; 3500 gallons of water lost		
162											
163											
164											
165											
166											
167											
168	120				Topock - Alluvium Deposits	CL		(167.0 - 174.5') Topock - Alluvium Deposits; Sandy lean clay with gravel (CL); reddish brown / moderate brown(5YR 4/4); medium plasticity; some very fine to very coarse grained sand, angular to subangular; little granules to very large pebbles, angular to subangular; little silt; coarser clasts composed of metadiorite; moist; some meta-diorite clasts are weathered	(167.0 - 177.0') Smooth drilling		
169											
170											
171					Topock - Alluvium Deposits	CL					
172											
173											
174									(173.5'); moist to wet		
175						Topock - Alluvium Deposits	SM		(174.5 - 177.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, angular to subround; some silt; little granules to medium pebbles, angular to subangular; little clay; trace large to very large pebbles, angular to subangular; wet		
176											
177											
178		84		Topock - Alluvium Deposits	GP		(177.0 - 177.5') Topock - Alluvium Deposits; Poorly graded gravel (GP); boulders; wet	(177.0 - 187.0') Normal drilling	(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost		
179				NR		(177.5 - 180.5') No recovery (NR)					
180											




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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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	84		MW-X-VAS-182-187 (<0.17 U ppb) 6/29/2019 15:28	Topock - Alluvium Deposits	NR		(180.5 - 187.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, angular to subround; little granules to medium pebbles, subangular to subround; little silt; trace subangular; trace clay; trace large to very large pebbles subangular; wet	(177.0 - 187.0') Normal drilling	(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost					
182														
183														
184					SM	(183.5'); little granules to very large pebbles, angular to subangular; little clay								
185						(184.5'); little granules to large pebbles, angular to subangular; trace clay								
186	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SC		(187.0 - 188.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subround; some clay; little granules to large pebbles, angular to subangular; little silt; coarser clasts composed of metadiorite; iron oxide staining on metadiorite pebbles; wet	(187.0 - 197.0') Normal drilling						
188				Topock - Alluvium Deposits	ML	(188.0 - 189.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); red (2.5YR 4/6); medium plasticity; some very fine to very coarse grained sand, angular to subround; little granules to large pebbles, angular to subangular; little clay; coarser clasts composed of metadiorite; moist to wet; very stiff								
189				Topock - Alluvium Deposits	SM	(189.5 - 190.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (2.5YR 4/4) to dark reddish brown (2.5YR 3/4); very fine grained to very coarse grained, angular to subround; some silt; little granules to very large pebbles, angular to subround; little clay; coarser clasts composed of metadiorite; moist to wet								
190				Topock - Alluvium Deposits	CL	(190.0 - 191.5') Topock - Alluvium Deposits; Sandy lean clay with gravel (CL); reddish brown (2.5YR 4/4); medium plasticity; some very fine to very coarse grained sand, angular to subround; little granules to small pebbles, angular to subround; little silt; moist; very stiff								
191				Topock - Alluvium Deposits	MH	(191.5 - 192.5') Topock - Alluvium Deposits; Sandy elastic silt with gravel (MH); reddish brown (2.5YR 4/4); high plasticity; some very fine to very coarse grained sand, angular to subround; little granules to medium pebbles, angular to subround; little clay; coarser clasts composed of metadiorite; moist; very stiff								
192				Topock - Alluvium Deposits	ML	(192.5 - 197.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); light red(2.5YR 7/6); medium plasticity; some very fine to very coarse grained sand, angular to subround; little granules to medium pebbles, angular to subangular; little clay; coarser clasts composed of metadiorite; moist; green staining								
193				Topock - Alluvium Deposits	ML	(197.0 - 199.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown (2.5YR 4/4); low plasticity; some very fine to medium grained sand, angular to subround; little granules to medium pebbles, angular to subangular; little clay; trace coarse to very coarse grained sand angular to subangular; moist; very stiff								
194				Topock - Alluvium Deposits	CL	(199.0 - 202.0') Topock - Alluvium Deposits; Sandy lean clay with gravel (CL); reddish brown (2.5YR 4/4); medium plasticity; some very fine to very coarse grained sand, angular to subround; little								
195														
196														
197				120			Topock - Alluvium Deposits			ML		(197.0 - 199.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown (2.5YR 4/4); low plasticity; some very fine to medium grained sand, angular to subround; little granules to medium pebbles, angular to subangular; little clay; trace coarse to very coarse grained sand angular to subangular; moist; very stiff		
198							Topock - Alluvium Deposits			CL	(199.0 - 202.0') Topock - Alluvium Deposits; Sandy lean clay with gravel (CL); reddish brown (2.5YR 4/4); medium plasticity; some very fine to very coarse grained sand, angular to subround; little			
199														
200														

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Date Started: 06/20/2019	Surface Elevation: N/A	Boring No.: MW-Xd
Date Completed: 07/31/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Prosonic Truck Mount	Borehole Diameter: 6-12 inches	Location: PG&E Topock, Needles, California
Driller Name: E. Ramos / S. Vasquez	Depth to First Water: 9.6 ft bgs	
Drilling Asst: O. Flores / L. Amaya	Sampling Method: 4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger: GJ / SM / CS	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			Topock - Alluvium Deposits	CL		granules to large pebbles, angular to subround; little silt; coarser clasts composed of metadiorite; moist; very stiff		(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost
202									
203							(202.0 - 227.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); red (2.5YR 4/6); very fine grained to very coarse grained, angular to subround; some silt; little granules to large pebbles, angular to subround; little clay; coarser clasts composed of metadiorite; moist		
204							(204'); little silt; trace clay; moist to wet		
205							(204.5'); some silt; trace very large pebbles, subangular; trace subangular; moist to wet		
206	108	No Sieve Samples Collected					(206.3'); little silt; no cobbles, increase in sand		(207.0 - 217.0') Normal drilling, approximately 6 inches of sample fell out of core barrel at ~208.5 during bagging, material was the same as in the core
207									
208									
209							(209'); some silt; no clay, weathered granules to very large pebbles		
210									
211	114			Topock - Alluvium Deposits	SM		(210.5'); little clay; moist to wet; decrease in silt, decrease in sand		
212									
213									
214									
215									
216									
217									
218									
219									
220									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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	114			Topock - Alluvium Deposits	SM				(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost
222									
223									
224									
225									
226	111.6	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		(227.0 - 230.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subround; some silt; little granules to large pebbles, angular to subangular; trace clay; coarser clasts composed of metadiorite; moist; iron oxide staining; weathered granules to very large pebbles	(227.0 - 232.0') Normal drilling	
227									
228									
229									
230									
231	114						(230'); increase in silt, decrease in very fine to very coarse sand	(232.0 - 237.0') Rough drilling	
232									
233									
234									
235									
236	114						(237'); and silt; little clay; decrease in very fine to very coarse sand	(237.0 - 245.0') Normal drilling	
237									
238									
239									
240									


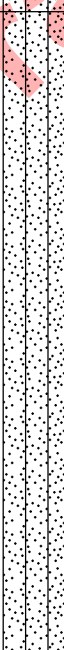
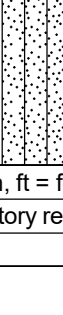
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured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

Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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	114			Topock - Alluvium Deposits	SM		(240.0 - 247.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subround; some silt; little granules to very large pebbles, angular to subangular; trace clay; coarser clasts composed of metadiorite; moist; weathered granules to very large pebbles, dry 243.5'-244' bgs	(237.0 - 245.0') Normal drilling	(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost
242									
243									
244									
245	120			Topock - Alluvium Deposits	SM		(244.5'); little silt; wet; iron oxide staining; increase in very fine to very coarse sand, no clay	(245.0 - 247.0') Hard drilling	
246									
247									
248									
249	120			Topock - Alluvium Deposits	SM		(247.0 - 254.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown (2.5YR 4/4); very fine grained to very coarse grained, angular to subround; some silt; little granules to very large pebbles, angular to subangular; little clay; trace mica; coarser clasts composed of metadiorite; moist; weathered granules to very large pebble	(247.0 - 257.0') Normal drilling	
250									
251									
252									
253	120			Topock - Alluvium Deposits	SM		(254.0 - 259.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (2.5YR 4/4) little (7.5R 4/6); very fine grained to very coarse grained, angular to subround; some silt; little granules to very large pebbles, angular to subangular; trace clay; moist; mottled; iron oxide staining; wet at 256' bgs, weathered granules to very large pebbles	(257.0 - 267.0') Normal drilling	
254									
255									
256									
257	120			Topock - Alluvium Deposits	SM				
258									
259									
260							(259.5 - 269.0') Topock - Alluvium Deposits; Silty sand (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, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		reddish brown (2.5YR 4/4) little (7.5R 4/6); very fine grained to very coarse grained, angular to subround; medium plasticity, no dilatency; some silt; little granules to very large pebbles, angular to subangular; little clay; coarser clasts composed of metadiorite; moist; mottled; weathered gravel granules to very large pebbles	(257.0 - 267.0') Normal drilling	(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost
262									
263									
264									
265									
266	120			Topock - Alluvium Deposits	SM		(269.0 - 327.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (2.5YR 4/4) some (7.5R 4/6); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; some silt; little clay; trace angular; coarser clasts composed of metadiorite; moist; mottled; weathered granules to small cobbles	(267.0 - 277.0') Normal drilling	
267									
268									
269									
270									
271	120	Topock - Alluvium Deposits	SM		(275'); little granules to very large pebbles, angular to subround; trace angular to subangular; increase in silt, increase in very fine to very coarse sand, dry from 283-285' bgs				
272									
273									
274									
275									
276	120								
277									
278									
279									
280									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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	120							(281.0 - 287.0') Rough drilling	(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost
282									
283									
284									
285									
286	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM		(287') red / moderate reddish brown(10R 4/6) and reddish brown (2.5YR 4/4); trace clay; dry to moist; decrease in silt, increase in very fine to very coarse sand	(287.0 - 297.0') Rough drilling	
287									
288									
289									
290									
291	120						(291'); decrease in silt, increase in very fine to very coarse sand		
292									
293									
294									
295									
296	120	MW-X-VAS-292-297 (<0.17 U ppb) 7/2/2019 14:45					(293'); moist to wet		
297									
298									
299									
300									
							(299.5') reddish brown (2.5YR 4/4) some red / moderate reddish	(297.0 - 307.0') Rough drilling	

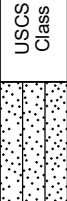







Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured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

Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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	120						brown(10R 4/6); some granules to very large pebbles, angular to subangular; decrease in very fine to very coarse sand	(297.0 - 307.0') Rough drilling	(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost
302									
303									
304							(303'); little granules to very large pebbles, angular to subangular; little silt; increase in very fine to very coarse sand		
305									
306	120	No Sieve Samples Collected		Topock - Alluvium Deposits	SM				(307.0 - 317.0') Rough drilling
307									
308							(307'); some granules to very large pebbles, angular to subangular; trace angular to subangular; dry to moist; decrease in very fine to very coarse sand		
309									
310									
311	120								(317.0 - 323.0') Normal drilling
312									
313							(312') dark reddish brown (2.5YR 3/4) trace red / moderate reddish brown(10R 4/6); some silt; moist to wet; increase in very fine to very coarse sand		
314									
315									
316	120								
317									
318									
319									
320									











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:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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
321	120			Topock - Alluvium Deposits	SM		(321'); little silt; dry to moist; iron oxide staining; increase in very fine to very coarse sand	(317.0 - 323.0') Normal drilling	(177.0 - 327.0') 5395 gallons of water used; 4465 gallons of water recovered; 930 gallons of water lost
322									
323									
324								(323.0 - 326.0') Rough drilling	
325									
326	1200	No Sieve Samples Collected		Topock - Alluvium Deposits	MH		(327.0 - 328.2') Topock - Alluvium Deposits; Gravelly elastic silt with sand (MH); reddish brown (2.5YR 4/4); medium plasticity; some granules to very large pebbles, angular to subround; little very fine to very coarse grained sand, subangular to subround; little clay; some coarser clasts composed of metadiorite; moist; medium stiff; moderate cementation	(327.0 - 337.0') Normal Drilling	
327									
328				Topock - Alluvium Deposits	SM		(328.2 - 329.9') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); very fine grained to small cobbles, subangular to subround; low plasticity; some silt; little granules to large pebbles, angular to subround; little clay; moist; weak cementation		
329				Topock - Alluvium Deposits	MH		(329.9 - 334.0') Topock - Alluvium Deposits; Gravelly elastic silt with sand (MH); reddish brown (2.5YR 4/4); medium plasticity; some granules to large pebbles, angular to subangular; little very fine to very coarse grained sand, subangular to subround; little clay; moist; medium stiff; weak cementation		
330							(331'); trace clay; increase in granules and pebbles, decrease in silt and clay		
331									
332				Topock - Alluvium Deposits	MH		(334.0 - 337.5') Topock - Alluvium Deposits; Sandy elastic silt with gravel (MH); reddish brown (2.5YR 4/4); medium plasticity; some fine to very coarse grained sand, subangular to subround; little granules to very large pebbles, angular to subangular; trace clay; moist; medium stiff; weak cementation		
333									
334									
335				Topock - Alluvium Deposits	ML		(337.5 - 338.0') Topock - Alluvium Deposits; Gravelly silt with sand (ML); reddish brown (2.5YR 4/4); low plasticity; some granules to very large pebbles, angular to subangular; little very fine to very coarse grained sand, subangular to subround; trace clay; moist; medium stiff; weak cementation	(337.0 - 345.0') Normal drilling, drilled 8 ft due to sluff	
336							(338.0 - 341.0') Topock - Alluvium Deposits; Gravelly silt with sand (ML); reddish brown (2.5YR 4/4); medium plasticity; some granules to very large pebbles, angular to subangular; little very		
337	96		MW-X-VAS-337-342 (<0.17 U ppb) 7/11/2019 11:30	Topock - Alluvium Deposits	ML				
338				Topock - Alluvium Deposits	ML				
339									
340									

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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: <u>MW-Xd</u>	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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
341	96		MW-X-VAS-337-342 (<0.17 U ppb) 7/11/2019 11:30	Topock - Alluvium Deposits	ML		fine to very coarse grained sand, subangular to subround; little clay; moist; stiff; moderate cementation (339'); wet to moist; weak cementation; decrease in granules and pebbles, increase in silt	(337.0 - 345.0') Normal drilling, drilled 8 ft due to sluff	
342				Topock - Alluvium Deposits	GM		(341.0 - 342.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (2.5YR 4/4); granules to very large pebbles, angular to subround; some fine to very coarse grained sand, subangular to subround; little silt; trace clay; moist		
343				Topock - Alluvium Deposits	SM		(342.5 - 345.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); medium grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subround; little silt; trace clay; moist; weak cementation		
344									
345				144	No Sieve Samples Collected		Topock - Alluvium Deposits	ML	
346									
347	Topock - Older Alluvium Deposits	MH					(347'); moist to dry; soft; weak cementation; increase in granules and pebbles, increase in sand, decrease in silt		
348									
349	Topock - Older Alluvium Deposits	ML					(348.0 - 348.3') Topock - Older Alluvium Deposits; Gravelly elastic silt with sand (MH); light brown (7.5YR 6/4); medium plasticity; some clay; little granules to medium pebbles, angular to subround; trace very fine to fine grained sand, subangular to round; dry; soft; weak cementation		
350									
351	Topock - Older Alluvium Deposits	ML					(348.3 - 352.0') Topock - Older Alluvium Deposits; Gravelly silt with sand (ML); reddish brown (2.5YR 4/4); low plasticity; some small to large pebbles, angular to subround; little fine to coarse grained sand, subangular to subround; moist to dry; soft; weak cementation		
352									
353	Topock - Older Alluvium Deposits	SW-SM		(352.0 - 355.0') Topock - Older Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); reddish brown (2.5YR 4/4); very fine grained to medium grained, subangular to subround; little granules to very large pebbles, angular to subround; little silt; little clay; trace small cobbles, subangular; moist to dry; weak cementation	(352.0 - 357.0') Rough drilling				
354									
355	Topock - Weathered Bedrock - conglomerate	MH		(355.0 - 357.0') Topock - Weathered Bedrock - conglomerate; Gravelly elastic silt with sand (MH); reddish brown (2.5YR 4/4); medium plasticity; some granules to very large pebbles, angular to subround; little very fine to fine grained sand, subangular to subround; little clay; little coarser clasts composed of metadiorite; dry to moist; stiff; moderate cementation	(357.0 - 362.0') Rough drilling and sluff encountered				
356									
357	Topock - Weathered Bedrock - conglomerate	ML		(357.0 - 359.0') Topock - Weathered Bedrock - conglomerate; Sandy silt with gravel (ML); reddish brown (2.5YR 4/4); low plasticity; some very fine to medium grained sand, subangular to subround; little granules to very large pebbles, angular to subround; little clay; moist; medium stiff; weak cementation					
358									
359	60			Topock - Weathered Bedrock - conglomerate		ML		(359.0 - 374.0') Topock - Weathered Bedrock - conglomerate; Sandy silt with gravel (ML); reddish brown (2.5YR 4/4); low plasticity; some very fine to very coarse grained sand, subangular	
360									


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Date Started:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd	
Date Completed:	07/31/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs		
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	GJ / SM / CS	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
361	60			conglomerate			to subround; little granules to very large pebbles, angular to subround; little clay; trace coarser clasts composed of metadiorite; dry to moist; soft	(357.0 - 362.0') Rough drilling and sluff encountered	
362							(361'); moist to wet		
363							(361.5'); moist to wet; soft; weak cementation; increase in sand and decrease in silt	(362.0 - 372.0') Soft drilling	
364									
365									
366									
367	120			Topock - Weathered Bedrock - conglomerate	ML		(363'); dry to moist		
368									
369									
370							(369'); dry to moist; soft; weak cementation; increase in sand and decrease in silt		
371									
372									
373								(372.0 - 377.0') Normal drilling	
374									
375	60			Topock - Weathered Bedrock - conglomerate	SM		(374.0 - 377.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, angular to subround; trace clay; moist; medium dense; moderate cementation		
376									
377				Topock - Weathered Bedrock - conglomerate	GW-GM		(377.0 - 377.5') Topock - Weathered Bedrock - conglomerate; Well graded gravel with silt and sand (GW-GM); reddish brown (2.5YR 4/4); granules to boulders, subangular to subround; little very fine to very coarse grained sand, subangular to subround; little silt; dry to moist; weak cementation	(377.0 - 382.0') Normal drilling	
378				Topock - Weathered Bedrock - conglomerate					
379	60			Topock - Weathered Bedrock - conglomerate	GM		(377.5 - 382.0') Topock - Weathered Bedrock - conglomerate; Silty gravel with sand (GM); reddish brown (2.5YR 4/4); granules to very large pebbles, angular to subround; little very fine to very coarse grained sand, subangular to subround; little silt; trace clay; trace coarser clasts composed of metadiorite; dry to moist;		
380									

















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:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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
381	60			Topock - Weathered Bedrock - conglomerate	GM		moderate cementation	(377.0 - 382.0') Normal drilling	
382									
383									
384									
385									
386									
387	132								
388									
389									
390									
391									
392									
393									
394									
395									
396									
397	162								
398									
399									
400									

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:	06/20/2019	Surface Elevation:	N/A	Boring No.: MW-Xd
Date Completed:	07/31/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	417 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Prosonic Truck Mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Needles, California
Driller Name:	E. Ramos / S. Vasquez	Depth to First Water:	9.6 ft bgs	
Drilling Asst:	O. Flores / L. Amaya	Sampling Method:	4 Inch X 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	GJ / SM / CS	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	
401	162	No Sieve Samples Collected		Topock - Weathered Bedrock - conglomerate	CL		(400.0 - 401.0') Topock - Weathered Bedrock - conglomerate; Gravelly lean clay with sand (CL); reddish brown (2.5YR 4/4); medium plasticity; some silt; little granules to large pebbles, angular to subround; little fine to very coarse grained sand, subangular to subround; trace small cobbles, subangular; moist; soft to medium stiff; weak cementation	(393.0 - 403.0') Normal drilling		
402				Topock - Weathered Bedrock - conglomerate	GC		(401.0 - 402.2') Topock - Weathered Bedrock - conglomerate; Clayey gravel with sand (GC); reddish brown (2.5YR 4/4); granules to very large pebbles, angular to subround; little fine to very coarse grained sand, subangular to subround; little silt; little clay; little coarser clasts composed of metadiorite; moist; weak cementation			
403				Topock - Weathered Bedrock - conglomerate	ML		(402.2 - 403.6') Topock - Weathered Bedrock - conglomerate; Gravelly silt with sand (ML); reddish brown (2.5YR 4/4); low plasticity; some granules to very large pebbles, angular to subround; little medium to very coarse grained sand, subangular to subround; little clay; moist; soft; weak cementation			(403.0 - 407.0') Soft drilling
404				Topock - Weathered Bedrock - conglomerate	GC		(403.6 - 404.0') Topock - Weathered Bedrock - conglomerate; Clayey gravel with sand (GC); reddish brown (2.5YR 4/4); granules to small cobbles, angular to subround; little medium to very coarse grained sand, subangular to subround; little silt; little clay; little coarser clasts composed of metadiorite; moist; weak cementation			
405				Topock - Weathered Bedrock - conglomerate	SM		(404.0 - 406.1') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, angular to subround; little silt; little clay; little coarser clasts composed of metadiorite; moist; weak cementation			
406				Topock - Weathered Bedrock - conglomerate	SM		(406.1 - 407.0') Topock - Weathered Bedrock - conglomerate; Sandy lean clay with gravel (CL); reddish brown (2.5YR 4/4); medium plasticity; some silt; little granules to large pebbles, subangular to subround; little fine to very coarse grained sand, subangular to subround; moist; soft; weak cementation			
407				Topock - Weathered Bedrock - conglomerate	CL		(407.0 - 408.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); fine grained to very coarse grained, subangular to subround; low plasticity; some granules to very large pebbles, angular to subround; little silt; little clay; moist; weak cementation	(407.0 - 417.0') Soft drilling		
408				Topock - Weathered Bedrock - conglomerate	SM		(408.0 - 411.0') Topock - Weathered Bedrock - conglomerate; Clayey gravel with sand (GC); reddish brown (2.5YR 4/4); granules to small cobbles, angular to subround; some fine to very coarse grained sand, subangular to subround; little silt; little clay; moist; weak cementation			
409				Topock - Weathered Bedrock - conglomerate	GC		(411.0 - 414.8') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4); fine grained to very coarse grained, subangular to subround; low plasticity; some granules to very large pebbles, angular to subround; some silt; little clay; moist; weak cementation			
410				Topock - Weathered Bedrock - conglomerate	GC		(414.8 - 417.0') Topock - Weathered Bedrock - conglomerate; Silty gravel with sand (GM); reddish brown (2.5YR 4/4); granules to very large pebbles, angular to subround; some fine to very coarse grained sand, subangular to subround; little silt; little clay; some coarser clasts composed of metadiorite; moist; moderate cementation			
411	Topock - Weathered Bedrock - conglomerate	SM								
412	120		MW-X-VAS-412-417 (<0.17 U ppb) 7/15/2019 12:43	Topock - Weathered Bedrock - conglomerate	SM		(412.0 - 417.0') Cleared bottom of borehole with water	(412.0 - 417.0') 375 gallons of water used; 0 gallons of water recovered; 375 gallons of water lost		
413				Topock - Weathered Bedrock - conglomerate	SM					
414				Topock - Weathered Bedrock - conglomerate	SM					
415				Topock - Weathered Bedrock - conglomerate	SM					
416				Topock - Weathered Bedrock - conglomerate	GM					
417	End of Boring at 417.0 'bgs.									
418										
419										
420										

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Date Started:	08/10/2019	Surface Elevation:	N/A	Well ID: MW-X-45, MW-X-120
Date Completed:	08/12/2019	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:	Steve Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	10-12 inches	
Logger:	Anthony Mack	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Wilford	Development End Date:	N/A	
Total Depth:	127 ft bgs	Well Completion:	<input 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 - 24.2') 2" PVC Sch 40 Casing		
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							


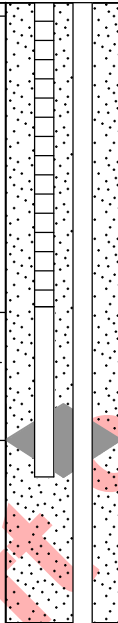

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured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

