Pacific Gas and Electric Company

Curt Russell
Topock Project Manager
Environmental Remediation

Topock Compressor Station
145453 National Trails Hwy
Needles, CA 92363

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

760.791.5884
Fax: 760.326.5542
E-Mail: gcr4@pge.com

April 30, 2020

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

Subject: *First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California* (PGE20180115A)

Dear Mr. Yue:

Enclosed is the First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California, for Pacific Gas and Electric Company's Interim Measures (IMs) Performance Monitoring Program, the Groundwater Monitoring Program, and the Surface Water Monitoring Program for the Topock Project. This report presents the First Quarter (January through March 2020) performance monitoring results for the IM-3 hydraulic containment system. This report also presents groundwater and surface water monitoring activities, results, and analyses related to the Groundwater and Surface Water Monitoring Programs during the First Quarter 2020.

The IM quarterly performance monitoring report is submitted in conformance with the reporting requirements in the California Environmental Protection Agency, Department of Toxic Substances Control's (DTSC) IM directive, dated February 14, 2005, and updates and modifications approved by DTSC in letters or emails dated October 12, 2007; July 14, 2008; July 17, 2008; March 3, 2010; April 28, 2010; July 23, 2010; June 27, 2014; July 20, 2015; and August 18, 2017.

Please contact me at 760.791.5884 if you have any questions on the combined monitoring report.

Sincerely,

Curt Russell
Topock Remediation Project Manager

Cc: Chris Guerre/DTSC
Pam Innis/DOI
Ken Foster/CA-SLC
Bruce Campbell/AZ-SLD

Topock Project Executive Abstract

Document Title: First Quarter 2020 Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles CA Submitting Agency: DTSC Final Document? ☒ Yes ☐ No	Date of Document: April 30, 2020 Who Created this Document?: (i.e. PG&E, DTSC, DOI, Other) – PG&E
Priority Status: ☐ **HIGH** ☐ **MED** ☒ **LOW** Is this time critical? ☐ Yes ☒ No Type of Document: ☐ Draft ☒ Report ☐ Letter ☐ Memo ☐ Other / Explain:	Action Required: ☒ Information Only ☐ Review & Comment Return to: ____________________ By Date:_____________________ ☐ Other / Explain:
What does this information pertain to? ☐ Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA)/Preliminary Assessment (PA) ☐ RCRA Facility Investigation (RFI)/Remedial Investigation (RI) (including Risk Assessment) ☐ Corrective Measures Study (CMS)/Feasibility Study (FS) ☐ Corrective Measures Implementation (CMI)/Remedial Action ☐ California Environmental Quality Act (CEQA)/Environmental Impact Report (EIR) ☒ Interim Measures ☐ Other / Explain:	Is this a Regulatory Requirement? ☒ Yes ☐ No If no, why is the document needed?
What is the consequence of NOT doing this item? What is the consequence of DOING this item? Submittal of this report is a compliance requirement under DTSC requirements.	Other Justification/s: ☐ Permit ☐ Other / Explain:

Brief Summary of attached document:

This quarterly report documents the monitoring activities and performance evaluation of the interim measure (IM) hydraulic containment system under the IM Performance Monitoring Program, the Groundwater Monitoring Program, and Surface Water Monitoring Program for the Topock Project. Hydraulic and chemical monitoring data were collected and used to evaluate the IM hydraulic containment system performance based on a set of standards approved by the California Department of Substances Control (DTSC). Key items included in this report are: (1) measured groundwater elevations and hydraulic gradient data at compliance well pairs that indicate the direction of groundwater flow is away from the Colorado River and toward the pumping centers on site; (2) hexavalent chromium data for monitoring wells; (3) pumping rates and volumes from the IM extraction system; and (4) Groundwater Monitoring Program and Surface Water Monitoring Program activities and results.

Based on the data and evaluation presented in this report, the IM performance standard has been met for the First Quarter 2020 Reporting Period. On July 23, 2010, DTSC approved a revised reporting schedule for this report that included a revised IM-3 sample collection period from January 1, 2020 through March 31, 2020.

Written by: PG&E

Recommendations:
none

How is this information related to the Final Remedy or Regulatory Requirements:

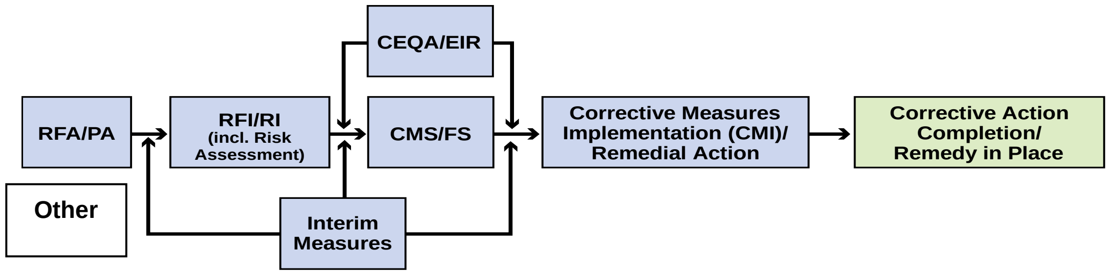
This report is required by DTSC as part of the Interim Measures Performance Monitoring Program.

Other requirements of this information?

None.

Related Reports and Documents:

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



Legend
RFA/PA – RCRA Facility Assessment/Preliminary Assessment
RFI/RI – RCRA Facility Investigation/CERCLA Remedial Investigation (including Risk Assessment)
CMS/FS – RCRA Corrective Measure Study/CERCLA Feasibility Study
CEQA/EIR – California Environmental Quality Act/Environmental Impact Report

Pacific Gas and Electric Company

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

Topock Compressor Station, Needles, California

April 30, 2020

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

Topock Compressor Station,
Needles, California

Prepared for:

California Department of Toxic Substances Control

Prepared by:

Arcadis U.S., Inc.

101 Creekside Ridge Court

Suite 200

Roseville

California 95678

Tel 916 786 0320

Fax 916 786 0366

Our Ref.:

30019133

Date:

April 30, 2020

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

This report was prepared under the supervision of a California Professional Geologist

Frederick T. Stanin, P.G., C. Hg
Principal Hydrogeologist

Alison Schaffer
Arcadis Report Lead

Daniel Bush, P.E.
Arcadis Project Manager

CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

δ2H	deuterium
δ18O	oxygen-18
µg/L	microgram per liter
3V	three-volume
COPC	constituent of potential concern
Cr(VI)	hexavalent chromium
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ft/ft	foot per foot
ft bgs	foot below ground surface
GMP	Groundwater Monitoring Program
gpm	gallon per minute
ID	identification
IM	interim measure
IM-3	Interim Measures number 3
IMCP	Interim Measures Contingency Plan
LF	low-flow
mg/L	milligram per liter
MS	matrix spike
MSD	matrix spike duplicate
ORP	oxidation-reduction potential
PDS	post digestion spike
PG&E	Pacific Gas and Electric Company
PMP	Performance Monitoring Program
QC	quality control
RCRA	Resource Conservation and Recovery Act
RMP	Surface Water Monitoring Program
RPD	relative percent difference
RRB	Red Rock Bridge
TDS	total dissolved solids

TSS	total suspended solids
USBR	United States Bureau of Reclamation
UTL	upper tolerance limit

EXECUTIVE SUMMARY

This quarterly report documents the monitoring activities and performance evaluation of the interim measure (IM) hydraulic containment system under the Groundwater Monitoring Program (GMP), Surface Water Monitoring Program (RMP), and IM Performance Monitoring Program (PMP) for the Topock Compressor Station (the site). Chemical and hydraulic monitoring data were collected and used to determine if site conditions have changed and evaluate the IM hydraulic containment system performance based on a set of standards approved by the California Department of Toxic Substances Control (DTSC).

Key items included in this report are: (1) GMP and RMP activities and results; (2) hexavalent chromium data for monitoring wells in the floodplain area; (3) measured groundwater elevations and hydraulic gradient data at compliance well pairs; and (4) pumping rates and volumes from the IM extraction system.

During First Quarter 2020, IM extraction well TW-03D was operated to support hydraulic control. Hydraulic gradient data indicate that the minimum landward gradient target of 0.001 foot per foot was exceeded each month, providing evidence of hydraulic containment of the hexavalent chromium plume. Hexavalent chromium concentrations greater than 20 micrograms per liter in the floodplain area were contained for removal and treatment. Based on the data and evaluation presented in this report, the IM performance standard has been met for the First Quarter 2020.

1 INTRODUCTION

Pacific Gas and Electric Company (PG&E) is implementing interim measures (IMs) to address chromium concentrations in groundwater at the Topock Compressor Station (the site). The Topock Compressor Station is in eastern San Bernardino County, 15 miles southeast of the City of Needles, California, as shown on Figure 1-1.

This report presents the monitoring data from three PG&E monitoring programs:

- Site-wide Groundwater Monitoring Program (GMP)
- Site-wide Surface Water Monitoring Program (RMP)
- Interim Measures (currently Interim Measure Number 3 [IM-3]) Performance Monitoring Program (PMP).

This report presents the monitoring data collected from PG&E's GMP, RMP, and PMP programs between January 1 through March 31, 2020 (hereafter referred to as "First Quarter 2020"). Table 1-1 shows the current reporting schedule for these programs.

This report is divided into six sections:

Section 1 introduces the site; the GMP, RMP, and PMP programs; and the regulatory framework.

Section 2 describes the First Quarter 2020 monitoring activities and site operations conducted in support of these programs.

Section 3 presents GMP and RMP monitoring results for the First Quarter 2020.

Section 4 presents PMP monitoring results and the IM evaluation for the First Quarter 2020.

Section 5 describes upcoming monitoring events for the Second Quarter 2020.

Section 6 lists the references cited throughout this report.

This combined GMP, RMP, and PMP reporting format was approved by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in May 2009 (DTSC 2009).

1.1 First Quarter 2020 Regulatory Communication

PG&E communications with the DTSC in First Quarter 2020 associated with the GMP, RMP, and/or PMP programs are outlined below.

- The Fourth Quarter 2019 and Annual Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report (PMP-GMP Report) was submitted to the DTSC on March 15, 2020 (Arcadis 2020).
- Required GMP, RMP, and PMP notifications submitted for First Quarter 2020 included:
  - On April 8, 2020, Arcadis sent a quarterly email notification to PG&E providing hexavalent chromium (Cr[VI]) and dissolved chromium results from the January and February 2020 shoreline

and in-channel surface water sampling events. During the sampling events, Cr(VI) and dissolved chromium concentrations were lower than the respective reporting limits.

- On April 24, 2020, Arcadis, on behalf of PG&E, sent a quarterly email notification to the DTSC providing Cr(VI) and dissolved chromium results from four subject floodplain wells (MW-34-100, MW-44-115, MW-46-175, and MW-44-125).
- As part of the conditional approval for the shutoff of extraction well PE-01, GMP monitoring results for monitoring wells listed in the July 20, 2015 DTSC approval letter (see Section 1.4.2.2; DTSC 2015) are compared to the maximum Cr(VI) and dissolved chromium concentrations measured in 2014 (or for biennial sampling frequency, the 2013 maximum concentrations), and results that exceed the previous maximum are required to be reported to the DTSC within 40 days after the end of the quarterly GMP sampling event. In First Quarter 2020, Cr(VI) and dissolved chromium concentrations were below the notification levels; therefore a notification email was not submitted to the DTSC.

1.2 History of Groundwater Impact at the Site

1.2.1 Cr(VI) Impacts to Groundwater

The Topock Compressor Station began operations in 1951. Remediation efforts are ongoing to address Cr(VI) in soil and groundwater resulting from the historical water discharge practices. A comprehensive library documenting the history of remediation at the Topock Compressor Station is available on the DTSC website at http://dtsc-topock.com/ (DTSC 2018).

1.2.2 Background Concentrations of Cr(VI)

Based on a regional study of naturally occurring metals in groundwater and a statistical evaluation of these data, naturally occurring Cr(VI) in groundwater was calculated to exhibit an upper tolerance limit (UTL) concentration of 32 micrograms per liter (µg/L; CH2M Hill 2009). This concentration is used as the background concentration for remedial activities. At the site, the Cr(VI) plume is mostly present within unconsolidated alluvial fan and fluvial deposits within the Alluvial Aquifer and, to a lesser extent, in fractured bedrock. Natural groundwater gradients are generally west-to-east at most of the site. The depth to groundwater and the thickness of the saturated sediments vary significantly across the site based on surface topography and the paleo-topography of the top of bedrock surface underneath the site.

1.3 Site-wide Groundwater and Surface Water Monitoring Programs

1.3.1 Basis for GMP and RMP Programs

Routine groundwater and surface water monitoring activities at the site began in 1998 following a Resource Conservation and Recovery Act (RCRA) facility investigation and are ongoing (CH2M Hill 2005). The main objective of the GMP and RMP programs is to monitor concentrations of Cr(VI) and other site constituents in groundwater and surface water to determine if site conditions have changed and to make decisions about remedial options and future monitoring (CH2M Hill 2005). In accordance with the

2005 Monitoring Plan for Groundwater and Surface Water Monitoring (CH2M Hill 2005), quarterly monitoring reports document groundwater and surface water monitoring activities performed at the site during each reporting period. Monitoring reports to date are available on the DTSC website. This report documents the GMP and RMP monitoring activities conducted in First Quarter 2020.

1.3.2 GMP and RMP Monitoring Networks

The GMP monitoring well network and RMP surface water monitoring network are shown on Figures 1-2 and 1-3, respectively, and are summarized in the table below. The complete GMP network includes 145 wells that monitor groundwater in the Alluvial Aquifer and bedrock. Well construction details for wells in the GMP monitoring well network are summarized in Table 1-2. The RMP network consists of 16 surface water monitoring locations, nine of which are sampled at multiple depths.

Groundwater and Surface Water Monitoring Wells

Groundwater Monitoring Wells	Surface Water Monitoring Wells
133 monitoring wells in California, including two normally dry wells	10 river channel locations (9 of which are sampled at two different depths)
8 monitoring wells in Arizona	4 shoreline locations
4 IM-3 extraction wells	2 other surface water sampling locations (adjacent to the shoreline)

GMP and RMP monitoring consists of collecting groundwater and surface water samples, inspecting the monitoring wells, and taking corrective actions as needed. GMP and RMP monitoring is performed quarterly, although the monitoring wells included in each GMP event vary by quarter. In addition, GMP monitoring is performed monthly at two extraction wells (TW-03D and PE-01). Table 1-2 provides a list of the monitoring wells and surface water monitoring locations included in the GMP and RMP programs and the monitoring frequency at each location. Monitoring frequency at GMP wells is also shown on Figure 1-2.

If a storm causes surface water flow in Bat Cave Wash, additional groundwater samples are collected from monitoring wells MW-09, MW-10, and MW-11. Bat Cave Wash is an incised ephemeral stream adjacent to the Topock Compressor Station, which flows following rainfall events and drains into the Colorado River (Figures 1-1 and 1-2).

1.4 Interim Measure Performance Monitoring Program

1.4.1 Basis for PMP Program

Operation of the current IM-3 system began in July 2005. The IM-3 system is intended to maintain hydraulic control of the groundwater Cr(VI) plume until the final corrective action is in place at the site (CH2M Hill 2007). The IM-3 system consists of a groundwater extraction system (four extraction wells: TW-02D, TW-03D, TW-02S, and PE-01), conveyance piping, a groundwater treatment plant, and an injection well field (for the discharge of the treated groundwater). Figure 1-1 shows the locations of the IM-3 extraction, conveyance, treatment, and injection facilities.

In a letter dated February 14, 2005, the DTSC issued an IM performance directive that established the operational requirements for the IM and methods for evaluating the performance of the IM (DTSC 2005). As defined by the DTSC, the performance standard for the IM is to *"establish and maintain a net landward hydraulic gradient, both horizontally and vertically, that ensures that Cr(VI) concentrations at or greater than 20 micrograms per liter [µg/L] in the floodplain are contained for removal and treatment"* (DTSC 2005). The IM is required to maintain a landward hydraulic gradient of at least 0.001 foot per foot (ft/ft) within the lower portion of the Alluvial Aquifer (DTSC 2005).

In accordance with the February 2005 DTSC directive, the following conditions must be met to demonstrate achievement of the IM performance standard (DTSC 2005):

- Demonstrate that a landward hydraulic gradient is maintained within the lower portion of the Alluvial Aquifer in the floodplain by:
    - Providing potentiometric surface contour maps of the Alluvial Aquifer within the floodplain area
    - Providing calculated hydraulic gradients using established gradient well pairs.
- Demonstrate that Cr(VI) concentrations greater than 20 µg/L in the floodplain area are contained for removal and treatment by:
    - Depicting the 20 and 50 µg/L isoconcentration contours for Cr(VI) within the floodplain on potentiometric surface maps and hydrogeologic cross-sections
    - Providing maps and cross-sections of the Cr(VI) concentration for the upper, middle, and lower portions of the Alluvial Aquifer in the floodplain area
    - Providing time versus concentration graphs for Cr(VI) measured in floodplain wells.

The February 2005 DTSC directive also defined the reporting requirements for the IM (DTSC 2005). In October 2007, the DTSC approved modifications to the reporting requirements, discontinuing monthly performance monitoring reports and continuing with quarterly and annual reports (DTSC 2007). The DTSC approved additional updates and modifications to the PMP in letters dated October 12, 2007; July 14, 2008; July 16, 2008; March 3, 2010; April 28, 2010; and June 27, 2014 (DTSC 2007, 2008a, 2008b, 2010a, 2010b, 2014).

1.4.2 PMP Monitoring Network

The PMP consists of a network of monitoring wells used to demonstrate achievement of the IM performance standard. Subsets of wells within the PMP network, including: (1) chromium monitoring network; (2) IM extraction wells; (3) IM hydraulic monitoring network; (4) IM Contingency Plan (IMCP) monitoring wells; and (5) IM chemical performance monitoring network, focus on different methods for evaluating performance of the IM. The PMP monitoring network is presented in the table below and shown on Figure 1-4.

PMP Monitoring Network (145 monitoring wells included in the GMP)

Type of Well	Wells Included in Network
IM Extraction Wells (4 monitoring wells)	• TW-02D • TW-03D • TW-02S • PE-01
IM Hydraulic Monitoring Network (57 monitoring wells and 2 river monitoring locations)	• 16 shallow monitoring wells • 15 mid-depth monitoring wells • 26 deep monitoring wells • 2 river monitoring locations: I-3 and Red Rock Bridge (RRB)
IMCP Monitoring Wells (24 monitoring wells)	• 6 shallow monitoring wells • 5 mid-depth monitoring wells • 13 deep monitoring wells
IM Chemical Performance Monitoring Network (10 monitoring wells and 1 river monitoring location)	• 5 shallow monitoring wells • 2 mid-depth monitoring wells • 3 deep monitoring wells • 1 river monitoring location: R-28

The subsets of monitoring well networks within the PMP are described in the following subsections.

1.4.2.1 Chromium Monitoring Network

Cr(VI) data, collected as part of the GMP, are used to generate maps, cross-sections, and concentration time series charts that demonstrate that Cr(VI) concentrations greater than 20 µg/L in the floodplain area are contained for removal and treatment. As described in Section 1.3.2, groundwater sampling events are performed quarterly; however, the monitoring wells included in each sampling event vary by quarter. In addition, groundwater sampling is performed monthly at extraction wells TW-03D and PE-01. Table 1-2 provides a list of monitoring wells included in the chromium monitoring network (i.e., the GMP monitoring network) and the monitoring frequency of each location.

1.4.2.2 IM Extraction Wells

The PMP includes four IM extraction wells, which are used to ensure a landward hydraulic gradient via groundwater extraction (Figure 1-4). The operation of the IM extraction system, including pumping rates, planned/unplanned downtime, and volume of groundwater extracted from each extraction well, is documented to demonstrate proper operation of the extraction system. In addition, the wells are sampled as part of the GMP: extraction wells TW-03D and PE-01 are sampled monthly, TW-02D is sampled quarterly, and TW-02S is sampled annually.

<u>Wells Monitored for Conditional Shutdown of PE-01</u>

On July 20, 2015, the DTSC conditionally approved a proposal to modify the IM-3 pumping regime by allowing PE-01 to be shut off and pumping to be shifted to TW-03D and TW-02D or TW-02S, so long as gradient targets are maintained and contingency is not triggered based on chromium concentrations in select floodplain wells (DTSC 2015). Because PE-01 pumps water with low concentrations of chromium (typically less than 5 µg/L), shifting more pumping to a higher concentration extraction well can increase the rate of chromium removal from the floodplain.

As part of the conditional approval for PE-01 shutoff, GMP monitoring results from 47 monitoring wells listed in the July 20, 2015 DTSC approval letter (i.e., wells within approximately 800 feet of TW-03D; Table 1-2) are compared to the maximum detected Cr(VI) and dissolved chromium concentrations from 2014 (or 2013 for wells sampled biennially). If any of the wells exceed the 2014 maximum concentration, then the DTSC must be notified within 40 days after completion of the field sampling event to determine if PE-01 pumping should be reinitiated (DTSC 2015).

1.4.2.3 IM Hydraulic Monitoring Network

The IM hydraulic monitoring network consists of 52 monitoring wells located on the California side of the Colorado River and two river monitoring locations (I-3 and RRB) used to evaluate the performance of the IM-3 system by demonstrating compliance of the required hydraulic gradient of 0.001 ft/ft (Figure 1-4, Table 1-2). In addition, five groundwater monitoring wells located on the Arizona side of the Colorado River (MW-54-085, MW-54-140, MW-54-195, MW-55-045, and MW-55-120; not formally part of the PMP) also provide groundwater elevation data that demonstrate hydraulic gradients on the Arizona side of the river (Figure 1-4). Groundwater and surface water elevation data from these locations are collected monthly using pressure transducers installed at each location.

Groundwater elevation data collected from the IM hydraulic monitoring network are used to develop potentiometric maps of shallow, mid-depth, and deep groundwater and measure hydraulic gradients of three well pairs (northern, central, and southern) to demonstrate compliance with the required 0.001 ft/ft landward hydraulic gradient. On August 18, 2017, the DTSC approved use of monitoring well MW-20-130 in place of well MW-45-095 in the central and southern gradient well pairs during months when extraction well PE-01 is not pumped for hydraulic control at the site (DTSC 2017b). The current gradient well pairs are:

- Northern Gradient Pair: MW-31-135 and MW-33-150.
- When PE-01 is operated for hydraulic control:
  - Central Gradient Pair: MW-45-095 and MW-34-100
  - Southern Gradient Pair: MW-45-095 and MW-27-085.
- When PE-01 is not operated for hydraulic control:
  - Central Gradient Pair: MW-20-130 and MW-34-100
  - Southern Gradient Pair: MW-20-130 and MW-27-085.

1.4.2.4 IM Contingency Plan Monitoring Wells

The IMCP was developed to detect and control possible migration of the Cr(VI) plume toward the Colorado River (DTSC 2005). Twenty-four IMCP wells were selected as part of an early detection system to detect any increases in chromium concentrations at areas of interest across the site (Figure 1-4, Table 1-2). The IMCP wells are sampled quarterly, as part of the GMP monitoring program (note that not all 24 wells are sampled each quarter), to determine if any increasing trends in Cr(VI) concentrations are observed. If Cr(VI) concentrations exceed the established trigger levels (based on historical Cr[VI] concentrations), then a contingency plan must be implemented in accordance with the Revised Contingency Plan Flow Chart (DTSC 2005; PG&E 2008).

1.4.2.5 IM Chemical Performance Monitoring Network

Eleven IM chemical performance monitoring wells are sampled annually or biennially to help evaluate performance of the future remedy (Figure 1-4, Table 1-2). Wells are sampled for an expanded chemistry suite (dissolved boron, bromide, dissolved calcium, chloride, dissolved magnesium, nitrate/nitrite as nitrogen, dissolved potassium, dissolved sodium, sulfate, total alkalinity [as calcium carbonate], total dissolved solids [TDS], and stable isotopes [oxygen-18 {δ18O} and deuterium {δ2H}]), which was last amended in 2008 (DTSC 2008b; PG&E 2008). Currently, nine monitoring wells and one river monitoring location (R-28) are sampled annually, and one well is sampled biennially (MW-26). Results of IM chemical performance monitoring were last reported in the Fourth Quarter 2019 and Annual PMP-GMP Report (Arcadis 2020). The next scheduled monitoring event is planned for Fourth Quarter 2020.

1.5 Sustainability

The GMP, RMP, and PMP programs strive to use sustainable sampling and data collection practices. This section briefly describes some of the sustainability practices now in use, which aim to reduce emissions from travel, reduce waste, conserve resources, and reduce potential impacts to nesting habitat and culturally sensitive areas.

- Groundwater sampling purge water is disposed on site via the IM-3 treatment plant and injection process.
- The RMP boat contractor is employed locally.
- Laboratory services are provided by a California-certified, Las Vegas-based lab.
- Cr(VI) and nitrate analytical methods were revised to methods with longer holding times.
- Reports are submitted via the DTSC website and electronically, and the number of hard copy quarterly report submittals has been reduced over time.
- Solar-powered data telemetry systems were installed at six key gradient compliance well locations located in floodplain areas with nesting habitat for sensitive avian species.
- Low-flow sampling methods are used at most wells screened in the Alluvial Aquifer, reducing the volume of purge water.
- For wells still using the three-volume purge sampling methods, pumps and tubing are sized for the optimum purge technique at each well.
- Utility vehicles (e.g., Polaris Ranger or Kawasaki Mule) and a quiet electric four-wheel-drive utility vehicle are used to access wells on the floodplain and in some culturally sensitive areas rather than the full-size pickup truck.