Date Started:	08/10/2019	Surface Elevation:	N/A	Well ID: MW-X-45, MW-X-120
Date Completed:	08/12/2019	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:	Steve Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	10-12 inches	
Logger:	Anthony Mack	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Wilford	Development End Date:	N/A	
Total Depth:	127 ft bgs	Well Completion:	<input 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					(0.0 - 24.2') 2" PVC Sch 40 Casing		
22					(17.1 - 22.0') Bentonite seal chips	(17.1 - 22.0') 3.41 bags	(17.1 - 22.0') 4 bags (17%) Note: Puregold Medium Chips
23			NR				
24							
25					(24.2 - 44.2') 2" Sch 40 PVC (20-slot) Screen		
26							
27							
28							
29							
30							
31							
32		Topock - Fill	SP		(22.0 - 48.5') Cemex #3 MESH (8x10)	(22.0 - 48.5') 26.5 bags	(22.0 - 48.5') 31 bags (17%) Note: Lapis Lustre Sand
33							
34	MW-X-VAS-32-37 (<0.033 U ppb) 6/26/2019 11:45						
35							
36							
37		Topock - Fluvial Deposits	SW				
38							
39							
40							

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Date Started:	08/10/2019	Surface Elevation:	N/A	Well ID: MW-X-45, MW-X-120
Date Completed:	08/12/2019	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:	Steve Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	10-12 inches	
Logger:	Anthony Mack	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Wilford	Development End Date:	N/A	
Total Depth:	127 ft bgs	Well Completion:	<input 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		Topock - Fluvial Deposits	SW		(24.2 - 44.2') 2" Sch 40 PVC (20-slot) Screen		(0.0 - 99.8') 2" PVC Sch 40 Casing	(22.0 - 48.5') 26.5 bags	(22.0 - 48.5') 31 bags (17%) Note: Lapis Lustre Sand
42									
43									
44									
45									
46					(44.2 - 46.5') Sump and End Cap				
47		Topock - Fluvial Deposits	GW		(40.0 - 46.5') Centralizer				
48									
49									
50							(17.0 - 127.0') 10.0" Borehole		
51									
52									
53									
54			NR						
55					(48.5 - 96.4') Bentonite seal chips			(48.5 - 96.4') 34.9 bags	(48.5 - 96.4') 37 bags (6%) Note: Puregold Medium Chips
56									
57									
58									
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, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval at MW-Xd

Date Started:	08/10/2019	Surface Elevation:	N/A	Well ID: MW-X-45, MW-X-120
Date Completed:	08/12/2019	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:	Steve Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	10-12 inches	
Logger:	Anthony Mack	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Wilford	Development End Date:	N/A	
Total Depth:	127 ft bgs	Well Completion:	<input 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					(0.0 - 99.8') 2" PVC Sch 40 Casing		
62							
63							
64							
65							
66							
67							
68							
69							
70			NR		(48.5 - 96.4') Bentonite seal chips	(17.0 - 127.0') 10.0" Borehole	(48.5 - 96.4') 34.9 bags
71							(48.5 - 96.4') 37 bags (6%) Note: Puregold Medium Chips
72							
73	MW-X-VAS-71-76 (<0.033 U ppb) 6/27/2019 08:52						
74							
75							
76							
77							
78							
79							
80							

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Date Started:	08/10/2019	Surface Elevation:	N/A	Well ID: MW-X-45, MW-X-120
Date Completed:	08/12/2019	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:	Steve Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	10-12 inches	
Logger:	Anthony Mack	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Wilford	Development End Date:	N/A	
Total Depth:	127 ft bgs	Well Completion:	<input 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					(0.0 - 99.8') 2" PVC Sch 40 Casing		
82							
83							
84							
85					(84.5 - 85.5') Centralizer		
86							
87							
88							
89			NR		(48.5 - 96.4') Bentonite seal chips	(48.5 - 96.4') 34.9 bags	(48.5 - 96.4') 37 bags (6%) Note: Puregold Medium Chips
90					(17.0 - 127.0') 10.0" Borehole		
91							
92							
93							
94							
95							
96							
97							
98		Topock - Fluvial Deposits	SW		(96.4 - 124.0') Cemex #3 MESH (8x10)	(96.4 - 124.0') 28.4 bags	(96.4 - 124.0') 35 bags (23%) Note: Lapis Lustre Sand
99							
100							

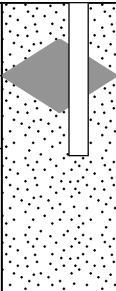

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured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

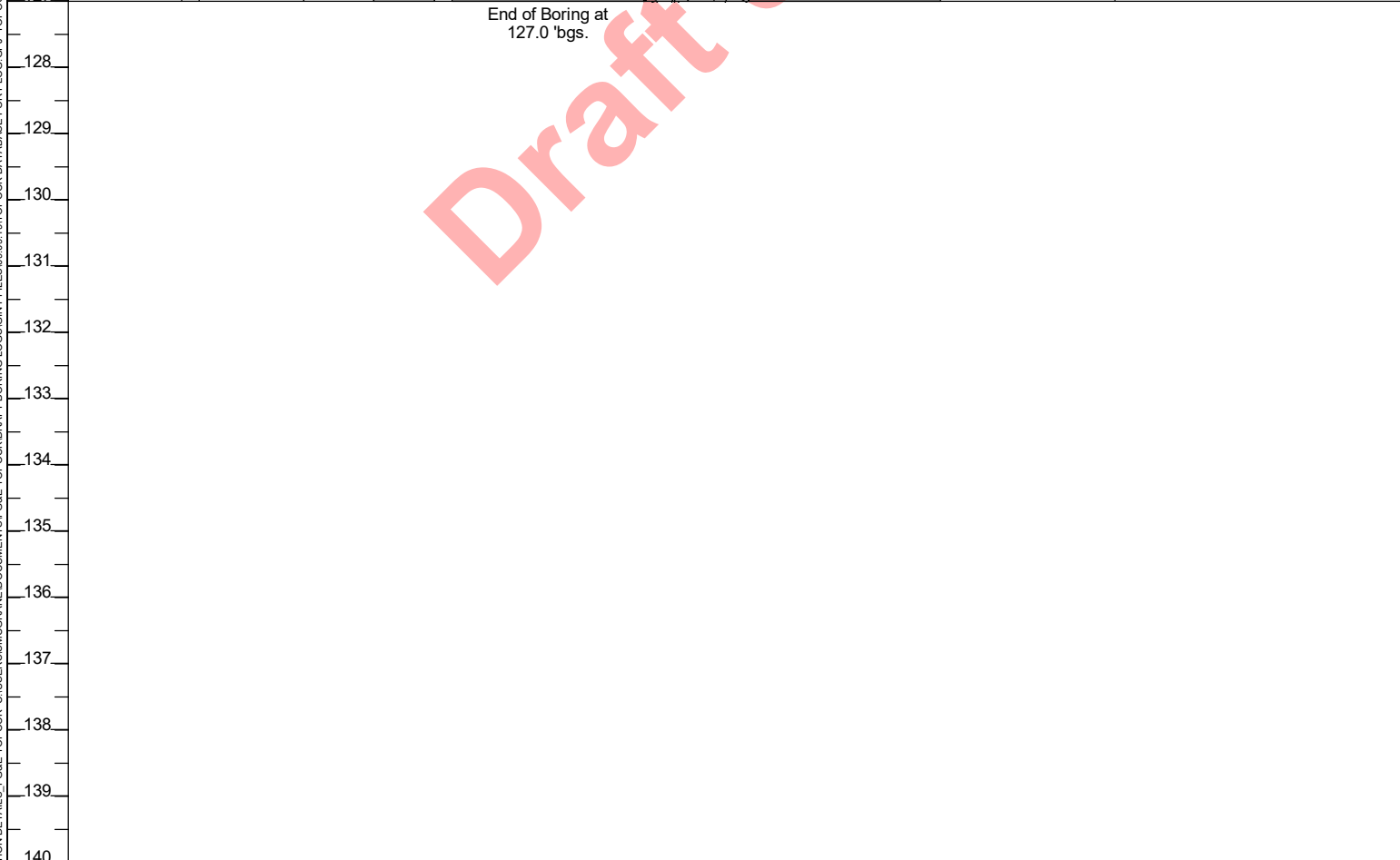
Date Started:	08/10/2019	Surface Elevation:	N/A	Well ID: MW-X-45, MW-X-120
Date Completed:	08/12/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	Steve Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	10-12 inches	
Logger:	Anthony Mack	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Wilford	Development End Date:	N/A	
Total Depth:	127 ft bgs	Well Completion:	<input 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
101							
102							
103		Topock - Fluvial Deposits	SW				
104							
105							
106							
107							
108		Topock - Fluvial Deposits	GW				
109	MW-X-VAS-107-112 (<0.033 U ppb) 6/27/2019 15:04	Topock - Fluvial Deposits	SM				
110							
111							
112							
113							
114	MW-X-VAS-112-117 (<0.033 U ppb) 6/28/2019 09:56	Topock - Fluvial Deposits	GW				
115							
116							
117		Topock - Alluvium Deposits	GW-GM				
118							
119		Topock - Alluvium Deposits	SM				
120							

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Date Started: 08/10/2019	Surface Elevation: N/A	Well ID: MW-X-45, MW-X-120
Date Completed: 08/12/2019	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: Steve Vasquez	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 10-12 inches	
Logger: Anthony Mack	Water Level Start: 9.6 ft bgs	Project Number: RC000753.0051
Editor: Grant Wilford	Development End Date: N/A	
Total Depth: 127 ft bgs	Well Completion: <input 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
121		Topock - Alluvium Deposits	SM		(120.5 - 121.5') Centralizer			(96.4 - 124.0') 28.4 bags	(96.4 - 124.0') 35 bags (23%) Note: Lapis Lustre Sand
122					(96.4 - 124.0') Cemex #3 MESH (8x10)	(119.8 - 122.1') Sump and End Cap			
123						(17.0 - 127.0') 10.0" Borehole			
124			NR		(124.0 - 125.0') Bentonite seal chips		(124.0 - 125.0') 0.8 bags	(124.0 - 125.0') 1 bags (25%) Note: Puregold Medium Chips	
125						(125.0 - 127.0') Slough			
126									
127								Note: Formation material that settled from the water column in the casing	



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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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 - 150.8') 2" PVC Sch 80 Casing		
2							
3							
4					(3.0 - 5.0') Bentonite seal chips	(3.0 - 5.0') 2.06	(3.0 - 5.0') 7 (240%) Note: Puregold Medium Chips, installed due to void and heat of hydration concerns
5							
6		Topock - Fill	SP				
7							
8							
9							
10							
11					(5.0 - 17.0') Portland Cement 6% Bentonite	(5.0 - 17.0') 66.5 gallons	(5.0 - 17.0') 100 gallons (50%) Note: Type I, II and V and Benseal
12							
13							
14	MW-X-VAS-12-17 (<0.033 U ppb) 6/25/2019 15:10		NR				
15							
16							
17							
18					(17.0 - 118.2') Bentonite seal chips	(17.0 - 118.2') 78.82 bags	(17.0 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
19		Topock - Fill	SW		Centralizer (19.5 - 20.5')		
20							

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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					(19.5 - 20.5') Centralizer		
22							
23					(0.0 - 150.8') 2" PVC Sch 80 Casing		
24							
25							
26							
27							
28		Topock - Fill	SW				
29							
30					(17.0 - 118.2') Bentonite seal chips	(0.0 - 42.0') 12.0" Borehole	(17.0 - 118.2') 78.82 bags
31							(17.0 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
32							
33							
34	MW-X-VAS-32-37 (<0.033 U ppb) 6/26/2019 11:45						
35							
36							
37		Topock - Fluvial Deposits	SW				
38							
39							
40							

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Date Started: 06/20/2019	Surface Elevation: N/A	Well ID: MW-X-170, MW-X-320
Date Completed: 07/31/2019	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: E. Ramos / S. Vasquez	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS	Water Level Start: 9.6 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: N/A	
Total Depth: 417 ft bgs	Well Completion: <input 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					(0.0 - 150.8') 2" PVC Sch 80 Casing		
42							
43							
44			NR				
45							
46							
47							
48		Topock - Fluvial Deposits	SW				
49		Topock - Fluvial Deposits	GW				
50					(17.0 - 118.2') Bentonite seal chips	(17.0 - 118.2') 78.82 bags	(17.0 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
51							
52		Topock - Fluvial Deposits	SW				
53							
54							
55		Topock - Fluvial Deposits	SP				
56							
57							
58		Topock - Fluvial Deposits	SW				
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, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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	SW		(0.0 - 150.8') 2" PVC Sch 80 Casing		
62							
63		Topock - Fluvial Deposits	SP				
64							
65							
66							
67							
68							
69		Topock - Fluvial Deposits	SW				
70					(69.5 - 70.5') Centralizer	(42.0 - 324.0') 10.0" Borehole	(17.0 - 118.2') 78.82 bags
71							(17.0 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
72					(17.0 - 118.2') Bentonite seal chips		
73	MW-X-VAS-71-76 (<0.033 U ppb) 6/27/2019 08:52						
74							
75							
76		Topock - Fluvial Deposits	SP				
77							
78		Topock - Fluvial Deposits	SW				
79							
80							

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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		Topock - Fluvial Deposits	SW		(0.0 - 150.8') 2" PVC Sch 80 Casing	(0.0 - 300.8') 2" PVC Sch 80 Casing		
82								
83		Topock - Fluvial Deposits	SW					
84								
85								
86		Topock - Fluvial Deposits	SW-SM		(17.0 - 118.2') Bentonite seal chips	(42.0 - 324.0') 10.0" Borehole		
87								
88								
89								
90		Topock - Fluvial Deposits	GW-GM					
91								
92	Topock - Fluvial Deposits	SP						
93								
94	Topock - Fluvial Deposits	SW						
95								
96		NR						
97								
98	Topock - Fluvial Deposits	SW						
99								
100								

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
101					(0.0 - 150.8') 2" PVC Sch 80 Casing		
102		Topock - Fluvial Deposits	SW				
103							
104		Topock - Fluvial Deposits	SW				
105							
106		Topock - Fluvial Deposits	SW				
107							
108		Topock - Fluvial Deposits	GW				
109	MW-X-VAS-107-112 (<0.033 U ppb) 6/27/2019 15:04	Topock - Fluvial Deposits	SM		(17.0 - 118.2') Bentonite seal chips	(17.0 - 118.2') 78.82 bags	(17.0 - 118.2') 77 bags (-2%) Note: Puregold Medium Chips
110							
111					(103.0 - 118.2') Bentonite seal chips	(103.0 - 118.2') 10.59 bags	(103.0 - 118.2') 12 bags (13%) Note: Puregold Medium Chips
112							
113		Topock - Fluvial Deposits	GW				
114	MW-X-VAS-112-117 (<0.033 U ppb) 6/28/2019 09:56	Topock - Fluvial Deposits	SM		(42.0 - 324.0') 10.0" Borehole		
115							
116							
117							
118		Topock - Alluvium Deposits	SM				
119					(118.2 - 146.8') Bentonite seal pellets Centralizer	(118.2 - 146.8') 22.9 buckets	(118.2 - 146.8') 25 buckets (9%) Note: Pel-Plug (TR30) 3/8"
120					(119.5 - 120.5')		

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
121					(119.5 - 120.5') Centralizer		
122							
123					(0.0 - 150.8') 2" PVC Sch 80 Casing		
124							
125							
126							
127							
128							
129							
130		Topock - Alluvium Deposits	SM		(118.2 - 146.8') Bentonite seal pellets	(42.0 - 324.0') 10.0" Borehole	(118.2 - 146.8') 22.9 buckets
131							(118.2 - 146.8') 25 buckets (9%) Note: Pel-Plug (TR30) 3/8"
132							
133							
134							
135							
136							
137							
138							
139							
140							

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
141					(0.0 - 150.8') 2" PVC Sch 80 Casing		
142							
143							
144					(118.2 - 146.8') Bentonite seal pellets	(118.2 - 146.8') 22.9 buckets	(118.2 - 146.8') 25 buckets (9%) Note: Pel-Plug (TR30) 3/8"
145							
146							
147							
148		Topock - Alluvium Deposits	SM				
149							
150							
151					(150.8 - 170.8') 2" Sch 80 PVC (20-slot) Screen		
152	MW-X-VAS-152-157 (<0.17 U ppb) 6/29/2019 09:19						
153					(146.8 - 174.0') Cemex #3 MESH (8x10)	(146.8 - 174.0') 26.6 bags	(146.8 - 174.0') 34 bags (28%) Note: Lapis Lustre Sand
154							
155							
156							
157							
158			NR				
159							
160							

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
161			NR		(150.8 - 170.8') 2" Sch 80 PVC (20-slot) Screen		
162							
163							
164							
165							
166							
167		Topock - Alluvium Deposits	CL		(146.8 - 174.0') Cemex #3 MESH (8x10)	(146.8 - 174.0') 26.6 bags	(146.8 - 174.0') 34 bags (28%) Note: Lapis Lustre Sand
168							
169		Topock - Alluvium Deposits	CL				
170							
171							
172					(170.5 - 172.0') Centralizer		
173					(170.8 - 173.2') Sump and End Cap		
174							
175		Topock - Alluvium Deposits	SM				
176							
177		Topock - Alluvium Deposits	GP		(174.0 - 297.4') Bentonite seal pellets	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
178							
179			NR				
180							

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
181	MW-X-VAS-182-187 (<0.17 U ppb) 6/29/2019 15:28		NR		(0.0 - 300.8') 2" PVC Sch 80 Casing		
182							
183		Topock - Alluvium Deposits	SM				
184							
185							
186		Topock - Alluvium Deposits	SC				
187							
188		Topock - Alluvium Deposits	ML				
189							
190		Topock - Alluvium Deposits	SM				
191		Topock - Alluvium Deposits	CL		(174.0 - 297.4') Bentonite seal pellets	(42.0 - 324.0') 10.0" Borehole	(174.0 - 297.4') 103.3 buckets
192		Topock - Alluvium Deposits	MH				(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
193							
194		Topock - Alluvium Deposits	ML				
195							
196							
197							
198		Topock - Alluvium Deposits	ML				
199							
200		Topock - Alluvium Deposits	CL				

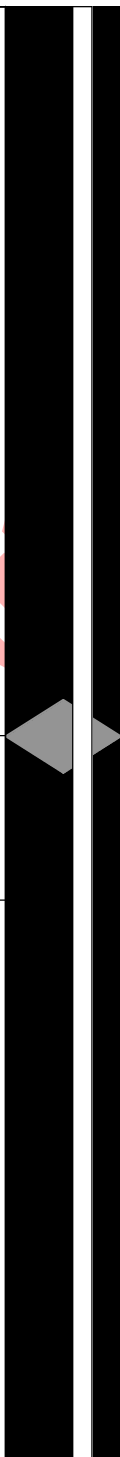
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, NR = no recovery, blue water table symbol represents depth to water measured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

Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
201		Topock - Alluvium Deposits	CL		(0.0 - 300.8') 2" PVC Sch 80 Casing		
202							
203							
204							
205							
206							
207							
208							
209	MW-X-VAS-207-212 (<0.17 U ppb) 6/30/2019 13:28						
210		Topock - Alluvium Deposits	SM		(174.0 - 297.4') Bentonite seal pellets	(42.0 - 324.0') 10.0" Borehole	(174.0 - 297.4') 103.3 buckets
211							(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
212							
213							
214							
215							
216							
217							
218							
219							
220							

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Date Started: 06/20/2019	Surface Elevation: N/A	Well ID: MW-X-170, MW-X-320
Date Completed: 07/31/2019	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: E. Ramos / S. Vasquez	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS	Water Level Start: 9.6 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: N/A	
Total Depth: 417 ft bgs	Well Completion: <input 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			
221		Topock - Alluvium Deposits	SM			(0.0 - 300.8') 2" PVC Sch 80 Casing		(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"			
222											
223											
224											
225											
226											
227											
228		Topock - Alluvium Deposits	SM						(42.0 - 324.0') 10.0" Borehole	(174.0 - 297.4') 103.3 buckets	
229											
230											(229.5 - 230.5') Centralizer
231											
232	(174.0 - 297.4') Bentonite seal pellets										
233											
234											
235											
236											
237											
238											
239											
240											

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WELL CONSTRUCTION DETAILS: PG&E TOPOCK TOPOCK DRAFT BORING LOGS\GINT FILES\09.09.19\TOPOCK DATABASE FOR PLOG.GPJ TOPOCK DATA TEMPLATE FOR PLOG.GDT 09/09/19 17:41

Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
241					(0.0 - 300.8') 2" PVC Sch 80 Casing		
242							
243		Topock - Alluvium Deposits	SM				
244							
245							
246							
247	MW-X-VAS-245-255 (<0.033 U ppb) 7/1/2019 13:35						
248							
249							
250		Topock - Alluvium Deposits	SM		(174.0 - 297.4') Bentonite seal pellets	(42.0 - 324.0') 10.0" Borehole	(174.0 - 297.4') 103.3 buckets
251							(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
252							
253							
254							
255							
256							
257		Topock - Alluvium Deposits	SM				
258							
259							
260			SM				

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
261		Topock - Alluvium Deposits	SM		(0.0 - 300.8') 2" PVC Sch 80 Casing		
262							
263							
264							
265							
266							
267							
268							
269		Topock - Alluvium Deposits	SM		(269.5 - 270.5') Centralizer	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
270					(42.0 - 324.0') 10.0" Borehole		
271							
272					(174.0 - 297.4') Bentonite seal pellets		
273							
274							
275							
276							
277							
278							
279							
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

Date Started: 06/20/2019	Surface Elevation: N/A	Well ID: MW-X-170, MW-X-320
Date Completed: 07/31/2019	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: E. Ramos / S. Vasquez	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS	Water Level Start: 9.6 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: N/A	
Total Depth: 417 ft bgs	Well Completion: <input 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
281					(0.0 - 300.8') 2" PVC Sch 80 Casing		
282							
283							
284							
285							
286							
287							
288							
289					(174.0 - 297.4') Bentonite seal pellets	(174.0 - 297.4') 103.3 buckets	(174.0 - 297.4') 119 buckets (15%) Note: Pel-Plug (TR30) 3/8"
290		Topock - Alluvium Deposits	SM		(42.0 - 324.0') 10.0" Borehole		
291							
292							
293							
294	MW-X-VAS-292-297 (<0.17 U ppb) 7/2/2019 14:45						
295							
296							
297							
298							
299					(297.4 - 324.0') Cemex #3 MESH (8x10)	(297.4 - 324.0') 28 bags	(297.4 - 324.0') 33 bags (18%) Note: Lapis Lustre Sand
300							

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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
301					(0.0 - 300.8') 2" PVC Sch 80 Casing		
302					(300.8 - 320.8') 2" PVC Sch 80 Screen		
303							
304							
305							
306							
307							
308							
309							
310		Topock - Alluvium Deposits	SM		(297.4 - 324.0') Cemex #3 MESH (8x10)	(297.4 - 324.0') 28 bags	(297.4 - 324.0') 33 bags (18%) Note: Lapis Lustre Sand
311							
312							
313							
314							
315							
316							
317							
318							
319							
320							


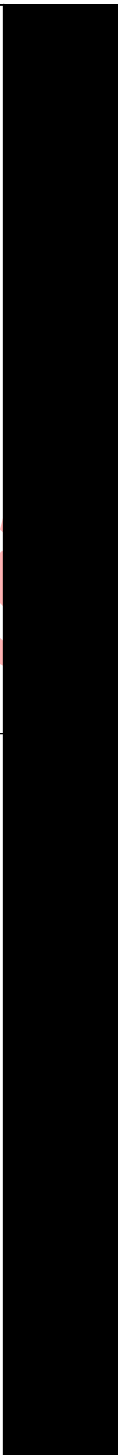










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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	Shallow Well Elevation:	N/A	
Drilling Co.:	Cascade	Deep Well Elevation:	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Northing (NAD83):	N/A	Project: Final GW Remedy Phase 1
Driller Name:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
321		Topock - Alluvium Deposits	SM		(320.5 - 321.5') Centralizer	(297.4 - 324.0') 28 bags	(297.4 - 324.0') 33 bags (18%) Note: Lapis Lustre Sand
322					(300.8 - 320.8') 2" PVC Sch 80 Screen		
323					(297.4 - 324.0') Cemex #3 MESH (8x10)		
324					(42.0 - 324.0') 10.0" Borehole		
325					(320.8 - 323.2') Sump and End Cap		
326							
327		Topock - Alluvium Deposits	MH				
328		Topock - Alluvium Deposits	SM				
329							
330		Topock - Alluvium Deposits	MH				
331							
332		Topock - Alluvium Deposits	MH		(324.0 - 417.0') Bentonite seal chips	(324.0 - 417.0') 25.3 bags	(324.0 - 417.0') 34 bags (34%) Note: Puregold Medium Chips
333							
334		Topock - Alluvium Deposits	MH				
335							
336							
337							
338	MW-X-VAS-337-342 (<0.17 U ppb) 7/11/2019 11:30	Topock - Alluvium Deposits	ML				
339		Topock - Alluvium Deposits	ML				
340							