- The IM-3 pumping regime was modified to allow PE-01 to be periodically shut off with pumping shifted to TW-03D and TW-02D or TW-02S. When applied, this modification allows for an increase in the rate of chromium removal from the floodplain.

2 FIRST QUARTER 2020 MONITORING ACTIVITIES

This section summarizes the monitoring activities completed during First Quarter 2020 for the GMP, RMP, and PMP programs.

2.1 Groundwater Monitoring Program

The First Quarter 2020 GMP consisted of monthly and quarterly groundwater monitoring, and a sampling method trial at one monitoring well.

2.1.1 Monthly Groundwater Monitoring

Monthly GMP monitoring events were performed at IM extraction well TW-03D in January, February, and March 2020 and consisted of groundwater sampling. IM extraction well PE-01 was not sampled in First Quarter 2020 due to construction activities associated with the final groundwater remedy at the site. The monitoring well locations are shown on Figure 1-2 and listed in Table 1-2. Samples at TW-03D were collected from the tap of the extraction well (see Table 1-2). During collection of each groundwater sample, field parameters were recorded (i.e., temperature, pH, specific conductivity, oxidation-reduction potential [ORP], turbidity, TDS, and salinity). Samples were sent to Asset Laboratories in Las Vegas, Nevada. Samples were analyzed for the following constituents:

- Cr(VI) and dissolved chromium
- General chemistry parameters: specific conductivity, pH, alkalinity, chloride, sulfate, and TDS
- Constituents of potential concern (COPCs): nitrate/nitrite as nitrogen
- In-situ byproducts: dissolved iron and dissolved manganese
- Cations: dissolved calcium, dissolved magnesium, and dissolved sodium.

2.1.2 Quarterly Groundwater Monitoring

The quarterly GMP monitoring event was performed from February 18 through 25, 2020 and consisted of groundwater sampling and inspection of 20 monitoring wells. Monitoring wells MW-57-050 and MW-58-065 were dry during the monitoring event; therefore, groundwater samples were not collected from these wells in First Quarter 2020. The monitoring well locations are shown on Figure 1-2 and listed in Table 1-2. Samples were collected using one or multiple sampling methods including low-flow, three-volume purge, and grab sampling methods (see Table 1-2). During collection of each groundwater sample, field parameters were recorded (i.e., temperature, pH, specific conductivity, ORP, turbidity, TDS, and salinity). Samples were sent to Asset Laboratories in Las Vegas, Nevada and were analyzed for the following constituents (note that not all samples were analyzed for the complete analytical suite listed below):

- Cr(VI) and dissolved chromium
- General chemistry parameters: Specific conductivity
- COPCs: dissolved molybdenum, dissolved selenium, and nitrate/nitrite as nitrogen
- In-situ byproducts: dissolved arsenic and dissolved manganese.

2.1.3 Sampling Method Trials at Select Wells

In accordance with a June 27, 2014 email from the DTSC, PG&E began sampling method trials to directly compare two different sampling methods (DTSC 2014). In August 2015, PG&E sent a letter to the DTSC recommending additional wells for low-flow sampling and proposing additional sampling method trials for select bedrock wells (PG&E 2015). The DTSC responded to this request with technical memoranda on April 6 and October 20, 2017, which provided conditional approval for actions including expanding the sampling method trials to specific long-screen and bedrock wells (DTSC 2017a, 2017c).

Sampling method trials were conducted at 10 monitoring wells during the 2018 Annual Reporting Period (January through December 2018) and were discontinued at nine of the 10 monitoring wells in Second Quarter 2019. The sampling method trial at MW-60BR-245 (comparing low-flow and three-volume purge sampling methods) continued in 2019 and First Quarter 2020. An evaluation of the sampling method trial is provided in Section 3.1.3.

2.2 Surface Water Monitoring Program

First Quarter 2020 RMP monitoring was performed on January 29 and 30, 2020 during “low-river” conditions and on February 19 and 20, 2020. Both RMP monitoring events consisted of collecting 25 surface water samples from 16 locations. At nine of the 16 locations, samples were collected from two depth intervals: shallow (1 foot below water surface) and deep (1 foot above the river bottom). The surface water locations are shown on Figure 1-3 and listed in Table 1-2. During collection of each surface water sample, field parameters were recorded (i.e., temperature, pH, specific conductivity, ORP, turbidity, TDS, and salinity). Samples were sent to Asset Laboratories in Las Vegas, Nevada for analysis of the following constituents:

- Cr(VI) and dissolved chromium
- General chemistry parameters: Specific conductivity and pH
- COPCs: dissolved molybdenum, dissolved selenium, and nitrate/nitrite as nitrogen
- In-situ byproducts: dissolved arsenic, total and dissolved iron, and dissolved manganese
- Geochemical Parameters: dissolved barium and total suspended solids (TSS).

2.3 IM Performance Monitoring Program

IM performance monitoring in First Quarter 2020 consisted of groundwater chromium monitoring within the floodplain area, a review of IM extraction system operation, and IM hydraulic monitoring. In addition, Cr(VI) and dissolved chromium data collected during chromium monitoring activities were used to monitor shutdown of extraction well PE-01 and evaluate the need to implement the IMCP.

2.3.1 Chromium Monitoring

Chromium monitoring was performed as part of the monthly and quarterly GMP monitoring activities. Twenty monitoring wells were sampled for Cr(VI) in February 2020. Extraction well TW-03D was sampled monthly in January, February, and March 2020. The monitoring well locations are shown on Figure 1-4 and listed in Table 1-2. Cr(VI) analytical results were used to evaluate Cr(VI) distribution in the floodplain area.

2.3.2 IM Extraction System Operation

The IM extraction system was operated in January, February, and March 2020. Pumping rates, planned or unplanned downtime, and the volume of groundwater extracted from each IM extraction well were documented. Daily IM-3 inspections were performed, including general facility inspections, flow measurements, and site security monitoring. Daily logs with documentation of inspections are maintained on site.

Wells Monitored for Conditional Shutdown of PE-01

Three GMP monitoring wells were sampled for Cr(VI) and dissolved chromium in First Quarter 2020 as part of the conditional approval for PE-01 shutdown. IM extraction well PE-01 was not sampled due to construction activities associated with the final groundwater remedy at the site. The monitoring well locations are shown on Figure 1-2 and listed in Table 1-2. Results were evaluated against the maximum detected Cr(VI) and dissolved chromium concentrations from 2014 (or 2013 for wells sampled biennially).

2.3.3 IM Hydraulic Monitoring

Groundwater elevation data from monitoring wells and river monitoring locations within the IM hydraulic monitoring network are measured using pressure transducers, which record continuous water levels at 30-minute intervals. Pressure transducers were downloaded in First Quarter 2020 during the first two weeks of each month (January, February, and March) from the 52 monitoring wells in the IM hydraulic monitoring network, two river monitoring locations (I-3 and RRB), and five wells located on the Arizona side of the Colorado River. The monitoring well and river monitoring locations are shown on Figure 1-4 and listed in Table 1-2. Pressure transducers at the six gradient control monitoring wells (MW-27-085, MW-31-135, MW-33-150, MW-34-100, MW-45-095, and MW-20-130) were downloaded via a cellular telemetry system.

2.3.4 IM Contingency Plan Monitoring

As discussed in Section 1.4.2.4, three IMCP monitoring wells were sampled for Cr(VI) as part of the First Quarter 2020 GMP program. The monitoring well locations are shown on Figure 1-4 and listed in Table 1-2. Results were evaluated against established trigger levels (based on historical Cr[VI] concentrations).

3 SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING RESULTS

This section summarizes results from the groundwater and surface water monitoring activities performed during First Quarter 2020 for the GMP and RMP programs.

3.1 Groundwater Monitoring Results

3.1.1 Cr(VI) and Dissolved Chromium

Table 3-1 presents the First Quarter 2020 groundwater sample results for Cr(VI) and dissolved chromium, as well as general chemistry parameters (specific conductivity, ORP, pH, and turbidity). The laboratory reports for samples analyzed during First Quarter 2020 are provided in Appendix A. Historical Cr(VI) and dissolved chromium concentration data are presented in Appendix B.

Figures 3-1a and 3-1b show the Cr(VI) concentrations across the site in wells monitoring the upper-depth (shallow) and lower-depth (deep) intervals of the Alluvial Aquifer and bedrock that were sampled this reporting period. These figures also show the interpreted extent of groundwater Cr(VI) concentrations higher than 32 µg/L for each depth interval. The value of 32 µg/L is based on the calculated natural background UTL for Cr(VI) in groundwater from the background study (CH2M Hill 2009).

During First Quarter 2020, the maximum detected Cr(VI) and dissolved chromium concentrations were 25,000 µg/L and 27,000 µg/L (both at MW-68-180), respectively.

3.1.2 Contaminants of Potential Concern and In-Situ By-Products

Table 3-1 presents the First Quarter 2020 groundwater sample results for COPCs (dissolved molybdenum, dissolved selenium, and nitrate/nitrite as nitrogen) and in-situ byproducts (dissolved arsenic and dissolved manganese). Maximum concentrations for each constituent are summarized below:

- Dissolved molybdenum: 190 µg/L (MW-46-175)
- Dissolved selenium: 15 µg/L (MW-68-180)
- Nitrate/nitrite as nitrogen: 29 milligrams per liter (mg/L; MW-68-180)
- Dissolved arsenic: 12 µg/L (MW-72-080, MW-72BR-200)
- Dissolved manganese: 910 µg/L (MW-64BR).

3.1.3 Sampling Method Trial Evaluation

From December 2017 through February 2020, sampling method trials were performed at monitoring well MW-60BR-245 to compare the low-flow and three-volume purge sampling methods (see table below). The methodology used to evaluate the sampling method trial results and trial results are summarized in the following sections.

Summary of Sampling Method Trials

Location ID	Sampling Method Trial	Low-Flow Depth Interval (ft bgs)	No. of Paired Sample Trials to Date	Recommendation
MW-60BR-245	3V vs. LF	175, 238	9	Change sampling method from 3V to LF

Notes:
3V = three-volume purge method
ft bgs = feet below ground surface
ID = identification
LF = low-flow purge method

3.1.3.1 Evaluation Methodology

Sampling method trial data were evaluated using the two evaluation components outlined below. Based on the evaluation results, three possible recommendations were identified: change the sampling method; keep the existing sampling method and discontinue the trial; or continue performing the sampling method trial to collect additional data.

Visual Evaluation of Datasets

Cr(VI) and dissolved chromium datasets were examined for both sampling methods. The datasets were compared to see if the methods provided similar results and/or demonstrated similar variability.

Relative Percent Difference Calculations

Relative percent difference (RPD) calculations were performed for paired analytical results from each sampling method trial. RPDs were calculated for Cr(VI) and dissolved chromium using the following equation:

$$\text{RPD} = \left(\frac{\text{Absolute value of (sampling method \#1 concentration)} - \text{(sampling method \#2 concentration)}}{\text{Average of sampling method \#1 concentration and sampling method \#2 concentration}}\right) x\ 100$$

RPDs were compared to a threshold of 20 percent. However, if the concentration of either sample result within a sample pair was less than or equal to five times the reporting limit, then a control limit of two times the reporting limit was applied. These criteria were selected because they are the criteria used in the Quality Assurance Project Plan to compare parent and duplicate sample results. For consistency purposes, a reporting limit of 1 µg/L was used for Cr(VI) and dissolved chromium results at each monitoring well.

If RPDs were less than the 20 percent threshold, or if concentrations were within the control limit of two times the reporting limit, then the two sampling methods were considered comparable. If RPDs were greater than the 20 percent threshold, or if concentrations were outside the control limit of two times the reporting limit, then Cr(VI) concentrations from both sampling methods were compared to the calculated Cr(VI) background concentration (32 µg/L; CH2M 2009) to determine if either sampling method would provide different conclusions about the extent of the plume boundary. For example, if Cr(VI) concentrations from both sampling methods are consistently above or consistently below the background concentration, then either sampling method can be used to delineate the plume boundary. However, if

Cr(VI) concentrations from one sampling method are above background, and concentrations from the second sampling method are below background, then additional evaluation and/or data are needed to determine which sampling method is most appropriate for delineating the plume boundary.

3.1.3.2 Evaluation Results

Table 3-2 presents the paired sampling method trial analytical results for monitoring well MW-60BR-245. Results of the sampling method trial evaluation and associated recommendations are summarized below.

Nine paired sampling method trials were performed at two different depth intervals: 175 and 238 feet bgs, targeting the identified fracture flow zones at these two depths.

- During the sampling method trials from December 2017 through February 2019 (six trials), groundwater samples were collected using the low-flow method first followed by 3V method.
  - Visual evaluation of the Cr(VI) and dissolved chromium datasets from December 2017 through February 2019 shows that concentrations measured in samples collected using the low-flow method are consistently lower than those measured in samples collected using the 3V method (see Figure 3-2 below). Low-flow Cr(VI) concentrations ranged from non-detect to 25 µg/L, whereas 3V Cr(VI) concentrations ranged from 69 µg/L to 110 µg/L during the same time period[1]. However, the reason for the increase in concentrations of the low-flow sample concentrations from the first four to the last two of the six trials is unknown.
  - In each of the six trials (from December 2017 through February 2019), the RPDs for Cr(VI) and dissolved chromium are greater than the 20% threshold and/or concentrations are outside the control limit of two times the reporting limit.
- Based on the results of the December 2017 through February 2019 trials, the groundwater sampling protocol for this monitoring well was revised in May 2019, December 2019, and February 2020 to collect samples using the 3V method first followed by the low-flow method. Groundwater samples were not collected from this monitoring well in Third Quarter 2019 due to site construction activities for the final groundwater remedy.
  - Visual evaluation of the Cr(VI) and dissolved chromium datasets from May 2019, December 2019, and February 2020 shows that concentrations measured in samples collected using the low-flow method are within the same range as those measured in the sample collected using the 3V method (see Figure 3-2 below). Low-flow Cr(VI) concentrations ranged from 85 µg/L to 96 µg/L (175-foot depth interval) and 68 µg/L to 75 µg/L (238-foot depth interval), and the 3V Cr(VI) concentrations ranged from 52 µg/L to 130 µg/L.
  - In May 2019, December 2019, and February 2020, the RPDs for Cr(VI) and dissolved chromium are above the 20% threshold, except for the December 2019 RPDs between the low-flow method (at the 238-foot depth interval) and the 3V method.
  - During the May 2019, December 2019, and February 2020 trials, Cr(VI) concentrations measured in samples collected using the low-flow and 3V methods were above the background

[1] Cr(VI) results from the December 2017 sampling method trial are not included in the range of concentrations because they are considered anomalous.

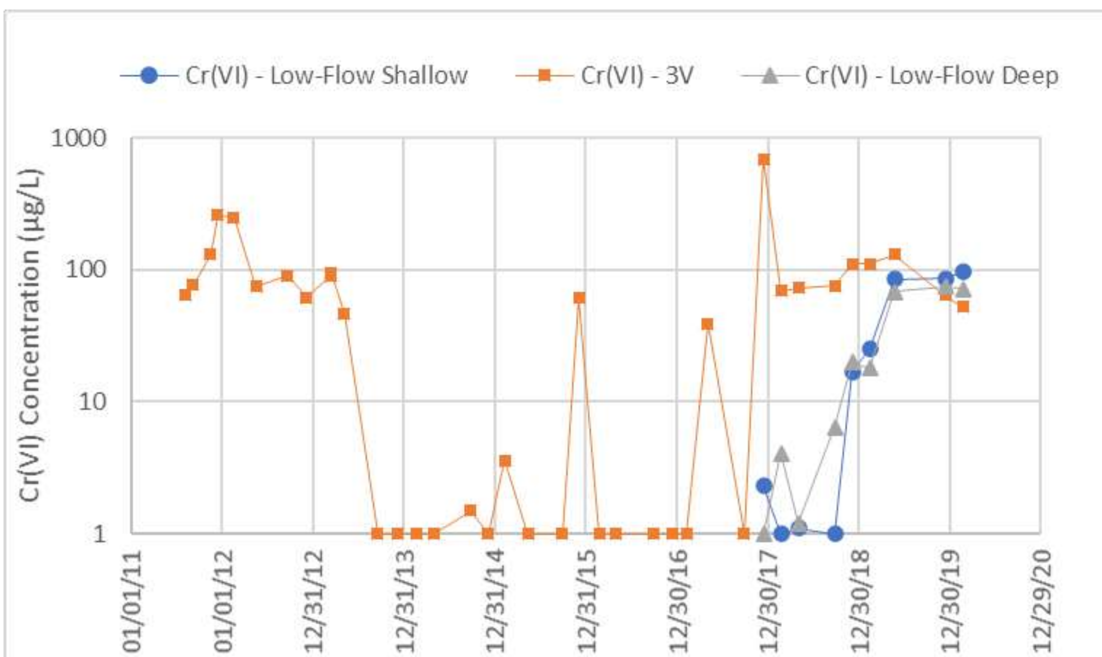
concentration of 32 µg/L. Therefore, either sampling method can be used to evaluate changes in plume dynamics, and either would indicate that the plume is delineated at this location.

- o The groundwater analytical results from the nine trials suggest that the initial groundwater sampling protocol (low-flow method followed by the 3V method) was biasing the 3V Cr(VI) and dissolved chromium concentrations high and the low-flow Cr(VI) and dissolved chromium concentrations low). By revising the sampling protocol to collect samples using the 3V method first followed by the low-flow method, Cr(VI) and dissolved chromium concentrations were more consistent between the two methods.

- During the nine sampling method trials, low-flow Cr(VI) and dissolved chromium concentrations at both depth intervals were similar (see Figure 3-2 below). Cr(VI) concentrations ranged from non-detect to 96 µg/L at the 175-foot depth interval and from non-detect to 75 µg/L at the 238-foot depth interval.
- Based on the construction of monitoring MW-60BR-245, the low-flow method is the preferred method for collecting groundwater samples at this location. The monitoring well is of open-hole construction (with a long vertical open-hole interval of 137 to 245 feet bgs). The low-flow method is more likely to be able to target groundwater at specific depths in the formation. In addition, a majority of monitoring wells at the site are sampled using the low-flow method, so changing to the low-flow method would be consistent with the sampling methods used across the site.

Recommendation: Change the sampling method from 3V to low-flow, targeting a depth interval of 175 ft bgs. This change is planned to be implemented during the next quarterly sampling event in Second Quarter 2020.

Figure 3-2. MW-60BR-245 Sampling Method Trial Analytical Results



3.1.4 Well Maintenance

Monitoring wells were inspected during groundwater sampling activities in First Quarter 2020. No corrective or maintenance actions were needed. Appendix C provides a summary of the inspection results.

3.2 Surface Water Monitoring Results

3.2.1 Cr(VI) and Dissolved Chromium

Table 3-3 presents the First Quarter 2020 surface water sample results for Cr(VI) and dissolved chromium, as well as general chemistry parameters (pH and specific conductivity). Cr(VI) and dissolved chromium from the January and February 2020 sampling events were not detected at concentrations higher than reporting limits at any surface water monitoring location. The laboratory reports for samples analyzed during First Quarter 2020 are provided in Appendix A.

3.2.2 Contaminants of Potential Concern and In Situ By-Products

Table 3-3 presents the First Quarter 2020 surface water results for COPCs (dissolved molybdenum, dissolved selenium, and nitrate/nitrite as nitrogen), in-situ byproducts (dissolved arsenic, total iron, dissolved iron, and dissolved manganese), and other geochemical indicator parameters (dissolved barium and TSS). Maximum concentrations for each constituent are summarized below (with associated locations):

- Dissolved molybdenum: 7.0 μg/L (RRB)
- Dissolved selenium: 2.3 μg/L (RRB)
- Nitrate/nitrite as nitrogen: 1.1 mg/L (RRB)
- Dissolved arsenic: 2.7 μg/L (C-MAR-S)
- Total iron: 1,400 μg/L (C-MAR-S)
- Dissolved iron: 880 J μg/L (C-MAR-S)
- Dissolved manganese: 110 J μg/L (C-MARS-S)
- Dissolved barium: 130 μg/L (C-MAR-D, C-MAR-S, C-R22A-S)
- TSS: 36 mg/L (C-MAR-S).

3.3 Data Validation and Completeness

Laboratory analytical data from the First Quarter 2020 sampling events were reviewed by project chemists to assess data quality and to identify deviations from analytical requirements. The following bullets summarize the notable analytical qualifications in data reported for the First Quarter 2020:

- Holding time and preservation

  - Based on the March 2007 USEPA ruling, and reaffirmed in the May 2012 USEPA ruling, pH has a 15-minute holding time. As a result, all samples analyzed in a certified laboratory by Method SM4500-HB (pH) are analyzed outside the USEPA-recommended holding time. Therefore, the pH results for the First Quarter 2020 sampling event analyzed in a certified lab are considered estimated.
- Calibration
  - Dissolved barium was recovered greater than quality control (QC) criteria in several interference check samples analyses, which affected numerous samples. The associated sample data were qualified as estimated detects and “J” flagged. Non-detects are not affected by this criterion.
  - The low-level calibration verification standard associated with the dissolved calcium and dissolved sodium analysis of sample TW-03D-0220 and the dissolved calcium analysis of sample TW-03D-0320 were recovered less than QC criteria. The associated detected results were not qualified.
- Matrix spike (MS) and matrix spike duplicate (MDS) samples
  - Dissolved iron was recovered less than criteria in the MS, MSD, and the post digestion spike (PDS) affecting eighteen samples. The eighteen samples included in the preparation batch were qualified as estimated detects and non-detects and flagged “J” and “UJ”.
  - Dissolved manganese was recovered less than QC limits in the PDS of sample TW-03D-0320. The sample result was qualified as an estimated detect and flagged “J”.
  - Dissolved barium was recovered greater than QC limits in the PDS of samples MW-905-Q120 and RRB-020. The sample results were qualified as estimated detects and flagged “J”.
  - Iron was recovered less than criteria in the MSD and greater than the criteria of the PDS affecting twenty samples. The twenty samples included in the preparation batch were qualified as estimated detects and flagged “J”.
  - Dissolved molybdenum was recovered greater than QC limits in the MSD affecting eleven samples. The eleven sample results were qualified as estimated detects and flagged “J”.
  - Dissolved magnesium was recovered greater than QC limits in the MSD of sample TW-03D-0220. The sample result was qualified as an estimated detect and flagged “J”.
  - Dissolved manganese did not meet precision criteria in the MSD analysis in thirteen samples. The thirteen samples in the associated preparation batch were qualified as estimated detects and “J” flagged.
- Field duplicate samples
  - Iron demonstrated relative percent differences greater than QC criteria for the field duplicate pairs of samples C-R22A-S-0120/MW-903-Q120 and C-R27-D-0220/MW-906-Q120. The associated results were qualified as estimated detects and flagged “J”.

4 FIRST QUARTER 2020 IM PERFORMANCE MONITORING PROGRAM EVALUATION

This section summarizes results of the First Quarter 2020 PMP evaluation.

4.1 Distribution of Hexavalent Chromium in the Floodplain

Cr(VI) data collected as part of the First Quarter 2020 GMP monitoring activities were used to generate maps, cross-sections, and concentration time series charts to demonstrate that Cr(VI) concentrations greater than 20 µg/L in the floodplain area are contained for removal and treatment.

Distribution of Cr(VI) concentrations in the upper-depth (shallow wells) and lower-depth (deep wells) intervals of the Alluvial Aquifer is shown in plan-view and cross-section view (cross-section A) on Figure 4-1. Figure 4-2 presents Cr(VI) concentrations for cross-section B, oriented parallel to the Colorado River. The locations of cross-sections A and B are shown on Figure 4-1. The figures demonstrate that Cr(VI) concentrations decrease from west to east along the floodplain (cross-section A) and that concentrations greater than 20 µg/L are contained in the floodplain area.

Appendix D provides Cr(VI) concentration time series charts for wells sampled in First Quarter 2020 and includes Cr(VI) concentration time series charts for six deep monitoring wells in the floodplain area (MW-34-100, MW-36-090, MW-36-100, MW-44-115, MW-44-125, and MW-46-175) that have historically been monitored for chromium encroachment. These six wells are located between the IM extraction wells and the Colorado River; therefore, they show the distribution of Cr(VI) concentrations at the toe of the Cr(VI) plume. As shown by the concentration time series charts, Cr(VI) concentrations have decreased since initiation of the IM extraction system in 2005 and have remained relatively steady over the past few years. In First Quarter 2020, Cr(VI) concentrations at the six wells were below 20 µg/L (Appendices B and D). In general, wells showing marked decreases in Cr(VI) concentration are located in the floodplain area where IM pumping is removing chromium in groundwater.

4.2 IM Extraction System Operation

During First Quarter 2020, IM extraction wells TW-03D, TW-02D, and TW-02S operated at an average pumping rate of 127.8 gallons per minute (gpm) to support hydraulic control (Table 4-1). The target pumping rate was 135 gpm. Extraction well PE-01 was not operated. The average monthly pumping rates were 128.9 gpm (January 2020), 131.9 gpm (February 2020), and 122.1 gpm (March 2020). Table 4-1 shows the average pumping rates and total groundwater volumes pumped during First Quarter 2020.