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:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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			
341	MW-X-VAS-337-342 (<0.17 U ppb) 7/11/2019 11:30	Topock - Alluvium Deposits	ML			(324.0 - 417.0') 6.0" Borehole	(324.0 - 417.0') 25.3 bags	(324.0 - 417.0') 34 bags (34%) Note: Puregold Medium Chips			
342		Topock - Alluvium Deposits	GM								
343		Topock - Alluvium Deposits	SM								
344											
345		Topock - Alluvium Deposits	ML								
346											
347		Topock - Older Alluvium Deposits	MH								
348											
349		Topock - Older Alluvium Deposits	ML								
350		Topock - Older Alluvium Deposits									
351	Topock - Older Alluvium Deposits	SW-SM									
352											
353	Topock - Older Alluvium Deposits	MH									
354											
355	Topock - Weathered Bedrock - conglomerate	ML									
356											
357	Topock - Weathered Bedrock - conglomerate	ML									
358											
359	Topock - Weathered Bedrock - conglomerate	ML									
360											




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Date Started: 06/20/2019	Surface Elevation: N/A	Well ID: MW-X-170, MW-X-320
Date Completed: 07/31/2019	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: E. Ramos / S. Vasquez	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS	Water Level Start: 9.6 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: N/A	
Total Depth: 417 ft bgs	Well Completion: <input 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
361		conglomerate					
362							
363							
364							
365							
366							
367		Topock - Weathered Bedrock - conglomerate	ML				
368							
369							
370					(324.0 - 417.0') Bentonite seal chips	(324.0 - 417.0') 6.0" Borehole	(324.0 - 417.0') 25.3 bags
371							(324.0 - 417.0') 34 bags (34%) Note: Puregold Medium Chips
372							
373							
374							
375		Topock - Weathered Bedrock - conglomerate	SM				
376							
377		Topock - Weathered Bedrock - conglomerate	GW-GM				
378							
379		Topock - Weathered Bedrock - conglomerate	GM				
380							


















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Date Started:	06/20/2019	Surface Elevation:	N/A	Well ID: MW-X-170, MW-X-320
Date Completed:	07/31/2019	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:	E. Ramos / S. Vasquez	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	O. Flores / L. Amaya	Borehole Diameter:	6-12 inches	
Logger:	GJ / SM / CS	Water Level Start:	9.6 ft bgs	Project Number: RC000753.0051
Editor:	Grant Willford	Development End Date:	N/A	
Total Depth:	417 ft bgs	Well Completion:	<input 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
381		Topock - Weathered Bedrock - conglomerate	GM				
382							
383							
384	MW-X-VAS-382-387 (<0.17 U ppb) 7/13/2019 14:43						
385		Topock - Weathered Bedrock - conglomerate	CL				
386							
387							
388							
389							
390					(324.0 - 417.0') Bentonite seal chips	(324.0 - 417.0') 6.0" Borehole	(324.0 - 417.0') 25.3 bags
391							
392							
393							
394							
395		Topock - Weathered Bedrock - conglomerate	CL				
396							
397							
398							
399							
400							

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Date Started: 06/20/2019	Surface Elevation: N/A	Well ID: MW-X-170, MW-X-320
Date Completed: 07/31/2019	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: E. Ramos / S. Vasquez	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: O. Flores / L. Amaya	Borehole Diameter: 6-12 inches	
Logger: GJ / SM / CS	Water Level Start: 9.6 ft bgs	Project Number: RC000753.0051
Editor: Grant Willford	Development End Date: N/A	
Total Depth: 417 ft bgs	Well Completion: <input 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
401		Topock - Weathered Bedrock - conglomerate	CL				
402		Topock - Weathered Bedrock - conglomerate	GC				
403		Topock - Weathered Bedrock - conglomerate	ML				
404		Topock - Weathered Bedrock - conglomerate	GC				
405		Topock - Weathered Bedrock - conglomerate	SM				
406		Topock - Weathered Bedrock - conglomerate	SM				
407		Topock - Weathered Bedrock - conglomerate	CL				
408		Topock - Weathered Bedrock - conglomerate	SM				
409		Topock - Weathered Bedrock - conglomerate	GC		(324.0 - 417.0') Bentonite seal chips	(324.0 - 417.0') 6.0" Borehole	(324.0 - 417.0') 25.3 bags
410		Topock - Weathered Bedrock - conglomerate	GC				
411		Topock - Weathered Bedrock - conglomerate	SM				
412		Topock - Weathered Bedrock - conglomerate	SM				
413		Topock - Weathered Bedrock - conglomerate	SM				
414	MW-X-VAS-412-417 (<0.17 U ppb) 7/15/2019 12:43	Topock - Weathered Bedrock - conglomerate	SM				
415		Topock - Weathered Bedrock - conglomerate	GM				
416		Topock - Weathered Bedrock - conglomerate	GM				
417		Topock - Weathered Bedrock - conglomerate	GM				
418					End of Boring at 417.0' bgs.		
419							
420							

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Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od
Date Completed:	05/12/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 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:	12.4 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	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 - 4.0') No recovery (NR)	(0.0 - 4.0') No recovery due to loose dredge sands.	(0.0 - 96.0') 1930 gallons of water used; 1500 gallons of water recovered; 430 gallons of water lost
2					NR				
3									
4									
5	24			Topock - Fill	SP		(4.0 - 10.0') Topock - Fill; Poorly graded sand (SP); light yellowish brown (10YR 6/4); very fine grained to fine grained, subangular to subround; trace small pebbles, subround to round; trace silt; dry; homogeneous; some organics present 4-6 ft. bgs		
6									
7									
8									
9									
10									
11	48						(10.0 - 16.0') No recovery (NR)	(10.0 - 16.0') No recovery due to loose dredge sands.	
12									
13					NR			(12.5') Sampler dropped 0.5 due to lose sands	
14									
15			MW-O-VAS-12.5-17 (0.163 J ppb) 5/8/2019 14:20						
16									
17							(16.0 - 26.8') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); very dark grayish brown (10YR 3/2); very fine grained to fine grained, subangular to subround; little silt; wet	(16.0 - 36.0') Soft drilling	
18	222			Topock - Fluvial Deposits	SP-SM				
19									
20									

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Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od	
Date Completed:	05/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 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:	12.4 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	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				Topock - Fluvial Deposits	SP-SM			(16.0 - 36.0') Soft drilling	(0.0 - 96.0') 1930 gallons of water used; 1500 gallons of water recovered; 430 gallons of water lost
22									
23									
24									
25									
26									
27				Topock - Fluvial Deposits	CH		(26.8 - 27.8') Topock - Fluvial Deposits; Fat clay (CH); dark grayish brown / dark yellowish brown(10YR 4/2); high plasticity; little silt; trace very fine grained sand, subround to round; moist; very soft to soft; homogeneous		
28	222						(27.8 - 36.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); dark grayish brown / dark yellowish brown(10YR 4/2); very fine grained to fine grained, subangular to subround; little silt; wet		
29				Topock - Fluvial Deposits	SP-SM				
30									
31									
32									
33									
34									
35									
36									
37				Topock - Fluvial Deposits	SP-SM		(36.0 - 45.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); light yellowish brown (10YR 6/4); very fine grained to fine grained, subangular to subround; little silt; trace clay; wet to moist	(36.0 - 56.0') Soft drilling	
38	240								
39									
40									

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Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od
Date Completed:	05/12/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 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:	12.4 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	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				Topock - Fluvial Deposits	SP-SM			(36.0 - 56.0') Soft drilling	(0.0 - 96.0') 1930 gallons of water used; 1500 gallons of water recovered; 430 gallons of water lost
42									
43									
44									
45									
46				Topock - Fluvial Deposits	SW		(45.0 - 50.0') Topock - Fluvial Deposits; Well graded sand (SW); light yellowish brown (10YR 6/4); very fine grained to coarse grained, subangular to subround; trace granules to small pebbles, subround to round; trace silt; wet		
47									
48	240								
49									
50				Topock - Fluvial Deposits	SW		(50.0 - 51.0') Topock - Fluvial Deposits; Well graded sand (SW); light yellowish brown (10YR 6/4); very fine grained to coarse grained, subangular to round; little granules to large pebbles, subangular to round; trace silt; wet; gravel composed of mixed lithology		
51									
52				Topock - Fluvial Deposits	SP-SM		(51.0 - 52.0') Topock - Fluvial Deposits; Poorly graded sand with silt (SP-SM); light yellowish brown (10YR 6/4); very fine grained to fine grained, subangular to subround; little silt; trace clay; wet to moist		
53			MW-O-VAS-51-56 (<0.033 U ppb) 5/9/2019 09:18	Topock - Fluvial Deposits	SM		(52.0 - 56.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); brown (10YR 4/3); very fine grained to coarse grained, subangular to subround; little granules to large pebbles, subangular to round; little silt; wet; gravel composed of mixed lithology		
54									
55									
56									
57									
58	120			Topock - Alluvium Deposits	CL		(56.0 - 60.0') Topock - Alluvium Deposits; Sandy lean clay with gravel (CL); brown (7.5YR 5/3); low plasticity; and very fine to very coarse grained sand, angular to subround; little granules to medium pebbles, angular to subround; little silt; moist; medium stiff; moderate cementation; gravel composed of mixed lithology	(56.0 - 66.0') Rough drilling	
59									
60									



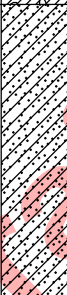


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Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od	
Date Completed:	05/12/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 ft bgs	Project:	Final GW 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:	12.4 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	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 - Alluvium Deposits	SC		(60.0 - 66.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subround; little granules to medium pebbles, angular to subangular; little silt; little clay; moist; strong cementation; iron oxide staining	(56.0 - 66.0') Rough drilling	(0.0 - 96.0') 1930 gallons of water used; 1500 gallons of water recovered; 430 gallons of water lost
62									
63							(63'); dry		
64									
65	120			Topock - Alluvium Deposits	SC		(66.0 - 76.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to medium pebbles, angular to subangular; little silt; little clay; moist to wet; moderate cementation; iron oxide staining	(66.0 - 76.0') Rough drilling	
66									
67									
68									
69	120		MW-O-VAS-66-71 (0.178 J ppb) 5/9/2019 14:30	Topock - Alluvium Deposits	SC		(69'); to 71.0' slightly saturated		
70									
71									
72									
73	120			Topock - Alluvium Deposits	SC		(74'); dry		
74									
75									
76									
77	120			Topock - Alluvium Deposits	SC		(76.0 - 82.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 5/4); very fine grained to coarse grained, angular to subround; some clay; little granules to medium pebbles, angular to subangular; little silt; moist; strong cementation; gravel composed of mixed litholgy, borderline moist-dry	(76.0 - 86.0') Rough drilling	
78									
79									
80									



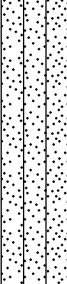
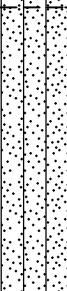
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = No Recovery, blue water table symbol represents depth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

Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od
Date Completed:	05/12/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 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:	12.4 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	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 - Alluvium Deposits	SC			(76.0 - 86.0') Rough drilling	(0.0 - 96.0') 1930 gallons of water used; 1500 gallons of water recovered; 430 gallons of water lost
82									
83					Topock - Alluvium Deposits	CL		(82.0 - 86.0') Topock - Alluvium Deposits; Gravelly lean clay with sand (CL); brown (7.5YR 4/3); medium plasticity; some silt; little granules to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; moist; hard; strong cementation	
84									
85	120							(86.0 - 96.0') Rough drilling	
86									
87					Topock - Alluvium Deposits	SC		(86.0 - 90.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); brown (7.5YR 4/3); very fine grained to coarse grained, angular to subround; little granules to medium pebbles, angular to subround; little silt; little clay; moist to wet; gravel composed of mixed lithology (87'); to 89.5' saturated	
88									
89	120								
90									
91					Topock - Alluvium Deposits	CL		(90.0 - 96.0') Topock - Alluvium Deposits; Sandy lean clay with gravel (CL); brown (7.5YR 4/3) trace light reddish brown (2.5YR 6/3); medium plasticity; some silt; little granules to medium pebbles, angular to subangular; little very fine to very coarse grained sand, angular to subround; moist to dry; medium stiff to very stiff; moderate cementation; gravel composed of mixed lithology, low to medium plasticity	
92								(93'); to 93.6' dry	
93	120								
94									
95									
96									
97				Topock - Alluvium Deposits	SC		(96.0 - 106.0') Topock - Alluvium Deposits; Clayey sand with gravel (SC); (7.5YR 4/); very fine grained to very coarse grained, angular to subround; little granules to medium pebbles, angular to subround; little silt; little clay; moist to dry; moderate cementation	(96.0 - 106.0') Rough drilling	
98									
99									
100									

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Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od
Date Completed:	05/12/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 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:	12.4 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	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	120			Topock - Alluvium Deposits	SC		(105.3'); to 105.8' dry	(96.0 - 106.0') Rough drilling	
102									
103									
104									
105									
106	120			Topock - Alluvium Deposits	SM		(106.0 - 112.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subround; little silt; trace clay; wet; weak cementation; gravel composed of mixed litholgy mostly metadiorite	(106.0 - 116.0') Soft drilling, sample interval 106 to 111 was low yielding	
107									
108									
109									
110									
111				Topock - Alluvium Deposits	SM		(112.0 - 116.0') Topock - Alluvium Deposits; Silty sand (SM); brown (7.5YR 5/3); very fine grained to very coarse grained, angular to subround; little granules to medium pebbles, angular to subround; little silt; little clay; wet		
112									
113									
114									
115									
116	120			Topock - Alluvium Deposits	SM		(116.0 - 127.8') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4); very fine grained to very coarse grained, angular to subround; little granules to large pebbles, angular to subround; little silt; little clay; wet; weak cementation; iron oxide staining; gravel composed of mixed litholgy mostly metadiorite, some red staining on pebbles	(116.0 - 126.0') Soft drilling	(116.0 - 126.0') 40 gallons of water used; 0 gallons of water recovered; 40 gallons of water lost
117									
118									
119									
120									


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Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od
Date Completed:	05/12/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 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:	12.4 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	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			Topock - Alluvium Deposits	SM			(116.0 - 126.0') Soft drilling	(116.0 - 126.0') 40 gallons of water used; 0 gallons of water recovered; 40 gallons of water lost	
122										
123										
124										
125										
126	120			Topock - Alluvium Deposits	ML		(127.8 - 130.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown / moderate brown(5YR 4/4); low plasticity; and very fine to very coarse grained sand, angular to subround; little granules to medium pebbles, angular to subangular; moist; stiff; moderate cementation; iron oxide staining; gravel composed of mixed litholgy mostly metadiorite, some iron staining on pebbles	(125.0') Artesian flow occured during the removal of 6 inch casing	(126.0 - 143.0') 640 gallons of water used; 290 gallons of water recovered; 350 gallons of water lost	
127							(126.0 - 132.0') Soft drilling			
128				Topock - Alluvium Deposits	SM		(130.0 - 136.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4) little red (2.5YR 5/8); very fine grained to very coarse grained, angular to subround; some silt; little granules to very large pebbles, angular to subround; little clay; moist; moderate cementation; iron oxide staining	(128.0') to 146' cleared borehole with water		
129										
130										
131										
132										
133								(132.0 - 136.0') Rough drilling		
134										
135										
136										
137	120		MW-O-VAS-136-141 (<0.17 U ppb) 5/11/2019 14:26	Topock - Alluvium Deposits	SM		(136.0 - 140.0') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown(5YR 4/4) some red (2.5YR 4/8); very fine grained to very coarse grained, angular to subround; some silt; little granules to large pebbles, angular to subround; trace clay; wet to moist; weak cementation; iron oxide staining	(136.0 - 140.0') Rough drilling,		
138										
139										
140										

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Date Started:	05/08/2019	Surface Elevation:	N/A	Boring No.: MW-Od
Date Completed:	05/12/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	146 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:	12.4 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	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
141	120			Topock - Competent Bedrock - conglomerate			(140.0 - 146.0') Topock - Competent Bedrock - conglomerate; reddish brown (2.5YR 4/4) little red (2.5YR 4/6); moist to dry; strong cementation; friable, heavily fractured-pulverized, mostly dry through out some slightly moist portions of core	(140.0 - 146.0') Rough drilling, encountered bedrock much shallower than expected, independent QA inspector observed core and agreed that core was bedrock, sample interval from 141 to 146 ft. bgs was low yielding	(126.0 - 143.0') 640 gallons of water used; 290 gallons of water recovered; 350 gallons of water lost
142									
143									
144									
145									
146									
147							End of Boring at 146.0' bgs.		
148									
149									
150									
151									
152									
153									
154									
155									
156									
157									
158									
159									
160									

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Date Started: 05/08/2019	Surface Elevation: N/A	Well ID: MW-O-120, MW-O-140
Date Completed: 05/12/2019	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: Dan O'Mara	Easting (NAD83): N/A	Location: PG&E Topock, Needles, California
Drilling Asst: E. Huellmantel / J. Pacheco	Borehole Diameter: 6-12 inches	
Logger: Grant Willford	Water Level Start: 12.4 ft bgs	Project Number: RC000753.0051
Editor: Sean McGrane	Development End Date: 7/23/2019	
Total Depth: 146 ft bgs	Well Completion: <input 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
0					(+2.0 - 100.0') 2" Casing (+3.0 - 0.0') Casing Monument		Note: 12x12-inch Lockable Steel Monument
1							
2			NR				
3					(0.9 - 5.0') Concrete		(0.9 - 5.0') 35 bags (%) Note: 24-inch Diameter Concrete Well Pad, King Kon-Crete 4000 PSI, Grout Removed to install
4							
5							
6							
7		Topock - Fill	SP				
8							
9					(5.0 - 14.0') Bentonite seal chips	(5.0 - 14.0') 6.3 bags	(5.0 - 14.0') 9 bags (43%) Note: Puregold Medium Chips
10							
11					(11.5 - 12.5') Centralizer	(4.0 - 143.0') 10" Borehole	
12							
13			NR				
14	MW-O-VAS-12.5-17 (0.163 J ppb) 5/8/2019 14:20						
15					(14.0 - 85.0') High Solids Grout	(14.0 - 85.0') 266.4 gallons	(14.0 - 85.0') 350 gallons (31%) Note: Type I, II and V and Benseal
16		Topock - Fluvial Deposits	SP-SM				
17							

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Date Started:	05/08/2019	Surface Elevation:	N/A	Well ID: MW-O-120, MW-O-140
Date Completed:	05/12/2019	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:	Dan O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	12.4 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/23/2019	
Total Depth:	146 ft bgs	Well Completion:	<input 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
18					(+2.0 - 100.0') 2" Casing		
19							
20							
21							
22		Topock - Fluvial Deposits	SP-SM				
23							
24							
25							
26							
27		Topock - Fluvial Deposits	CH		(14.0 - 85.0') High Solids Grout	(4.0 - 143.0') 10" Borehole	(14.0 - 85.0') 266.4 gallons
28							(14.0 - 85.0') 350 gallons (31%) Note: Type I, II and V and Benseal
29							
30							
31							
32		Topock - Fluvial Deposits	SP-SM				
33							
34							
35							
36							
37		Topock - Fluvial Deposits	SP-SM				

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Date Started:	05/08/2019	Surface Elevation:	N/A	Well ID: MW-O-120, MW-O-140
Date Completed:	05/12/2019	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:	Dan O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	12.4 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/23/2019	
Total Depth:	146 ft bgs	Well Completion:	<input 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
38					(+2.0 - 100.0') 2" Casing		
39							
40							
41		Topock - Fluvial Deposits	SP-SM				
42							
43							
44							
45							
46							
47		Topock - Fluvial Deposits	SW		(14.0 - 85.0') High Solids Grout	(4.0 - 143.0') 10" Borehole	(14.0 - 85.0') 266.4 gallons
48							(14.0 - 85.0') 350 gallons (31%) Note: Type I, II and V and Benseal
49							
50		Topock - Fluvial Deposits	SW				
51							
52		Topock - Fluvial Deposits	SP-SM				
53	MW-O-VAS-51-56 (<0.033 U ppb) 5/9/2019 09:18						
54		Topock - Fluvial Deposits	SM				
55							
56							
57		Topock - Alluvium Deposits	CL				

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Date Started:	05/08/2019	Surface Elevation:	N/A	Well ID: MW-O-120, MW-O-140
Date Completed:	05/12/2019	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:	Dan O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	12.4 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/23/2019	
Total Depth:	146 ft bgs	Well Completion:	<input 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
58		Topock - Alluvium Deposits	CL		(+2.0 - 100.0') 2" Casing		
59							
60							
61							
62		Topock - Alluvium Deposits	SC		(61.5 - 62.5') Centralizer		
63							
64							
65							
66							
67					(14.0 - 85.0') High Solids Grout	(4.0 - 143.0') 10" Borehole	(14.0 - 85.0') 266.4 gallons
68	MW-O-VAS-66-71 (0.178 J ppb) 5/9/2019 14:30						(14.0 - 85.0') 350 gallons (31%) Note: Type I, II and V and Benseal
69							
70							
71		Topock - Alluvium Deposits	SC				
72							
73							
74							
75							
76		Topock - Alluvium Deposits	SC				
77							

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Date Started:	05/08/2019	Surface Elevation:	N/A	Well ID: MW-O-120, MW-O-140
Date Completed:	05/12/2019	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:	Dan O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	12.4 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/23/2019	
Total Depth:	146 ft bgs	Well Completion:	<input 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
78		Topock - Alluvium Deposits	SC		(+2.0 - 100.0') 2" Casing		(+1.8 - 130.0') 2" PVC Sch 40 Casing	(14.0 - 85.0') 266.4 gallons	(14.0 - 85.0') 350 gallons (31%) Note: Type I, II and V and Benseal
79									
80									
81									
82		Topock - Alluvium Deposits	CL		(14.0 - 85.0') High Solids Grout			(85.0 - 98.0') 11.9 buckets	(85.0 - 98.0') 12 buckets (1%) Note: Pel-Plug (TR30) 3/8"
83									
84									
85									
86		Topock - Alluvium Deposits	SC		(85.0 - 98.0') Bentonite seal pellets		(4.0 - 143.0') 10" Borehole		
87									
88									
89									
90	Topock - Alluvium Deposits	CL							
91									
92									
93									
94	Topock - Alluvium Deposits	SC							
95									
96									
97									

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Date Started:	05/08/2019	Surface Elevation:	N/A	Well ID: MW-O-120, MW-O-140
Date Completed:	05/12/2019	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:	Dan O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	12.4 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/23/2019	
Total Depth:	146 ft bgs	Well Completion:	<input 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
98					(+2.0 - 100.0') 2" Casing		
99					(+1.8 - 130.0') 2" PVC Sch 40 Casing	(85.0 - 98.0') 11.9 buckets	(85.0 - 98.0') 12 buckets (1%) Note: Pel-Plug (TR30) 3/8"
100							
101					(100.0 - 120.0') 2" Sch 40 PVC (20-slot) Screen		
102							
103	MW-O-VAS-101-107 (<0.033 U ppb) 5/10/2019 12:32	Topock - Alluvium Deposits	SC				
104							
105							
106							
107							
108	MW-O-VAS-106-111 (<0.17 U) 5/11/2019 08:25	Topock - Alluvium Deposits	SM		(98.0 - 124.0') Cemex #3 MESH (8x10)	(98.0 - 124.0') 25.2 bags	(98.0 - 124.0') 36 bags (43%) Note: Lapis Lustre Sand
109					(4.0 - 143.0') 10" Borehole		
110							
111							
112							
113							
114		Topock - Alluvium Deposits	SM				
115							
116							
117		Topock - Alluvium Deposits	SM				

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Date Started:	05/08/2019	Surface Elevation:	N/A	Well ID: MW-O-120, MW-O-140
Date Completed:	05/12/2019	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:	Dan O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	12.4 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/23/2019	
Total Depth:	146 ft bgs	Well Completion:	<input 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
118					(100.0 - 120.0') 2" Sch 40 PVC (20-slot) Screen		
119							
120							
121					(98.0 - 124.0') Cemex #3 MESH (8x10)		
122					(120.5 - 121.5') Centralizer		
123					(120.0 - 122.3') Sump and End Cap		
124		Topock - Alluvium Deposits	SM			(98.0 - 124.0') 25.2 bags	(98.0 - 124.0') 36 bags (43%) Note: Lapis Lustre Sand
125							
126					(124.0 - 128.0') Bentonite seal pellets		
127					(4.0 - 143.0') 10" Borehole	(124.0 - 128.0') 3.8 buckets	(124.0 - 128.0') 5 buckets (32%) Note: Pel-Plug (TR30) 3/8"
128		Topock - Alluvium Deposits	ML				
129							
130					(130.0 - 140.0') 2" PVC Sch 40 Screen		
131							
132							
133		Topock - Alluvium Deposits	SM		(128.0 - 143.0') Cemex #3 MESH (8x10)	(128.0 - 143.0') 15.8 bags	(128.0 - 143.0') 19.5 bags (23%) Note: Lapis Lustre Sand
134							
135							
136							
137		Topock - Alluvium Deposits	SM				

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Date Started:	05/08/2019	Surface Elevation:	N/A	Well ID: MW-O-120, MW-O-140
Date Completed:	05/12/2019	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:	Dan O'Mara	Easting (NAD83):	N/A	Location: PG&E Topock, Needles, California
Drilling Asst:	E. Huellmantel / J. Pacheco	Borehole Diameter:	6-12 inches	
Logger:	Grant Willford	Water Level Start:	12.4 ft bgs	Project Number: RC000753.0051
Editor:	Sean McGrane	Development End Date:	7/23/2019	
Total Depth:	146 ft bgs	Well Completion:	<input 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
138	MW-O-VAS-136-141 (<0.17 U ppb) 5/11/2019 14:26	Topock - Alluvium Deposits	SM		(128.0 - 143.0') Cemex #3 MESH (8x10)		
139							
140						(128.0 - 143.0') 15.8 bags	(128.0 - 143.0') 19.5 bags (23%) Note: Lapis Lustre Sand
141					(140.5 - 141.5') Centralizer		
142							
143		Topock - Competent Bedrock - conglomerate			(140.0 - 142.3') Sump and End Cap		
144							
145					(143.0 - 146.0') Bentonite seal chips	(143.0 - 146.0') 0.8 bags	(143.0 - 146.0') 1 bags (25%) Note: Enviroplug Medium Chips, installed to 142 ft. bgs, 1.5 ft removed during reaming
146							
147					End of Boring at 146.0' bgs.		
148							
149							
150							
151							
152							
153							
154							
155							
156							
157							

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Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot	
Date Completed:	07/29/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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; no odor; no staining	(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; no odor; no staining	(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									
18				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; no odor; no staining	(17.0 - 27.0') Heaving sands. No recovery 20 to 27 ft bgs due to loose dredge sands	
19	36			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; no odor; no staining		
20									

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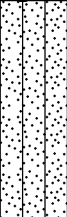



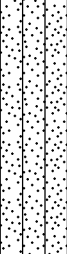

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Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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	
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; no odor; no staining	(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; no odor; no staining		
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; no odor; no staining		
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									

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Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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; little silt; trace caliche; trace coarser clast consists of metidirite and quartz; wet; no odor; no staining		
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; no odor; no staining		
44									
45		RB-2-SS-42-47 7/15/2019 10:06		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; trace clay; little caliche; little coarser clast consists of metidirite and quartz; wet; no odor; no staining		
46									
47									
48		RB-2-SS-47-50 7/15/2019 10:00		Topock - Alluvium Deposits	GM		(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; no odor; no staining		
49	180								
50									
51									
52		RB-2-SS-50-55 7/15/2019 10:10		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; no odor; no staining		
53									
54									
55									
56				Topock - Alluvium Deposits	SM		(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; no odor; no staining		
57		RB-2-SS-55-60 7/15/2019 10:15							
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:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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; no odor; no staining		
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; no odor; no staining		
63									
64									
65									
66									
67	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; trace silt; some coarser clasts composed of metadiorite, quartz, granite, and basalt; wet; no odor; no staining		
68									
69									
70									
71									
72		RB-2-SS-70-75 7/15/2019 11:38							
73									
74									
75			RB-2-VAS-72-77 (<0.033 U ppb) 6/30/2019 14:10		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; no odor; no staining		
76				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; no odor; no staining		
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; no odor; no staining		
78									
79									
80									









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Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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. Condalaria, G. Angiano	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	Joe Latham	Sampling Interval:	Continuous	
Editor:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
81				Topock - Alluvium Deposits	SW-SM				
82		RB-2-SS-80-85					(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; no odor; no staining		
83	120	7/15/2019 12:21		Topock - Alluvium Deposits	ML				
84									
85									
86									
87		RB-2-SS-85-90		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; no odor; no staining		
88		7/15/2019 14:00							
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; no odor; no staining	(90.0 - 103.0') Rough drilling	
92	120	RB-2-SS-90-95							
93		7/16/2019 08:04		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; no odor; no staining		
94									
95									
96									
97		RB-2-SS-95-100		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; no odor; no staining		
98	120	7/16/2019 08:12							
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		




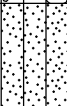
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
101	120	RB-2-SS-100-105 7/16/2019 08:20		Topock - Alluvium Deposits	GC		fine grained to very coarse grained sand; some coarser clasts composed of metadiorite; moist; no odor; no staining	(90.0 - 103.0') Rough drilling	
102									
103									
104									
105									
106			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; no odor; no staining		
107									
108									
109									
110									
111	120	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; little coarser clasts composed of metadiorite; moist; no odor; no staining	(110.0 - 125.0') Rough drilling	
112									
113									
114									
115									
116		RB-2-SS-110-115 7/16/2019 08:40		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; no odor; no staining		
117									
118									
119									
120									
121	120	RB-2-SS-115-120 7/16/2019 08:51		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; no odor; no staining		
122									
123									
124									
125									
126				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; no odor; no staining		
127									
128									
129									
130									
131				Topock - Alluvium Deposits	GM		(114.0 - 119.5') 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; no odor; no staining		
132									
133									
134									
135									
136				Topock - Alluvium Deposits	GM		(119.5'); less silt, more clay		
137									
138									
139									
140									

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Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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; no odor; no staining	(110.0 - 125.0') Rough drilling	
122									
123									
124									
125	120	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; no odor; no staining		
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; no odor; no staining		
130									
131									
132									
133	120	RB-2-SS-134-139 7/16/2019 10:36		Topock - Alluvium Deposits	SM		(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; no odor; no staining		
134									
135									
136									
137	120	RB-2-SS-139-144 7/16/2019		Topock - Alluvium Deposits					
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

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
141	120	10:45		Topock - Alluvium Deposits	SM				
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; some coarser clasts composed of metadiorite; moist; no odor; no staining		
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; no odor; no staining		
147	120								
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; no odor; no staining		
149									
150	120	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; no odor; no staining		
151									
152									
153	120								
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; no odor; no staining		
155									
156	120								
157		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; no odor; no staining		
158									
159									
160				Topock - Alluvium	GC		(159.5 - 160.0') Topock - Alluvium Deposits; Clayey gravel (GC);		

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

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
161	120	RB-2-SS-157-162 7/16/2019 11:20		Deposits			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; no odor; no staining		
162				Topock - Alluvium Deposits	GM		(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; no odor; no staining; 0.3' lense of grayish green color change from 160.5' to 160.8' bgs		
163		RB-2-SS-162-165 7/16/2019 11:58		Topock - Alluvium Deposits	GM		(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; no odor; no staining		
164	120			Topock - Alluvium Deposits	GM				
165				Topock - Alluvium Deposits	GM				
166				Topock - Alluvium Deposits	GM				
167		RB-2-SS-165-170 7/16/2019 12:07		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; no odor; no staining	(167.0 - 177.0') Rough drilling	
168				Topock - Alluvium Deposits	SM		(170') moist; 0.2' lense of color change - grayish green from 170 to 170.2' bgs		
169	120	RB-2-SS-170-172 7/16/2019 12:18		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; no odor; no staining		
170				Topock - Alluvium Deposits	SM				
171				Topock - Alluvium Deposits	SM				
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		(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; no odor; no staining; 0.2' lense of grayish green color change from 175.5 to 175.7' bgs		
173				Topock - Alluvium Deposits	SM				
174				Topock - Alluvium Deposits	SM				
175				Topock - Alluvium Deposits	SM				
176				Topock - Alluvium Deposits	SM				
177	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; no odor; no staining		
178		RB-2-SS-177-180 7/17/2019 07:59		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; no odor; no staining		
179				Topock - Alluvium Deposits	SM				
180				Topock - Alluvium Deposits	SM				

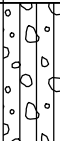







Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
181	120	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; no odor; no staining		
182		RB-2-SS-182-187 7/17/2019 08:17		Topock - Alluvium Deposits	SW		(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; no odor; no staining		
183									
184									
185									
186	120	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; no odor; no staining		
187				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; no odor; no staining		
188				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; no odor; no staining		
189							(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; no odor; green staining		
190	120	RB-2-SS-190-195 7/17/2019 08:33		Topock - Alluvium Deposits	SW-SM				
191									
192									
193									
194	120	RB-2-SS-195-198 7/17/2019 08:40		Topock - Alluvium Deposits	SM				
195									
196									
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; no odor; no staining		
199									
200									
					ML		(199.5 - 202.0') Topock - Alluvium Deposits; Gravelly silt with sand		


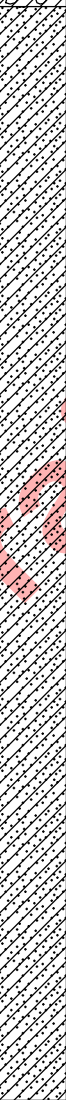
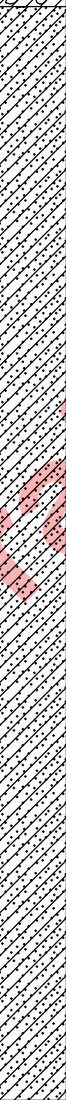


Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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; no odor; no staining	(207.0') Switched driller T. Alymer with D. OMara			
202											
203		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; no odor; no staining; green staining at 202.5' bgs					
204		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; no odor; no staining					
205				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; no odor; no staining					
206				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; no odor; no staining				
207											
208	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; no odor; no staining					
209											
210		RB-2-SS-209-214 7/17/2019 09:22									
211											
212											
213		RB-2-SS-214-217 7/17/2019 09:28									
214											
215											
216	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; no odor; no staining					
217											
218											
219											
220				GC		(219.5 - 222.0') Topock - Alluvium Deposits; Clayey gravel with					





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

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
221	180	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; no odor; no staining		
222		RB-2-SS-222-227 7/17/2019 09:40		Topock - Alluvium Deposits	SC		(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; no odor; no staining; greenish gray staining at 234' bgs	(227.0 - 244.0') Rough drilling	
223									
224									
225									
226									
227	60	RB-2-SS-227-233 7/17/2019 09:45		Topock - Alluvium Deposits	SC		(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; no odor; no staining; greenish gray staining at 234' bgs	(227.0 - 244.0') Rough drilling	
228									
229									
230									
231									
232	84	RB-2-SS-233-235 7/17/2019 09:50		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; no odor; no staining	(237.0') Switched driller D. OMara with S. Vasquez	
233									
234									
235									
236									
237	84	RB-2-SS-235-240 7/17/2019 10:30	RB-2-VAS-237-242 (<0.17 U ppb) 7/15/2019 13:38	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; no odor; no staining	(237.0') Switched driller D. OMara with S. Vasquez	
238									
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

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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 13:38	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; no odor; no staining	(227.0 - 244.0') Rough drilling	
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; no odor; no staining		
245									
246									
247	84	RB-2-SS-250-255 7/17/2019 10:45		Topock - Weathered Bedrock - conglomerate	CL		(247.0 - 252.0') 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; no odor; no staining		
248									
249									
250	84	RB-2-SS-255-260 7/17/2019 10:50						(251.0 - 254.0') Rough drilling	
251									
252									
253	84						(252.0 - 274.0') dark reddish brown (2.5YR 3/4); decrease in moisture content, white mottling		
254							(254') reddish brown (2.5YR 4/4); increase in moisture content		
255									
256	84								
257							(257') dark reddish brown (2.5YR 3/4); decrease in moisture content		
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

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Soil Description	Drilling Notes	Drilling Fluid
261	84								
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							
268									
269								(269.0 - 274.0') Rough drilling	
270									
271	84								
272		RB-2-SS-270-275 7/17/2019 11:00							
273									
274									
275				Topock - Weathered Bedrock - conglomerate	SC		(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; trace silt; little coarser clasts composed of metadiorite; wet; no odor; no staining		
276		RB-2-VAS-274-279 (<0.17 U ppb) 7/18/2019 09:17							
277	108	RB-2-SS-275-280 7/17/2019 12:49		Topock - Weathered Bedrock - conglomerate	CL		(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; no odor; no staining		
278									
279				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		
280									


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

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

SOIL BORING LOG PG&E TOPOCK DATABASE FOR PI OG GP1 TOPOCK DATA TEMPLATE FOR PI OG GDT 09/09/19 18:07

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

Date Started:	06/28/2019	Surface Elevation:	N/A	Boring No.: RB-2 Pilot	
Date Completed:	07/29/2019	Northing (NAD83):	N/A		
Drilling Co.:	Cascade	Easting (NAD83):	N/A	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	307 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Borat 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:	N/A	Converted to Well:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

Depth (ft)	Recovery (in)	Sieve Sample ID	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	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.	
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									

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

Date Started:	06/28/2019	Surface Elevation:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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 - 5.0') Cemex #1/20 MESH (20x40)	(0.0 - 5.0') 7.9 bags	(0.0 - 5.0') 7 bags (-11%) Note: Lapis Lustre Sand
2							
3							
4					(0.0 - 8.5') 12.0" Borehole		
5			NR				
6							
7							
8		Topock - Fill	SP				
9							
10							
11							
12					(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
13							
14			NR		(8.5 - 297.0') 6.0" Borehole		
15							
16							
17							
18		Topock - Fill	SP				
19		Topock - Fluvial Deposits	SP				
20							


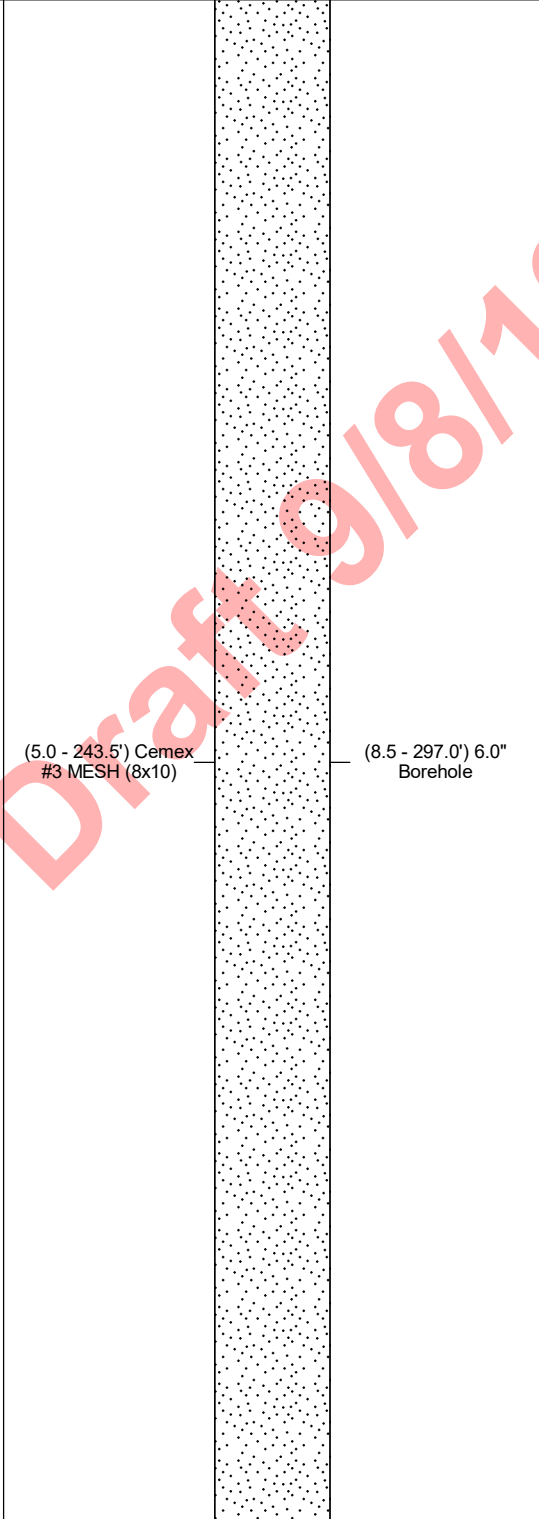
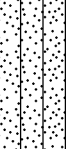


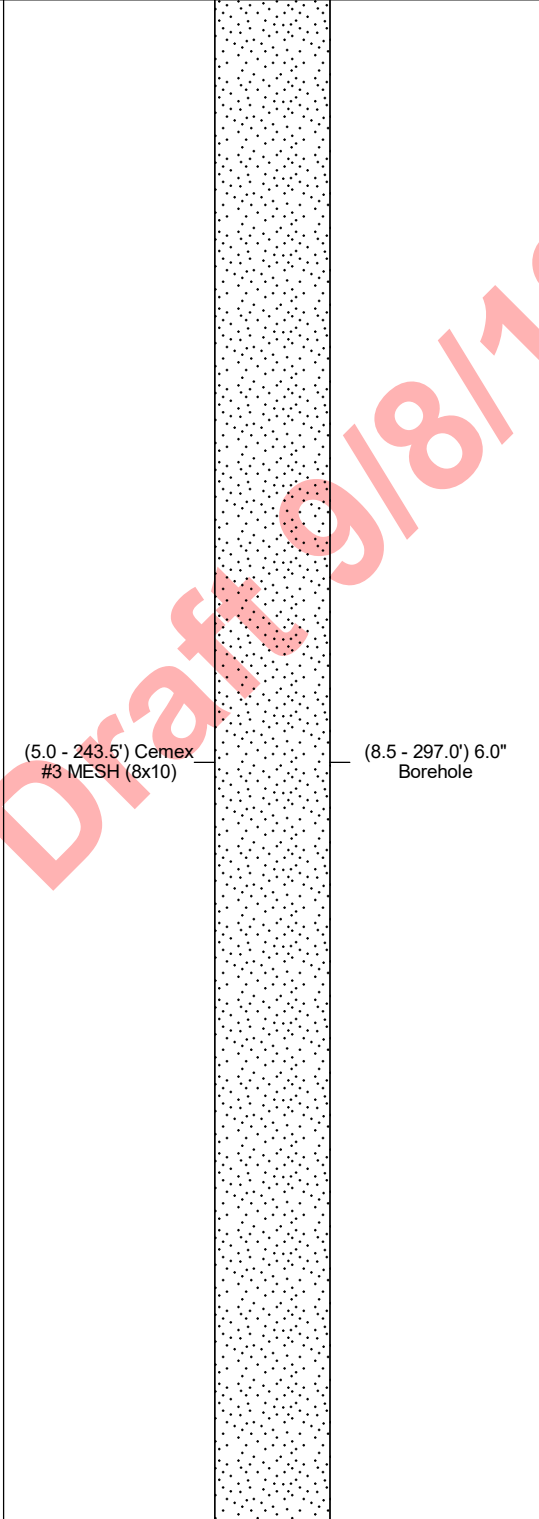



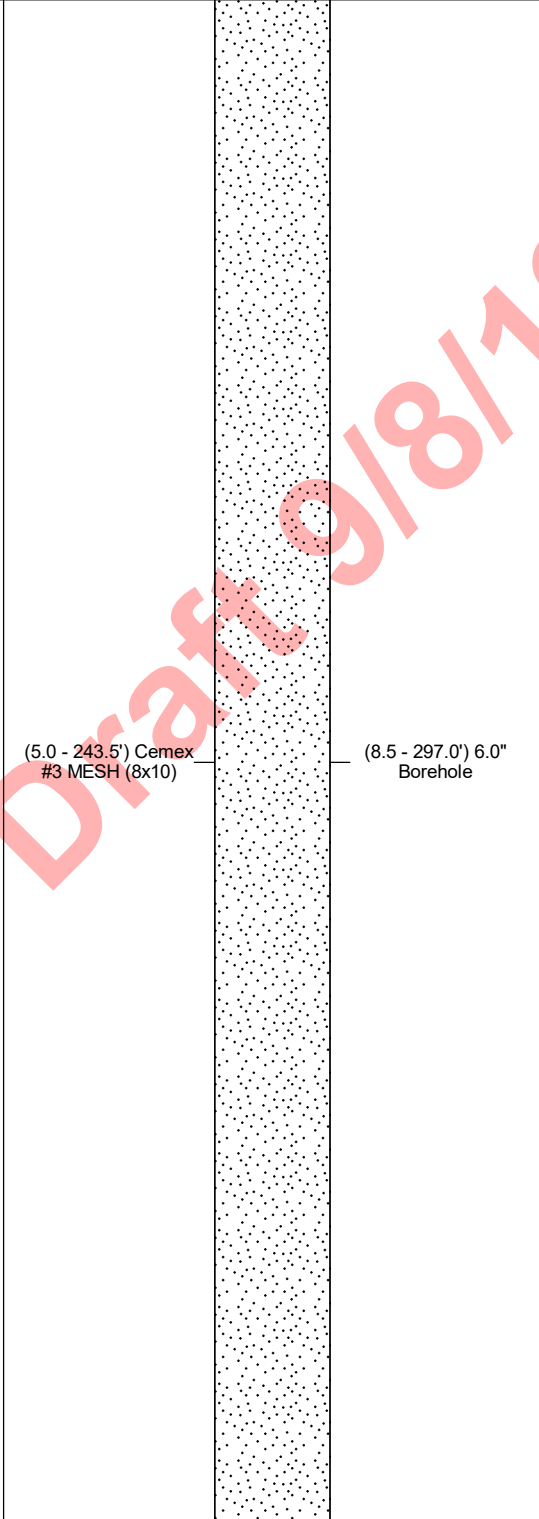
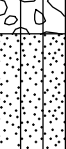


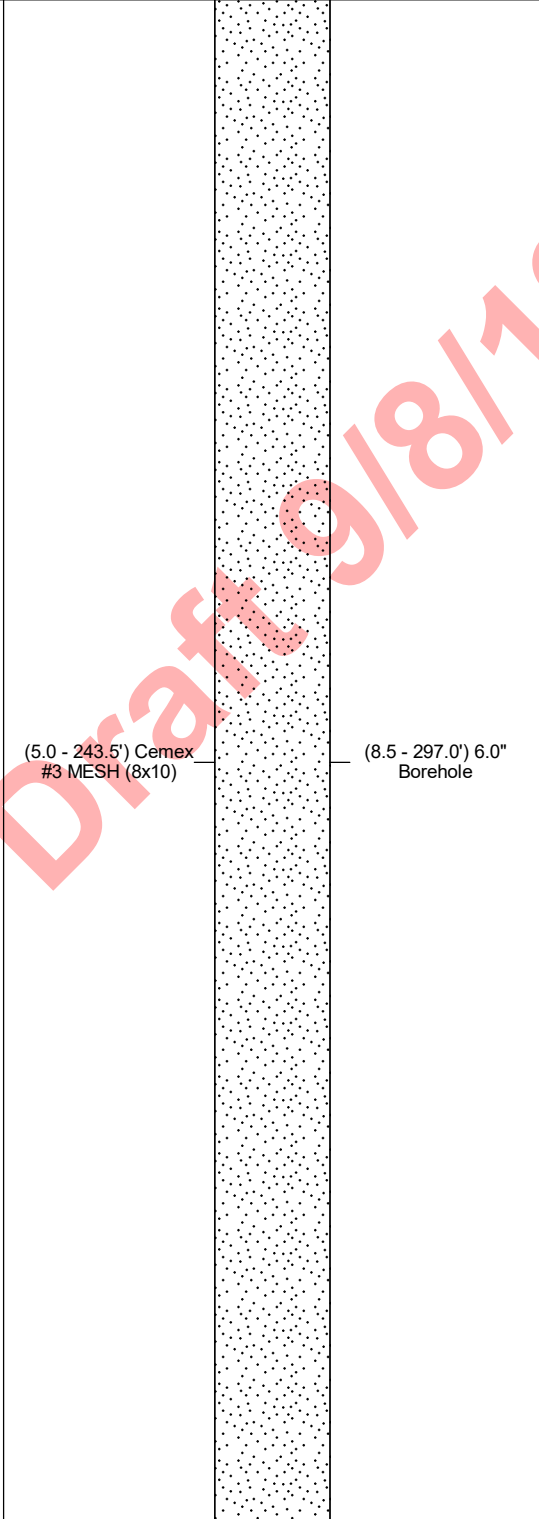
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started:	06/28/2019	Surface Elevation:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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		Topock - Fluvial Deposits	SP				
29							
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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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		Topock - Fluvial Deposits	GW-GM					
46								
47		Topock - Fluvial Deposits	GW-GM					
48								
49		Topock - Alluvium Deposits	GM					
50								
51		Topock - Alluvium Deposits	GM					
52								
53		Topock - Alluvium Deposits	SM					
54								
55		Topock - Alluvium Deposits	SC					
56								
57		Topock - Alluvium Deposits	SM					
58								
59		Topock - Alluvium Deposits	SC					
60								