The IM-3 system extracted and treated 16,548,580 gallons of groundwater during First Quarter 2020, and an estimated 42.9 pounds (19.5 kilograms) of chromium were removed from the aquifer between January 1 and February 29, 2020 (Table 4-1). Note that groundwater extraction is reported on a different schedule than chromium removal reporting (i.e., January through March and January through February, respectively; Table 4-1). The operational runtime percentage for the IM-3 system during First Quarter 2020 was 93.7 percent. Appendix E provides the operations log for the IM-3 system, including planned and unplanned downtime.

Chromium Concentrations in Wells Monitored for Conditional Shutdown of PE-01

During First Quarter 2020, three of the 47 wells monitored to support the conditional shutdown of PE-01 (see Section 1.4.2.2) were sampled for Cr(VI) and dissolved chromium. Concentrations in MW-34-100, MW-44-115, and MW-46-175 were lower than the 2014 maximum concentrations (i.e., notification levels). Table 4-2 presents the Cr(VI) and dissolved chromium concentrations and their associated notification levels.

4.3 IM Hydraulic Monitoring Results

Table 4-3 presents the First Quarter 2020 average monthly and quarterly groundwater and river elevations, calculated from the pressure transducer data. Average daily groundwater and river elevations are provided as hydrographs in Appendix F. Groundwater elevations were adjusted for temperature and salinity differences among wells (i.e., adjusted to a common freshwater equivalent).

Hydraulic Gradient Evaluation: California Floodplain

Figures 4-3a, 4-3b, and 4-3c present the average First Quarter 2020 groundwater elevations and associated groundwater contours for the shallow, mid-depth, and deep wells, respectively. Figure 4-4 presents the average groundwater elevations and associated groundwater contours for wells located in the floodplain along cross-section A. Due to complex vertical gradients present at portions of the Topock site, water levels for some wells are not considered in the contouring on Figures 4-3a, 4-3b, 4-3c, or 4-4.

During First Quarter 2020, hydraulic gradients were measured for three gradient well pairs selected for performance monitoring of the IM-3 system (shown on Figure 1-4; note that PE-01 was not operated for hydraulic control):

- Northern Gradient Pair: MW-31-135 and MW-33-150
- Central Gradient Pair: MW-20-130 and MW-34-100
- Southern Gradient Pair: MW-20-130 and MW-27-085.

As discussed in Section 1.4.2.3, a landward hydraulic gradient of 0.001 ft/ft must be maintained to demonstrate compliance with the performance standard. Table 4-4 presents the monthly average hydraulic gradients measured for each of the gradient well pairs in First Quarter 2020, as well as the overall average of all well pairs. The overall monthly average gradients for all well pairs were 0.0037, 0.0041, and 0.0039 ft/ft for January, February, and March 2020, respectively. Landward gradients measured each month exceeded the 0.001 ft/ft requirement, as shown in Table 4-4. Figure 4-5 illustrates the measured hydraulic gradients during First Quarter 2020 with the concurrent Colorado River elevations and IM-3 pumping rates.

Hydraulic Gradient Evaluation: Arizona Side of the Colorado River

During First Quarter 2020, pressure transducer data were recorded in five wells located on the Arizona side of the Colorado River. The average quarterly groundwater elevations for monitoring wells MW-54-085, MW-54-140, MW-54-195, MW-55-045, and MW-55-120 are presented on Figures 4-3b and 4-3c and are used for contouring where appropriate. Except for well MW-55-045, all wells in the MW-54 and MW-55 clusters are screened in the deep interval of the Alluvial Aquifer. Well MW-55-045 is screened across portions of the shallow and middle intervals (Figure 4-3b). Average quarterly water levels at the MW-54 and MW-55 well clusters indicate that water level elevations in monitoring wells in Arizona are higher than those in wells across the river on the California floodplain. This indicates that the apparent hydraulic gradient on the Arizona side of the river is westward and, as a result, groundwater flow would also be toward the west in that area. This is consistent with the site conceptual model and with the current numerical groundwater flow model.

4.4 IM Contingency Plan Monitoring Results

During First Quarter 2020, Cr(VI) concentrations in the three IMCP monitoring wells sampled were lower than the established trigger levels; therefore, implementation of the contingency plan was not needed. Cr(VI) concentrations for the IMCP wells and their associated trigger levels are presented in Table 4-5.

4.5 Projected River Levels During Next Quarter

Colorado River water level projections provide river level information that is useful for anticipating IM-3 extraction requirements for the upcoming quarter. The Colorado River stage near the site is measured at river monitoring location I-3. Water levels are directly influenced by releases from Davis Dam, and, to a lesser degree, from Lake Havasu elevations, both of which are controlled by the United States Bureau of Reclamation (USBR). Total releases from Davis Dam follow a predictable annual cycle, with the largest monthly releases typically in spring and early summer and the smallest monthly releases in late fall/winter (November and December). Superimposed on this annual cycle is a diurnal cycle determined primarily by daily fluctuations in electric power demand. Releases within a given 24-hour period often fluctuate over a wider range of flows than that of monthly average flows over an entire year. Figure 4-6 shows the river stage measured at location I-3 superimposed on the projected I-3 river levels.

Projected river levels for future months are based on the USBR projections of Davis Dam discharge and Lake Havasu levels from the preceding month. For example, the projected river level for April 2020 is based on the March 2020 USBR projections of Davis Dam release and Lake Havasu level. Future projections of Colorado River stage, shown on Figure 4-6, are based on USBR long-range projections of Davis Dam releases and Lake Havasu levels from March 2020. There is more uncertainty in these projections at longer times in the future because water demand is based on various factors, including climatic factors.

Current USBR projections, presented in Table 4-6, show that the projected Davis Dam release for April 2020 is 14,600 cubic feet per second, and the predicted Colorado River elevation at the I-3 gauge is 456.04 feet above mean sea level.

4.6 First Quarter 2020 Performance Monitoring Program Evaluation Summary

A summary of the First Quarter 2020 PMP evaluation is provided below.

- Cr(VI) isoconcentration maps indicate that Cr(VI) concentrations greater than 20 µg/L in the floodplain area are hydraulically controlled.

- IM extraction well TW-03D was primarily operated to support hydraulic control. A total of 16,548,580 gallons of groundwater were extracted by the IM-3 system, and an estimated 42.9 pounds (19.5 kilograms) of chromium were removed from groundwater.
- Cr(VI) and dissolved chromium concentrations in monitoring wells located within 800 feet of extraction well TW-03D were lower than their established notification levels. The shutdown of extraction well PE-01 was continued through the end of First Quarter 2020.
- Groundwater potentiometric surface maps and the gradient analysis from designated well pairs provide evidence of hydraulic containment of the Cr(VI) plume. The overall monthly average landward gradients in January, February, and March 2020 were approximately 3.7, 4.1, and 3.9 times the required minimum magnitude of 0.001 ft/ft, respectively.
- Cr(VI) and dissolved chromium concentrations in the IMCP monitoring wells were lower than their established trigger levels, indicating that chromium concentrations did not increase at areas of interest across the site.

5 UPCOMING OPERATION AND MONITORING EVENTS

GMP, RMP, and PMP monitoring activities will continue under direction from the DTSC in Second Quarter 2020. Monitoring activities and results will be reported in the Second Quarter 2020 PMP-GMP Report (planned for submittal by August 15, 2020).

5.1 Groundwater Monitoring Program

5.1.1 Monthly Groundwater Monitoring

Monthly GMP monitoring events are planned for April, May, and June 2020 at extraction well TW-03D. Extraction well PE-01 is not planned to be sampled in Second Quarter 2020 due to construction activities associated with the final groundwater remedy at the site.

5.1.2 Quarterly Groundwater Sampling

The quarterly GMP monitoring event is planned for April and June 2020. This event will consist of groundwater sampling and inspection of 103 monitoring wells. Any necessary corrective actions to monitoring wells will be performed in a timely manner.

If rainfall events occur in Second Quarter 2020 that cause surface water flow in Bat Cave Wash, monitoring wells MW-09, MW-10, and MW-11 will be sampled.

5.1.3 Sampling Method Trials at Select Wells

The sampling method trial at monitoring well MW-60BR-245 is planned to be discontinued in Second Quarter 2020. Groundwater samples will be collected using the low-flow method at a target depth of 175 feet bgs.

5.2 Surface Water Monitoring Program

The surface water monitoring event is planned for April 2020. The monitoring event will consist of surface water sampling at 16 locations.

5.3 IM Performance Monitoring Program

5.3.1 Chromium Monitoring

Chromium monitoring will be performed as part of the Second Quarter 2020 GMP monthly and quarterly monitoring events. Cr(VI) data will be collected from a total of 105 monitoring wells.

5.3.2 IM Extraction System Operation

During Second Quarter 2020, the IM-3 system will continue operating and operations will be documented. IM extraction well TW-03D will be pumped with a target rate of 135 gpm, except during periods of planned and unplanned downtime, to maintain appropriate hydraulic gradients across the Alluvial Aquifer. If TW-

03D cannot produce the target pumping rate of 135 gpm, then TW-02D and/or TW-02S may be pumped to supplement TW-03D and achieve total flow. Extraction well PE-01 will not be pumped in Second Quarter 2020 due to construction activities associated with the final groundwater remedy at the site.

Second Quarter 2020 GMP monitoring results from wells listed in the July 20, 2015 DTSC approval letter for conditional PE-01 shutdown (DTSC 2015) will be compared to the 2014 (or 2013 for wells sampled biennially) maximum Cr(VI) and dissolved chromium concentrations. Results that exceed the notification levels will be reported to the DTSC within 40 days after the end of the quarterly GMP sampling event.

5.3.3 IM Hydraulic Monitoring

The IM hydraulic monitoring network will continue to be used to demonstrate compliance of the required 0.001 ft/ft landward hydraulic gradient. During the first two weeks of each month, pressure transducers will be downloaded from the 52 monitoring wells in the IM hydraulic monitoring network, five wells located on the Arizona side of the Colorado River, and two river monitoring locations. Pressure transducers at the six gradient control wells (MW-27-085, MW-31-135, MW-33-150, MW-34-100, MW-45-095, and MW-20-130) will continue to be downloaded via cellular telemetry at monthly or more frequent intervals, as needed, to verify that 0.001 ft/ft landward gradients are maintained.

5.3.4 IM Contingency Plan Monitoring

Second Quarter 2020 GMP monitoring results from IMCP wells will be compared to their respective trigger levels. If any exceedances are observed, the DTSC will be notified in accordance with the Revised Contingency Plan Flow Chart (PG&E 2008).

5.4 Quarterly Notifications

Email notifications will be sent in Second Quarter 2020 providing Cr(VI) and dissolved chromium results for shoreline and in-channel surface water monitoring locations and monitoring wells MW-34-100, MW-44-115, MW-46-175, and MW-44-125.

5.5 Monitoring Well Installation

In accordance with the Basis of Design Report (CH2M Hill 2015), new monitoring wells, extraction wells, and injection wells are currently being installed as part of the final groundwater remedy at the site. A summary of field activities and monitoring results associated with the installation of the new wells will be reported under separate cover as part of the monthly reporting process associated with construction of the final groundwater remedy.

6 REFERENCES

Arcadis. 2020. Fourth Quarter 2019 and Annual Interim Measures Performance Monitoring and Site-Wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California. March 15.

CH2M Hill. 2005. Monitoring Plan for Groundwater and Surface Water Monitoring Program. PG&E Topock Compressor Station, Needles, California. April 11.

CH2M Hill. 2007. RCRA Facility Investigation/Remedial Investigation Report, Volume 1 – Site Background and History. PG&E Topock Compressor Station, Needles, California. August.

CH2M Hill. 2009. Groundwater Background Study, Steps 3 and 4: Revised Final Report of Results, PG&E Topock Compressor Station, Needles, California. November 6.

CH2M Hill. 2015. Basis of Design Report/Final (100%) Design Submittal for the Final Groundwater Remedy. November.

DTSC. 2005. Letter to PG&E. Criteria for Evaluating Interim Measures Performance Requirements to Hydraulically Contain Chromium Plume in Floodplain Area, PG&E Topock Compressor Station, Needles, California (EPA ID No. CAT080011729). February 14.

DTSC. 2007. Letter to PG&E. Approval of Updates and Modifications to the Interim Measures Performance Monitoring Program. PG&E Topock Compressor Station. October 12.

DTSC. 2008a. Letter to PG&E. Modifications to Hydraulic Data Collection for the Interim Measures Performance Monitoring Program at PG&E Topock Compressor Station, Needles, California. July 14.

DTSC. 2008b. Letter to Geology and Remediation Engineering. Updates to the Interim Measures Chemical Performance Monitoring Program. PG&E Topock Compressor Station, Needles, California. July 16.

DTSC. 2009. Email. Re: Request for Combined Reporting of Topock GMP and PMP. May 26.

DTSC. 2010a. Email. Re: Topock GMP Monitoring Frequency Modification. March 3.

DTSC. 2010b. Letter to PG&E. Arizona Monitoring Well Sampling Frequency Modification. PG&E Topock Compressor Station, Needles, California. April 28.

DTSC. 2014. Email from Chris Guerre/DTSC to Yvonne Meeks/PG&E. PG&E Topock: DTSC response to Section 7 2013 Annual Report Recommendations. June 27.

DTSC. 2015. Letter from Aaron Yue/DTSC to Yvonne Meeks/PG&E. Conditional Approval of Proposal to Modify Interim Measures 3 (IM3) Extraction Well Pumping at PG&E Topock Compressor Station, Needles, California (USEPA ID No. CAT080011729). July 0.

DTSC. 2017a. Memorandum from Chris Guerre/DTSC to Aaron Yue/DTSC Proposal for Alternative Groundwater Sampling Trial. PG&E Topock Compressor Station Site, Needles, California. April 6.

DTSC. 2017b. Email from Chris Guerre/DTSC to Jay Piper/CH2M and Curt Russell/PG&E. Re: PG&E Topock – Letter Requesting Modified Key Gradient Well Pairs When PE-01 Is Not Pumping. August 18.

DTSC. 2017c. Memorandum from Chris Guerre/DTSC to Aaron Yue/DTSC. Response to Comments on Proposal for Alternative Groundwater Sampling Trial. PG&E Topock Compressor Station Site, Needles, California. October 20.

DTSC. 2018. PG&E Topock Compressor Station: Environmental Investigation and Cleanup Activities. Web page. Located at: http://dtsc-topock.com/.

PG&E. 2008. Approved Modifications to the Topock IM Performance Monitoring Program PG&E Topock Compressor Station, Needles, California. August 4.

PG&E. 2015. Proposed Trial of Alternative Sampling Approaches at Select Monitoring Wells in the Topock GMP and CMP. August 21.

TABLES

Table 1-1

Topock Monitoring Reporting Schedule

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Period	Reporting Period	Report Submittal Date	Anticipated Number of Monitoring Locations: Groundwater Monitoring Program (GMP)	Anticipated Number of Monitoring Locations: Surface Water Monitoring Program (RMP)	Anticipated Number of Monitoring Locations: Chromium Monitoring*	Anticipated Number of Monitoring Locations: Monitoring for Conditional Shutdown of PE-01*	Anticipated Number of Monitoring Locations: IM Hydraulic Monitoring	Anticipated Number of Monitoring Locations: IM Contingency Plan Monitoring*	Anticipated Number of Monitoring Locations: IM Chemical Performance Monitoring
First Quarter	January - March	April 30	22	16	22	4	59	3	0
Second Quarter	April - June	August 15	105	16	105	30	59	19	0
Third Quarter	July - October	December 15	22	16	22	4	59	3	0
Fourth Quarter	November - December	March 15	143 annual + 2 biennial	16	143 annual + 2 biennial	47	59	24	10 annual + 1 biennial

Notes:

1. On July 23, 2010, DTSC approved a revised reporting schedule that included a revised IM-3 monitoring period (i.e., chromium removed), as follows:
   First Quarter: January - February
   Second Quarter: March - May
   Third Quarter: June - September
   Fourth Quarter: October - December

* = Monitoring consists of collecting hexavalent chromium and/or dissolved chromium data from groundwater monitoring wells; these data are collected during the GMP monitoring event.
GMP = Groundwater Monitoring Program.
DTSC = Department of Toxic Substance Control.
IM = interim measure.
RMP = Surface Water Monitoring Program.

Table 1-2
GMP, RMP, and PMP Monitoring Summary
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Location ID	Site Area	Measuring Point Elevation (ft amsl)	Well Screen Interval (ft bgs)	Well Screen Lithology	Well Casing Diameter (inches)	Well Depth (ft bgs)	Aquifer Zone	Sampling Method	GMP Monitoring Frequency	RMP Monitoring Frequency	PMP Monitoring: Chromium Monitoring Frequency	PMP Monitoring: Monitoring Frequency for Conditional Shutdown of PE-01	PMP Monitoring: IM Hydraulic Monitoring Frequency	PMP Monitoring: IM Contingency Plan Monitoring Frequency	PMP Monitoring: IM Chemical Performance Monitoring Frequency	Notes
MW-09	Bat Cave Wash	536.56	77 - 87	Alluvial	4 in PVC	89.4	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	Bat Cave Wash flow
MW-10	Bat Cave Wash	530.65	74 - 94	Alluvial	4 in PVC	96.9	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	Bat Cave Wash flow
MW-11	Bat Cave Wash	522.54	62.5 - 82.5	Alluvial	4 in PVC	86.1	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	Bat Cave Wash flow
MW-12	East of Station	484.01	27.5 - 47.5	Alluvial	4 in PVC	50.4	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-13	Bat Cave Wash	488.64	28.5 - 48.5	Alluvial	4 in PVC	52.0	Shallow	LF	Annual	--	Annual	--	--	--	--	
MW-14	East Mesa	570.99	111 - 131	Alluvial	4 in PVC	133.8	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-15	East of New Ponds	641.52	180.5 - 200.5	Alluvial	4 in PVC	203.0	Shallow	LF	Annual	--	Annual	--	--	--	--	
MW-16	Near New Ponds	657.31	198 - 218	Alluvial	4 in PVC	218.1	Shallow	LF	Biennial	--	Biennial	--	--	--	--	
MW-17	West of Mesa Area	589.96	130 - 150	Alluvial	4 in PVC	153.6	Shallow	LF	Biennial	--	Biennial	--	--	--	--	
MW-18	West Mesa	545.32	85 - 105	Alluvial	4 in PVC	106.7	Shallow	LF	Annual	--	Annual	--	--	--	--	
MW-19	Route 66	499.92	46 - 66	Alluvial	4 in PVC	65.8	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-20-070	MW-20 bench	500.07	50 - 70	Alluvial	4 in PVC	69.6	Shallow	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	Annual	
MW-20-100	MW-20 bench	500.58	89.5 - 99.5	Alluvial	4 in PVC	101.4	Middle	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	Annual	
MW-20-130	MW-20 bench	500.66	121 - 131	Alluvial	4 in PVC	132.3	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	Annual	Hydraulic Gradient Well
MW-21	Route 66	505.55	39 - 59	Alluvial	4 in PVC	58.5	Shallow	LF	Semiannual	--	Semiannual	--	--	Semiannual	--	Low recharge well; typically purges dry at 1 casing volume
MW-22	Floodplain	460.72	5.5 - 10.5	Fluvial	2 in PVC	12.4	Shallow	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-23-060	East Ravine	504.08	50 - 60	Bedrock	2 in Sch 40 PVC	60.2	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-23-080	East Ravine	504.13	75 - 80	Bedrock	2 in Sch 40 PVC	80.8	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-24A	MW-24 Bench	567.16	104 - 124	Alluvial	4 in PVC	127.5	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-24B	MW-24 Bench	564.76	193 - 213	Alluvial	4 in PVC	214.8	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-24BR	MW-24 Bench	563.95	378 - 437	Bedrock	4 in PVC	441.0	Bedrock	3V	Annual	--	Annual	--	--	--	--	Low recharge well; typically purges dry at 1 casing volume
MW-25	Near Bat Cave Wash	542.90	84.5 - 104.5	Alluvial	4 in PVC	106.5	Shallow	LF	Semiannual	--	Semiannual	--	Monthly	--	Annual	
MW-26	Route 66	502.22	51.5 - 71.5	Alluvial	2 in PVC	70.1	Shallow	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	Biennial	
MW-27-020	Floodplain	460.56	7 - 17	Fluvial	2 in PVC	14.4	Shallow	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-27-060	Floodplain	461.49	47.3 - 57.3	Fluvial	2 in PVC	59.0	Middle	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-27-085	Floodplain	460.99	77.5 - 87.5	Fluvial	2 in PVC	80.0	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	Hydraulic Gradient Well
MW-28-025	Floodplain	466.77	13 - 23	Fluvial	2 in PVC	21.1	Shallow	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	--	
MW-28-090	Floodplain	467.53	70 - 90	Fluvial	2 in PVC	98.4	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-29	Floodplain	485.21	29.5 - 39.5	Fluvial	2 in PVC	41.5	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-30-030	Floodplain	468.12	12 - 32	Fluvial	2 in PVC	26.9	Shallow	LF	Annual	--	Annual	Annual	--	--	--	
MW-30-050	Floodplain	468.81	40 - 50	Fluvial	4 in PVC	52.6	Middle	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-31-060	MW-20 Bench	496.81	41.5 - 61.5	Alluvial	4 in PVC	64.0	Shallow	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	Annual	
MW-31-135	MW-20 Bench	498.11	113 - 133	Alluvial	2 in PVC	135.4	Deep	LF	Annual	--	Annual	Annual	Monthly	--	--	Hydraulic Gradient Well
MW-32-020	Floodplain	461.51	10 - 20	Fluvial	2 in PVC	19.6	Shallow	LF	Annual	--	Annual	Annual	--	Annual	--	
MW-32-035	Floodplain	461.63	27.5 - 35	Fluvial	4 in PVC	37.2	Shallow	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	Annual	
MW-33-040	Floodplain	487.38	29 - 39	Fluvial	2 in PVC	41.8	Shallow	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-33-090	Floodplain	487.55	69 - 89	Alluvial	4 in PVC	88.3	Middle	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-33-150	Floodplain	487.77	132 - 152	Alluvial	2 in PVC	155.4	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	Hydraulic Gradient Well
MW-33-210	Floodplain	487.25	190 - 210	Alluvial	2 in PVC	223.0	Deep	LF	Semiannual	--	Semiannual	Semiannual	--	Semiannual	--	
MW-34-055	Floodplain	460.95	45 - 55	Fluvial	4 in PVC	56.6	Middle	LF	Annual	--	Annual	Annual	Monthly	--	Annual	
MW-34-080	Floodplain	461.20	73 - 83	Fluvial	4 in PVC	84.3	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	Annual	
MW-34-100	Floodplain	460.97	89.5 - 99.5	Fluvial	2 in PVC	117.0	Deep	LF	Quarterly	--	Quarterly	Quarterly	Monthly	Quarterly	Annual	Hydraulic Gradient Well
MW-35-060	Route 66	484.33	41 - 61	Alluvial	2 in PVC	56.8	Shallow	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-35-135	Route 66	484.24	116 - 136	Alluvial	2 in PVC	158.7	Deep	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-36-020	Floodplain	469.33	10 - 20	Fluvial	1 in PVC	20.3	Shallow	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-36-040	Floodplain	469.59	30 - 40	Fluvial	1 in PVC	40.3	Shallow	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-36-050	Floodplain	469.62	46 - 51	Fluvial	1 in PVC	108.0	Middle	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-36-070	Floodplain	469.27	60 - 70	Fluvial	1 in PVC	70.3	Middle	LF	Annual	--	Annual	Annual	Monthly	Annual	--	
MW-36-090	Floodplain	469.64	80 - 90	Fluvial	1 in PVC	90.3	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	--	
MW-36-100	Floodplain	469.65	88 - 98	Fluvial	2 in PVC	108.0	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	--	
MW-37D	Bat Cave Wash	486.19	180 - 200	Alluvial	2 in PVC	226.7	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-37S	Bat Cave Wash	485.97	64 - 84	Alluvial	2 in PVC	85.0	Middle	LF	Annual	--	Annual	--	--	--	--	
MW-38D	Bat Cave Wash	525.31	163 - 183	Alluvial	2 in PVC	190.9	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-38S	Bat Cave Wash	526.59	75 - 95	Alluvial	2 in PVC	98.1	Shallow	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-39-040	Floodplain	468.02	30 - 40	Fluvial	1 in PVC	42.1	Shallow	LF	Annual	--	Annual	Annual	Monthly	Annual	--	
MW-39-050	Floodplain	467.93	47 - 52	Fluvial	1 in PVC	54.6	Middle	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-39-060	Floodplain	468.00	49 - 59	Alluvial	1 in PVC	15.2	Middle	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-39-070	Floodplain	468.02	60 - 70	Alluvial	1 in PVC	71.7	Middle	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-39-080	Floodplain	467.92	70 - 80	Alluvial	1 in PVC	82.6	Deep	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-39-100	Floodplain	468.12	80 - 100	Alluvial	2 in PVC	117.7	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	--	
MW-40D	I-40 Median	566.08	240 - 260	Alluvial	2 in PVC	266.0	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-40S	I-40 Median	566.04	115 - 135	Alluvial	2 in PVC	134.0	Shallow	H	Semiannual	--	Semiannual	--	--	--	--	

Table 1-2
GMP, RMP, and PMP Monitoring Summary
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Location ID	Site Area	Measuring Point Elevation (ft amsl)	Well Screen Interval (ft bgs)	Well Screen Lithology	Well Casing Diameter (inches)	Well Depth (ft bgs)	Aquifer Zone	Sampling Method	GMP Monitoring Frequency	RMP Monitoring Frequency	PMP Monitoring: Chromium Monitoring Frequency	PMP Monitoring: Monitoring Frequency for Conditional Shutdown of PE-01	PMP Monitoring: IM Hydraulic Monitoring Frequency	PMP Monitoring: IM Contingency Plan Monitoring Frequency	PMP Monitoring: IM Chemical Performance Monitoring Frequency	Notes
MW-41D	Bat Cave Wash	479.42	271 - 291	Alluvial	2 in PVC	311.5	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-41M	Bat Cave Wash	479.84	170 - 190	Alluvial	2 in PVC	190.0	Deep	LF	Annual	--	Annual	--	--	--	--	
MW-41S	Bat Cave Wash	480.07	40 - 60	Alluvial	2 in PVC	60.0	Shallow	LF	Annual	--	Annual	--	--	--	--	
MW-42-030	Floodplain	463.74	9.8 - 29.8	Fluvial	2 in Sch 40 PVC	30.1	Shallow	LF	Annual	--	Annual	Annual	Monthly	--	--	
MW-42-055	Floodplain	463.85	42.5 - 52.5	Fluvial	2 in PVC	52.8	Middle	LF	Semiannual	--	Semiannual	Semiannual	--	Semiannual	--	
MW-42-065	Floodplain	463.37	56.2 - 66.2	Fluvial	2 in PVC	80.0	Middle	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-43-025	Floodplain	462.54	15 - 25	Fluvial	2 in PVC	25.0	Shallow	LF	Annual	--	Annual	--	Monthly	--	--	
MW-43-075	Floodplain	462.71	65 - 75	Fluvial	2 in PVC	75.0	Deep	LF	Annual	--	Annual	--	--	Annual	--	
MW-43-090	Floodplain	462.76	80 - 90	Fluvial	2 in PVC	97.0	Deep	LF	Annual	--	Annual	--	Monthly	Annual	--	
MW-44-070	Floodplain	471.84	61 - 71	Fluvial	2 in PVC	70.0	Middle	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-44-115	Floodplain	471.94	105 - 115	Alluvial	2 in PVC	113.5	Deep	LF	Quarterly	--	Quarterly	Quarterly	Monthly	Quarterly	--	
MW-44-125	Floodplain	472.11	116 - 125	Alluvial	2 in PVC	128.8	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-45-095a	Floodplain	468.27	83 - 93	Fluvial	2 in PVC	97.0	Deep	--	--	--	--	X (see Note 1)	Monthly	--	--	Pressure transducer location; Hydraulic Gradient Well
MW-46-175	Floodplain	482.16	165 - 175	Alluvial	2 in PVC	175.5	Deep	LF	Quarterly	--	Quarterly	Quarterly	Monthly	Quarterly	--	
MW-46-205	Floodplain	482.23	196.5 - 206.5	Alluvial	2 in PVC	206.5	Deep	LF	Semiannual	--	Semiannual	Semiannual	--	Semiannual	--	
MW-47-055	Floodplain	484.04	45 - 55	Alluvial	2 in PVC	55.0	Shallow	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-47-115	Floodplain	484.17	105 - 115	Alluvial	2 in PVC	115.0	Deep	LF	Semiannual	--	Semiannual	Semiannual	Monthly	Semiannual	--	
MW-48	East of Station	486.22	124 - 134	Bedrock	2 in PVC	138.0	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	Low recharge well; typically purges dry at 1 casing volume
MW-49-135	Floodplain	483.97	125 - 135	Alluvial	1.5 in PVC	135.0	Deep	LF	Annual	--	Annual	--	Monthly	--	--	
MW-49-275	Floodplain	483.95	255 - 275	Alluvial	2 in PVC	274.7	Deep	LF	Annual	--	Annual	--	--	--	--	
MW-49-365	Floodplain	484.01	346 - 366	Alluvial	2 in PVC	367.4	Deep	LF	Annual	--	Annual	--	--	--	--	
MW-50-095	Route 66	496.49	85 - 95	Alluvial	2 in PVC	95.0	Middle	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-50-200	Route 66	496.35	190 - 200	Alluvial	2 in PVC	204.5	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-51	Route 66	501.56	97 - 112	Alluvial	4 in PVC	113.3	Middle	LF	Semiannual	--	Semiannual	Semiannual	Monthly	--	--	
MW-52D	Floodplain	462.16	85 - 87	Fluvial	0.75 in MLABS	89.5	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-52M	Floodplain	462.16	66 - 68	Fluvial	0.75 in MLABS	70.5	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-52S	Floodplain	462.16	47 - 49	Fluvial	0.75 in MLABS	51.5	Middle	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-53D	Floodplain	461.32	123.5 - 125	Fluvial	0.75 in MLABS	---	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-53M	Floodplain	461.32	98.5 - 100	Fluvial	0.75 in MLABS	---	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-54-085	Arizona	466.10	77 - 87	Fluvial	2 in PVC	93.2	Deep	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-54-140	Arizona	465.98	128 - 138	Fluvial	2 in PVC	138.0	Deep	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-54-195	Arizona	466.32	185 - 195	Fluvial	2 in PVC	195.0	Deep	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-55-045	Arizona	465.84	37 - 47	Fluvial	2 in PVC	54.0	Middle	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-55-120	Arizona	465.82	108 - 118	Fluvial	2 in PVC	120.3	Deep	LF	Semiannual	--	Semiannual	--	Monthly	--	--	
MW-56D	Arizona	461.36	103.5 - 105.5	Fluvial	0.75 in MLABS	---	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-56M	Arizona	461.36	73.5 - 75.5	Fluvial	0.75 in MLABS	---	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-56S	Arizona	461.36	33.5 - 35.5	Fluvial	0.75 in MLABS	---	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-57-050	East Ravine	508.76	40 - 50	Bedrock	2 in Sch 40 PVC	50.0	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-57-070	East Ravine	509.37	55 - 70	Bedrock	2 in Sch 40 PVC	70.0	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-57-185	East Ravine	508.97	70 - 184	Bedrock	4 in Sch 40 PVC	184.7	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-58-065	East Ravine	523.26	54 - 64	Bedrock	2 in Sch 40 PVC	66.0	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-58BR	East Ravine	---	--	Bedrock	---	---	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-59-100	East Ravine	541.61	86 - 101	Alluvial	2 in Sch 40 PVC	101.0	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-60-125	East Ravine	555.47	103 - 123	Bedrock	2 in Sch 40 PVC	122.5	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-60BR-245	East Ravine	554.95	136 - 245	Bedrock	5 in	244.1	Bedrock	LF, 3V	Quarterly	--	Quarterly	--	--	--	--	Sampling Method Trial
MW-61-110	East Ravine	544.03	92 - 112	Bedrock	2 in Sch 40 PVC	112.5	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-62-065	East Ravine	503.56	44.5 - 64.5	Bedrock	2 in Sch 40 PVC	67.4	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-62-110	East Ravine	504.05	85 - 110	Bedrock	---	110.0	Bedrock	G	Quarterly	--	Quarterly	--	--	--	--	
MW-62-190	East Ravine	504.05	155 - 192	Bedrock	---	190.0	Bedrock	3V	Semiannual	--	Semiannual	--	--	--	--	
MW-63-065	East Ravine	504.47	46 - 66	Bedrock	2 in Sch 40 PVC	65.6	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-64BR	East Ravine	575.60	2 - 258	Bedrock	3 in	260.0	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-65-160	Topock Compressor Station	596.59	150 - 160	Alluvial	2 in PVC	160.1	Shallow	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-65-225	Topock Compressor Station	596.58	215 - 225	Alluvial	2 in PVC	225.1	Deep	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-66-165	Topock Compressor Station	586.16	142 - 162	Alluvial	2 in PVC	162.1	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-66-230	Topock Compressor Station	586.22	218 - 228	Alluvial	2 in PVC	228.1	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-66BR-270	Topock Compressor Station	586.15	248 - 271	Bedrock	5 in	270.6	Bedrock	3V	Semiannual	--	Semiannual	--	--	--	--	
MW-67-185	Topock Compressor Station	625.91	177 - 187	Alluvial	2 in	186.7	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-67-225	Topock Compressor Station	625.83	210 - 225	Alluvial	2 in PVC	225.0	Middle	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-67-260	Topock Compressor Station	625.81	250 - 260	Alluvial	2 in PVC	260.0	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-68-180	Topock Compressor Station	621.17	165 - 180	Alluvial	2 in PVC	180.1	Shallow	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-68-240	Topock Compressor Station	621.17	220 - 240	Alluvial	2 in PVC	240.1	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-68BR-280	Topock Compressor Station	620.64	257 - 279	Bedrock	5 in	278.2	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-69-195	Topock Compressor Station	631.36	176 - 196	Bedrock	2 in	195.5	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	

Table 1-2
GMP, RMP, and PMP Monitoring Summary
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Location ID	Site Area	Measuring Point Elevation (ft amsl)	Well Screen Interval (ft bgs)	Well Screen Lithology	Well Casing Diameter (inches)	Well Depth (ft bgs)	Aquifer Zone	Sampling Method	GMP Monitoring Frequency	RMP Monitoring Frequency	PMP Monitoring: Chromium Monitoring Frequency	PMP Monitoring: Monitoring Frequency for Conditional Shutdown of PE-01	PMP Monitoring: IM Hydraulic Monitoring Frequency	PMP Monitoring: IM Contingency Plan Monitoring Frequency	PMP Monitoring: IM Chemical Performance Monitoring Frequency	Notes
MW-70-105	East Ravine	541.47	85 - 105	Bedrock	2 in PVC	107.8	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-70BR-225	East Ravine	539.84	120 - 227	Bedrock	5 in	229.3	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-71-035	East Ravine	483.69	26 - 36	Alluvial	2 in	36.2	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	
MW-72-080	East Ravine	513.32	60 - 80	Bedrock	2 in	80.1	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-72BR-200	East Ravine	513.79	107 - 200	Bedrock	---	200.0	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-73-080	East Ravine	505.84	60.2 - 80.2	Bedrock	2 in	79.9	Bedrock	LF	Quarterly	--	Quarterly	--	--	--	--	
MW-74-240	East Ravine	672.34	220 - 240	Bedrock	2 in	239.7	Bedrock	LF	Semiannual	--	Semiannual	--	--	--	--	
OW-03D	West Mesa	558.63	242 - 262	Alluvial	2 in Sch 40 PVC	272.5	Deep	LF	Annual	--	Annual	--	--	--	--	
OW-03M	West Mesa	558.9	180 - 200	Alluvial	2 in Sch 40 PVC	200.3	Middle	LF	Annual	--	Annual	--	--	--	--	
OW-03S	West Mesa	558.58	86 - 116	Alluvial	2 in Sch 40 PVC	116.3	Shallow	LF	Annual	--	Annual	--	--	--	--	
PGE-07BR	MW-24 Bench	--	249 - 300	Bedrock	7 in	300.0	Bedrock	3V	Annual	--	Annual	--	--	--	--	Inactive supply well
PGE-8	Station	596.01	405-554	Bedrock	6.75 in Steel	564.0	Bedrock	3V	Annual	--	Annual	--	--	--	--	Inactive injection well
PT-2D	Floodplain	--	95 - 105	Alluvial	2 in in PVC	105	Deep	--	--	--	--	--	Monthly	--	--	
PT-5D	Floodplain	--	95 - 105	Alluvial	2 in in PVC	105	Deep	--	--	--	--	--	Monthly	--	--	
PT-6D	Floodplain	--	95 - 105	Alluvial	2 in in PVC	105	Deep	--	--	--	--	--	Monthly	--	--	
PE-01	Floodplain	457.52	79 - 89	Fluvial	6 in Sch 40	99.0	Deep	tap	Monthly	--	Monthly	Monthly	--	--	--	IM extraction well
TW-01	Plan B Test	620.55	169 - 269	Alluvial	5 in PVC	271.0	Shallow	LF	Semiannual	--	Semiannual	--	--	--	--	Inactive pilot test well
TW-02D	MW-20 bench	493.29	113 - 148	Alluvial	6 in Sch 80 PVC	150.0	Deep	tap	Quarterly	--	Quarterly	--	--	--	--	IM extraction well
TW-02S	MW-20 bench	499.05	42.5 - 92.5	Alluvial	6 in Sch 80 PVC	97.5	Shallow	tap	Annual	--	Annual	--	--	--	--	IM extraction well
TW-03D	MW-20 bench	498.09	111 - 156	Alluvial	8 in PVC	156.0	Deep	tap	Monthly	--	Monthly	--	--	--	--	IM extraction well
TW-04	Floodplain	484.11	210 - 250	Alluvial	4 in PVC	255.0	Deep	LF	Semiannual	--	Semiannual	Semiannual	--	--	--	
TW-05	Route 66	496.30	110 - 150	Alluvial	4 in PVC	155.0	Deep	LF	Semiannual	--	Semiannual	--	--	--	--	
Park Moabi-3	Park Moabi	518.55	80 - 200	Alluvial	8 in Steel	252.0	Middle	tap	Annual	--	Annual	--	--	--	--	Active supply well
Park Moabi-4	Park Moabi	---	93 - 140	Alluvial	Steel	---	Middle	tap	Annual	--	Annual	--	--	--	--	Active supply well
C-BNS	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	
C-CON	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
C-I-3 (I-3)	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	Monthly	--	--	Deep and shallow depth intervals
C-MAR	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
C-NR1	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
C-NR3	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
C-NR4	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
C-R22A	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
C-R27	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
C-TAZ	In-Channel	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	Deep and shallow depth intervals
R-28	Shoreline	--	--	--	--	--	--		--	Quarterly	--	--	--	--	Annual	
R-19	Shoreline	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	
R-63	Shoreline	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	
RRB	Shoreline	--	--	--	--	--	--		--	Quarterly	--	--	Monthly	--	--	
SW-1	Other Surface Water Monitoring Location	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	
SW-2	Other Surface Water Monitoring Location	--	--	--	--	--	--		--	Quarterly	--	--	--	--	--	

Notes:
1. On June 27, 2014, DTSC approved discontinuation of groundwater sampling at monitoring well MW-45-095a. This location was originally included in the list of wells monitored for conditional shutdown of PE-01.

-- = not applicable.
3V = three volume.
amsl = above mean sea level.
bgs = below ground surface.
Deep = deep interval of Alluvial Aquifer.
DTSC = Department of Toxic Substance Control.
ft = feet.
G = grab sample.
GMP = Groundwater Monitoring Program.
H = HydraSleeve
ID = identification.
IM = interim measure.
LF = low flow (minimal drawdown).
Middle = mid-depth interval of Alluvial Aquifer.
PMP = Performance Monitoring Program.
PVC = polyvinyl chloride (pipe)
RMP = Surface Water Monitoring Program.
Shallow = shallow interval of Alluvial Aquifer.
Tap = sampled from tap of extraction well.

Table 3-1
Groundwater Sampling Results, First Quarter 2020
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Specific Conductance (µS/cm)	Dissolved Molybdenum (µg/L)	Dissolved Selenium (µg/L)	Nitrate/Nitrite as Nitrogen (mg/L)	Dissolved Arsenic (µg/L)	Dissolved Manganese (µg/L)	Dissolved Iron (µg/L)	ORP (mV)	Field pH (SU)	Turbidity (NTU)
MW-34-100	DA	2/20/2020		LF	ND (0.2)	4.0	11,000	53	ND (0.5)	ND (0.05)	ND (0.1)	86	--	-64	7.7	5.0
MW-38S	SA	2/25/2020		LF	3.8	3.3	1,500	25	2.5	4.7	6.6	48	--	-4.0	7.2	4.0
MW-38S	SA	2/25/2020	FD	--	3.9	3.2	1,400	22	2.4	5.1	6.6	48	--	--	--	--
MW-44-115	DA	2/21/2020		LF	4.8	5.9	9,400	62	ND (0.5)	ND (0.05)	2.1	6.4	--	-75	7.4	9.0
MW-46-175	DA	2/21/2020		LF	9.1	17	19,000	190	ND (2.5)	1.0	--	--	--	-44	7.6	4.0
MW-57-050	BR	--		--	--	--	--	--	--	--	--	--	--	--	--	--
MW-58-065	BR	--		--	--	--	--	--	--	--	--	--	--	--	--	--
MW-58BR	BR	2/17/2020		LF	120	120	8,100	22	2.7	1.8	0.11	160	--	50	7.2	3.0
MW-60BR-245	BR	2/20/2020		3V	52	44	16,000	57	3.0	0.22	6.0	7.0	--	-8.8	7.4	2.0
MW-60BR-245_D	BR	2/21/2020		LF	72	62	17,000	61	2.6	0.15	9.0	5.4	--	11	7.2	2.0
MW-60BR-245_S	BR	2/21/2020		LF	96	85	17,000	58	2.8	0.23	7.5	8.1	--	-7.0	7.3	2.0
MW-62-065	BR	2/19/2020		LF	480	460	6,100	13	3.8	5.1	0.13	3.5	--	2.7	7.2	18
MW-62-110	BR	2/18/2020		LF	ND (0.2)	ND (1.0)	8,800	49	ND (0.5)	0.055	5.7	150	--	-44	7.9	5.0
MW-63-065	BR	2/19/2020		LF	1.2	2.5	6,600	18	0.89	1.0	ND (0.1)	14	--	7.4	7.0	28
MW-63-065	BR	2/19/2020	FD	--	1.2	2.8	6,400	18	0.86	1.1	ND (0.1)	17	--	--	--	--
MW-64BR	BR	2/21/2020		LF	ND (1.0)	ND (1.0)	13,000	61	ND (0.5)	ND (0.05)	3.2	910	--	-5.0	7.0	4.0
MW-65-160	SA	2/20/2020		LF	250	250	3,600	28	9.2	14	0.34	0.52	--	-5.0	7.0	12
MW-65-225	DA	2/20/2020		LF	460	470	6,600	27	6.9	10	0.34	4.4	--	-16	7.0	10
MW-68-180	SA	2/20/2020		LF	25,000	27,000	4,200	63	15	29	1.8	6.1	--	16	7.2	4.0
MW-69-195	BR	2/25/2020		LF	150	140	2,400	68	7.9	11	2.0	6.5	--	-5.6	7.1	7.0
MW-72-080	BR	2/20/2020		LF	96	85	15,000	75	ND (2.5)	0.63	12	15	--	110	7.4	7.0
MW-72BR-200	BR	2/20/2020		LF	1.2	2.9	15,000	71	ND (0.5)	ND (0.05)	12	100	--	-59	7.4	7.0
MW-73-080	BR	2/20/2020		LF	21	19	9,600	33	3.7	2.9	ND (0.1)	9.4	--	19	7.2	8.0
PE-01	DA	--		--	--	--	--	--	--	--	--	--	--	--	--	--
TW-02D	DA	2/19/2020		Tap	740	670	5,200	18	3.4	--	--	140	--	130	8.1	2.0
TW-03D	DA	1/8/2020		Tap	470	460	6,900	--	--	2.6	--	20	ND (20)	150	7.3	1.0
TW-03D	DA	2/5/2020		Tap	460	480	7,900	--	--	2.5	--	21	ND (20)	98	7.5	9.0
TW-03D	DA	3/4/2020		Tap	450	390	7,400	--	--	2.9	--	19 J	ND (20)	180	6.8	2.0

Notes:

1. Beginning February 1, 2008, hexavalent chromium samples are field-filtered per DTSC-approved change from analysis Method SW7199 to E218.6.
2. The following analytical methods were used:
   Hexavalent chromium = USEPA Method 218.6
   Dissolved chromium, dissolved arsenic, dissolved manganese, dissolved molybdenum, dissolved selenium = Method SW6020
   Specific conductance = USEPA Method 120.1
   Nitrate/Nitrate as Nitrogen = SM 4500-NO3 F
3. Monitoring wells MW-57-050 and MW-58-065 were dry during the First Quarter 2020 sampling event. Extraction well PE-01 was not sampled in First Quarter 2020 due to construction activities associated with the final groundwater remedy at the site.

-- = not applicable or not reportable.
µg/L = micrograms per liter.
µS/cm = microSiemens per centimeter.
BR = bedrock.
DA = deep interval of Alluvial Aquifer.
DTSC = Department of Toxic Substance Control.
FD = field duplicate.
J = concentration or reporting limit (RL) estimated by laboratory or data validation.
LF = Low Flow (minimal drawdown).
mV = millivolts.
ND = not detected at listed reporting limit.
NTU = nephelometric turbidity units.
ORP = oxidation-reduction potential.
SA = shallow interval of Alluvial Aquifer.
SU = standard units.
Tap = sampled from tap of extraction well.
USEPA = United States Environmental Protection Agency.

Table 3-2
Sampling Method Trial Results through First Quarter 2020
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Sampling Date	Sampling Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
12/14/2017	3V	690	830
12/13/2017	LF - 175 ft	2.3	12
	Control Limit/RPD	**344 - 348**	**194%**
12/14/2017	3V	690	830
12/13/2017	LF - 238 ft	ND (1)	1.4
	Control Limit	**344 - 348**	**414 - 418**
2/21/2018	3V	69	59
2/21/2018	LF - 175 ft	ND (1)	7.7
	Control Limit/RPD	**33 - 37**	**154%**
2/21/2018	3V	69	59
2/21/2018	LF - 238 ft	4.1	39
	Control Limit/RPD	**35 - 39**	**41%**
5/2/2018	3V	73	67
5/2/2018	LF - 175 ft	1.1	1.5
	Control Limit	**35 - 39**	**32 - 36**
5/2/2018	3V	73	67
5/2/2018	LF - 238 ft	1.2	1.7
	Control Limit	**35 - 39**	**32 - 36**
9/25/2018	3V	76	81
9/25/2018	LF - 175 ft	ND (1)	ND (1)
	Control Limit	**37 - 41**	**39 - 43**
9/25/2018	3V	76	81
9/25/2018	LF - 238 ft	6.4	6.2
	RPD	**169%**	**172%**
12/6/2018	3V	110	120
12/6/2018	LF - 175 ft	17	17
	RPD	**146%**	**150%**
12/6/2018	3V	110	120
12/6/2018	LF - 238 ft	20	21
	RPD	**138%**	**140%**
2/14/2019	3V	110	110
2/14/2019	LF - 175 ft	25	29
	RPD	**126%**	**117%**
2/14/2019	3V	110	110
2/14/2019	LF - 238 ft	18	17
	RPD	**144%**	**146%**

Table 3-2
Sampling Method Trial Results through First Quarter 2020
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Sampling Date	Sampling Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
5/22/2019	3V	130	120
5/23/2019	LF - 175 ft	85	74
	RPD	**42%**	**47%**
5/22/2019	3V	130	120
5/23/2019	LF - 238 ft	68	61
	RPD	**63%**	**65%**
12/12/2019	3V	64	52
12/13/2019	LF - 175 ft	86	76
	RPD	**29%**	**38%**
12/12/2019	3V	64	52
12/13/2019	LF - 238 ft	75	61
	RPD	16%	16%
2/20/2020	3V	52	44
2/21/2020	LF - 175 ft	96	85
	RPD	**59%**	**64%**
2/20/2020	3V	52	44
2/21/2020	LF - 238 ft	72	62
	RPD	**32%**	**34%**

Notes:
1. Results presented in table are for monitoring well MW-60BR-245.
2. During the December 2017 through February 2019 sampling method trials, groundwater samples were collected using the LF method first followed by the 3V method. In May 2019, December 2019, and February 2020, groundwater samples were collected using the 3V method first followed by the LF method.
3. **Bold underlined** values highlighted in green are above a 20% threshold for RPD evaluation or outside the control limit. If the concentration of either sample result within a sample pair is less than or equal to 5 times the reporting limit, then a control limit of two times the reporting limit is applied. For consistency purposes, a reporting limit of 1 µg/L was used for hexavalent chromium and dissolved chromium results.

µg/L = micrograms per liter.
3V = three volume purge.
ft = feet.
ID = identification.
J = concentration estimated by laboratory or data validation.
LF = low-flow.
ND = not detected at the listed reporting limit.
RPD = relative percent difference.