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


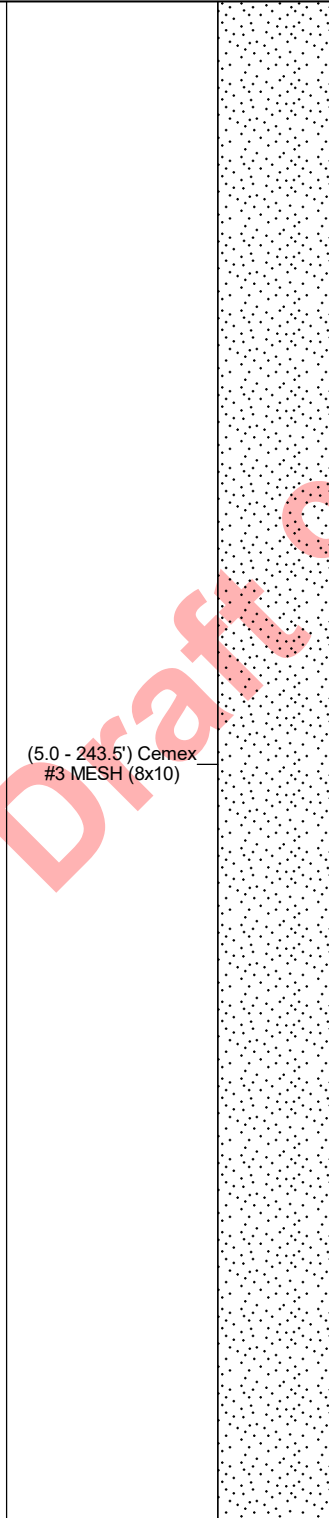
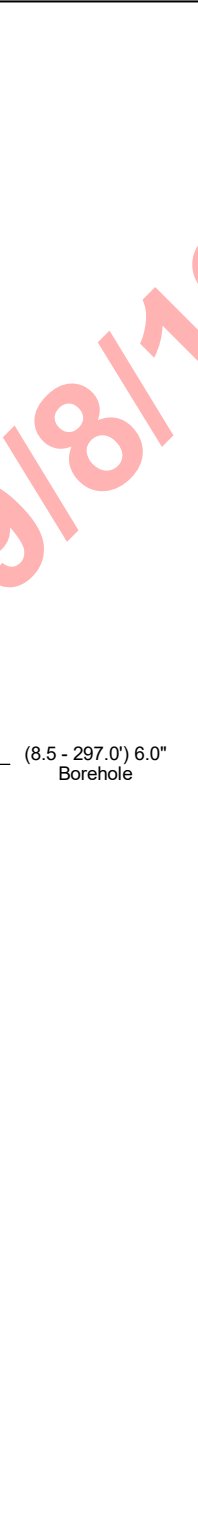



(8.5 - 297.0') 6.0" Borehole

(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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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				(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
62								
63								
64								
65								
66		Topock - Alluvium Deposits	GW					
67								
68								
69								
70								
71		Topock - Alluvium Deposits	GC					
72								
73								
74	RB-2-VAS-72-77 (<0.033 U ppb) 6/30/2019 14:10	Topock - Alluvium Deposits	SW					
75		Topock - Alluvium Deposits						
76			Topock - Alluvium Deposits	SW-SM				
77								
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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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								
98		Topock - Alluvium Deposits	GM					
99								
100		Topock - Alluvium Deposits	GC					

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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	GC					
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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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				(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
122								
123								
124								
125								
126		Topock - Alluvium Deposits	ML				(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
127								
128								
129								
130								
131		Topock - Alluvium Deposits	GM				(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
132								
133								
134								
135								
136		Topock - Alluvium Deposits	SM				(5.0 - 243.5') 97.7 bags	(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
161	RB-2-VAS-172-177 (<0.17 U ppb) 7/12/2019 14:55	Deposits	GM					
162		Topock - Alluvium Deposits						
163		Topock - Alluvium Deposits	GM					
164								
165		Topock - Alluvium Deposits	SM					
166								
167		Topock - Alluvium Deposits	SM					
168								
169		Topock - Alluvium Deposits	SM					
170								
171	Topock - Alluvium Deposits	SM						
172								
173	Topock - Alluvium Deposits	SM						
174								
175								
176	Topock - Alluvium Deposits	SM						
177								
178								
179	Topock - Alluvium Deposits	SM						
180								

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion 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: N/A	Well ID: RB-2 Pilot
Date Completed: 07/29/2019	Northing (NAD83): N/A	
Drilling Co.: Cascade	Easting (NAD83): N/A	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: N/A	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		<div>(5.0 - 243.5') Cemex #3 MESH (8x10)</div>	<div>(8.5 - 297.0') 6.0" Borehole</div>	<div>(5.0 - 243.5') 97.7 bags</div>	<div>(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand</div>
182		Topock - Alluvium Deposits	SW					
183								
184								
185								
186								
187		Topock - Alluvium Deposits	GW-GM					
188								
189		Topock - Alluvium Deposits	SM					
190		Topock - Alluvium Deposits	GM					
191								
192	Topock - Alluvium Deposits	SW-SM						
193								
194								
195								
196	Topock - Alluvium Deposits	SM						
197								
198								
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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	Project Number: RC000753.0051

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction	Calculated Material Volumes	Material Volumes Installed
201		Topock - Alluvium Deposits	ML				
202							
203		Topock - Alluvium Deposits	SM				
204		Topock - Alluvium Deposits	SM				
205	RB-2-VAS-202-207 (<0.17 U ppb) 7/14/2019 09:20	Topock - Alluvium Deposits	ML				
206		Topock - Alluvium Deposits	SM				
207							
208							
209							
210					(5.0 - 243.5') Cemex #3 MESH (8x10)	(8.5 - 297.0') 6.0" Borehole	(5.0 - 243.5') 97.7 bags
211							(5.0 - 243.5') 126 bags (29%) Note: Lapis Lustre Sand
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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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		Topock - Alluvium Deposits	SC					
230					(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 13:38	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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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 13:38	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		Topock - Weathered Bedrock - conglomerate	SC		(243.5 - 254.0') Cemex #1/20 MESH (20x40)	(243.5 - 254.0') 4.1 bags	(243.5 - 254.0') 8 bags (95%) Note: Lapis Lustre Sand
245							
246							
247							
248		Topock - Weathered Bedrock - conglomerate	CL		(8.5 - 297.0') 6.0" Borehole		
249							
250							
251							
252							
253							
254							
255							
256							
257							
258							
259							
260							
					(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

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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							
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							
272							
273							
274							
275							
276	RB-2-VAS-274-279 (<0.17 U ppb) 7/18/2019 09:17	Topock - Weathered Bedrock - conglomerate	SC				
277							
278		Topock - Weathered Bedrock - conglomerate	CL				
279							
280		Topock - Weathered Bedrock - conglomerate	CL				



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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 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:	N/A	Well ID: RB-2 Pilot
Date Completed:	07/29/2019	Northing (NAD83):	N/A	
Drilling Co.:	Cascade	Easting (NAD83):	N/A	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:	N/A	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								
304								
305								
306								
307								
308								
309								
310								
311								
312								
313								
314								
315								
316								
317								
318								
319								
320								






Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion Note: Granule backfill material will be excavated from the pilot borehole during drilling for the construction of the well.

Date Started: 04/25/2019	Surface Elevation: 466.3 ft amsl	Boring No.: RB-3 Pilot
Date Completed: 05/07/2019	Northing (NAD83): 2103172.5	
Drilling Co.: Cascade	Easting (NAD83): 7616213.0	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 245 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Terrasonic track mount	Borehole Diameter: 6-12 inches	Location: PG&E Topock, Topock, California
Driller Name: Dan O'Mara	Depth to First Water: 11.35 ft bgs	
Drilling Asst: E. Huellmantel / J. Pacheco	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: Gantt Jeffers	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	0			Topock - Fill	SP		(0.0 - 8.0') Topock - Fill; Poorly graded sand (SP); pale brown (10YR 6/3); fine grained to medium grained, subangular to round; trace mica; dry; roots and wood fragments present	(0.0 - 4.0') No recovery due to loose dredge sands.	
2									
3									
4									
5	12			Topock - Fill	SP		(5') very fine grained to medium grained; trace silt; decrease in grain size	(5.0 - 10.0') Poor recovery due to loose dredge sands.	
6									
7							(6.5'); moist; iron oxide staining; no roots or fragments of wood		
8									
9	36			Topock - Fill	NR		(8.0 - 15.0') No recovery (NR)	(11.5') Approximate Depth to Water	
10									
11									
12									
13									
14									
15									
16	36	RB-3-SS-15-18 5/2/2019 09:19		Topock - Fill	SP		(15.0 - 18.0') Topock - Fill; Poorly graded sand (SP); dark grayish brown / dark yellowish brown(10YR 4/2); very fine grained to medium grained, subangular to round; trace silt; trace organics; trace mica; wet; organic odor	(11.5') Approximate Depth to Water	
17									
18			RB-3-VAS-15-20 (<0.033 U) 4/26/2019 15:35						
19									
20									
							(18.0 - 20.0') No recovery (NR)		

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: <u>04/25/2019</u>	Surface Elevation: <u>466.3 ft amsl</u>	Boring No.: <u>RB-3 Pilot</u>
Date Completed: <u>05/07/2019</u>	Northing (NAD83): <u>2103172.5</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>7616213.0</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>245 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Terrasonic track mount</u>	Borehole Diameter: <u>6-12 inches</u>	Location: <u>PG&E Topock, Topock, California</u>
Driller Name: <u>Dan O'Mara</u>	Depth to First Water: <u>11.35 ft bgs</u>	
Drilling Asst: <u>E. Huellmantel / J. Pacheco</u>	Sampling Method: <u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>Gantt Jeffers</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Grant Willford</u>	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-3-SS-20-25 5/2/2019 09:21		Topock - Fill	SP		(20.0 - 33.0') Topock - Fill; Poorly graded sand (SP); dark grayish brown / dark yellowish brown(10YR 4/2) little black (5Y 2.5/1); very fine grained to fine grained, subangular to round; little organics; trace mica; wet; organic odor		
22									
23									
24									
25									
26	96	RB-3-SS-25-30 5/2/2019 09:24		Topock - Fill	SP		(25') brown (7.5YR 4/2); very fine grained; no organics; decrease in sand grain size, color change		(25.0 - 35.0') 10 gallons of water used; 0 gallons of water recovered; 10 gallons of water lost
27									
28							(27.5') dark grayish brown / dark yellowish brown(10YR 4/2); very fine grained to fine grained; no organics; increase in sand grain size, color change		
29									
30							(29.5') very fine grained to medium grained; increase in grain size sand		
31									
32									
33									
34									
35									
36	108	RB-3-SS-30-33 5/2/2019 09:26			NR		(33.0 - 35.0') No recovery (NR)		
37									
38									
39									
40									
36	108	RB-3-SS-35-40 5/2/2019 09:39		Topock - Fill	SP		(35.0 - 39.5') Topock - Fill; Poorly graded sand (SP); dark grayish brown / dark yellowish brown(10YR 4/2); very fine grained to medium grained, subangular to round; trace mica; wet		(35.0 - 45.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
37									
38									
39									
40									
40					SW		(39.5 - 44.0') Topock - Fluvial Deposits; Well graded sand (SW);		

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

SOIL BORING LOG, PG&E TOPOCK C:\USERS\MCGRANED\DOCUMENTS\PG&E TOPOCK DRAFT BORING LOGS\GINT FILES\09.06.19\TOPOCK DATABASE FOR FLOG.GPJ TOPOCK DATA TEMPLATE FOR FLOG.GDT 09/06/19 09:56

Date Started: <u>04/25/2019</u>	Surface Elevation: <u>466.3 ft amsl</u>	Boring No.: <u>RB-3 Pilot</u>
Date Completed: <u>05/07/2019</u>	Northing (NAD83): <u>2103172.5</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>7616213.0</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>245 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Terrasonic track mount</u>	Borehole Diameter: <u>6-12 inches</u>	Location: <u>PG&E Topock, Topock, California</u>
Driller Name: <u>Dan O'Mara</u>	Depth to First Water: <u>11.35 ft bgs</u>	
Drilling Asst: <u>E. Huellmantel / J. Pacheco</u>	Sampling Method: <u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>Gantt Jeffers</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Grant Willford</u>	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	108	RB-3-SS-40-44 5/2/2019 09:41		Topock - Fluvial Deposits	SW		brown (10YR 5/3); very fine grained to very coarse grained, subround to round; trace granules to large pebbles, round; trace mica; wet		(35.0 - 45.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
42									
43									
44									
45					NR		(44.0 - 45.0') No recovery (NR)		
46	72	RB-3-SS-45-50 5/2/2019 09:43		Topock - Fluvial Deposits	SW		(45.0 - 47.0') Topock - Fluvial Deposits; Well graded sand (SW); brown (10YR 5/3); very fine grained to very coarse grained, subround to round; trace granules to large pebbles, round; trace mica; wet		(45.0 - 55.0') 10 gallons of water used; 0 gallons of water recovered; 10 gallons of water lost
47									
48				Topock - Fluvial Deposits	GW		(47.0 - 50.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); dark grayish brown / dark yellowish brown (10YR 4/2); granules to small cobbles, subround to round; some very fine to very coarse grained sand, subangular to round; trace silt; some coarser clasts composed of metadiorite; trace mica; wet		
49									
50		RB-3-SS-50-56 5/2/2019 09:45	RB-3-VAS-50-55 (0.100 J) 4/27/2019 11:10	Topock - Fluvial Deposits	SP		(50.0 - 51.0') Topock - Fluvial Deposits; Poorly graded sand (SP); brown (10YR 5/3); fine grained, subround to round; trace mica; wet		
51									
52					NR		(51.0 - 55.0') No recovery (NR)		
53									
54	120	RB-3-SS-56-60 5/2/2019 09:53		Topock - Fluvial Deposits	GW		(55.0 - 57.0') Topock - Fluvial Deposits; Well graded gravel with sand (GW); dark grayish brown / dark yellowish brown (10YR 4/2); granules to small cobbles, subround to round; some very fine to very coarse grained sand, subangular to round; trace silt; some coarser clasts composed of metadiorite; trace mica; wet		(55.0 - 65.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
55									
56				Topock - Fluvial Deposits	ML		(57.0 - 59.5') Topock - Fluvial Deposits; Silt with sand (ML); brown (7.5YR 5/4); medium plasticity, slow dilatency; little very fine to very coarse grained sand, subangular to subround; little clay; trace small to very large pebbles, subround to round; trace subround; trace organics; trace mica; wet; soft to medium stiff		
57									
58					ML		(59.5 - 65.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML);		
59									
60									

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Date Started: <u>04/25/2019</u>	Surface Elevation: <u>466.3 ft amsl</u>	Boring No.: <u>RB-3 Pilot</u>
Date Completed: <u>05/07/2019</u>	Northing (NAD83): <u>2103172.5</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>7616213.0</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>245 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Terrasonic track mount</u>	Borehole Diameter: <u>6-12 inches</u>	Location: <u>PG&E Topock, Topock, California</u>
Driller Name: <u>Dan O'Mara</u>	Depth to First Water: <u>11.35 ft bgs</u>	
Drilling Asst: <u>E. Huellmantel / J. Pacheco</u>	Sampling Method: <u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>Gantt Jeffers</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Grant Willford</u>	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-3-SS-60-65 5/2/2019 09:58		Topock - Alluvium Deposits	ML		brown (7.5YR 4/3) trace weak red (2.5YR 4/2); low plasticity, no dilatency; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; coarser clasts composed of metadiorite; trace mica; moist; very stiff; weak cementation; interbedded silt and granule to very large pebble lenses, weathered pebbles		(55.0 - 65.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
62									
63									
64									
65	120	RB-3-SS-65-70 5/2/2019 10:01		Topock - Alluvium Deposits	GM		(65.0 - 66.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); brown (7.5YR 4/3); granules to very large pebbles, angular to subangular; and very fine to very coarse grained sand, angular to subround; little silt; coarser clasts composed of metadiorite; trace mica; wet	(65.0 - 75.0') Rough drilling	(65.0 - 75.0') 15 gallons of water used; 0 gallons of water recovered; 15 gallons of water lost
66				Topock - Alluvium Deposits	SM		(66.0 - 77.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4) trace red (2.5YR 4/6); fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace subangular; trace clay; coarser clasts composed of metadiorite; trace mica; dry to moist; weak cementation; interbedded silt and granule to very large pebble lenses, weathered pebbles		
67									
68									
69									
70									
71									
72									
73		(72'); little silt; increase in granules and pebbles							
74		(74'); some silt; decrease granules and pebbles							
75									
76	120	RB-3-SS-75-80 5/2/2019 10:06							
77									
78									
79									
80	120	RB-3-SS-75-80 5/2/2019 10:10		Topock - Alluvium Deposits	ML		(77.0 - 79.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown (5YR 5/4) trace red (2.5YR 4/6); no plasticity, no dilatency; some granules to very large pebbles, angular to subangular; some angular to subangular; trace clay; coarser clasts composed of metadiorite; trace mica; wet; very stiff; weak cementation; weathered pebbles		
				Topock - Alluvium Deposits	SM		(79.0 - 89.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown (5YR 5/4) trace red (2.5YR 4/6); fine grained to very coarse grained, angular to subangular; some granules to very large		







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Date Started:	04/25/2019	Surface Elevation:	466.3 ft amsl	Boring No.: <u>RB-3 Pilot</u>	
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5		
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Topock, California
Driller Name:	Dan O'Mara	Depth to First Water:	11.35 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Gantt Jeffers	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	120	RB-3-SS-80-85 5/2/2019 10:18	RB-3-VAS-80-85 (0.132 J) 4/27/2019 15:18	Topock - Alluvium Deposits	SM		pebbles, angular to subangular; some silt; coarser clasts composed of metadiorite; trace mica; wet; weak cementation; interbedded silt and granule to very large pebble lenses, weathered pebbles	(80.0 - 85.0') Geology observed good interval to collect a sample	
82							(81.5'); and granules to very large pebbles, angular to subangular; little silt; none cementation		
83									
84									
85									
86									
87		RB-3-SS-85-90 5/2/2019 10:21					(87') reddish brown / moderate brown(5YR 4/4); some granules to very large pebbles, angular to subangular; some silt; trace clay; weak cementation; color change		
88									
89									
90	120			Topock - Alluvium Deposits	ML		(89.0 - 91.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); no plasticity, no dilatancy; some very fine to very coarse grained sand, angular to subround; little granules to very large pebbles, angular to subangular; trace subangular; trace clay; trace mica; coarser clasts composed of metadiorite; moist; weak cementation; interbedded very fine to very coarse sand and granule to very large pebble lenses, weathered pebbles		
91									
92		RB-3-SS-90-95 5/2/2019 11:09		Topock - Alluvium Deposits	SM		(91.0 - 95.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and granule to very large pebble lenses, weathered pebbles		
93									
94									
95									
96									
97	120	RB-3-SS-95-100 5/2/2019 11:11		Topock - Alluvium Deposits	GM		(95.0 - 101.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; little silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and very fine to very coarse sand lenses, weathered pebbles		(95.0 - 105.0') 25 gallons of water used; 0 gallons of water recovered; 25 gallons of water lost
98									
99									
100									

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Date Started:	<u>04/25/2019</u>	Surface Elevation:	<u>466.3 ft amsl</u>	Boring No.: <u>RB-3 Pilot</u>	
Date Completed:	<u>05/07/2019</u>	Northing (NAD83):	<u>2103172.5</u>		
Drilling Co.:	<u>Cascade</u>	Easting (NAD83):	<u>7616213.0</u>	Client:	<u>PG&E</u>
Drilling Method:	<u>Sonic Drilling</u>	Total Depth:	<u>245 ft bgs</u>	Project:	<u>Final GW Remedy Phase 1</u>
Drill Rig Type:	<u>Terrasonic track mount</u>	Borehole Diameter:	<u>6-12 inches</u>	Location:	<u>PG&E Topock, Topock, California</u>
Driller Name:	<u>Dan O'Mara</u>	Depth to First Water:	<u>11.35 ft bgs</u>		
Drilling Asst:	<u>E. Huellmantel / J. Pacheco</u>	Sampling Method:	<u>4 inch x 10 ft Core Barrel</u>	Project Number:	<u>RC000753.0051</u>
Logger:	<u>Gantt Jeffers</u>	Sampling Interval:	<u>Continuous</u>		
Editor:	<u>Grant Willford</u>	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	120	RB-3-SS-100-105 5/2/2019 11:16		Topock - Alluvium Deposits	GM				(95.0 - 105.0') 25 gallons of water used; 0 gallons of water recovered; 25 gallons of water lost
102				Topock - Alluvium Deposits	SM		(101.5 - 105.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, angular to subangular; little silt; coarser clasts composed of metadiorite; trace mica; wet; weak cementation; interbedded silt and granule to very large pebble lenses, weathered pebbles (102.5'); some silt (103.5'); trace clay		
103									
104									
105	120	RB-3-SS-105-107 5/2/2019 11:18		Topock - Alluvium Deposits	GM		(105.0 - 108.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4) little red (2.5YR 4/6); granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, angular to subround; little silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and very fine to very coarse sand lenses, weathered pebbles		(105.0 - 115.0') 25 gallons of water used; 0 gallons of water recovered; 25 gallons of water lost
106									
107									
108									
109		Topock - Alluvium Deposits	SM		(108.0 - 109.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4) little red (2.5YR 4/6); fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, angular to subangular; some silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and granule to very large pebble lenses, weathered pebbles				
110		Topock - Alluvium Deposits	GM		(109.0 - 115.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); granules to very large pebbles, angular to subangular; and very fine to very coarse grained sand, angular to subangular; little silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and very fine to very coarse sand lenses, weathered pebbles				
111									
112									
113									
114	120	RB-3-SS-110-115 5/2/2019 11:21							
115									
116									
117									
118	120	RB-3-SS-115-120 5/2/2019 11:24		Topock - Alluvium Deposits	SM		(115.0 - 135.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4) little red (2.5YR 4/6); fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, angular to subangular; some silt; trace angular; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and granule to very large pebble lenses, weathered pebbles		
119									
120									





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Date Started:	04/25/2019	Surface Elevation:	466.3 ft amsl	Boring No.: <u>RB-3 Pilot</u>	
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5		
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Topock, California
Driller Name:	Dan O'Mara	Depth to First Water:	11.35 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Gantt Jeffers	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							(120.5'); weak cementation; increase in silt, decrease in granule to pebbles		
122	120	RB-3-SS-120-125 5/2/2019 11:31	RB-3-VAS-120-125 (<0.17 U) 4/28/2019 11:29						
123									
124									
125									
126									(125.0 - 135.0') 25 gallons of water used; 0 gallons of water recovered; 25 gallons of water lost
127		RB-3-SS-125-130 5/2/2019 11:44		Topock - Alluvium Deposits	SM		(127.5'); none cementation; increase in granule to pebbles, decrease silt		
128									
129									
130	120								
131									
132		RB-3-SS-130-135 5/2/2019 11:46							
133									
134									
135									
136									
137	120	RB-3-SS-135-140 5/2/2019 11:50		Topock - Alluvium Deposits	GM		(135.0 - 144.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); granules to small cobbles, angular to subangular; and very fine to very coarse grained sand, angular to subangular; little silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and very fine to very coarse sand lenses, weathered pebbles		(135.0 - 145.0') 25 gallons of water used; 0 gallons of water recovered; 25 gallons of water lost
138									
139									
140									