Table 3-3

Surface Water Sampling Results, First Quarter 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Sample Type	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Field pH (SU)	Specific Conductance (µS/cm)	Dissolved Molybdenum (µg/L)	Dissolved Selenium (µg/L)	Nitrate/Nitrite as Nitrogen (mg/L)	Dissolved Arsenic (µg/L)	Dissolved Iron (µg/L)	Iron (µg/L)	Dissolved Manganese (µg/L)	Dissolved Barium (µg/L)	Total Suspended Solids (mg/L)
C-BNS	1/29/2020		ND (0.2)	ND (1.0)	8.1	930	4.7	1.6	0.35	2.2	ND (20)	93	1.6	120	ND (5.0)
C-BNS	2/19/2020		ND (0.2)	ND (1.0)	8.2	850	4.6	1.6	0.32	2.2	80 J	130 J	1.3	120 J	7.5
C-CON-D	1/30/2020		ND (0.2)	ND (1.0)	8.1	890	4.6	1.6	0.3	2.2	27 J	84	2.0 J	120	ND (5.0)
C-CON-D	2/20/2020		ND (0.2)	ND (1.0)	8.1	820	4.5 J	1.4	0.28	2.1	29	78	1.4	110	7.0
C-CON-S	1/30/2020		ND (0.2)	ND (1.0)	8.1	890	4.6	1.6	0.36	2.2	32 J	53	2.2 J	110	ND (5.0)
C-CON-S	2/20/2020		ND (0.2)	ND (1.0)	8.2	830	4.6 J	1.4	0.33	2.1	28	67 J	1.2	110	5.0
C-CON-S	2/20/2020	FD	ND (0.2)	ND (1.0)	--	870	4.7	1.6	0.29	2.3	38	88	0.99	120 J	5.5
C-I-3-D	1/29/2020		ND (0.2)	ND (1.0)	8.1	920	4.4	1.6	0.35	2.1	ND (20)	75	1.2	110	10
C-I-3-D	2/19/2020		ND (0.2)	ND (1.0)	8.1	860	4.6	1.6	0.36	2.1	86 J	91 J	0.84	120 J	8.0
C-I-3-S	1/29/2020		ND (0.2)	ND (1.0)	8.1	920	4.4	1.5	0.29	2.2	ND (20)	120	1.1	110	ND (5.0)
C-I-3-S	2/19/2020		ND (0.2)	ND (1.0)	8.2	860	4.6	1.6	0.35	2.2	44 J	75	1.1	120 J	5.0
C-MAR-D	1/30/2020		ND (0.2)	ND (1.0)	8.8	1,000	5.1	1.6	0.31	2.6	380 J	1,100	92 J	130	28
C-MAR-D	2/20/2020		ND (0.2)	ND (1.0)	8.0	880	4.7 J	1.5	0.35	2.1	69	400 J	14	110	24
C-MAR-S	1/30/2020		ND (0.2)	ND (1.0)	8.9	1,100	5.0	1.4	0.27	2.7	880 J	1,400	110 J	130	36
C-MAR-S	2/20/2020		ND (0.2)	ND (1.0)	8.1	880	4.7 J	1.5	0.28	2.3	250	430 J	21	120	30
C-NR1-D	1/30/2020		ND (0.2)	ND (1.0)	8.1	900	4.5	1.7	0.27	2.2	ND (20 J)	57	2.0 J	110	ND (5.0)
C-NR1-D	2/20/2020		ND (0.2)	ND (1.0)	8.1	840	4.6 J	1.5	0.35	2.1	38 J	80 J	0.84	120	6.0
C-NR1-S	1/30/2020		ND (0.2)	ND (1.0)	8.0	900	4.4	1.6	0.27	2.1	28 J	26	2.6 J	110	ND (5.0)
C-NR1-S	2/20/2020		ND (0.2)	ND (1.0)	8.1	840	4.6 J	1.5	0.35	2.2	ND (20 J)	83 J	1.1	120	ND (5.0)
C-NR3-D	1/30/2020		ND (0.2)	ND (1.0)	8.1	910	4.5	1.5	0.33	2.1	44 J	54	2.3 J	110	ND (5.0)
C-NR3-D	1/30/2020	FD	ND (0.2)	ND (1.0)	0	900	4.4	1.6	0.39	2.1	31 J	37	2.1 J	110	ND (5.0)
C-NR3-D	2/20/2020		ND (0.2)	ND (1.0)	8.1	820	4.6 J	1.6	0.27	2.1	66 J	120 J	1.7	120	5.0
C-NR3-S	1/30/2020		ND (0.2)	ND (1.0)	8.1	910	4.3	1.6	0.33	2.0	51 J	97	1.7 J	110	ND (5.0)
C-NR3-S	2/20/2020		ND (0.2)	ND (1.0)	8.1	820	4.7 J	1.5	0.29	2.2	20 J	91 J	1.3	120	ND (5.0)
C-NR4-D	1/30/2020		ND (0.2)	ND (1.0)	8.1	890	4.3	1.5	0.36	2.1	ND (20 J)	65	1.5 J	110	ND (5.0)
C-NR4-D	2/20/2020		ND (0.2)	ND (1.0)	8.1	880	4.7 J	1.5	0.38	2.1	22 J	72 J	1.0	120	5.5
C-NR4-S	1/30/2020		ND (0.2)	ND (1.0)	8.1	890	4.4	1.5	0.36	2.1	22 J	38	1.5 J	110	ND (5.0)
C-NR4-S	2/20/2020		ND (0.2)	ND (1.0)	8.1	860	4.5 J	1.5	0.37	2.1	30	120 J	1.1	110	ND (5.0)
C-R22A-D	1/29/2020		ND (0.2)	ND (1.0)	8.1	940	4.8	1.6	0.36	2.2	ND (20)	130	2.6	120	7.0
C-R22A-D	2/19/2020		ND (0.2)	ND (1.0)	8.1	890	4.5	1.6	0.33	2.2	110 J	130 J	1.2	120 J	ND (5.0)
C-R22A-S	1/29/2020		ND (0.2)	ND (1.0)	8.1	950	4.6	1.6	0.35	2.3	ND (20)	120	2.7	120	7.0
C-R22A-S	1/29/2020	FD	ND (0.2)	ND (1.0)	0	930	4.9	1.6	0.36	2.3	27	160	2.9	130	6.5
C-R22A-S	2/19/2020		ND (0.2)	ND (1.0)	8.1	870	4.7	1.6	0.33	2.2	32 J	90	1.4	120 J	ND (5.0)
C-R27-D	1/29/2020		ND (0.2)	ND (1.0)	8.1	940	4.6	1.6	0.25	2.1	110	180	4.0	120	14
C-R27-D	2/19/2020		ND (0.2)	ND (1.0)	8.1	870	4.6	1.6	0.28	2.1	39 J	260 J	2.1	120 J	5.0
C-R27-D	2/19/2020	FD	ND (0.2)	ND (1.0)	--	890	4.6	1.6	0.28	2.2	61 J	190 J	1.1	120 J	5.0
C-R27-S	1/29/2020		ND (0.2)	ND (1.0)	8.1	960	4.6	1.5	0.31	2.2	ND (20)	170	2.0	120	10
C-R27-S	2/19/2020		ND (0.2)	ND (1.0)	8.1	860	4.7	1.7	0.28	2.3	58 J	270 J	1.1	120 J	ND (5.0)
C-TAZ-D	1/29/2020		ND (0.2)	ND (1.0)	8.2	920	4.5	1.6	0.29	2.2	26	150	2.2	110	6.5
C-TAZ-D	2/19/2020		ND (0.2)	ND (1.0)	8.1	840	4.5	1.5	0.27	2.2	33 J	120 J	1.4	120 J	8.5
C-TAZ-S	1/29/2020		ND (0.2)	ND (1.0)	8.2	920	4.6	1.7	0.35	2.2	ND (20)	100	1.6	110	5.5
C-TAZ-S	2/19/2020		ND (0.2)	ND (1.0)	8.1	850	4.4	1.6	0.32	2.2	30 J	84 J	1.0	120 J	5.0
R-19	1/30/2020		ND (0.2)	ND (1.0)	8.0	890	4.7	1.6	0.37	2.1	38 J	47	2.5 J	110	ND (5.0)
R-19	2/20/2020		ND (0.2)	ND (1.0)	8.1	830	4.7 J	1.5	0.33	2.1	27 J	93 J	1.3	120	ND (5.0)
R-28	1/29/2020		ND (0.2)	ND (1.0)	8.1	980	4.7	1.6	0.32	2.2	ND (20)	180	2.6	120	8.5
R-28	2/19/2020		ND (0.2)	ND (1.0)	8.1	860	4.6	1.6	0.33	2.1	63 J	150 J	1.8	120 J	7.5
R63	1/29/2020		ND (0.2)	ND (1.0)	8.1	920	4.4	1.6	0.3	2.1	ND (20)	110	3.6	110	ND (5.0)
R63	2/19/2020		ND (0.2)	ND (1.0)	8.2	860	4.8	1.6	0.28	2.3	43 J	170 J	2.9	120 J	ND (5.0)

Table 3-3

Surface Water Sampling Results, First Quarter 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Sample Date	Sample Type	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)	Field pH (SU)	Specific Conductance (µS/cm)	Dissolved Molybdenum (µg/L)	Dissolved Selenium (µg/L)	Nitrate/Nitrite as Nitrogen (mg/L)	Dissolved Arsenic (µg/L)	Dissolved Iron (µg/L)	Iron (µg/L)	Dissolved Manganese (µg/L)	Dissolved Barium (µg/L)	Total Suspended Solids (mg/L)
RRB	1/30/2020		ND (0.2)	ND (1.0)	7.8	2,800	7.0	2.3	1.1	2.4	ND (100 J)	1,100	21 J	80	15
RRB	2/20/2020		ND (0.2)	ND (1.0)	8.1	870	4.8	1.5	0.22	2.1	21	160	2.7	97 J	ND (5.0)
SW-1	1/29/2020		ND (0.2)	ND (1.0)	8.5	1,100	--	--	--	--	--	--	--	--	--
SW-1	2/19/2020		ND (0.2)	ND (1.0)	7.7	1,200	--	--	--	--	--	--	--	--	--
SW-2	1/29/2020		ND (0.2)	ND (1.0)	7.4	1,500	--	--	--	--	--	--	--	--	--
SW-2	2/19/2020		ND (0.2)	ND (1.0)	8.0	1,600	--	--	--	--	--	--	--	--	--

Notes:

1. Beginning February 1, 2008, hexavalent chromium samples are field-filtered per DTSC-approved change from analysis Method SW7199 to E218.6.
2. The following analytical methods were used:
   Hexavalent chromium = USEPA 218.6
   Dissolved chromium, dissolved arsenic, dissolved barium, dissolved selenium = SW6020
   Dissolved iron, total iron, dissolved manganese, dissolved molybdenum = SW6010B
   Specific conductance = USEPA 120.1
   Nitrate/Nitrate as Nitrogen = SM 4500-NO3 F
   Total suspended solids = SM 2540D

-- = not applicable.
µg/L = micrograms per liter.
µS/cm = microSiemens per centimeter.
DTSC = Department of Toxic Substance Control.
FD = field duplicate.
ID = identification.
J = concentration or reporting limit (RL) estimated by laboratory or data validation.
mg/L = milligrams per liter.
ND = not detected at listed reporting limit.
SU = standard units.
USEPA = United States Environmental Protection Agency.

Table 4-1

Pumping Rate and Extracted Volume for IM-3 System, First Quarter 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report

PG&E Topock Compressor Station, Needles, California

Extraction Well ID	January 2020 Average Pumping Rate[a] (gpm)	January 2020 Volume Pumped (gal)	February 2020 Average Pumping Rate[a] (gpm)	February 2020 Volume Pumped (gal)	March 2020 Average Pumping Rate[a] (gpm)	March 2020 Volume Pumped (gal)	First Quarter 2020 Average Pumping Rate[a] (gpm)	First Quarter 2020 Volume Pumped (gal)
TW-02S	0.00	0	0.00	0	0.35	15,500	0.12	15,500
TW-02D	0.00	0	0.00	0	0.16	7,346	0.05	7,346
TW-03D	128.9	5,754,306	131.92	5,318,999	122.14	5,452,429	127.66	16,525,734
PE-01	0.00	0	0.00	0	0.00	0	0.00	0
TOTAL	**128.9**	**5,754,306**	**131.9**	**5,318,999**	**122.7**	**5,475,275**	**127.8**	**16,548,580**

Chromium Removed This Quarter (kg)	19.5
Chromium Removed Project to Date (kg)	4,400
Chromium Removed This Quarter (lb)	42.9
Chromium Removed Project to Date (lb)	9,700

Notes:

[a] The "Average Pumping Rate" is the overall average during the reporting period, including system downtime, based on flow meter readings.

1. Chromium removed includes the period of January 1, 2020 through February 29, 2020.

gal = gallons.
gpm = gallons per minute.
ID = identification.
IM = Interim Measure.
kg = kilograms.
lb = pounds.

Table 4-2

Wells Monitored for Conditional Shutdown of PE-01, First Quarter 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report

PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Q1 2020 Sample Date	Q1 2020 Sample Method	Hexavalent Chromium 2014 Maximum Concentration (µg/L)	Hexavalent Chromium Q1 2020 Result (µg/L)	Dissolved Chromium 2014 Maximum Concentration (µg/L)	Dissolved Chromium Q1 2020 Result (µg/L)	Q1 2020 Result Exceeded 2014 Maximum Concentration?
MW-20-070	Shallow	--	--	2,200	--	2,400	--	--
MW-26	Shallow	--	--	2,400	--	2,300	--	--
MW-27-020	Shallow	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-28-025	Shallow	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-30-030	Shallow	--	--	0.21	--	ND (1.0)	--	--
MW-31-060	Shallow	--	--	600	--	660	--	--
MW-32-020	Shallow	--	--	ND (1.0)	--	ND (5.0)	--	--
MW-32-035	Shallow	--	--	ND (1.0)	--	ND (1.0)	--	--
MW-33-040	Shallow	--	--	0.28	--	ND (1.0)	--	--
MW-36-020	Shallow	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-36-040	Shallow	--	--	0.34	--	ND (1.0)	--	--
MW-39-040	Shallow	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-42-030	Shallow	--	--	0.54	--	ND (1.0)	--	--
MW-47-055	Shallow	--	--	16	--	16	--	--
MW-20-100	Middle	--	--	2,900	--	2,900	--	--
MW-27-060	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-30-050	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-33-090	Middle	--	--	13.3	--	15.5	--	--
MW-34-055	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-36-050	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-36-070	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-39-050	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-39-060	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-39-070	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-42-055	Middle	--	--	0.35	--	2.8	--	--
MW-42-065	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-44-070	Middle	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-51	Middle	--	--	4,800	--	4,800	--	--
MW-20-130	Deep	--	--	9,100	--	9,000	--	--
MW-27-085	Deep	--	--	ND (1.0)	--	ND (1.0)	--	--
MW-28-090	Deep	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-31-135	Deep	--	--	12	--	12	--	--
MW-33-150	Deep	--	--	12	--	10.8	--	--
MW-33-210	Deep	--	--	13	--	13.5	--	--
MW-34-080	Deep	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-34-100	Deep	2/20/2020	LF	263	ND (0.2)	270	4.0	No
MW-36-090	Deep	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-36-100	Deep	--	--	65	--	62	--	--
MW-39-080	Deep	--	--	ND (0.20)	--	ND (1.0)	--	--
MW-39-100	Deep	--	--	57	--	49	--	--
MW-44-115	Deep	2/21/2020	LF	41.6	4.8	42.9	5.9	No
MW-44-125	Deep	--	--	4.0 J	--	5.9	--	--
MW-45-095a	Deep	--	--	13.7*	--	14.2*	--	--
MW-46-175	Deep	2/21/2020	LF	46.3	9.1	46.1	17	No
MW-46-205	Deep	--	--	5.5	--	4.8	--	--
MW-47-115	Deep	--	--	24	--	20	--	--
PE-01	Deep	--	--	5.6	--	6	--	--
PE-01	Deep	--	--	5.6	--	6	--	--
PE-01	Deep	--	--	5.6	--	6	--	--
PE-01	Deep	--	--	5.6	--	6	--	--
TW-04	Deep	--	--	7.4*	--	20	--	--

Table 4-2

Wells Monitored for Conditional Shutdown of PE-01, First Quarter 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report

PG&E Topock Compressor Station, Needles, California

Notes:

1. Monitoring wells presented in the table are located within approximately 800 feet of TW-03D, as stated in DTSC 2015.
2. * = Result is the maximum concentration from 2013.
3. Values shown in parentheses are the reporting limit.
4. If a field duplicate sample was collected, the maximum concentration between the primary and field duplicate sample is presented.
5. On June 27, 2014, DTSC approved discontinuation of groundwater sampling at monitoring well MW-45-095a.
6. **Bold** values exceeded the 2013 and/or 2014 maximum concentration for hexavalent chromium and/or dissolved chromium.

-- = not applicable.
µg/L = micrograms per liter.
DTSC = Department of Toxic Substance Control.
ID = identification.
LF = low flow (minimal drawdown).
ND = not detected at listed reporting limit.
NS = not sampled.
Q1 = first quarter.
Tap = sampled from tap of extraction well.

References:

DTSC. 2015. Letter from Aaron Yue/DTSC to Yvonne Meeks/PG&E. "Conditional Approval of Proposal to Modify Interim Measures 3 (IM3) Extraction Well Pumping at Pacific Gas and Electric Company, Topock Compressor Station (PG&E), Needles, California (USEPA ID No. CAT080011729)." July 20.

Table 4-3

Groundwater Elevation Results, First Quarter 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report

PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	January Average Groundwater Elevation (ft amsl)	February Average Groundwater Elevation (ft amsl)	March Average Groundwater Elevation (ft amsl)	Quarterly Average Groundwater Elevation (ft amsl)	Days in Quarterly Average
MW-20-070	Shallow	451.12	451.60	452.34	451.69	91
MW-22	Shallow	452.57	452.94	454.33	453.33	86
MW-25	Shallow	453.28	453.40	454.03	453.57	91
MW-26	Shallow	453.06	453.08	453.66	453.27	91
MW-27-020	Shallow	452.06	453.26	453.98	453.10	91
MW-28-025	Shallow	452.16	453.30	453.93	453.13	91
MW-31-060	Shallow	451.92	452.60	453.34	452.62	91
MW-32-035	Shallow	452.07	452.98	453.73	452.92	91
MW-33-040	Shallow	452.17	453.07	453.79	453.01	91
MW-35-060	Shallow	452.55	453.49	454.30	453.45	91
MW-36-020	Shallow	451.99	452.93	453.65	452.86	91
MW-36-040	Shallow	451.99	453.11	453.73	452.94	91
MW-39-040	Shallow	451.82	452.71	453.48	452.67	91
MW-42-030	Shallow	451.91	452.85	453.50	452.75	91
MW-43-025	Shallow	452.08	453.15	453.86	453.11	84
MW-47-055	Shallow	452.78	453.56	454.22	453.52	91
MW-20-100	Middle	450.52	451.04	451.74	451.10	91
MW-27-060	Middle	452.21	453.33	454.02	453.18	91
MW-30-050	Middle	451.76	452.75	453.54	452.68	91
MW-33-090	Middle	452.26	453.27	454.23	453.26	91
MW-34-055	Middle	452.18	453.28	453.99	453.15	91
MW-36-050	Middle	451.90	452.95	453.63	452.82	91
MW-36-070	Middle	452.39	INC	INC	INC	48
MW-39-050	Middle	451.75	452.68	453.34	452.59	91
MW-39-060	Middle	451.47	452.37	453.01	452.28	91
MW-39-070	Middle	451.04	451.82	452.51	451.79	91
MW-42-065	Middle	451.95	452.94	453.57	452.82	91
MW-44-070	Middle	451.99	453.09	453.73	452.93	91
MW-50-095	Middle	452.54	453.00	INC	INC	56
MW-51	Middle	452.64	452.71	453.31	452.89	91
MW-55-045	Middle	454.69	455.08	455.56	455.11	91
MW-20-130	Deep	449.54	450.52	451.33	450.46	91
MW-27-085	Deep	452.14	453.23	453.91	453.09	91
MW-28-090	Deep	452.04	453.14	453.75	452.98	91
MW-31-135	Deep	451.33	451.92	452.65	451.97	91
MW-33-150	Deep	452.58	453.52	454.14	453.41	91
MW-34-080	Deep	452.42	453.61	454.25	453.42	91
MW-34-100	Deep	452.31	453.45	454.09	453.28	91
MW-35-135	Deep	INC	INC	INC	INC	6
MW-36-090	Deep	451.16	452.36	453.16	452.22	91
MW-36-100	Deep	451.74	452.66	453.32	452.57	91
MW-39-080	Deep	451.06	451.85	452.46	451.79	91
MW-39-100	Deep	451.66	452.51	453.19	452.45	91
MW-43-090	Deep	452.27	453.42	453.92	453.16	86
MW-44-115	Deep	451.62	452.60	453.25	452.49	91
MW-44-125	Deep	452.12	453.08	453.72	452.97	91
MW-45-095a	Deep	451.85	452.90	453.46	452.73	91
MW-46-175	Deep	452.54	453.39	454.01	453.31	91
MW-47-115	Deep	452.29	452.96	453.57	452.94	91
MW-49-135	Deep	452.72	453.52	454.18	453.47	91
MW-54-085	Deep	452.62	453.71	454.29	453.54	91
MW-54-140	Deep	452.46	453.31	453.88	453.21	91
MW-54-195	Deep	INC	INC	INC	INC	7
MW-55-120	Deep	454.82	455.17	455.63	455.21	91
PT-2D	Deep	450.56	451.35	452.07	451.32	91
PT-5D	Deep	451.60	452.43	453.10	452.37	91
PT-6D	Deep	451.51	452.33	453.01	452.28	91
I-3	Surface water	452.62	453.80	454.61	453.68	91
RRB	Surface water	INC	INC	INC	INC	0

Notes:

ft amsl = feet above mean sea level.

INC = data are incomplete; less than 75 percent of data were available during the reporting period due to rejection, field equipment malfunction, or inaccessibility.

ID = identification.

Table 4-4

Average Hydraulic Gradients Measured at Well Pairs, First Quarter 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report

PG&E Topock Compressor Station, Needles, California

Gradient Pair	Well Pair	Reporting Period	Mean Landward Hydraulic Gradient (feet/foot)	Days in Monthly Average	PE-01 Run for Gradient Control?
Overall Average	--	January	0.0037	--	No
Overall Average	--	February	0.0041	--	No
Overall Average	--	March	0.0039	--	No
Northern Gradient Pair	MW-31-135 / MW-33-150	January	0.0026	31	No
Northern Gradient Pair	MW-31-135 / MW-33-150	February	0.0034	29	No
Northern Gradient Pair	MW-31-135 / MW-33-150	March	0.0031	31	No
Central Gradient Pair (used when PE-01 is run for gradient control)	MW-45-095 / MW-34-100	January	--	--	--
Central Gradient Pair (used when PE-01 is run for gradient control)	MW-45-095 / MW-34-100	February	--	--	--
Central Gradient Pair (used when PE-01 is run for gradient control)	MW-45-095 / MW-34-100	March	--	--	--
Central Gradient Pair (used when PE-01 is not run for gradient control)	MW-20-130 / MW-34-100	January	0.0048	31	No
Central Gradient Pair (used when PE-01 is not run for gradient control)	MW-20-130 / MW-34-100	February	0.0051	29	No
Central Gradient Pair (used when PE-01 is not run for gradient control)	MW-20-130 / MW-34-100	March	0.0048	31	No
Southern Gradient Pair (used when PE-01 is run for gradient control)	MW-45-095 / MW-27-085	January	--	--	--
Southern Gradient Pair (used when PE-01 is run for gradient control)	MW-45-095 / MW-27-085	February	--	--	--
Southern Gradient Pair (used when PE-01 is run for gradient control)	MW-45-095 / MW-27-085	March	--	--	--
Southern Gradient Pair (used when PE-01 is not run for gradient control)	MW-20-130 / MW-27-085	January	0.0038	31	No
Southern Gradient Pair (used when PE-01 is not run for gradient control)	MW-20-130 / MW-27-085	February	0.0039	29	No
Southern Gradient Pair (used when PE-01 is not run for gradient control)	MW-20-130 / MW-27-085	March	0.0037	31	No

Notes:

1. The target mean landward hydraulic gradient for the selected well pairs is 0.001 feet/foot.
2. "Days in Monthly Average" refers to the number of days the pressure transducers in both wells were operating correctly.
3. Beginning in August 2017, MW-20-130 was approved for gradient compliance (instead of MW-45-95) at the central and southern well pairs during months when PE-01 is not run for gradient control.
4. MW-45-095 is also known as MW-45-095a.

-- = not applicable

Table 4-5
Interim Measure Contingency Plan Trigger Levels and Results, First Quarter 2020
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Q1 2020 Sample Date	Q1 2020 Sample Method	Hexavalent Chromium Trigger Level (µg/L)	Q1 2020 Hexavalent Chromium Result (µg/L)	Q1 2020 Result Exceeded Trigger Level?
MW-21	Shallow	--	--	20	NS	--
MW-27-085	Deep	--	--	20	NS	--
MW-28-090	Deep	--	--	20	NS	--
MW-32-020	Shallow	--	--	20	NS	--
MW-32-035	Shallow	--	--	20	NS	--
MW-33-040	Shallow	--	--	20	NS	--
MW-33-090	Middle	--	--	25	NS	--
MW-33-150	Deep	--	--	20	NS	--
MW-33-210	Deep	--	--	20	NS	--
MW-34-080	Deep	--	--	20	NS	--
MW-34-100	Deep	2/20/2020	LF	750	ND (0.2)	No
MW-36-070	Middle	--	--	20	NS	--
MW-39-040	Shallow	--	--	20	NS	--
MW-42-055	Middle	--	--	20	NS	--
MW-42-065	Middle	--	--	20	NS	--
MW-43-075	Deep	--	--	20	NS	--
MW-43-090	Deep	--	--	20	NS	--
MW-44-070	Middle	--	--	20	NS	--
MW-44-115	Deep	2/21/2020	LF	1,200	4.8	No
MW-44-125	Deep	--	--	475	NS	--
MW-46-175	Deep	2/21/2020	LF	225	9.1	No
MW-46-205	Deep	--	--	20	NS	--
MW-47-055	Shallow	--	--	150	NS	--
MW-47-115	Deep	--	--	31	NS	--

Notes:
1. If a field duplicate sample was collected, the maximum concentration between the primary and field duplicate sample is presented.
2. None of the results from the First Quarter 2020 exceeded their respective trigger level.

µg/L = micrograms per liter.
ID = identification.
LF = Low Flow (minimal drawdown).
ND = not detected at listed reporting limit.
NS = not sampled.
Q1 = first quarter.

Table 4-6
Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

Month, Year	Davis Dam Release Projected (cfs)	Davis Dam Release Actual (cfs)	Davis Dam Release Difference (cfs)	Colorado River Elevation at I-3 Predicted (ft amsl)	Colorado River Elevation at I-3 Actual (ft amsl)	Colorado River Elevation at I-3 Difference (feet)
January 2013	8,300	8,299	1	453.20	453.28	0.04
February 2013	10,600	10,972	-372	454.30	454.63	0.40
March 2013	15,200	15,545	-345	456.00	456.29	0.30
April 2013	17,600	17,090	510	456.90	456.74	0.10
May 2013	15,800	15,592	208	456.40	456.44	0.00
June 2013	15,700	15,588	112	456.50	456.47	0.00
July 2013	14,400	13,165	1,235	456.00	455.79	0.20
August 2013	13,100	12,185	915	455.40	455.43	0.00
September 2013	11,700	11,446	254	454.80	455.02	0.20
October 2013	12,300	12,497	-197	454.90	455.09	0.20
November 2013	9,700	8,918	782	454.00	453.98	0.00
December 2013	6,400	7,636	-1,236	452.40	452.81	0.40
January 2014	8,300	8,970	-670	452.80	453.27	0.50
February 2014	11,600	11,850	-250	454.30	454.67	0.30
March 2014	16,600	17,473	-873	456.40	456.70	0.30
April 2014	18,200	17,718	482	457.10	457.08	0.00
May 2014	16,700	16,622	78	456.80	456.68	0.10
June 2014	15,900	15,917	-17	456.60	456.64	0.10
July 2014	15,100	14,640	460	456.30	456.24	0.00
August 2014	12,300	11,336	964	455.20	455.26	0.10
September 2014	13,100	12,211	889	455.30	455.30	0.00
October 2014	10,700	10,434	266	454.30	454.81	0.50
November 2014	10,700	10,575	125	454.30	454.22	0.10
December 2014	6,400	7,235	-835	452.40	452.93	0.50
January 2015	10,600	10,740	-140	454.30	454.39	0.09
February 2015	10,500	11,252	-752	454.20	454.52	0.32
March 2015	14,900	15,658	-758	455.90	456.29	0.39
April 2015	18,000	17,170	830	457.10	456.82	0.28
May 2015	16,000	13,890	2110	456.50	456.06	0.50
June 2015	14,500	13,616	884	456.10	455.94	0.16
July 2015	13,400	12,411	989	455.60	455.50	0.10
August 2015	12,100	12,627	-527	455.10	455.45	0.40
September 2015	13,300	12,734	566	455.40	INC	NA
October 2015	11,300	10,653	647	454.70	454.80	0.1
November 2015	10,000	10,066	-66	454.16	453.87	0.29
December 2015	6,200	8,556	-2,356	453.30	453.48	-0.18
January 2016	9,400	9,000	400	453.44	454.05	-0.60
February 2016	11,300	11,700	-400	454.37	454.95	-0.57
March 2016	15,800	15,000	800	455.86	456.51	-0.65
April 2016	15,400	16,400	-1,000	456.77	457.17	-0.40
May 2016	15,800	14,700	1,100	455.98	456.76	-0.78
June 2016	14,400	14,100	300	456.01	456.64	-0.62
July 2016	13,300	13,100	200	455.73	456.38	-0.65
August 2016	11,500	11,600	-100	455.02	455.70	-0.69
September 2016	12,200	11,900	300	455.19	455.83	-0.63
October 2016	10,400	10,400	0	454.25	455.23	-0.98
November 2016	9,900	9,600	300	453.70	454.40	-0.70
December 2016	8,300	7,800	500	453.37	453.55	-0.18
January 2017	8,000	6,600	1,400	453.22	453.36	-0.14
February 2017	9,500	8,700	800	453.91	454.15	-0.24
March 2017	13,900	13,700	200	455.53	456.10	-0.57
April 2017	15,900	16,100	-200	456.40	456.97	-0.57
May 2017	14,000	13,800	200	455.74	456.39	-0.66
June 2017	13,600	14,300	-700	455.95	456.46	-0.51
July 2017	13,300	13,300	0	455.62	456.22	-0.59

Table 4-6

Predicted and Actual Monthly Average Davis Dam Discharge and Colorado River Elevation at I-3

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide

Groundwater and Surface Water Monitoring Report

PG&E Topock Compressor Station, Needles, California

Month, Year	Davis Dam Release Projected (cfs)	Davis Dam Release Actual (cfs)	Davis Dam Release Difference (cfs)	Colorado River Elevation at I-3 Predicted (ft amsl)	Colorado River Elevation at I-3 Actual (ft amsl)	Colorado River Elevation at I-3 Difference (feet)
August 2017	11,500	11,500	0	454.91	455.59	-0.68
September 2017	12,700	11,100	1,600	454.39	455.32	-0.93
October 2017	12,000	10,900	1,100	454.01	455.15	-1.14
November 2017	10,400	10,000	400	454.25	454.70	-0.45
December 2017	8,800	9,000	-200	453.51	454.09	-0.58
January 2018	8,100	7,100	1,000	452.50	453.05	-0.55
February 2018	11,100	11,000	100	454.40	454.82	-0.42
March 2018	14,400	13,600	800	455.38	455.94	-0.56
April 2018	16,000	16,800	-800	456.25	457.09	-0.84
May 2018	15,900	16,300	-400	456.80	457.06	-0.26
June 2018	15,600	15,300	300	456.40	456.88	-0.48
July 2018	13,700	13,400	300	455.60	456.33	-0.73
August 2018	12,000	11,900	100	454.91	455.58	-0.67
September 2018	13,400	13,700	-300	464.03	456.29	7.74
October 2018	11,200	10,300	900	454.54	455.16	-0.62
November 2018	10,500	10,300	200	454.40	455.02	-0.62
December 2018	7,300	6,300	1000	452.94	453.33	-0.39
January 2019	7,300	6,800	500	452.96	453.32	-0.36
February 2019	11,800	10,200	1600	454.71	454.85	-0.14
March 2019	12,400	12,200	200	455.09	455.47	-0.38
April 2019	15,100	14,900	200	456.20	456.55	-0.35
May 2019	15,200	15,200	0	456.40	456.87	-0.47
June 2019	15,100	14,900	200	456.38	456.80	-0.42
July 2019	14,200	14,500	-300	455.90	456.53	-0.63
August 2019	12,700	13,000	-300	455.31	455.84	-0.53
September 2019	13,600	12,900	700	455.52	456.06	-0.54
October 2019	9,800	9,600	200	454.19	454.88	-0.69
November 2019	8,400	7,700	700	453.71	453.89	-0.18
December 2019	4,300	4,000	300	451.93	452.61	-0.68
January 2020	5,600	6,200	-600	452.39	452.62	-0.23
February 2020	8,300	9,100	-800	453.34	453.80	-0.46
March 2020	13,300	8,900	4400	455.42	454.61	0.81
April 2020	14,600	--	--	456.04	--	--

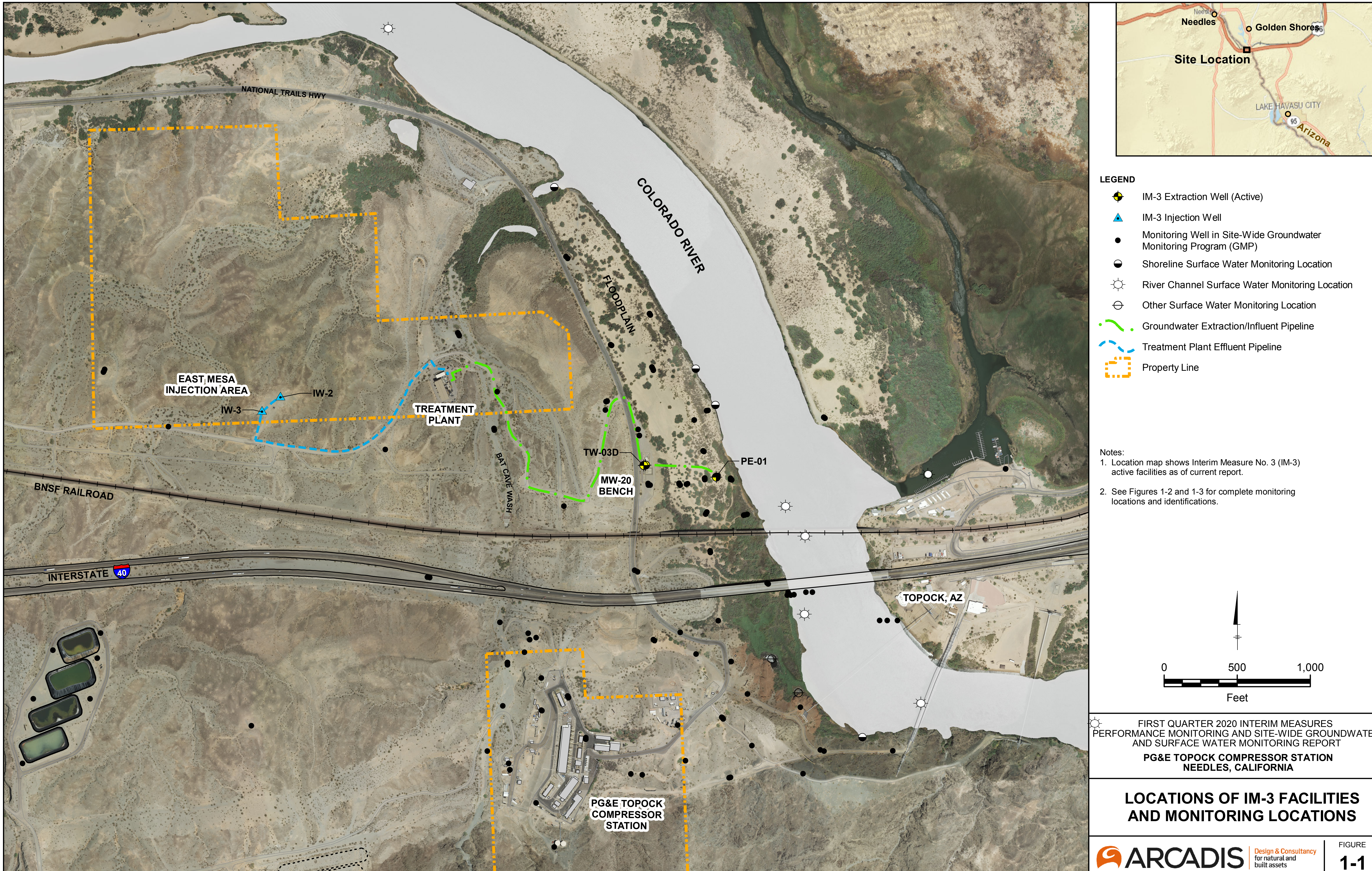
Notes:

1. Projected river level for each month is calculated based on the preceding month's U.S. Bureau of Reclamation (USBR) projections of Davis Dam release and stage in Lake Havasu.

2. Projected and actual Davis Dam releases are reported monthly by the USBR, available online at https://www.usbr.gov/uc/water/crsp/studies/24Month_04.pdf.

-- = not applicable.
cfs = cubic feet per second.
ft amsl = feet above mean sea level.
INC = incomplete data set for Colorado River elevation at I-3.
NA = difference in predicted and actual river elevation not available due to incomplete dataset.

FIGURES



LEGEND

- IM-3 Extraction Well (Active)
- IM-3 Injection Well
- Monitoring Well in Site-Wide Groundwater Monitoring Program (GMP)
- Shoreline Surface Water Monitoring Location
- River Channel Surface Water Monitoring Location
- Other Surface Water Monitoring Location
- Groundwater Extraction/Influent Pipeline
- Treatment Plant Effluent Pipeline
- Property Line

Notes:

1. Location map shows Interim Measure No. 3 (IM-3) active facilities as of current report.
2. See Figures 1-2 and 1-3 for complete monitoring locations and identifications.

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

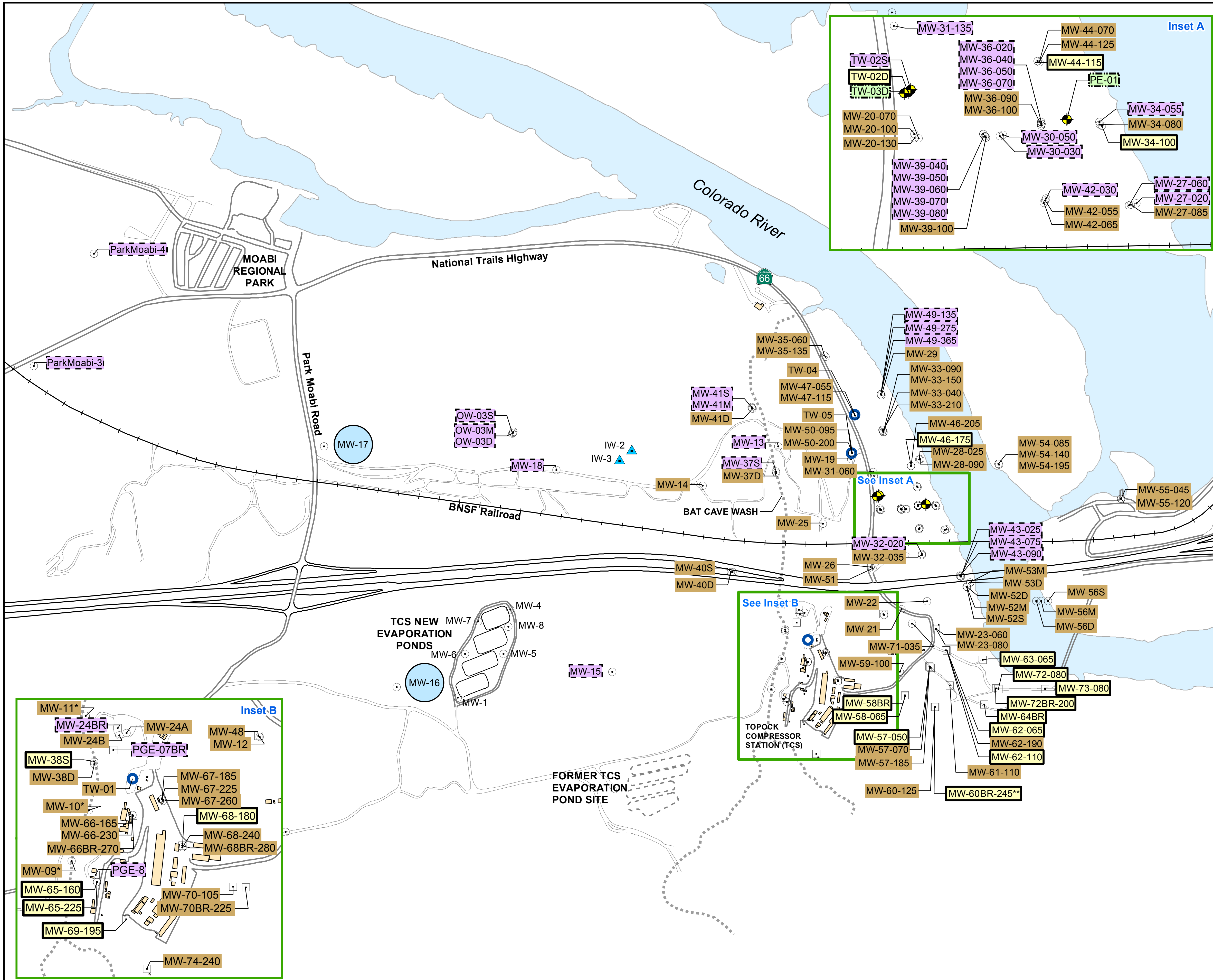
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

LOCATIONS OF IM-3 FACILITIES AND MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE **1-1**

Z:\GISPROJECTS_ENV\PGE_TOPOCK\GEC\MXD\GMP\1Q20\FINAL\FIGURE1-1_IM3_GMP_LOCS_2020Q1.MXD 3/26/2020 10:19:19 PM



LEGEND

- Groundwater Monitoring Well Completed in Bedrock
- Injection Well
- Groundwater Monitoring Well Completed in Alluvial Aquifer
- Test Well or Supply Well (Inactive)
- Extraction Well (TW-03D and PE-01 are primary extraction wells; TW-02S and TW-02D are backup extraction wells)

Sampling Frequency for Groundwater Monitoring Program (GMP)

MW-17	Biennial sampling
MW-13	Annual sampling
MW-09*	Collect additional sample in quarter following a runoff event with flow through Bat Cave Wash culverts.
MW-60BR-245**	Monitoring well currently being evaluated in Sampling Method Trail.
MW-21	Semiannual sampling
MW-38S	Quarterly sampling
TW-3D	Monthly sampling

Notes:
1. GMP = Groundwater Monitoring Program
2. TCS = Topock Compressor Station

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

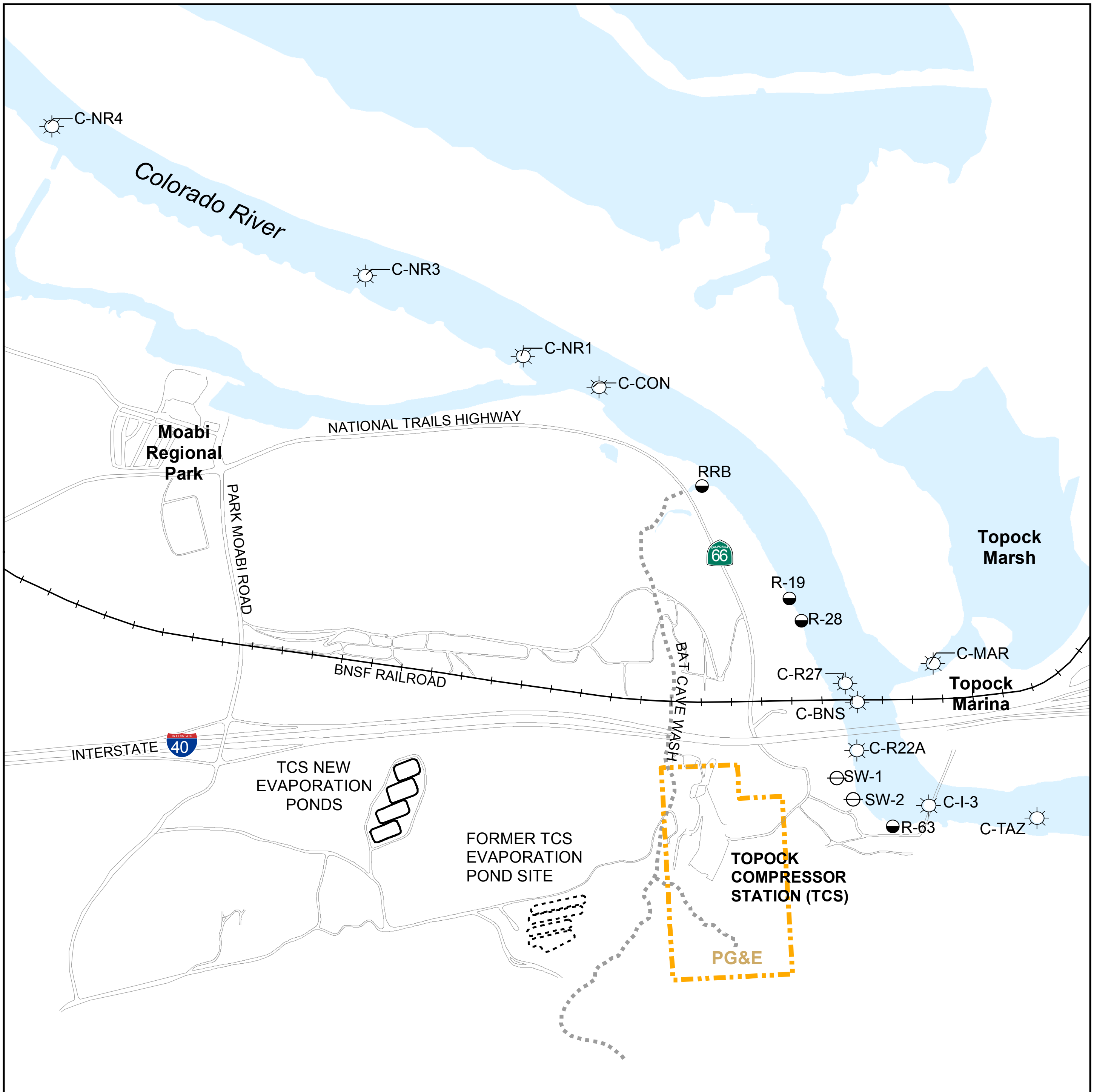
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR GMP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-2

Z:\GISPROJECTS_ENV\PGE_TOPOCK\GEC\MXD\GMP\1Q20\FINAL\FIGURE1-2_GMP_SAMPLING_FREQUENCY_2020Q1.MXD 3/26/2020 10:21:36 PM



LEGEND

- Shoreline Surface Water Monitoring Location
- River Channel Surface Water Monitoring Location
- Other Surface Water Monitoring Location
- PG&E Property Line

0 600 1,200
Feet

Notes:
1. Shoreline, river channel, and other surface water monitoring locations are sampled quarterly and twice per quarter during periods of low river stage (typically November - January).
2. Location for SW-2 is approximate. GPS coverage was not available.
3. RMP = Surface Water Monitoring Program
4. TCS = Topock Compressor Station

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

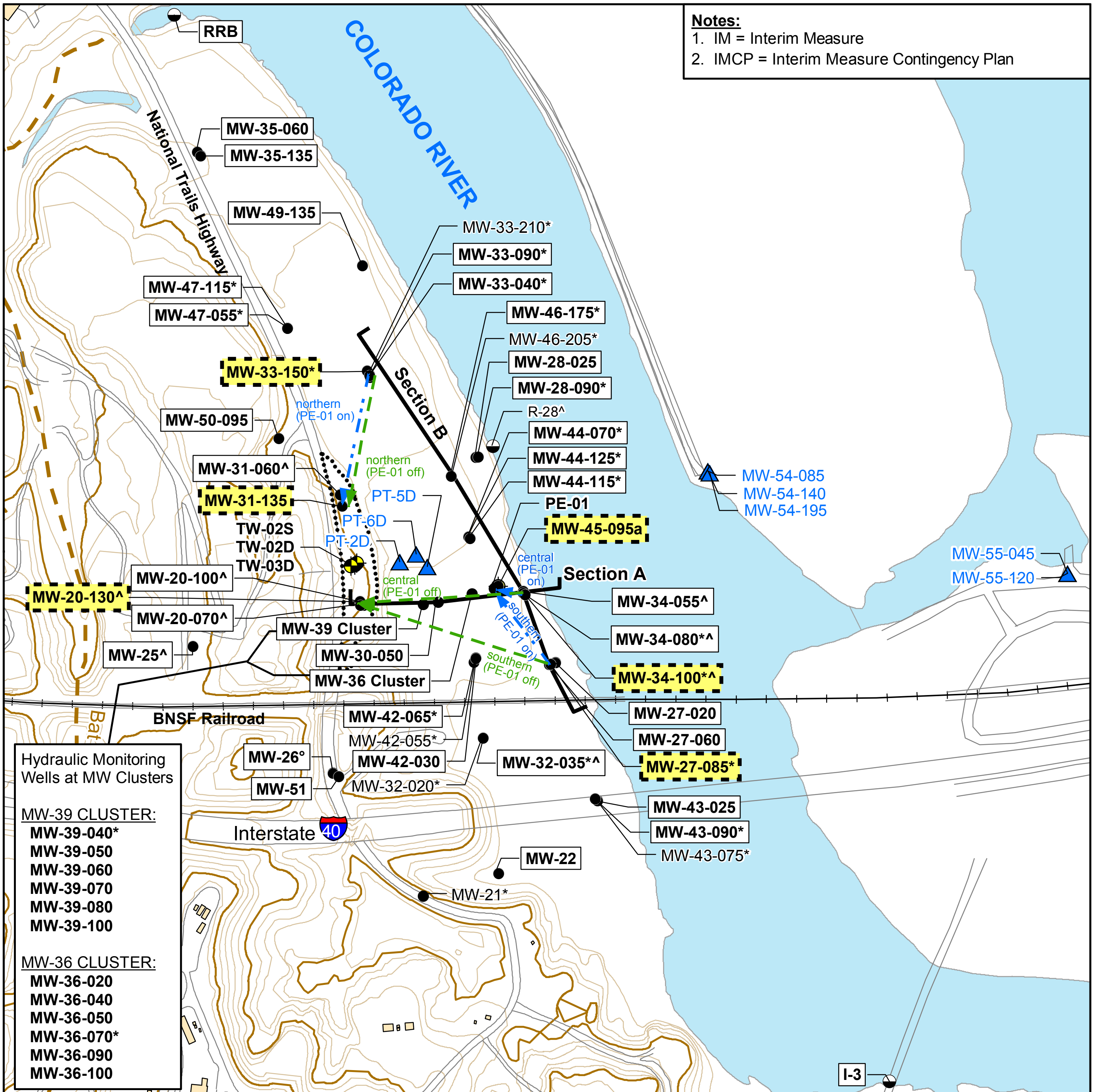
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