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Date Started:	04/25/2019	Surface Elevation:	466.3 ft amsl	Boring No.: <u>RB-3 Pilot</u>
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5	
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location: PG&E Topock, Topock, California
Driller Name:	Dan O'Mara	Depth to First Water:	11.35 ft bgs	
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger:	Gantt Jeffers	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	120	RB-3-SS-140-145 5/2/2019 11:54		Topock - Alluvium Deposits	GM				(135.0 - 145.0') 25 gallons of water used; 0 gallons of water recovered; 25 gallons of water lost
142									
143									
144									
145	120	RB-3-SS-145-150 5/2/2019 11:57		Topock - Alluvium Deposits	SM		(144.5 - 149.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); fine grained to very coarse grained, subangular to subround; some granules to very large pebbles, angular to subangular; some silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and granule to very large pebble lenses		(145.0 - 155.0') 35 gallons of water used; 0 gallons of water recovered; 35 gallons of water lost
146									
147									
148									
149		RB-3-SS-150-155 5/2/2019 12:05	RB-3-VAS-150-155 (<0.17 U) 4/29/2019 10:13	Topock - Alluvium Deposits	GM		(149.0 - 152.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); granules to small cobbles, angular to subangular; some very fine to very coarse grained sand, angular to subangular; some silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and sand very fine to very coarse sand lenses		
150									
151									
152									
153		RB-3-SS-155-160 5/2/2019 12:11		Topock - Weathered Bedrock - conglomerate	ML		(152.0 - 155.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown(5YR 4/4) trace red (2.5YR 4/6); fine grained to very coarse grained, angular to subround; some granules to very large pebbles, angular to subangular; some silt; coarser clasts composed of metadiorite; trace mica; wet; interbedded silt and granule to very large pebble lenses	(155.0 - 165.0') Core is moderately cemented groundwater sample to be collected above	
154									
155									
156									
157	120						(155.0 - 191.5') Topock - Weathered Bedrock - conglomerate; Sandy silt with gravel (ML); reddish brown (2.5YR 4/4) trace dark red (2.5YR 3/6); low plasticity, no dilatency; some very fine to very coarse grained sand, subangular to subround; little granules to very large pebbles, angular to subangular; trace angular to subangular; trace clay; coarser clasts composed of metadiorite; trace mica; moist; very stiff to hard; weak cementation; interbedded very fine to very coarse sand and granule to very large pebble lenses		
158									
159									
160									

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Date Started: 04/25/2019	Surface Elevation: 466.3 ft amsl	Boring No.: RB-3 Pilot
Date Completed: 05/07/2019	Northing (NAD83): 2103172.5	
Drilling Co.: Cascade	Easting (NAD83): 7616213.0	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 245 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type: Terrasonic track mount	Borehole Diameter: 6-12 inches	Location: PG&E Topock, Topock, California
Driller Name: Dan O'Mara	Depth to First Water: 11.35 ft bgs	
Drilling Asst: E. Huellmantel / J. Pacheco	Sampling Method: 4 inch x 10 ft Core Barrel	Project Number: RC000753.0051
Logger: Gantt Jeffers	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-3-SS-160-165 5/2/2019 12:13					(160'); dry	(155.0 - 165.0') Core is moderately cemented groundwater sample to be collected above	
162									
163									
164									
165	120	RB-3-SS-165-170 5/2/2019 12:14		Topock - Weathered Bedrock - conglomerate	ML		(169'); dry	(165.0 - 175.0') Rough drilling	(165.0 - 175.0') 30 gallons of water used; 10 gallons of water recovered; 20 gallons of water lost
166									
167									
168									
169									
170									
171									
172									
173									
174									
175	120	RB-3-SS-170-175 5/2/2019 12:18							
176									
177									
178									
179									
180		RB-3-SS-175-180 5/2/2019 12:20							

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Date Started: <u>04/25/2019</u>	Surface Elevation: <u>466.3 ft amsl</u>	Boring No.: <u>RB-3 Pilot</u>
Date Completed: <u>05/07/2019</u>	Northing (NAD83): <u>2103172.5</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>7616213.0</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>245 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Terrasonic track mount</u>	Borehole Diameter: <u>6-12 inches</u>	Location: <u>PG&E Topock, Topock, California</u>
Driller Name: <u>Dan O'Mara</u>	Depth to First Water: <u>11.35 ft bgs</u>	
Drilling Asst: <u>E. Huellmantel / J. Pacheco</u>	Sampling Method: <u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>Gantt Jeffers</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Grant Willford</u>	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	120	RB-3-SS-180-185 5/2/2019 12:22	RB-3-VAS-180-185 <0.033 U <0.033 U 4/29/2019 15:38						
182									
183									
184									
185	120	RB-3-SS-185-190 5/2/2019 12:24		Topock - Weathered Bedrock - conglomerate	ML		(190'); dry		
186									
187									
188									
189									
190									
191									
192									
193									
194									
195	120	RB-3-SS-190-195 5/2/2019 12:28		Topock - Weathered Bedrock - conglomerate	SM		(191.5 - 196.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4) trace red (2.5YR 4/6); fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace angular; trace clay; coarser clasts composed of metadiorite; trace mica; wet	(195.0 - 215.0') Rough drilling	
196									
197									
198									
199									
200									
	120	RB-3-SS-195-200 5/2/2019 12:37		Topock - Weathered Bedrock - conglomerate	ML		(196.0 - 212.5') Topock - Weathered Bedrock - conglomerate; Sandy silt with gravel (ML); reddish brown (2.5YR 4/4) trace dark red (2.5YR 3/6); no plasticity, no dilatancy; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, subangular to subround; trace angular to subangular; trace clay; coarser clasts composed of metadiorite; trace mica; moist; very stiff to hard; weak cementation; interbedded very fine to very coarse sand and granule to very large pebble lenses (197.5'); low plasticity; little granules to very large pebbles, angular to subangular; increase in silt, decrease in sand, no cobbles (199'); no plasticity; some granules to very large pebbles, angular to subangular; decrease in silt, increase in 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, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

SOIL BORING LOG, PG&E TOPOCK, C:\USERS\MCGRANED\DOCUMENTS\PG&E TOPOCK\DRIFT BORING LOGS\GINT FILES\09_06_19\TOPOCK DATA TEMPLATE FOR FLOG.GPJ, TOPOCK DATA TEMPLATE FOR FLOG.GPJ, 09/06/19 09:56

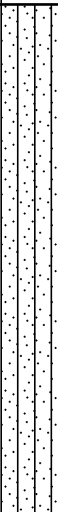

Date Started: <u>04/25/2019</u>	Surface Elevation: <u>466.3 ft amsl</u>	Boring No.: <u>RB-3 Pilot</u>
Date Completed: <u>05/07/2019</u>	Northing (NAD83): <u>2103172.5</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>7616213.0</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>245 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Terrasonic track mount</u>	Borehole Diameter: <u>6-12 inches</u>	Location: <u>PG&E Topock, Topock, California</u>
Driller Name: <u>Dan O'Mara</u>	Depth to First Water: <u>11.35 ft bgs</u>	
Drilling Asst: <u>E. Huellmantel / J. Pacheco</u>	Sampling Method: <u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>Gantt Jeffers</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Grant Willford</u>	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-3-SS-200-205 5/2/2019 12:39						(195.0 - 215.0') Rough drilling		
202										
203										
204										
205	120	RB-3-SS-205-210 5/2/2019 12:41	RB-3-VAS-205-210 (<0.17 U) 4/30/2019 15:15	Topock - Weathered Bedrock - conglomerate	ML			(205.0') Sample interval chosen based on lithology		
206										
207										
208										
209		RB-3-SS-210-215 5/2/2019 12:43								
210										
211										
212	120	RB-3-SS-215-220 5/2/2019 12:44		Topock - Weathered Bedrock - conglomerate	SM		(212.5 - 218.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4) trace red (2.5YR 4/6); fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace clay; coarser clasts composed of metadiorite; trace mica; dry to moist; weak cementation; interbedded silt and granules to pebbles, weathered pebbles			
213										
214										
215										
216	120			Topock - Weathered Bedrock - conglomerate	ML		(218.0 - 227.0') Topock - Weathered Bedrock - conglomerate; Sandy silt with gravel (ML); reddish brown (2.5YR 4/4) trace dark red (2.5YR 3/6); low plasticity, no dilatency; some granules to very large pebbles, angular to subangular; some very fine to very coarse grained sand, subangular to subround; trace clay; coarser clasts composed of metadiorite; trace mica; moist; very stiff; weak cementation; interbedded sand very fine to very coarse sand and granule to very			
217										
218										
219										
220										

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


SOIL BORING LOG, PG&E TOPOCK, C:\USERS\SMC\GRAND\DOCUMENTS\PG&E TOPOCK\DATABASE FOR FLOG.GPJ TOPOCK DATA TEMPLATE FOR FLOG.GDT, 09/06/19 09:56

Date Started: <u>04/25/2019</u>	Surface Elevation: <u>466.3 ft amsl</u>	Boring No.: <u>RB-3 Pilot</u>
Date Completed: <u>05/07/2019</u>	Northing (NAD83): <u>2103172.5</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>7616213.0</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>245 ft bgs</u>	Project: <u>Final GW Remedy Phase 1</u>
Drill Rig Type: <u>Terrasonic track mount</u>	Borehole Diameter: <u>6-12 inches</u>	Location: <u>PG&E Topock, Topock, California</u>
Driller Name: <u>Dan O'Mara</u>	Depth to First Water: <u>11.35 ft bgs</u>	
Drilling Asst: <u>E. Huellmantel / J. Pacheco</u>	Sampling Method: <u>4 inch x 10 ft Core Barrel</u>	Project Number: <u>RC000753.0051</u>
Logger: <u>Gantt Jeffers</u>	Sampling Interval: <u>Continuous</u>	
Editor: <u>Grant Willford</u>	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	120			Topock - Weathered Bedrock - conglomerate	ML		large pebble lenses, weathered pebbles				
222											
223											
224											
225											
226	120					Topock - Weathered Bedrock - conglomerate	SM				(227.0 - 245.0') Topock - Weathered Bedrock - conglomerate; Silty sand with gravel (SM); reddish brown (2.5YR 4/4) trace red (2.5YR 4/6); fine grained to very coarse grained, angular to subangular; some granules to very large pebbles, angular to subangular; some silt; trace angular to subangular; trace clay; coarser clasts composed of metadiorite; trace mica; moist; weak cementation; interbedded silt and granules to pebbles
227											
228											
229											
230											
231											
232											
233											
234											
235		120							Topock - Weathered Bedrock - conglomerate		SM
236											
237											
238											
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, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/25/2019	Surface Elevation:	466.3 ft amsl	Boring No.: <u>RB-3 Pilot</u>	
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5		
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project:	Final GW Remedy Phase 1
Drill Rig Type:	Terrasonic track mount	Borehole Diameter:	6-12 inches	Location:	PG&E Topock, Topock, California
Driller Name:	Dan O'Mara	Depth to First Water:	11.35 ft bgs		
Drilling Asst:	E. Huellmantel / J. Pacheco	Sampling Method:	4 inch x 10 ft Core Barrel	Project Number:	RC000753.0051
Logger:	Gantt Jeffers	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	120			Topock - Weathered Bedrock - conglomerate	SM		(241'); dry to moist; some dry lenses		
242			--no sample-- (Interval did not produce.) 5/1/2019 14:00						
243									
244									
245							End of Boring at 245.0 'bgs.		
246									
247									
248									
249									
250									
251									
252									
253									
254									
255									
256									
257									
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, J - estimated value, NR = no recovery, blue water table symbol represents depth to water measured during the first VAS interval

Date Started:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot	
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5		
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project:	Final GW Remedy Phase I
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:	11.35 ft bgs		
Logger:	Gantt Jeffers	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								
2					(0.0 - 4.5') Choker Sand Seal	(0.0 - 4.0') 12" Borehole	(0.0 - 4.5') 7.1 bags	(0.0 - 4.5') 6 bags (-15%) Note: Wildcat Washed Plastering
3								
4		Topock - Fill	SP					
5								
6								
7								
8								
9								
10								
11								
12			NR					
13					(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
14								
15								
16								
17	RB-3-VAS-15-20 (<0.033 U) 4/26/2019 15:35	Topock - Fill	SP					
18								
19			NR					
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: 04/25/2019	Surface Elevation: 466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed: 05/07/2019	Northing (NAD83): 2103172.5	
Drilling Co.: Cascade	Easting (NAD83): 7616213.0	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 245 ft bgs	Project: Final GW Remedy Phase I
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: 11.35 ft bgs	
Logger: Gantt Jeffers	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								
25								
26								
27		Topock - Fill	SP					
28								
29								
30					(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
31								
32								
33								
34			NR					
35								
36								
37		Topock - Fill	SP					
38								
39								
40			SW					

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:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5	
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project: Final GW Remedy Phase I
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:	11.35 ft bgs	
Logger:	Gantt Jeffers	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								
42		Topock - Fluvial Deposits	SW					
43								
44								
45			NR					
46		Topock - Fluvial Deposits	SW					
47								
48		Topock - Fluvial Deposits	GW					
49								
50					(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
51		Topock - Fluvial Deposits	SP					
52	RB-3-VAS-50-55 (0.100 J) 4/27/2019 11:10							
53			NR					
54								
55								
56		Topock - Fluvial Deposits	GW					
57								
58		Topock - Fluvial Deposits	ML					
59								
60			ML					


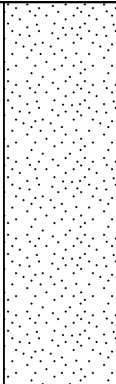



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth 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:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot	
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5		
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project:	Final GW Remedy Phase I
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:	11.35 ft bgs		
Logger:	Gantt Jeffers	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	ML				
62							
63		Topock - Alluvium Deposits	GM				
64							
65		Topock - Alluvium Deposits	SM		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags
66							
67							
68							
69							
70							
71							
72							
73							
74							
75							
76							
77		Topock - Alluvium Deposits	ML				
78							
79		Topock - Alluvium Deposits	SM				
80							

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Date Started: 04/25/2019	Surface Elevation: 466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed: 05/07/2019	Northing (NAD83): 2103172.5	
Drilling Co.: Cascade	Easting (NAD83): 7616213.0	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 245 ft bgs	Project: Final GW Remedy Phase I
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: 11.35 ft bgs	
Logger: Gantt Jeffers	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	RB-3-VAS-80-85 (0.132 J) 4/27/2019 15:18	Topock - Alluvium Deposits	SM					
82								
83								
84								
85								
86								
87								
88								
89								
90		Topock - Alluvium Deposits	ML		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
91								
92								
93		Topock - Alluvium Deposits	SM					
94								
95								
96								
97								
98		Topock - Alluvium Deposits	GM					
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.


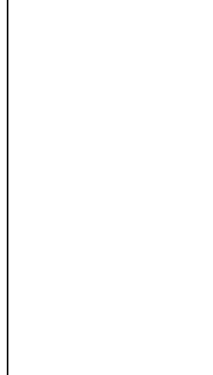
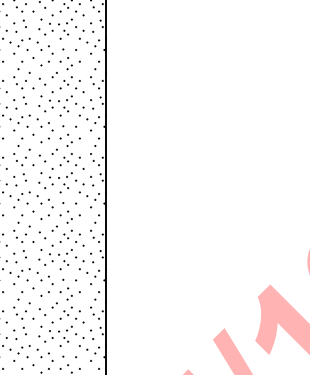




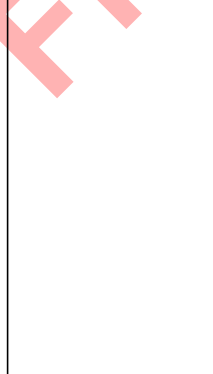
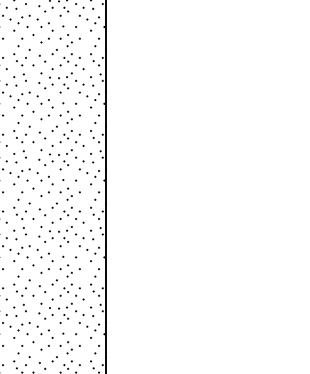
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Date Started: 04/25/2019	Surface Elevation: 466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed: 05/07/2019	Northing (NAD83): 2103172.5	
Drilling Co.: Cascade	Easting (NAD83): 7616213.0	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 245 ft bgs	Project: Final GW Remedy Phase I
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: 11.35 ft bgs	
Logger: Gantt Jeffers	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		Topock - Alluvium Deposits	GM		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
102								
103		Topock - Alluvium Deposits	SM					
104								
105								
106		Topock - Alluvium Deposits	GM					
107								
108		Topock - Alluvium Deposits	SM					
109								
110		Topock - Alluvium Deposits	GM					
111								
112								
113								
114								
115		Topock - Alluvium Deposits	SM					
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:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot	
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5		
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project:	Final GW Remedy Phase I
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:	11.35 ft bgs		
Logger:	Gantt Jeffers	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	RB-3-VAS-120-125 (<0.17 U) 4/28/2019 11:29	Topock - Alluvium Deposits	SM					
122								
123								
124								
125								
126		Topock - Alluvium Deposits	SM					
127								
128								
129								
130								
131								
132								
133								
134								
135								
136		Topock - Alluvium Deposits	GM					
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: 04/25/2019	Surface Elevation: 466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed: 05/07/2019	Northing (NAD83): 2103172.5	
Drilling Co.: Cascade	Easting (NAD83): 7616213.0	Client: PG&E
Drilling Method: Sonic Drilling	Total Depth: 245 ft bgs	Project: Final GW Remedy Phase I
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: 11.35 ft bgs	
Logger: Gantt Jeffers	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	RB-3-VAS-150-155 (<0.17 U) 4/29/2019 10:13	Topock - Alluvium Deposits	GM		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
142		Topock - Alluvium Deposits	GM					
143		Topock - Alluvium Deposits	GM					
144		Topock - Alluvium Deposits	GM					
145	RB-3-VAS-150-155 (<0.17 U) 4/29/2019 10:13	Topock - Alluvium Deposits	SM		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
146		Topock - Alluvium Deposits	SM					
147		Topock - Alluvium Deposits	SM					
148		Topock - Alluvium Deposits	SM					
149	RB-3-VAS-150-155 (<0.17 U) 4/29/2019 10:13	Topock - Alluvium Deposits	GM		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
150		Topock - Alluvium Deposits	GM					
151		Topock - Alluvium Deposits	GM					
152		Topock - Alluvium Deposits	GM					
153	RB-3-VAS-150-155 (<0.17 U) 4/29/2019 10:13	Topock - Alluvium Deposits	SM		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
154		Topock - Alluvium Deposits	SM					
155		Topock - Alluvium Deposits	SM					
156		Topock - Alluvium Deposits	SM					
157	RB-3-VAS-150-155 (<0.17 U) 4/29/2019 10:13	Topock - Weathered Bedrock - conglomerate	ML		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
158		Topock - Weathered Bedrock - conglomerate	ML					
159		Topock - Weathered Bedrock - conglomerate	ML					
160		Topock - Weathered Bedrock - conglomerate	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, 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: <u>04/25/2019</u>	Surface Elevation: <u>466.3 ft amsl</u>	Well ID: RB-3 Pilot
Date Completed: <u>05/07/2019</u>	Northing (NAD83): <u>2103172.5</u>	
Drilling Co.: <u>Cascade</u>	Easting (NAD83): <u>7616213.0</u>	Client: <u>PG&E</u>
Drilling Method: <u>Sonic Drilling</u>	Total Depth: <u>245 ft bgs</u>	Project: <u>Final GW Remedy Phase I</u>
Driller Name: <u>Dan O'Mara</u>	Borehole Diameter: <u>6-12 inches</u>	Location: <u>PG&E Topock, Needles, California</u>
Drilling Asst: <u>E. Huellmantel / J. Pacheco</u>	Depth to First Water: <u>11.35 ft bgs</u>	
Logger: <u>Gantt Jeffers</u>	Editor: <u>Grant Willford</u>	Project Number: <u>RC000753.0051</u>

Depth (ft)	Groundwater Sample ID	Geologic Formation	USCS Code	USCS Class	Well Construction		Calculated Material Volumes	Material Volumes Installed
161								
162								
163								
164								
165								
166								
167								
168								
169								
170		Topock - Weathered Bedrock - conglomerate	ML		(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
171								
172								
173								
174								
175								
176								
177								
178								
179								
180								

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:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot	
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5		
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client:	PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project:	Final GW Remedy Phase I
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:	11.35 ft bgs		
Logger:	Gantt Jeffers	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	RB-3-VAS-180-185 (<0.033 U <0.033 U) 4/29/2019 15:38								
182									
183									
184									
185									
186		Topock - Weathered Bedrock - conglomerate	ML						
187									
188									
189									
190					(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.0 - 245.0') 6" Borehole	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand	
191									
192		Topock - Weathered Bedrock - conglomerate	SM						
193									
194									
195									
196									
197		Topock - Weathered Bedrock - conglomerate	ML						
198									
199									
200									

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:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5	
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project: Final GW Remedy Phase I
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:	11.35 ft bgs	
Logger:	Gantt Jeffers	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							
202							
203							
204							
205					(4.5 - 210.0') Cemex #3 MESH (8x10)	(4.5 - 210.0') 80.7 bags	(4.5 - 210.0') 94 bags (16%) Note: Lapis Lustre Sand
206		Topock - Weathered Bedrock - conglomerate	ML				
207	RB-3-VAS-205-210 (<0.17 U) 4/30/2019 15:15						
208							
209							
210					(4.0 - 245.0') 6" Borehole		
211							
212							
213							
214							
215		Topock - Weathered Bedrock - conglomerate	SM		(210.0 - 221.0') Indicator Sand	(210.0 - 221.0') 4.3 bags	(210.0 - 221.0') 5 bags (16%) Note: Wildcat Washed Plastering
216							
217							
218							
219		Topock - Weathered Bedrock - conglomerate	ML				
220							


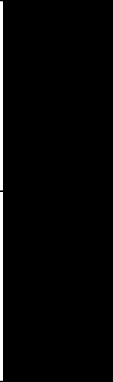
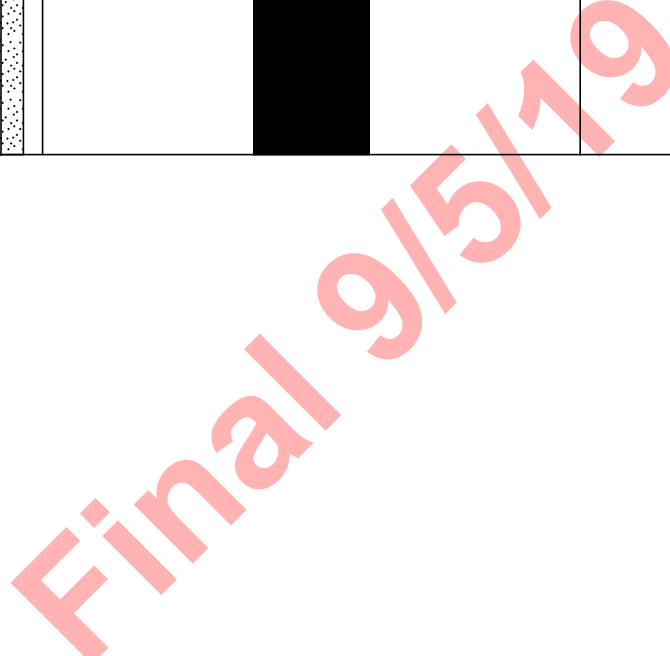
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth 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:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5	
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project: Final GW Remedy Phase I
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:	11.35 ft bgs	
Logger:	Gantt Jeffers	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 - Weathered Bedrock - conglomerate	ML		(210.0 - 221.0') Indicator Sand		(210.0 - 221.0') 4.3 bags	(210.0 - 221.0') 5 bags (16%) Note: Wildcat Washed Plastering			
222											
223											
224											
225											
226											
227											
228		Topock - Weathered Bedrock - conglomerate	SM								
229											
230											
231								(221.0 - 245.0') Bentonite seal chips		(221.0 - 245.0') 6.5 bags	(221.0 - 245.0') 7.5 bags (15%) Note: Puregold Medium Chips
232											
233											
234											
235											
236											
237											
238											
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, 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:	04/25/2019	Surface Elevation:	466.3 ft amsl	Well ID: RB-3 Pilot
Date Completed:	05/07/2019	Northing (NAD83):	2103172.5	
Drilling Co.:	Cascade	Easting (NAD83):	7616213.0	Client: PG&E
Drilling Method:	Sonic Drilling	Total Depth:	245 ft bgs	Project: Final GW Remedy Phase I
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:	11.35 ft bgs	
Logger:	Gantt Jeffers	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	--no sample-- (Interval did not produce.) 5/1/2019 14:00	Topock - Weathered Bedrock - conglomerate	SM			(221.0 - 245.0') Bentonite seal chips	(4.0 - 245.0') 6" Borehole	(221.0 - 245.0') 6.5 bags	(221.0 - 245.0') 7.5 bags (15%) Note: Puregold Medium Chips
242									
243									
244									
245									
246									
247									
248									
249									
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252									
253									
254									
255									
256									
257									
258									
259									
260									

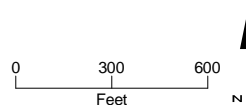
Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, ppb = parts per billion, U = not detected above the laboratory reporting limit, J - estimated value, NR = no recovery, blue water table symbol represents depth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

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



LEGEND

- Soil Sample Collected from this Location in August 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 August 2019, 277 real time dust observation/monitoring events were conducted at the perimeter of the work areas (outside of the exclusion zone). There was one temporary exceedance of the action level for fugitive dust monitoring ($100 \mu\text{g}/\text{m}^3$) on August 20, 2019 due to backfilling of very dry soil/dirt using excavator at Pipeline B/J. Contractor applied water to reduce fugitive dust.