MONITORING LOCATIONS AND SAMPLING FREQUENCY FOR RMP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-3

Z:\GISPROJECTS_ENV\PGE_TOPOCK\GEC\MXD\GMP\1Q20\FINAL\FIGURE1-3_GMP_RIVER_SWLOCS_2020Q1.MXD 3/26/2020 10:16:05 PM



LEGEND

Hydraulic Monitoring Network (59 Wells)

- MW-35-060 — Hydraulic Monitoring Network Well
- MW-31-135 — Hydraulic Monitoring Well - used for gradient calculation
- MW-54-085 — Hydraulic Monitoring Well - used but not required

Chemical Performance Monitoring Network (11 Locations)

- R-28^ — Monitored Annually
- MW-26° — Monitored Biennially

IM Contingency Plan Network (24 wells)

- * IMCP Monitoring Well

Other IM Features

- IM Extraction Well
- River Gage Station or Sampling Location

- Key Well Gradient Pair (PE-01 on)
- Key Well Gradient Pair (PE-01 off)
- Hydrogeologic Section

0 300 600
Feet

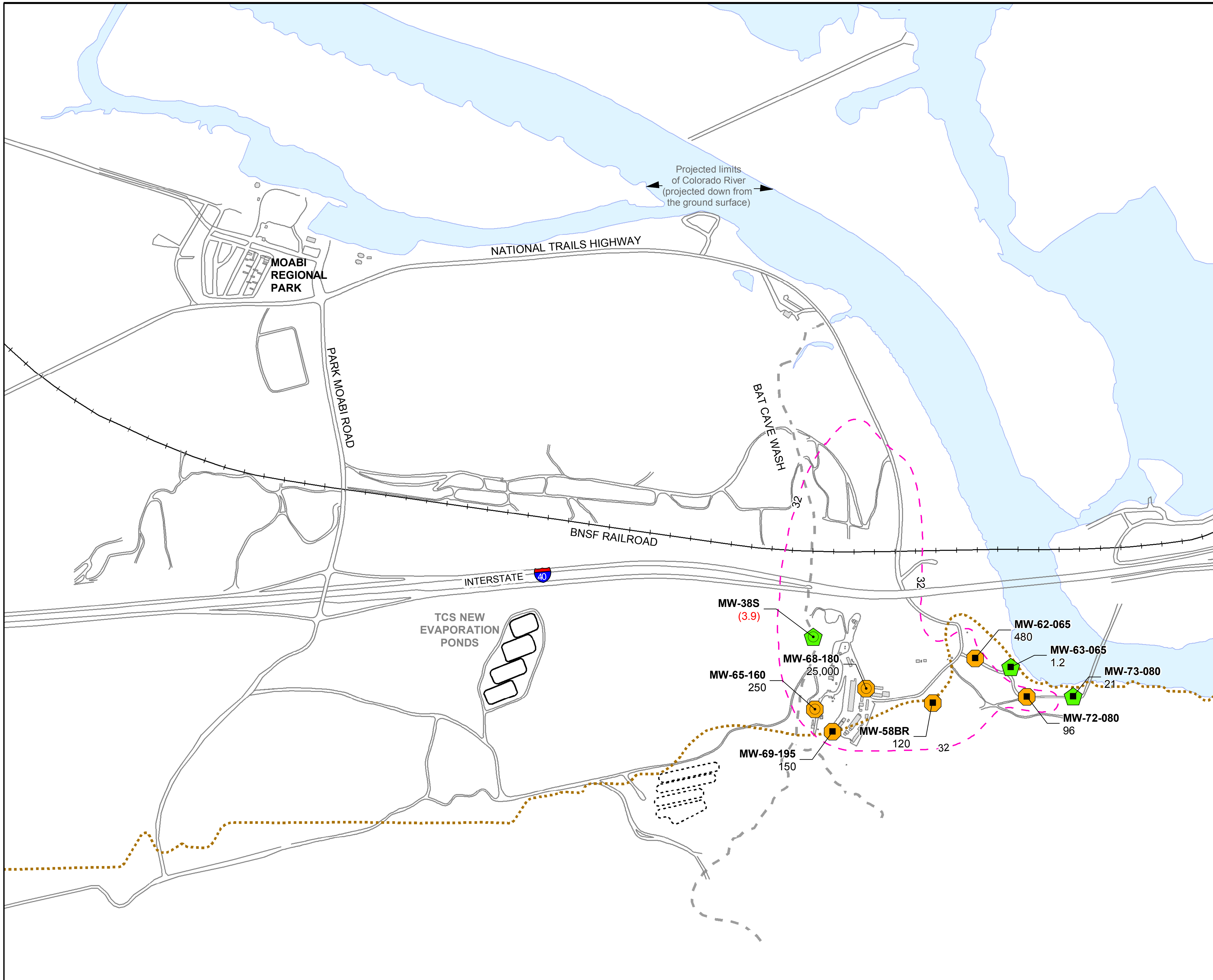
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

LOCATIONS OF WELLS AND CROSS-SECTIONS USED FOR IM PERFORMANCE MONITORING

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-4



LEGEND

- Alluvial Aquifer well sampled during sampling event
- Bedrock well sampled during sampling event

Cr(VI) Concentrations

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- Approximate boundary of "shallow" wells with Cr(VI) concentrations ≥ 32 µg/L
- Approximate bedrock contact at 455 feet above mean sea level.

MW-62-065 — Sampling Location
480 — Groundwater Cr(VI) Concentration (µg/L)
(3.9) — Groundwater Cr(VI) Concentration (ug/L) not used for contouring

Notes:
1. µg/L = micrograms per liter
2. Cr(VI) = Hexavalent Chromium
3. TCS = Topock Compressor Station
4. ≥ = greater than or equal to
5. 32 µg/L is used as the background Cr(VI) concentration in groundwater for remedial activities.
6. Results plotted are maximum concentration from primary and duplicate samples.
7. The 32 µg/L boundary for Cr(VI) is estimated based on available groundwater analytical results from Fourth Quarter 2019 and the current quarter.
8. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map.

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

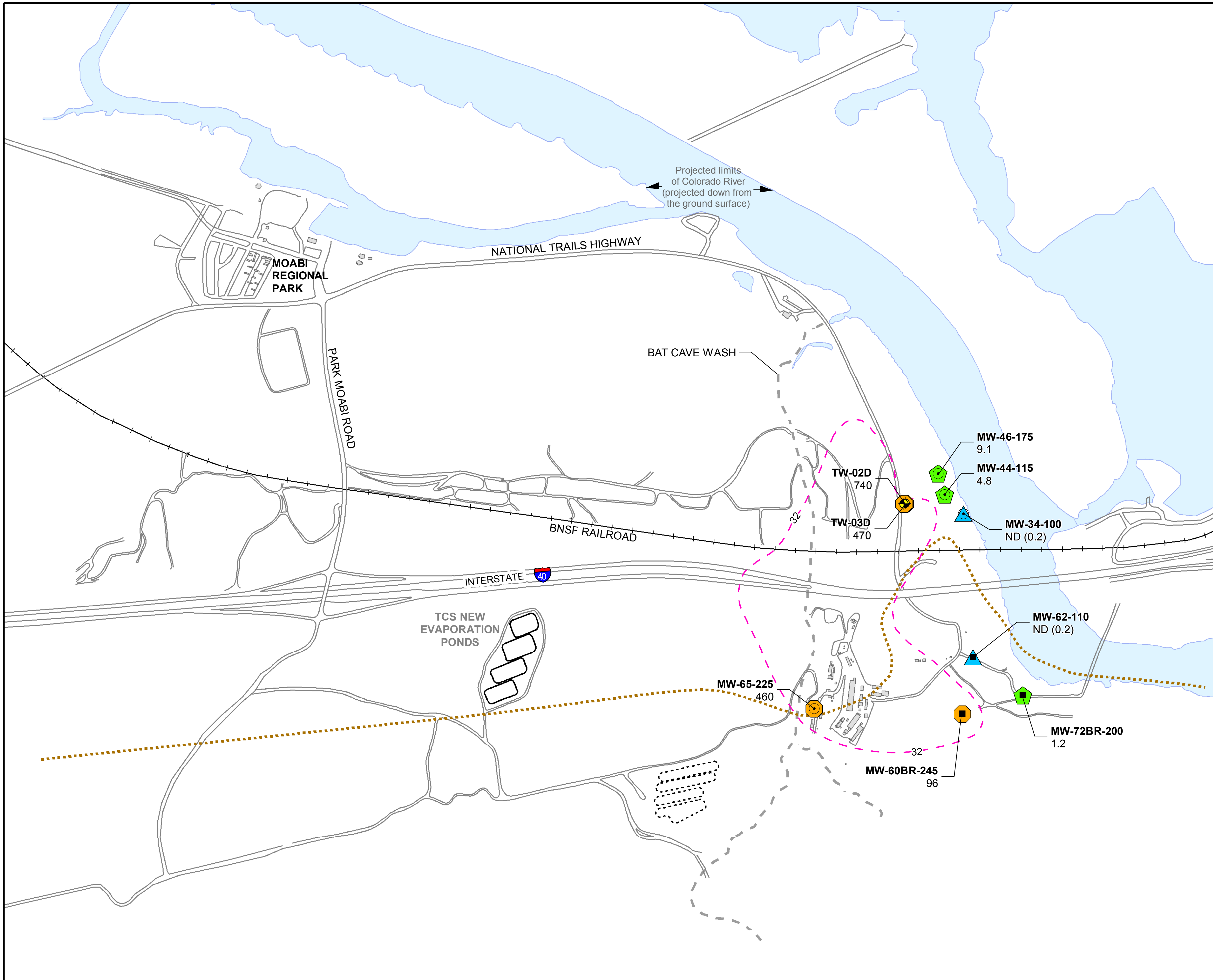
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Cr(VI) SAMPLING RESULTS, SHALLOW WELLS IN ALLUVIAL AQUIFER AND BEDROCK, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3-1a

Z:\GISPROJECTS_ENV\PGE_TOPOCK\GEC\MXD\GMP\1Q20\FINAL\FIGURE3-1A_CRVI_SHALLOW_2020Q1.MXD PSI01045 4/17/2020 4:52:44 AM



LEGEND

- Alluvial Aquifer well sampled during sampling event
- Bedrock well sampled during sampling event
- Extraction well sampled during sampling event

Cr(VI) Concentrations

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- Approximate boundary of "deep" wells with Cr(VI) concentrations ≥ 32 µg/L
- Approximate bedrock contact at 395 feet above mean sea level.

MW-46-175 — Sampling Location
9.1 — Groundwater Cr(VI) Concentration (µg/L)

Notes:
1. ND = Cr(VI) not detected at analytical reporting limit.
2. µg/L = micrograms per liter
3. Cr(VI) = Hexavalent Chromium
4. TCS = Topock Compressor Station
5. ≥ = greater than or equal to
6. 32 µg/L is used as the background Cr(VI) concentration in groundwater for remedial activities.
7. Results plotted are maximum concentration from primary and duplicate samples.
8. The 32 µg/L boundary for Cr(VI) is estimated based on available groundwater analytical results from Fourth Quarter 2019 and the current quarter.
9. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map.

0 500 1,000
Feet

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

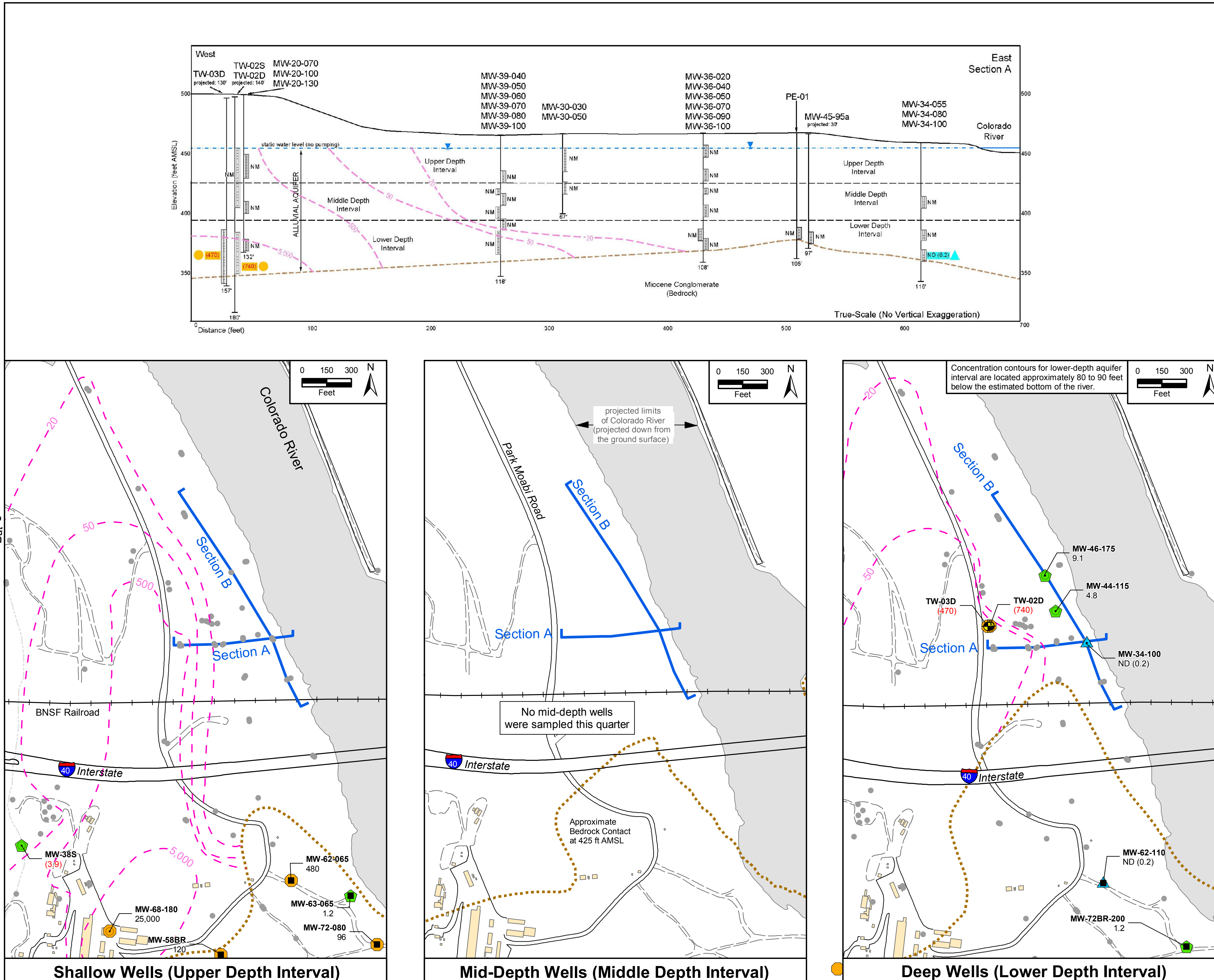
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Cr(VI) SAMPLING RESULTS, DEEP WELLS IN ALLUVIAL AQUIFER AND BEDROCK, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3-1b

Z:\GISPROJECTS_ENV\PGE_TOPOCK\GEC\MXD\GMP\1Q20\FINAL\FIGURE3-1B_CRVI_DEEP_2020Q1.MXD SHARMAYH4948 4/17/2020 4:53:56 AM



LEGEND

- Alluvial Aquifer well sampled during sampling event
- Bedrock well sampled during sampling event
- Extraction well sampled during sampling event
- Well not sampled during sampling event

Cr(VI) Concentrations

- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L
- Inferred Cr(VI) concentration contour within Alluvial Aquifer depth interval
- Approximate bedrock contact (per depth interval)
- Hydrogeologic Section

water level
well screen — 57 — Groundwater Cr(VI) Concentration (µg/L)
boring depth (feet) 103'

MW-38S — Sampling Location
3.9 — Groundwater Cr(VI) Concentration (µg/L)
(740) — Groundwater Cr(VI) Concentration (µg/L) not used for contouring

Notes:

1. ND = Cr(VI) not detected at analytical reporting limit.
2. µg/L = micrograms per liter
3. ≥ = greater than or equal to
4. Cr(VI) = Hexavalent Chromium
5. The Cr(VI) concentration contours of 20 and 50 µg/L are shown in accordance with Department of Toxic Substances Control's 2005 Interim Measure performance monitoring directive, which was established for containment of Cr(VI) concentrations greater than 20 µg/L in the floodplain portion of the Alluvial Aquifer.
6. The Cr(VI) contours are estimated based on available groundwater analytical results from Fourth Quarter 2019 and the current quarter. There are no data confirming the existence of Cr(VI) under the Colorado River.
7. Extraction wells PE-01, TW-02S, TW-02D, and TW-03D are not included in contouring. These wells draw water from a larger area and do not represent Cr(VI) concentrations at their specific locations.
8. Long-screened wells and wells screened across more than one depth interval are generally not posted on this map.

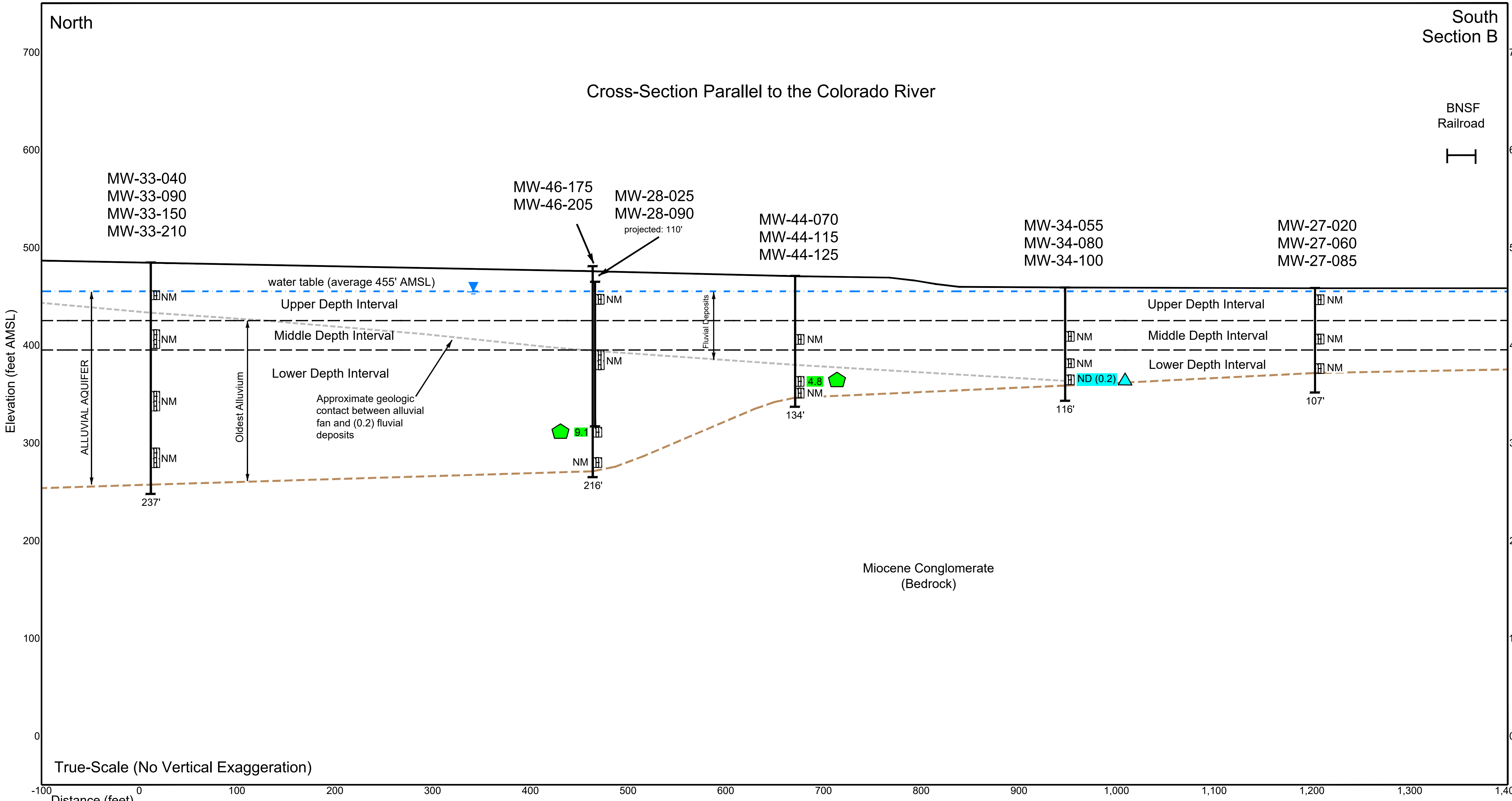
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

CR(VI) CONCENTRATIONS IN ALLUVIAL AQUIFER AND BEDROCK, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE **4-1**



Notes:
AMSL = above mean sea level.
µg/L = micrograms per liter.
ND = not detected at listed reporting limit.
≥ = greater than or equal to.
Cr(VI) = hexavalent chromium.

1. See Figure 4-1 for location of this cross-section.

Legend

water level
well screen
boring depth (feet) 103'
14 Groundwater Cr(VI) Concentration (µg/L)

— 20 — Inferred hexavalent chromium contours (µg/L) in Alluvial Aquifer.

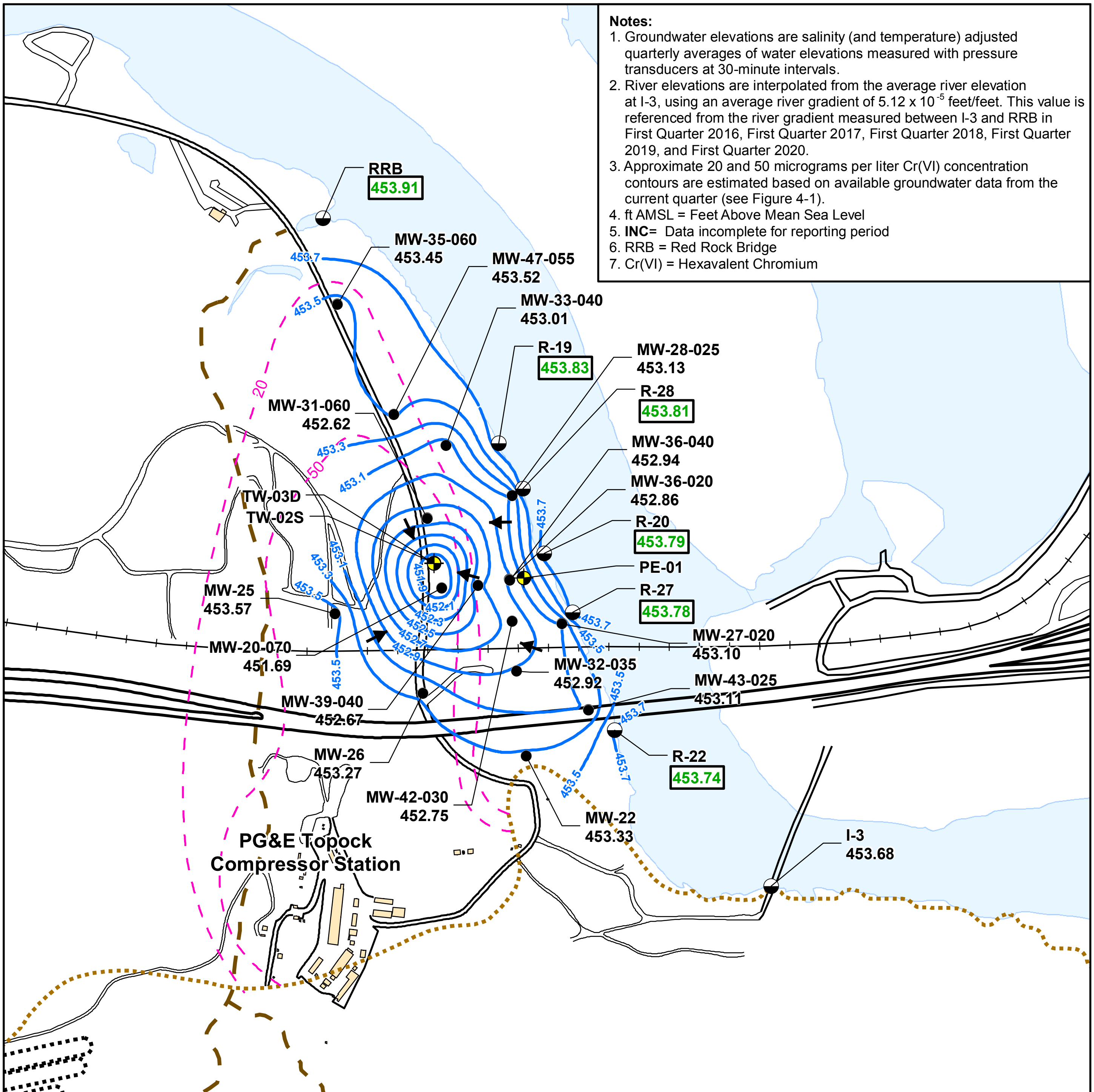
Cr(VI) Concentrations
- Not detected at analytical reporting limit
- Concentration between reporting limit and 32 µg/L
- Concentration ≥ 32 µg/L