Two perimeter air sampling events occurred in August 2019, during construction of the portion of Pipeline B/J in the vicinity of AOCs 9 and 10. Table 1 presents analytical results from the August air sampling events.

References Cited:

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

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

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

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

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

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

Table 1. Perimeter Air Sampling Results

August 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 August 2019, the following monitoring events were conducted:

- Thirty-two (32) 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 37 and 59 dBA, with an average and median of just above 48 dBA.
- Thirty-one (31) 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 46 and 64 dBA, with an average and median of about 52 dBA.
- Thirty-one (31) 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 typically varied between 43 and 60 dBA, with an average and median of 52-54 dBA.
- Seventeen (17) 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 48 and 64 dBA, with an average of 57 dBA and median of 56 dBA. Sound levels spiked when there are boat traffic, train traffic, and bird activities around the mobile homes. When there were no boats, trains, or birds, the sound level was about 54 dBA.
- Twelve (12) 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/J. The sound level typically varied between 53 and 60 dBA, with an average of 56 dBA. It appears most of the sound was from I-40 and/or TCS.

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



PIVOT
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

Attachment G
Six-Week Look-Ahead Schedule
(September 1 through October 12, 2019)


PG&E Topock Final Groundwater Remedy	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Primary Planned Activities	9/1/2019	9/2/2019	9/3/2019	9/4/2019	9/5/2019	9/6/2019	9/7/2019
Start Time (PST)				6:30 AM	6:30 AM	6:30 AM	6:30 AM
Pipeline C Installation E5, F5	No Work	No Work Labor Day	No Work	Punch list tasks @ Pipeline C5		Punch list tasks @ Pipeline C3	Punch list tasks @ Pipeline C3
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-Y (E6), IRZ-19 pilot (E5), RB-3 (E5), MW-D (E5)	MW-Y (E6), IRZ-19 pilot (E5), RB-3 (E5), MW-D (E5)	MW-Y (E6), IRZ-19 pilot (E5), RB-3 (E5), MW-D (E5)	MW-Y (E6), IRZ-19 pilot (E5), RB-3 (E5), MW-D (E5)
Well Development				MW-C (E5)	MW-C (E5)	MW-C (E5)	MW-C (E5)
Well Testing				IRZ-20 (E5) - Injection Testing	IRZ-20 (E5) - Injection Testing	IRZ-20 (E5) - Injection Testing	IRZ-20 (E5) - Injection Testing
Primary Planned Activities	9/8/2019	9/9/2019	9/10/2019	9/11/2019	9/12/2019	9/13/2019	9/14/2019
Start Time (PST)	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	
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	Pipeline installation @ B and J	No Work
Well Installation	MW-B-267 site prep (E5), MW-Y (E6), IRZ-19 pilot (E5), RB-3 (E5), MW-D (E5)	MW-B-267 site prep (E5), MW-Y (E6), IRZ-19 pilot (E5), RB-3 (E5), MW-D (E5)	MW-B-267 (E5), MW-Y (E6), IRZ-19 pilot (E5), RB-2 (E5)	MW-B-267 (E5), MW-Y (E6), MW-S (G5), RB-2 (E5)	MW-B-267 (E5), MW-Y (E6), MW-S (G5), RB-2 (E5)	--	
Well Development	RB-4 (E5)	RB-5 (E5)	RB-5 (E5)	RB-5 (E5)	RB-5 (E5)	--	
Well Testing	IRZ-20 (E5) - Injection Testing	IRZ-21 (E5) - Injection Testing	IRZ-21 (E5) - Injection Testing	IRZ-21 (E5) - Injection Testing	IRZ-21 (E5) - Injection Testing	--	
Primary Planned Activities	9/15/2019	9/16/2019	9/17/2019	9/18/2019	9/19/2019	9/20/2019	9/21/2019
Start Time (PST)			6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM
Pipeline C Installation E5, F5	No Work	No Work	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/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	Pipeline installation @ B and J
Well Installation			MW-B-267 (E5), MW-S (G5), RB-2 (E5)	MW-B-267 (E5), MW-S (G5), RB-2 (E5)	MW-B-267 (E5), MW-S (G5), RB-2 (E5)	MW-B-267 (E5), MW-S (G5), RB-2 (E5)	MW-B-267 (E5), IRZ-29 site prep (F5), MW-S (G5), RB-2 (E5)
Well Development			RB-5 (E5), MW-D (E5)	MW-D (E5)	MW-D (E5)	MW-D (E5)	MW-D (E5)
Well Testing			RB-5 (E5)	RB-5 (E5)	RB-5 (E5)	RB-5 (E5)	RB-5 (E5)
Primary Planned Activities	9/22/2019	9/23/2019	9/24/2019	9/25/2019	9/26/2019	9/27/2019	9/28/2019
Start Time (PST)	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	
Pipeline C Installation E5, F5	--	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	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	Pipeline installation @ B and J	
Well Installation	MW-B-267 (E5), IRZ-29 site prep (F5), MW-S (G5), RB-2 (E5)	IRZ-29 pilot (F5), MW-S (G5), RB-2 (E5)	IRZ-29 pilot (F5), MW-S (G5), RB-2 (E5)	IRZ-29 pilot (F5), MW-S (G5), RB-2 (E5)	IRZ-29 pilot (F5), MW-S (G5), RB-2 (E5)	--	
Well Development	MW-H (E5)	MW-H (E5)	MW-H (E5)	MW-H (E5)	MW-H (E5)	--	
Well Testing	RB-5 (E5)	RB-4 (E5)	RB-4 (E5)	RB-4 (E5)	RB-4 (E5)	--	
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 (PST)			6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM
Soil Processing Yard D1	No Work	No Work	Fence installation	Fence installation	Fence installation	Fence installation	Fence installation
Pipeline C Installation E5, F5			Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/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	Pipeline installation @ B and J
Well Installation			IRZ-29 pilot (F5), MW-S (G5), MW-11D site set up (F5), RB-2 (E5)	IRZ-29 pilot (F5), IRZ-31 site set up (F5), MW-S (G5), MW-11D site set up (F5), RB 2 (E5)	IRZ-29 pilot (F5), IRZ-31 site set up (F5), MW-S (G5), MW-11D site set up (F5), RB 2 (E5)	IRZ-31 pilot (F5), MW-11D (F5), IRZ-39 (F5)	IRZ-31 pilot (F5), MW-11D (F5), IRZ-39 (F5)
Well Development			MW-X (E6)	MW-X (E6)	MW-X (E6)	MW-X (E6)	MW-X (E6)
Well Testing			IRZ-25 (F5)	IRZ-25 (F5)	IRZ-25 (F5)	IRZ-25 (F5)	IRZ-25 (F5)
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 (PST)	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	6:30 AM	
Pipeline C Installation E5, F5	--	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	Tentative: Pipeline installation @ C6 OR Tentative: Pipeline installation @C5/C7	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	Pipeline installation @ B and J	
Well Installation	IRZ-31 pilot (F5), MW-11D (F5), IRZ-39 (F5)	IRZ-31 pilot (F5), MW-11D (F5), IRZ-39 (F5)	IRZ-31 pilot (F5), IRZ-33 site set up (F5), MW-11D (F5), IRZ-39 (F5)	IRZ-31 pilot (F5), IRZ-33 site set up (F5), MW-11D (F5), IRZ-39 (F5)	IRZ-33 pilot (F5), MW-11D (F5), IRZ-39 (F5)	--	
Well Development	MW-Y (E6)	MW-Y (E6)	MW-Y (E6)	MW-Y (E6)	MW-Y (E6)	--	
Well Testing	IRZ-25 (F5)	IRZ-25 (F5) - Injection Testing	IRZ-25 (F5) - Injection Testing	IRZ-25 (F5) - Injection Testing	IRZ-25 (F5) - Injection Testing	--	

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.
"GS" - 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 H
Available Groundwater Monitoring Data
(DTSC Condition of Approval xi)

Attachment H. 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.

<div><div>Design & Consultancy for natural and built assets</div></div>					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
<div>TMP 2019-06 Baseline Sampling</div>					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 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	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Date Sampled															
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		6/30/2019	64	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.2	1	120	120	ND (0.5)	ND (0.5)	620			
MW-10D	MW-10D-0619	N		6/26/2019	130	1,400	ND (50)	ND (0.5)	ND (0.5)	1.5	1.1	130	80	ND (0.5)	ND (0.5)	1,200			
MW-B-117	MW-B-117-0619	N		6/27/2019	79	110	ND (50)	ND (0.5)	ND (0.5)	2.1	2	98	95	ND (2.5)	ND (0.5)	760			
MW-B-33	MW-B-33-0619	N		6/27/2019	82	400	ND (50)	ND (0.5)	ND (0.5)	3.3	3.1	93	95	ND (0.5)	ND (0.5)	550			
MW-B-33	MW-921-Q219	FD	MW-B-33-0619	6/27/2019	82	610	ND (50)	ND (0.5)	ND (0.5)	3.2	2.8	93	88	ND (0.5)	ND (0.5)	530			
MW-F-104	MW-F-104-0619	N		6/26/2019	130	560	ND (50)	ND (0.5)	ND (0.5)	4.7	4.6	77	69	ND (2.5)	ND (2.5)	1,600			
MW-F-60	MW-F-60-3V-0619	N		6/26/2019	84	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.4	1.3	90	84	ND (0.5)	ND (0.5)	610			
MW-F-60	MW-F-60-LF-0619	N		6/26/2019	85	340	ND (50)	ND (0.5)	ND (0.5)	1.3	1.4	92	89	ND (0.5)	ND (0.5)	620			
MW-G-57	MW-G-57-0619	N		6/24/2019	120	880	ND (50)	ND (0.5)	ND (0.5)	3.7	3.3	51	39	ND (0.5)	ND (0.5)	860			
MW-M-57	MW-M-57-0619	N		6/26/2019	89	930	94	ND (0.5)	ND (0.5)	1.2	1.1	44	42	ND (0.5)	ND (0.5)	400			
MW-M-95	MW-M-95-0619	N		6/26/2019	66	320	ND (50)	ND (0.5)	ND (0.5)	2.2	2.1	340	330	ND (0.5)	ND (0.5)	470			
MW-U-183	MW-U-183-0619	N		6/26/2019	54	210	ND (50)	ND (0.5)	ND (0.5)	1.1	1.1	150	150	ND (0.5)	ND (0.5)	740			
MW-U-273	MW-U-273-0619	N		6/26/2019	60	270	52	ND (0.5)	ND (0.5)	5.4	5	43	39	ND (2.5)	ND (0.5)	1,200			
MW-W-31	MW-W-31-0619	N		6/24/2019	820	640	ND (50)	ND (0.5)	ND (0.5)	5.5	5.5	130	130	ND (0.5)	ND (0.5)	1,500			


= Preliminary result. Data results were significantly delayed in the second quarter due to lab instrument issues.

<div><div>Design & Consultancy for natural and built assets</div></div>					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
<div>TMP 2019-06 Baseline Sampling</div>					Description	Boron, dissolved	Bromide	Cadmium	Cadmium, dissolved	Calcium	Calcium, dissolved	Chloride	Chromium, Hexavalent	Chromium, total	Chromium, total dissolved	Cobalt	Cobalt, dissolved	
					Method	SW 6010B	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	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	Parent Sample	Date Sampled														
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		6/30/2019	0.63	ND (2.5)	ND (0.5)	ND (0.5)	320,000	320	2,300	240	250	230	ND (0.5)	ND (0.5)		
MW-10D	MW-10D-0619	N		6/26/2019	1.1	ND (2.5)	ND (0.5)	ND (0.5)	150,000	140	1,000	230	230	210	0.63	ND (0.5)		
MW-B-117	MW-B-117-0619	N		6/27/2019	0.75	ND (2.5)	ND (0.5)	ND (0.5)	200,000	190	3,300	ND (0.2)	ND (1.0)	ND (1.0)	ND (0.5)	ND (0.5)		
MW-B-33	MW-B-33-0619	N		6/27/2019	0.55	ND (2.5)	ND (0.5)	ND (0.5)	170,000	170	1,400	3.9	6.1	4.2	ND (0.5)	ND (0.5)		
MW-B-33	MW-921-Q219	FD	MW-B-33-0619	6/27/2019	0.54	ND (2.5)	ND (0.5)	ND (0.5)	170,000	170	1,400	4	6.3	4.7	ND (0.5)	ND (0.5)		
MW-F-104	MW-F-104-0619	N		6/26/2019	1.6	ND (2.5)	ND (0.5)	ND (0.5)	160,000	150	2,200	2,900	2,900	3,000	ND (0.5)	ND (0.5)		
MW-F-60	MW-F-60-3V-0619	N		6/26/2019	0.59	ND (2.5)	ND (0.5)	ND (0.5)	190,000	180	760	2,100	2,200	2,000	ND (0.5)	ND (0.5)		
MW-F-60	MW-F-60-LF-0619	N		6/26/2019	0.62	ND (2.5)	ND (0.5)	ND (0.5)	190,000	190	760	1,800	2,000	1,800	ND (0.5)	ND (0.5)		
MW-G-57	MW-G-57-0619	N		6/24/2019	0.83	1.2	ND (0.5)	ND (0.5)	100,000	97	1,300	660	700	690	ND (0.5)	ND (0.5)		
MW-M-57	MW-M-57-0619	N		6/26/2019	0.37	ND (1.0)	ND (0.5)	ND (0.5)	81,000	77	490	2.8	7.6	3.4	ND (0.5)	ND (0.5)		
MW-M-95	MW-M-95-0619	N		6/26/2019	0.43	ND (2.5)	ND (0.5)	ND (0.5)	310,000	270	1,700	ND (0.2)	1.2	ND (1.0)	ND (0.5)	ND (0.5)		
MW-U-183	MW-U-183-0619	N		6/26/2019	0.69	ND (2.5)	ND (0.5)	ND (0.5)	380,000	340	2,200	ND (0.2)	2.3	ND (1.0)	ND (0.5)	ND (0.5)		
MW-U-273	MW-U-273-0619	N		6/26/2019	1.1	ND (2.5)	ND (0.5)	ND (0.5)	140,000	140	2,200	0.52	3.2	1	ND (0.5)	ND (0.5)		
MW-W-31	MW-W-31-0619	N		6/24/2019	1.6	ND (2.5)	ND (0.5)	ND (0.5)	390,000	390	4,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (0.5)	ND (0.5)		


= Preliminary result. Data results were significantly delayed in the second quarter due to lab instrument issues.

<div>  <div> Design & Consultancy for natural and built assets </div> </div> <div> <div>TMP 2019-06 Baseline Sampling</div> </div>					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
Description						Copper	Copper, dissolved	Fluoride	Iron	Iron, dissolved	Lead	Lead, dissolved	Magnesium	Magnesium, dissolved	Manganese	Manganese, dissolved
Method						SW 6020	SW 6020	EPA 300.0	SW 6010B	SW 6010B	SW 6020	SW 6020	SW 6010B	SW 6010B	SW 6020	SW 6020
Units						ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Date Sampled												
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		6/30/2019	ND (1.0)	ND (1.0)	2.5	59	35	ND (1.0)	ND (1.0)	46,000	46	3.4	ND (0.5)	ND (0.2)
MW-10D	MW-10D-0619	N		6/26/2019	ND (1.0)	ND (1.0)	1	2,600	ND (20)	ND (1.0)	ND (1.0)	31,000	29	350	53	ND (0.2)
MW-B-117	MW-B-117-0619	N		6/27/2019	ND (1.0)	ND (1.0)	3.1	310	160	ND (1.0)	ND (1.0)	34,000	34	1,100	1,100	ND (0.2)
MW-B-33	MW-B-33-0619	N		6/27/2019	ND (1.0)	ND (1.0)	2.6	530	62	ND (1.0)	ND (1.0)	34,000	34	770	900	ND (0.2)
MW-B-33	MW-921-Q219	FD	MW-B-33-0619	6/27/2019	ND (1.0)	ND (1.0)	2.7	630	46	ND (1.0)	ND (1.0)	33,000	33	780	760	ND (0.2)
MW-F-104	MW-F-104-0619	N		6/26/2019	ND (1.0)	ND (1.0)	2.3	690	ND (20)	ND (1.0)	ND (1.0)	15,000	14	210	180	ND (0.2)
MW-F-60	MW-F-60-3V-0619	N		6/26/2019	ND (1.0)	ND (1.0)	1.1	64	ND (20)	ND (1.0)	ND (1.0)	37,000	37	260	200	ND (0.2)
MW-F-60	MW-F-60-LF-0619	N		6/26/2019	ND (1.0)	ND (1.0)	0.91	350	ND (20)	ND (1.0)	ND (1.0)	38,000	38	280	250	ND (0.2)
MW-G-57	MW-G-57-0619	N		6/24/2019	ND (1.0)	ND (1.0)	3	1,300	23	ND (1.0)	ND (1.0)	15,000	14	9.9	ND (0.5)	ND (0.2)
MW-M-57	MW-M-57-0619	N		6/26/2019	17	ND (1.0)	1.9	1,100	120	1.3	ND (1.0)	16,000	16	330	270	ND (0.2)
MW-M-95	MW-M-95-0619	N		6/26/2019	ND (1.0)	ND (1.0)	3.4	1,200	680	ND (1.0)	ND (1.0)	52,000	47	2,100	1,800	ND (0.2)
MW-U-183	MW-U-183-0619	N		6/26/2019	ND (1.0)	ND (1.0)	3.1	230	33	ND (1.0)	ND (1.0)	57,000	52	470	400	ND (0.2)
MW-U-273	MW-U-273-0619	N		6/26/2019	ND (1.0)	ND (1.0)	4.8	320	50	ND (1.0)	ND (1.0)	8,000	7.4	ND (0.5)	ND (0.5)	ND (0.2)
MW-W-31	MW-W-31-0619	N		6/24/2019	ND (1.0)	ND (1.0)	1.8	10,000	9,500	ND (1.0)	ND (1.0)	210,000	220	350	310	ND (0.2)


= Preliminary result. Data results were significantly delayed in the second quarter due to lab instrument issues.


<div>  <div> Design & Consultancy for natural and built assets </div> </div> <div> <div>TMP 2019-06 Baseline Sampling</div> </div>					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
Description						Mercury, dissolved	Molybdenum	Molybdenum, dissolved	Nickel	Nickel, dissolved	Nitrate/Nitrite as Nitrogen	Potassium, dissolved	Selenium	Selenium, dissolved	Silver	Silver, dissolved
Method						EPA 7470A	SW 6020	SW 6020	SW 6020	SW 6020	SM 4500-NO3 F	SW 6010B	SW 6020	SW 6020	SW 6020	SW 6010B
Units						ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Parent Sample	Date Sampled												
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		6/30/2019	ND (0.2)	16	15	53	51	2.5	13	1.6	1.5	ND (0.5)	ND (0.5)	1,300
MW-10D	MW-10D-0619	N		6/26/2019	ND (0.2)	4.4	5	1.7	ND (1.0)	11	13	7.7	7	ND (0.5)	ND (0.5)	670
MW-B-117	MW-B-117-0619	N		6/27/2019	ND (0.2)	44	40	ND (1.0)	ND (1.0)	0.69	17	0.64	0.55	ND (0.5)	ND (0.5)	1,600
MW-B-33	MW-B-33-0619	N		6/27/2019	ND (0.2)	14	14	ND (1.0)	ND (1.0)	0.61	11	0.58	0.73	ND (0.5)	ND (0.5)	690
MW-B-33	MW-921-Q219	FD	MW-B-33-0619	6/27/2019	ND (0.2)	14	13	ND (1.0)	ND (1.0)	0.59	11	0.79	0.75	ND (0.5)	ND (0.5)	730
MW-F-104	MW-F-104-0619	N		6/26/2019	ND (0.2)	27	28	1.3	ND (1.0)	15	17	77	79	ND (0.5)	ND (0.5)	1,500
MW-F-60	MW-F-60-3V-0619	N		6/26/2019	ND (0.2)	13	13	1.2	ND (1.0)	8.2	14	9.8	10	ND (0.5)	ND (0.5)	390
MW-F-60	MW-F-60-LF-0619	N		6/26/2019	ND (0.2)	13	14	ND (1.0)	ND (1.0)	7.5	15	9.7	9.4	ND (0.5)	ND (0.5)	390
MW-G-57	MW-G-57-0619	N		6/24/2019	ND (0.2)	33	34	1.1	ND (1.0)	14	12	30	28	ND (0.5)	ND (0.5)	1,100
MW-M-57	MW-M-57-0619	N		6/26/2019	ND (0.2)	21	22	6.5	1.5	5.6	9	3.1	3.3	ND (0.5)	ND (0.5)	270
MW-M-95	MW-M-95-0619	N		6/26/2019	ND (0.2)	20	20	ND (1.0)	ND (1.0)	0.35	14	0.5	ND (0.5)	ND (0.5)	ND (0.5)	700
MW-U-183	MW-U-183-0619	N		6/26/2019	ND (0.2)	13	13	1.1	ND (1.0)	1.8	14	2	1.6	ND (0.5)	ND (0.5)	990
MW-U-273	MW-U-273-0619	N		6/26/2019	ND (0.2)	38	36	1.8	1	2.7	16	4.1	3.5	ND (0.5)	ND (0.5)	1,500
MW-W-31	MW-W-31-0619	N		6/24/2019	ND (0.2)	14	15	ND (1.0)	ND (1.0)	0.088	15	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2,900

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<div><div>Design & Consultancy for natural and built assets</div></div>					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	BC Labs
<div>TMP 2019-06 Baseline Sampling</div>					Description	Sulfate	Thallium	Thallium, dissolved	Total dissolved solids	Total organic carbon	TPH as diesel	TPH as motor oil	Vanadium	Vanadium, dissolved	Zinc	Zinc, dissolved	Ammonia as nitrogen SM 4500-NH3 G
					Method	EPA 300.0	SW 6020	SW 6020	SM 2540 C	SM 5310 C	SW 8015B	SW 8015B	SW 6020	SW 6020	SW 6020	SW 6020	SW 6020
					Units	mg/L	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
Location ID	Sample ID	Sample Type	Parent Sample	Date Sampled													
IRZ-20-SC-137-155	IRZ-20-SC-137-155	N		6/30/2019	340	ND (0.5)	ND (0.5)	4,700	ND (1.0)	ND (54)	ND (54)	4.4	3.2	60	61	ND (0.2)	
MW-10D	MW-10D-0619	N		6/26/2019	350	ND (0.5)	ND (0.5)	2,300	ND (1.0)			8.2	5.4	ND (10)	ND (10)	ND (0.2)	
MW-B-117	MW-B-117-0619	N		6/27/2019	480	ND (0.5)	ND (0.5)	6,600	ND (1.0)			ND (1.0)	ND (1.0)	ND (10)	ND (10)	ND (0.2)	
MW-B-33	MW-B-33-0619	N		6/27/2019	250	ND (0.5)	ND (0.5)	3,200	ND (1.0)			1.5	ND (1.0)	ND (10)	ND (10)	ND (0.2)	
MW-B-33	MW-921-Q219	FD	MW-B-33-0619	6/27/2019	240	ND (0.5)	ND (0.5)	3,100	ND (1.0)			1.5	ND (1.0)	ND (10)	ND (10)	ND (0.2)	
MW-F-104	MW-F-104-0619	N		6/26/2019	860	ND (0.5)	ND (0.5)	4,800	ND (1.0)			3.9	3.1	ND (10)	ND (10)	ND (0.2)	
MW-F-60	MW-F-60-3V-0619	N		6/26/2019	390	ND (0.5)	ND (0.5)	1,800	ND (1.0)			2.7	2.5	ND (10)	ND (10)	ND (0.2)	
MW-F-60	MW-F-60-LF-0619	N		6/26/2019	390	ND (0.5)	ND (0.5)	1,900	ND (10)			2.7	2.1	ND (10)	ND (10)	ND (0.2)	
MW-G-57	MW-G-57-0619	N		6/24/2019	490	ND (0.5)	ND (0.5)	3,000	ND (1.0)			5.6	3.8	ND (10)	ND (10)	ND (2.0)	
MW-M-57	MW-M-57-0619	N		6/26/2019	170	ND (0.5)	ND (0.5)	1,100	ND (1.0)			3.6	2.3	51	ND (10)	ND (0.2)	
MW-M-95	MW-M-95-0619	N		6/26/2019	210	ND (0.5)	ND (0.5)	3,000	ND (1.0)			1.2	ND (1.0)	ND (10)	ND (10)	ND (0.2)	
MW-U-183	MW-U-183-0619	N		6/26/2019	440	ND (0.5)	ND (0.5)	4,100	ND (1.0)			2.1	2.2	ND (10)	ND (10)	ND (0.2)	
MW-U-273	MW-U-273-0619	N		6/26/2019	480	ND (0.5)	ND (0.5)	4,000	ND (1.0)			15	13	ND (10)	ND (10)	ND (0.2)	
MW-W-31	MW-W-31-0619	N		6/24/2019	1,400	ND (0.5)	ND (0.5)	8,300	ND (2.0)			3.7	2.6	ND (10)	ND (10)	9.5	

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<div>  <div> Design & Consultancy for natural and built assets </div> </div>					Lab	ASSET Chromium, Hexavalent	ASSET Chromium, total dissolved
<div>TMP 2019-06 Post-Development Sampling</div>					Description	EPA 218.6	SW 6020
					Method	ug/L	ug/L
					Unit		
Location ID	Sample ID	Sample Type	Matrix	Date Sampled			
MW-B-337	MW-B-337-062619-INTERIM	N	GW	6/26/2019	ND (1.0)	ND (1.0)	

<div><div> ARCADIS</div><div>Design & Consultancy for natural and built assets</div></div>					Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
PMP 2019-07 Sampling					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
					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
					Unit	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L		mg/L	uS/cm
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	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	4,300


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<div>  <div> Design & Consultancy for natural and built assets </div> </div>						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
Description						Method	Alkalinity, total as CaCO3	Aluminum	Aluminum, dissolved	Antimony	Antimony, dissolved	Arsenic	Arsenic, dissolved	Barium
Unit							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
Location ID	Sample ID	Sample Type	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)	1.5	1.6	69
MW-10D	MW-10D-0719	N		GW	7/24/2019		120	200	ND (50)	4.3	4.5	1.9	1.6	120
MW-B-117	MW-B-117-0719	N		GW	7/23/2019		80	69	ND (50)	ND (0.5)	ND (0.5)	2.1	2.1	100
MW-B-33	MW-906-Q319	FD	MW-B-33-0719	GW	7/23/2019		86	620	ND (50)	ND (0.5)	ND (0.5)	3.2	2.9	96
MW-B-33	MW-B-33-0719	N		GW	7/23/2019		85	620	ND (50)	ND (0.5)	ND (0.5)	3.2	3.1	99
MW-F-60	MW-F-60-3V-0719	N		GW	7/25/2019		82	150	ND (50)	ND (0.5)	ND (0.5)	1.2	1.1	87
MW-F-60	MW-F-60-LF-0719	N		GW	7/25/2019		83	400	ND (50)	ND (0.5)	ND (0.5)	1.3	1.2	94
MW-L-180	MW-907-Q319	FD	MW-L-180-0719	GW	7/25/2019		37	460	ND (50)	ND (0.5)	ND (0.5)	3.9	3.1	56
MW-L-180	MW-L-180-0719	N		GW	7/25/2019		38	390	ND (50)	ND (0.5)	ND (0.5)	3.8	3.1	55
MW-M-132	MW-M-132-0719	N		GW	7/22/2019		62	1,500	ND (50)	ND (0.5)	ND (0.5)	2.5	2.3	180
MW-M-193	MW-M-193-0719	N		GW	7/22/2019		49	2,100	70	ND (0.5)	ND (0.5)	3.5	2.8	110
MW-M-57	MW-M-57-0719	N		GW	7/22/2019		80	890	ND (50)	ND (0.5)	ND (0.5)	1.2	1.1	49
MW-M-95	MW-M-95-0719	N		GW	7/22/2019		55	220	ND (50)	ND (0.5)	ND (0.5)	1.2	1.1	290
MW-N-217	MW-N-217-0719	N		GW	7/23/2019		110	430	54	2.7	1	4.6	4.6	45
MW-R-109	MW-R-109-0719	N		GW	7/23/2019		73	ND (50)	ND (50)	ND (0.5)	ND (0.5)	1.5	1.4	51
MW-R-192	MW-R-192-0719	N		GW	7/23/2019		45	760	83	ND (0.5)	ND (0.5)	1.6	1.7	190
MW-R-275	MW-R-275-0719	N		GW	7/23/2019		49	320	52	ND (0.5)	ND (0.5)	3	2.7	230
MW-U-183	MW-U-183-0719	N		GW	7/24/2019		53	350	ND (50)	ND (0.5)	ND (0.5)	1.2	1.1	170
MW-U-273	MW-U-273-0719	N		GW	7/24/2019		58	2,100	51	ND (0.5)	ND (0.5)	6.4	5.4	53

= Preliminary result. Data results continued to be significantly late this quarter due to lab issues.

<div>  <div> Design & Consultancy for natural and built assets </div> </div>						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
<div>TMP 2019-07 Baseline Sampling</div>						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
						Unit	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	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)	440	0.5	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	180,000
MW-10D	MW-10D-0719	N		GW	7/24/2019	ND (0.5)	ND (0.5)	1,100	1.1	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	100,000
MW-B-117	MW-B-117-0719	N		GW	7/23/2019	ND (2.5)	ND (0.5)	880	0.88	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	200,000
MW-B-33	MW-906-Q319	FD	MW-B-33-0719	GW	7/23/2019	ND (0.5)	ND (0.5)	560	0.61	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	170,000
MW-B-33	MW-B-33-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	620	0.58	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	190,000
MW-F-60	MW-F-60-3V-0719	N		GW	7/25/2019	ND (0.5)	ND (0.5)	640	0.65	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	200,000
MW-F-60	MW-F-60-LF-0719	N		GW	7/25/2019	ND (0.5)	ND (0.5)	640	0.67	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	190,000
MW-L-180	MW-907-Q319	FD	MW-L-180-0719	GW	7/25/2019	ND (0.5)	ND (0.5)	1,400	0.7	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	270,000
MW-L-180	MW-L-180-0719	N		GW	7/25/2019	ND (0.5)	ND (0.5)	1,400	1.5	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	280,000
MW-M-132	MW-M-132-0719	N		GW	7/22/2019	ND (2.5)	ND (0.5)	1,000	0.99	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	270,000
MW-M-193	MW-M-193-0719	N		GW	7/22/2019	ND (2.5)	ND (0.5)	1,700	1.7	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	200,000
MW-M-57	MW-M-57-0719	N		GW	7/22/2019	ND (0.5)	ND (0.5)	420	0.4	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	84,000
MW-M-95	MW-M-95-0719	N		GW	7/22/2019	ND (0.5)	ND (0.5)	450	0.42	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	290,000
MW-N-217	MW-N-217-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	1,000	1	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	71,000
MW-R-109	MW-R-109-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	350	0.35	ND (1.0)	ND (0.5)	ND (0.5)	ND (0.5)	88,000
MW-R-192	MW-R-192-0719	N		GW	7/23/2019	ND (2.5)	ND (0.5)	1,100	1.1	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	240,000
MW-R-275	MW-R-275-0719	N		GW	7/23/2019	ND (2.5)	ND (0.5)	1,500	1.5	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	250,000
MW-U-183	MW-U-183-0719	N		GW	7/24/2019	ND (0.5)	ND (0.5)	720	1.5	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	360,000
MW-U-273	MW-U-273-0719	N		GW	7/24/2019	ND (0.5)	ND (0.5)	1,200	1.3	ND (2.5)	ND (0.5)	ND (0.5)	ND (0.5)	130,000


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<div>  <div> Design & Consultancy for natural and built assets </div> </div>						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
<div> <div>TMP 2019-07 Baseline Sampling</div> </div>						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
						Unit	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled									
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N		GW	7/11/2019		1,200	87	93	90	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-10D	MW-10D-0719	N		GW	7/24/2019		880	31	33	29	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-B-117	MW-B-117-0719	N		GW	7/23/2019		3,400	0.6	4.6	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-B-33	MW-906-Q319	FD	MW-B-33-0719	GW	7/23/2019		1,500	8.3	9.5	6.7	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-B-33	MW-B-33-0719	N		GW	7/23/2019		1,400	8.3	9.6	8.3	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-F-60	MW-F-60-3V-0719	N		GW	7/25/2019		760	2,400	2,400	2,400	0.62	ND (0.5)	ND (1.0)	ND (1.0)
MW-F-60	MW-F-60-LF-0719	N		GW	7/25/2019		770	2,000	2,300	2,000	0.99	ND (0.5)	ND (1.0)	ND (1.0)
MW-L-180	MW-907-Q319	FD	MW-L-180-0719	GW	7/25/2019		3,600	ND (1.0)	12	1.1	0.53	ND (0.5)	ND (1.0)	ND (1.0)
MW-L-180	MW-L-180-0719	N		GW	7/25/2019		3,700	ND (1.0)	10	1.3	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-M-132	MW-M-132-0719	N		GW	7/22/2019		2,700	ND (0.2)	7	ND (1.0)	1.9	ND (0.5)	ND (1.0)	ND (1.0)
MW-M-193	MW-M-193-0719	N		GW	7/22/2019		4,100	ND (1.0)	61	1.2	21	1.3	14	ND (1.0)
MW-M-57	MW-M-57-0719	N		GW	7/22/2019		450	12	15	11	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-M-95	MW-M-95-0719	N		GW	7/22/2019		1,700	ND (0.2)	ND (1.0)	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-N-217	MW-N-217-0719	N		GW	7/23/2019		1,200	0.66	24	2.8	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-R-109	MW-R-109-0719	N		GW	7/23/2019		430	11	10	10	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-R-192	MW-R-192-0719	N		GW	7/23/2019		2,700	ND (0.2)	1.8	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-R-275	MW-R-275-0719	N		GW	7/23/2019		3,500	ND (1.0)	24	2	8.1	1.3	3.6	ND (1.0)
MW-U-183	MW-U-183-0719	N		GW	7/24/2019		2,200	0.4	2.9	ND (1.0)	ND (0.5)	ND (0.5)	ND (1.0)	ND (1.0)
MW-U-273	MW-U-273-0719	N		GW	7/24/2019		2,200	0.41	56	1	5.2	0.63	9.5	ND (1.0)


= Preliminary result. Data results continued to be significantly late this quarter due to lab issues.

<div>  <div> Design & Consultancy for natural and built assets </div> </div>						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
<div> <div>TMP 2019-07 Baseline Sampling</div> </div>						Description	Iron	Iron, dissolved	Lead	Lead, dissolved	Magnesium	Magnesium, dissolved	Manganese	ASSET Manganese, dissolved
						Method	SW 6010B	SW 6010B	SW 6020	SW 6020	SW 6010B	SW 6010B	SW 6020	SW 6020
						Unit	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled									
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N		GW	7/11/2019	64	35	ND (1.0)	ND (1.0)	29,000	33	ND (0.5)	ND (0.5)	ND (0.2)
MW-10D	MW-10D-0719	N		GW	7/24/2019	330	60	ND (1.0)	ND (1.0)	25,000	24	130	ND (0.5)	ND (0.2)
MW-B-117	MW-B-117-0719	N		GW	7/23/2019	130	71	ND (1.0)	ND (1.0)	40,000	40	1,000	1,100	ND (0.2)
MW-B-33	MW-906-Q319	FD	MW-B-33-0719	GW	7/23/2019	790	44	ND (1.0)	ND (1.0)	33,000	36	470	500	ND (0.2)
MW-B-33	MW-B-33-0719	N		GW	7/23/2019	800	53	ND (1.0)	ND (1.0)	38,000	35	480	470	ND (0.2)
MW-F-60	MW-F-60-3V-0719	N		GW	7/25/2019	290	43	ND (1.0)	ND (1.0)	41,000	41	170	170	ND (0.2)
MW-F-60	MW-F-60-LF-0719	N		GW	7/25/2019	620	110	ND (1.0)	ND (1.0)	41,000	43	170	160	ND (0.2)
MW-L-180	MW-907-Q319	FD	MW-L-180-0719	GW	7/25/2019	710	43	ND (5.0)	ND (1.0)	19,000	19	ND (0.5)	ND (0.5)	ND (0.2)
MW-L-180	MW-L-180-0719	N		GW	7/25/2019	640	25	ND (5.0)	ND (5.0)	20,000	20	ND (0.5)	ND (0.5)	ND (0.2)
MW-M-132	MW-M-132-0719	N		GW	7/22/2019	2,700	480	ND (1.0)	ND (1.0)	32,000	31	730	740	ND (0.2)
MW-M-193	MW-M-193-0719	N		GW	7/22/2019	3,400	180	ND (1.0)	ND (1.0)	12,000	11	350	320	ND (0.2)
MW-M-57	MW-M-57-0719	N		GW	7/22/2019	1,300	48	ND (1.0)	ND (1.0)	15,000	15	190	180	ND (0.2)
MW-M-95	MW-M-95-0719	N		GW	7/22/2019	580	230	ND (1.0)	ND (1.0)	53,000	51	1,400	1,400	ND (0.2)
MW-N-217	MW-N-217-0719	N		GW	7/23/2019	610	97	ND (1.0)	ND (1.0)	6,800	6.7	27	26	ND (0.2)
MW-R-109	MW-R-109-0719	N		GW	7/23/2019	53	23	ND (1.0)	ND (1.0)	15,000	15	ND (0.5)	ND (0.5)	ND (0.2)
MW-R-192	MW-R-192-0719	N		GW	7/23/2019	830	300	ND (1.0)	ND (1.0)	27,000	27	480	540	ND (0.2)
MW-R-275	MW-R-275-0719	N		GW	7/23/2019	880	260	ND (1.0)	ND (1.0)	23,000	22	500	500	ND (0.2)
MW-U-183	MW-U-183-0719	N		GW	7/24/2019	370	31	ND (1.0)	ND (1.0)	62,000	20	140	120	ND (0.2)
MW-U-273	MW-U-273-0719	N		GW	7/24/2019	4,000	60	ND (1.0)	ND (1.0)	8,800	8.4	17	ND (0.5)	ND (0.2)


= Preliminary result. Data results continued to be significantly late this quarter due to lab issues.

<div>  <div> Design & Consultancy for natural and built assets </div> </div>						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
<div>TMP 2019-07 Baseline Sampling</div>						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
						Unit	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L
Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled									
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N		GW	7/11/2019	ND (0.2)	8	8.1	6.4	6.7	2.8	9.2	1.4	2
MW-10D	MW-10D-0719	N		GW	7/24/2019	ND (0.2)	37	34	1.3	ND (1.0)	5.1	15	5	4.6
MW-B-117	MW-B-117-0719	N		GW	7/23/2019	ND (0.2)	44	43	ND (1.0)	ND (1.0)	0.51	17	0.77	0.52
MW-B-33	MW-906-Q319	FD	MW-B-33-0719	GW	7/23/2019	ND (0.2)	11	11	ND (1.0)	ND (1.0)	0.77	11	0.7	0.56
MW-B-33	MW-B-33-0719	N		GW	7/23/2019	ND (0.2)	11	11	ND (1.0)	ND (1.0)	0.78	11	0.77	1.1
MW-F-60	MW-F-60-3V-0719	N		GW	7/25/2019	ND (0.2)	13	14	7.9	2.7	8.1	15	11	11
MW-F-60	MW-F-60-LF-0719	N		GW	7/25/2019	ND (0.2)	14	14	12	3.2	9.8	15	10	10
MW-L-180	MW-907-Q319	FD	MW-L-180-0719	GW	7/25/2019	ND (0.2)	36	35	3.8	ND (1.0)	0.37	15	0.71	0.52
MW-L-180	MW-L-180-0719	N		GW	7/25/2019	ND (0.2)	35	35	2.8	ND (1.0)	0.44	19	0.66	0.55
MW-M-132	MW-M-132-0719	N		GW	7/22/2019	ND (0.2)	24	24	6.7	ND (1.0)	0.13	17	ND (0.5)	ND (0.5)
MW-M-193	MW-M-193-0719	N		GW	7/22/2019	ND (0.2)	73	52	110	8.4	0.4	29	0.94	0.69
MW-M-57	MW-M-57-0719	N		GW	7/22/2019	ND (0.2)	18	18	1.8	ND (1.0)	7.3	9.1	3.7	3.9
MW-M-95	MW-M-95-0719	N		GW	7/22/2019	ND (0.2)	11	10	ND (1.0)	ND (1.0)	0.45	13	ND (0.5)	ND (0.5)
MW-N-217	MW-N-217-0719	N		GW	7/23/2019	ND (0.2)	58	58	3.5	ND (1.0)	ND (0.05)	17	0.72	ND (0.5)
MW-R-109	MW-R-109-0719	N		GW	7/23/2019	ND (0.2)	14	14	ND (1.0)	ND (1.0)	6.6	11	5.4	4.5
MW-R-192	MW-R-192-0719	N		GW	7/23/2019	ND (0.2)	27	27	ND (1.0)	ND (1.0)	0.19	16	ND (0.5)	ND (0.5)
MW-R-275	MW-R-275-0719	N		GW	7/23/2019	ND (0.2)	63	57	32	6.1	ND (0.05)	23	ND (0.5)	ND (0.5)
MW-U-183	MW-U-183-0719	N		GW	7/24/2019	ND (0.2)	12	12	1.3	ND (1.0)	1.8	20	2.2	1.9
MW-U-273	MW-U-273-0719	N		GW	7/24/2019	ND (0.2)	50	44	40	8.6	2.6	17	4	3.8

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<div>  <div> Design & Consultancy for natural and built assets </div> </div>						Lab	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET	ASSET
<div> <div>TMP 2019-07 Baseline Sampling</div> </div>						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
						Unit	ug/L	ug/L	mg/L	mg/L	ug/L	ug/L	mg/L	mg/L
Location ID	Sample ID	Sample Type	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)	670	230	ND (0.5)	ND (0.5)	2,800	ND (1.0)	ND (50)
MW-10D	MW-10D-0719	N		GW	7/24/2019	ND (0.5)	ND (0.5)	610	320	ND (0.5)	ND (0.5)	2,100	ND (1.0)	
MW-B-117	MW-B-117-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	2,200	530	ND (0.5)	ND (0.5)	6,100	ND (1.0)	
MW-B-33	MW-906-Q319	FD	MW-B-33-0719	GW	7/23/2019	ND (0.5)	ND (0.5)	830	250	ND (0.5)	ND (0.5)	3,200	ND (1.0)	
MW-B-33	MW-B-33-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	830	250	ND (0.5)	ND (0.5)	3,100	ND (1.0)	
MW-F-60	MW-F-60-3V-0719	N		GW	7/25/2019	4.1	ND (0.5)	420	390	ND (0.5)	ND (0.5)	2,100	ND (1.0)	
MW-F-60	MW-F-60-LF-0719	N		GW	7/25/2019	7.7	ND (0.5)	430	390	ND (0.5)	ND (0.5)	2,100	ND (1.0)	
MW-L-180	MW-907-Q319	FD	MW-L-180-0719	GW	7/25/2019	1.8	ND (0.5)	1,100	490	ND (2.5)	ND (0.5)	6,800	ND (1.0)	
MW-L-180	MW-L-180-0719	N		GW	7/25/2019	1.2	ND (0.5)	2,100	490	ND (2.5)	ND (2.5)	7,000	ND (1.0)	
MW-M-132	MW-M-132-0719	N		GW	7/22/2019	2	ND (0.5)	1,500	330	ND (0.5)	ND (0.5)	5,400	ND (1.0)	
MW-M-193	MW-M-193-0719	N		GW	7/22/2019	53	0.85	2,700	520	ND (0.5)	ND (0.5)	7,200	ND (1.0)	
MW-M-57	MW-M-57-0719	N		GW	7/22/2019	ND (0.5)	ND (0.5)	300	170	ND (0.5)	ND (0.5)	1,200	ND (1.0)	
MW-M-95	MW-M-95-0719	N		GW	7/22/2019	ND (0.5)	ND (0.5)	770	240	ND (0.5)	ND (0.5)	4,300	ND (1.0)	
MW-N-217	MW-N-217-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	910	350	ND (0.5)	ND (0.5)	2,600	ND (1.0)	
MW-R-109	MW-R-109-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	310	140	ND (0.5)	ND (0.5)	950	ND (1.0)	
MW-R-192	MW-R-192-0719	N		GW	7/23/2019	ND (0.5)	ND (0.5)	1,600	320	ND (0.5)	ND (0.5)	5,100	ND (1.0)	
MW-R-275	MW-R-275-0719	N		GW	7/23/2019	26	2.2	2,200	430	ND (0.5)	ND (0.5)	6,600	ND (1.0)	
MW-U-183	MW-U-183-0719	N		GW	7/24/2019	ND (0.5)	ND (0.5)	2,400	450	ND (0.5)	ND (0.5)	5,100	ND (1.0)	
MW-U-273	MW-U-273-0719	N		GW	7/24/2019	42	1.1	1,500	480	ND (0.5)	ND (0.5)	4,300	ND (1.0)	

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Design & Consultancy
for natural and
built assets

TMP 2019-07 Baseline Sampling

Lab

Description

Method

Unit

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

BCLabs


Ammonia as nitrogen

SM 4500-NH3 G


mg/L

Location ID	Sample ID	Sample Type	Parent Sample	Matrix	Date Sampled						
IRZ-20-SC-49-71	IRZ-20-SC-49-71	N		GW	7/11/2019	ND (50)	6.5	6.6	40	40	ND (2.0)
MW-10D	MW-10D-0719	N		GW	7/24/2019		3.2	2.6	42	30	ND (2.0)
MW-B-117	MW-B-117-0719	N		GW	7/23/2019		ND (1.0)	ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-B-33	MW-906-Q319	FD	MW-B-33-0719	GW	7/23/2019		2.4	1.4	ND (10)	ND (10)	ND (2.0)
MW-B-33	MW-B-33-0719	N		GW	7/23/2019		2.4	1.6	ND (10)	ND (10)	ND (2.0)
MW-F-60	MW-F-60-3V-0719	N		GW	7/25/2019		3.4	3	ND (10)	ND (10)	ND (2.0)
MW-F-60	MW-F-60-LF-0719	N		GW	7/25/2019		3.3	2.2	ND (10)	ND (10)	ND (2.0)
MW-L-180	MW-907-Q319	FD	MW-L-180-0719	GW	7/25/2019		8.4	6.8	ND (10)	ND (10)	ND (2.0)
MW-L-180	MW-L-180-0719	N		GW	7/25/2019		8	6.7	ND (10)	ND (10)	ND (2.0)
MW-M-132	MW-M-132-0719	N		GW	7/22/2019		2.6	ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-M-193	MW-M-193-0719	N		GW	7/22/2019		7.7	3	18	ND (10)	ND (2.0)
MW-M-57	MW-M-57-0719	N		GW	7/22/2019		6.3	4.7	ND (10)	ND (10)	ND (2.0)
MW-M-95	MW-M-95-0719	N		GW	7/22/2019		1.3	ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-N-217	MW-N-217-0719	N		GW	7/23/2019		1.7	ND (1.0)	32	ND (10)	ND (2.0)
MW-R-109	MW-R-109-0719	N		GW	7/23/2019		2.4	2.4	ND (10)	ND (10)	ND (2.0)
MW-R-192	MW-R-192-0719	N		GW	7/23/2019		1.4	ND (1.0)	ND (10)	ND (10)	ND (2.0)
MW-R-275	MW-R-275-0719	N		GW	7/23/2019		1.4	ND (1.0)	38	12	ND (2.0)
MW-U-183	MW-U-183-0719	N		GW	7/24/2019		3.2	2.6	ND (10)	ND (10)	ND (2.0)
MW-U-273	MW-U-273-0719	N		GW	7/24/2019		20	14	32	ND (10)	ND (2.0)

= Preliminary result. Data results continued to be significantly late this quarter due to lab issues.

<div><div></div><div>Design & Consultancy for natural and built assets</div></div>					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	SM 4500-NO3 F	SW 6020	EPA 300.0
					Unit	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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<div>  <div> Design & Consultancy for natural and built assets </div> </div> <div> <div>TMP 2019-07 Post-Development Sampling</div> </div>					Lab	ASSET Chromium, Hexavalent	ASSET Chromium, total dissolved
					Description	EPA 218.6	SW 6020
					Method	ug/L	ug/L
					Unit		
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)

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