FIRST QUARTER 2020 INTERIM-MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

Cr(VI) CONCENTRATIONS
FLOODPLAIN CROSS-SECTION B,
FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4-2



Notes:
1. Groundwater elevations are salinity (and temperature) adjusted quarterly averages of water elevations measured with pressure transducers at 30-minute intervals.
2. River elevations are interpolated from the average river elevation at I-3, using an average river gradient of 5.12×10^{-5} feet/feet. This value is referenced from the river gradient measured between I-3 and RRB in First Quarter 2016, First Quarter 2017, First Quarter 2018, First Quarter 2019, and First Quarter 2020.
3. Approximate 20 and 50 micrograms per liter Cr(VI) concentration contours are estimated based on available groundwater data from the current quarter (see Figure 4-1).
4. ft AMSL = Feet Above Mean Sea Level
5. **INC**= Data incomplete for reporting period
6. RRB = Red Rock Bridge
7. Cr(VI) = Hexavalent Chromium

LEGEND
- Monitoring Well
- River Station
- Extraction Well
- Bedrock Contact at 455 ft AMSL Elevation
- Interpreted Groundwater Flow Direction
- Groundwater Elevation Contour 0.2 ft (dashed where inferred)
- Inferred Cr(VI) concentration (micrograms per liter) contour

MW-47-055 — Gauging Location
453.52 — Average Groundwater Elevation (ft AMSL)

R-27 — River Station
453.78 — River Elevation (ft AMSL) Interpolated Average

0 800 1,600
Feet

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

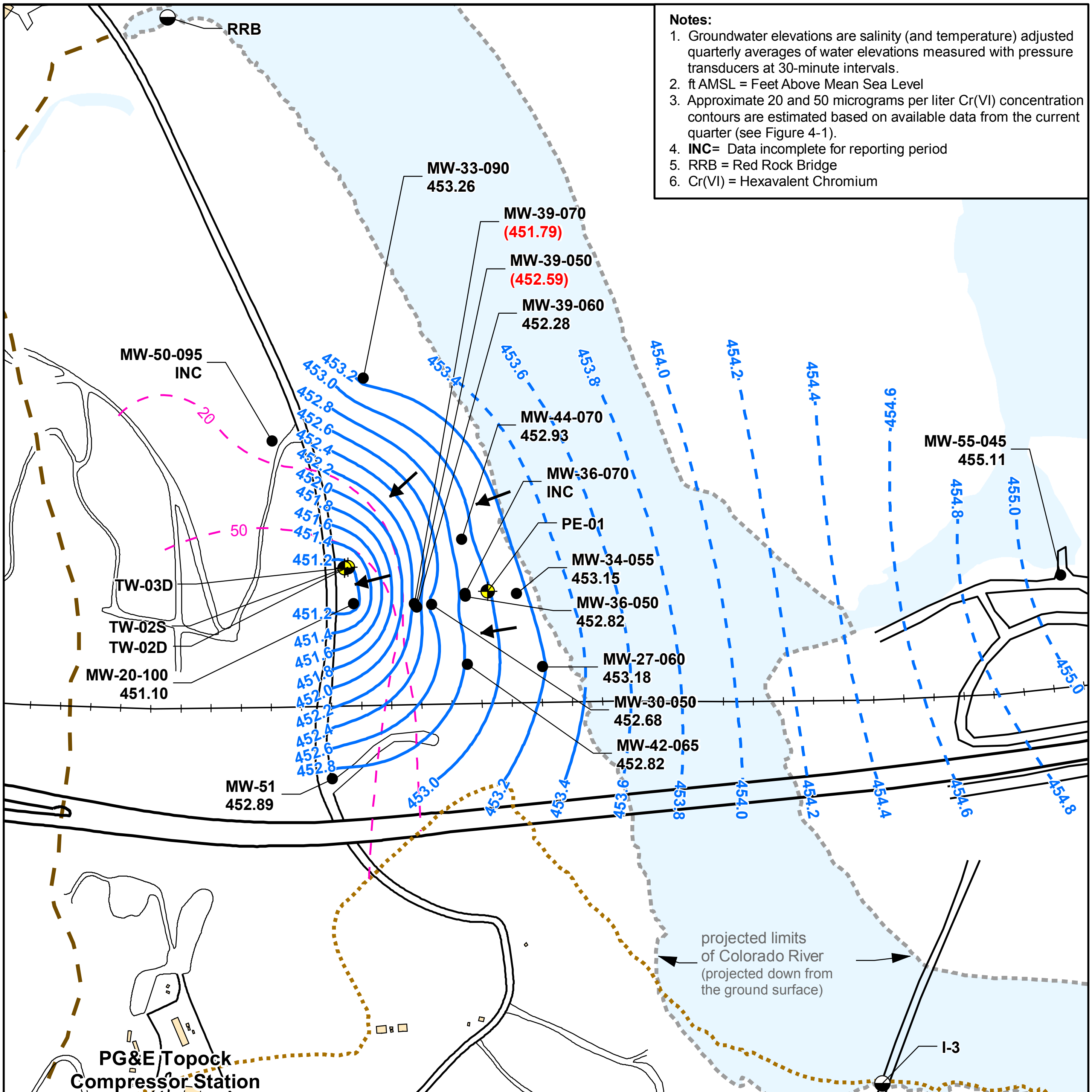
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

AVERAGE GROUNDWATER ELEVATIONS IN SHALLOW WELLS AND RIVER ELEVATIONS, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4-3a

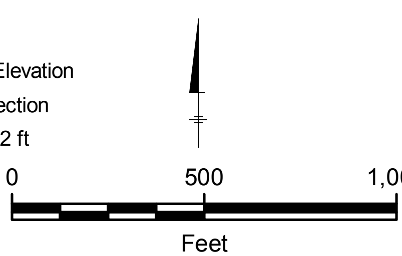
Z:\GISPROJECTS_ENV\PGE_TOPOCK\GEC\MXD\GMP\1Q20\FINAL\FIGURE4-3A_GWE_SHALLOW_2020Q1.MXD 4/23/2020 2:40:24 AM



Notes:
1. Groundwater elevations are salinity (and temperature) adjusted quarterly averages of water elevations measured with pressure transducers at 30-minute intervals.
2. ft AMSL = Feet Above Mean Sea Level
3. Approximate 20 and 50 micrograms per liter Cr(VI) concentration contours are estimated based on available data from the current quarter (see Figure 4-1).
4. **INC**= Data incomplete for reporting period
5. RRB = Red Rock Bridge
6. Cr(VI) = Hexavalent Chromium

LEGEND
- Monitoring Well
- River Location
- Extraction Well
- Bedrock Contact at 425 ft AMSL Elevation
- Interpreted Groundwater Flow Direction
- Groundwater Elevation Contour 0.2 ft (dashed where inferred)
- Inferred Cr(VI) concentration (micrograms per liter) contour

MW-30-050 — Gauging Location
452.68 — Average Groundwater Elevation (ft AMSL)
(452.59) — Elevation in red parentheses not used for contouring



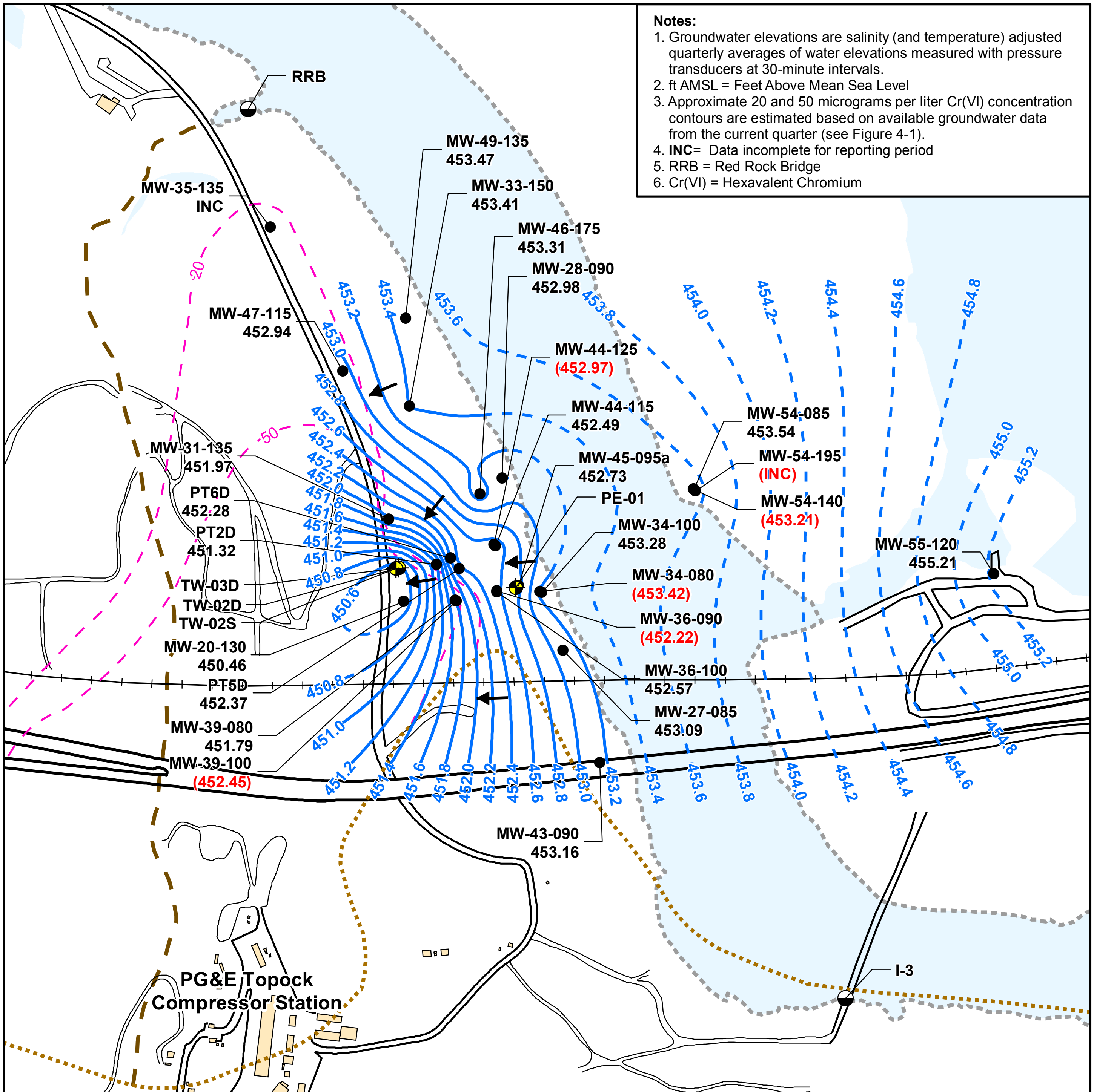
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

AVERAGE GROUNDWATER ELEVATIONS IN MID-DEPTH WELLS, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4-3b



Notes:

1. Groundwater elevations are salinity (and temperature) adjusted quarterly averages of water elevations measured with pressure transducers at 30-minute intervals.
2. ft AMSL = Feet Above Mean Sea Level
3. Approximate 20 and 50 micrograms per liter Cr(VI) concentration contours are estimated based on available groundwater data from the current quarter (see Figure 4-1).
4. **INC**= Data incomplete for reporting period
5. RRB = Red Rock Bridge
6. Cr(VI) = Hexavalent Chromium

LEGEND

- Monitoring Well
- River Location
- Extraction Well
- Bedrock Contact at 396 ft AMSL Elevation
- Interpreted Groundwater Flow Direction
- Groundwater Elevation Contour 0.2 ft (dashed where inferred)
- Inferred Cr(VI) concentration (micrograms per liter) contour

0 600 1,200
Feet

MW-28-090 — Gauging Location
452.98 — Average Groundwater Elevation (ft AMSL)
(453.42) — Elevation in red parentheses not used for contouring

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

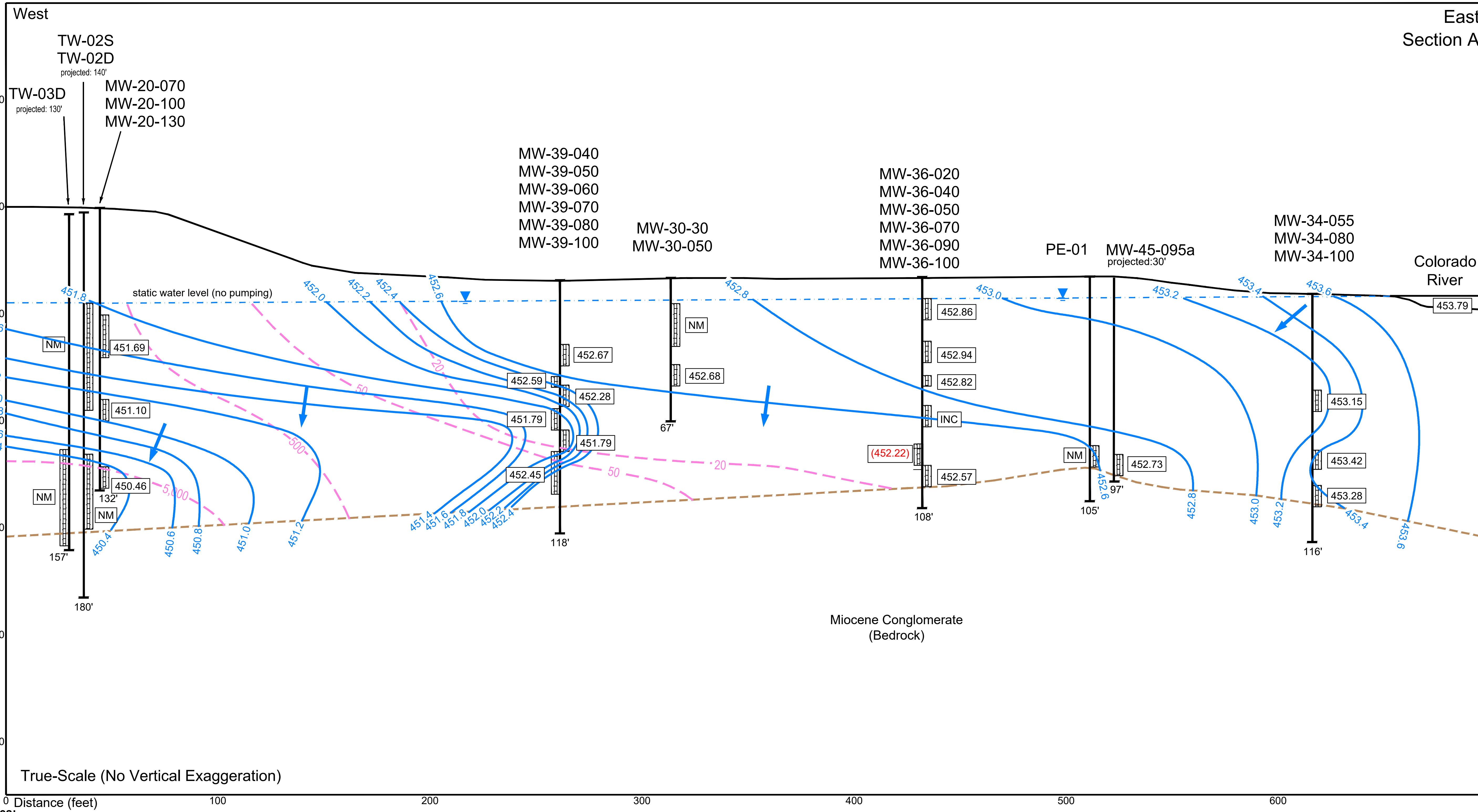
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

AVERAGE GROUNDWATER ELEVATIONS IN DEEP WELLS, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4-3c

Z:\GISPROJECTS_ENV\PGE_TOPOCK\GEC\MXD\GMP\1Q20\FINAL\FIGURE4-3C_GWE_DEEP_2020Q1.MXD 4/23/2020 3:21:25 AM



Notes:

1. Results show average groundwater elevations for January, February and March 2020 measured with pressure transducers at 30-minute intervals.
2. Groundwater elevations are adjusted for salinity and temperature.
3. Colorado River elevation shown as interpolated First Quarter 2020 average from R-20 river monitoring location.
4. The hexavalent chromium contour lines are from Figure 4-1.
5. Groundwater elevations shown in red parenthesis are not used for contouring.

AMSL = above mean sea level.
NM = well not measured or used in contouring.
ppb = concentration in parts per billion
INC = quarterly pressure transducer data incomplete due to malfunction, inaccessibility, or low water level conditions

Legend

MW-030-050

Inferred water table

well screen and associated average groundwater elevation (feet AMSL) 453.66

boring depth (feet) 67'

20 Inferred hexavalent chromium contour (ppb) in Alluvial Aquifer based on Current Quarter

453.2 Inferred groundwater head contour

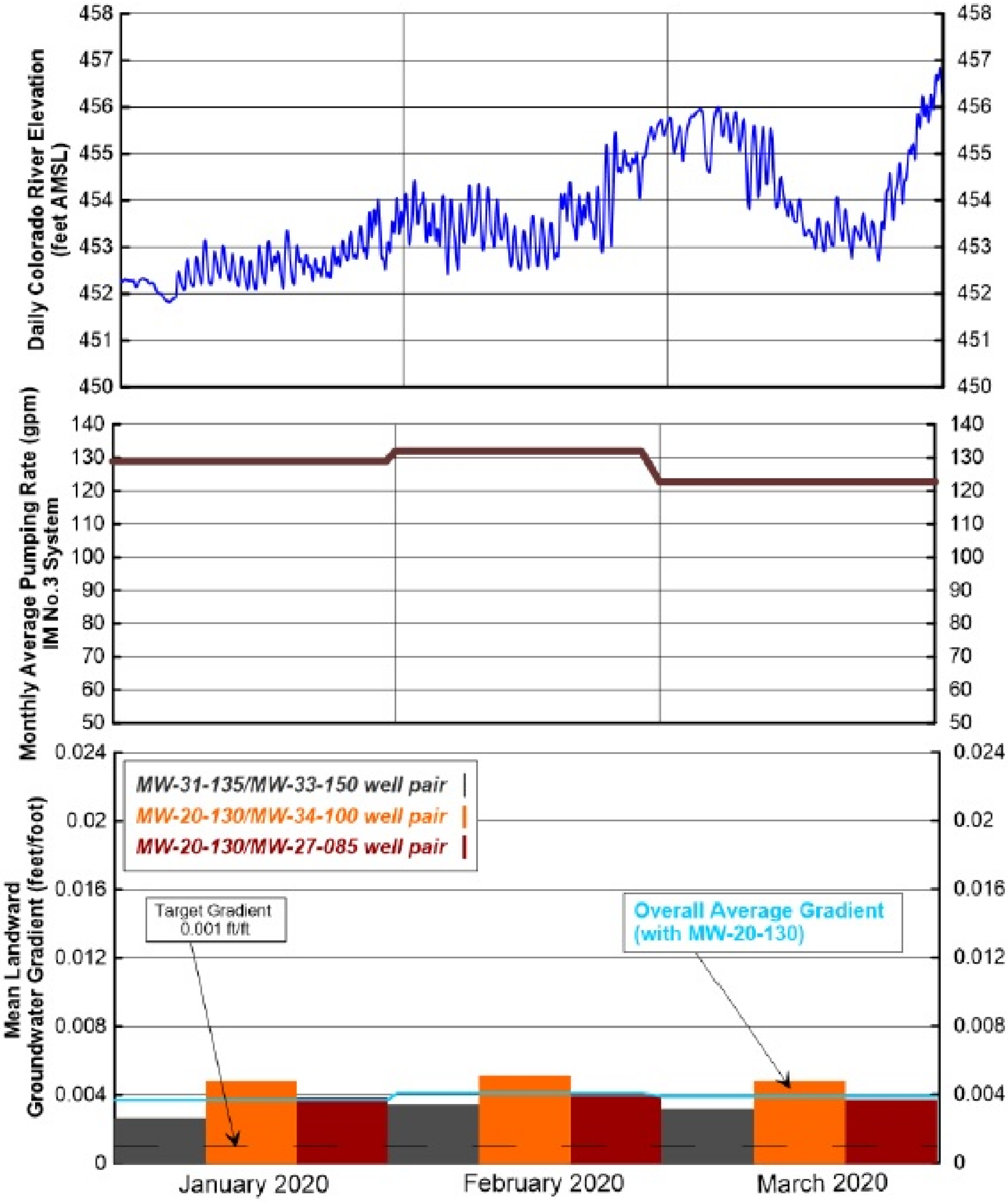
Interpreted groundwater flow direction

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT
PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

AVERAGE GROUNDWATER ELEVATIONS FOR WELLS IN FLOODPLAIN CROSS-SECTION A, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE
4-4



Notes:
1. For Interim Measure (IM) pumping, the target landward gradient for well pairs is 0.001 feet/foot.
2. Pumping rate plotted is the combined rate of extraction wells TW-03D and PE-01 in operation each month.
3. Beginning August 2017, MW-20-130 approved for gradient compliance (instead of MW-45-095) at central and southern well pairs during months when PE-01 is not run for gradient control.
4. AMSL = above mean sea level.
5. gpm = gallons per minute

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

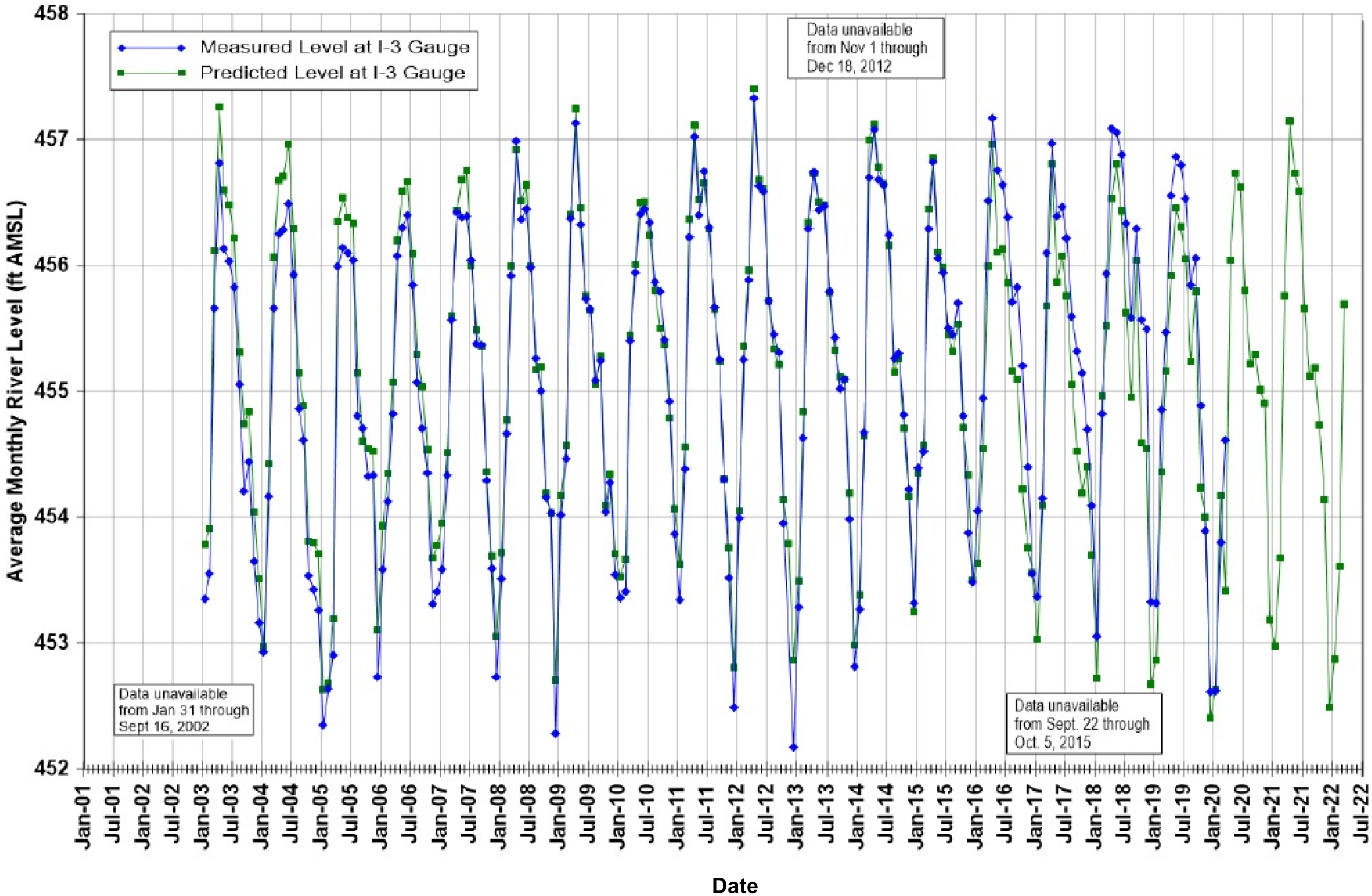
PG&E TOPOCK COMPRESSOR STATION NEEDLES, CALIFORNIA

MEASURED HYDRAULIC GRADIENTS, RIVER ELEVATION, AND PUMPING RATE, FIRST QUARTER 2020

ARCADIS Design & Consultancy for natural and built assets

FIGURE

4-5



Notes:

Projected river level for each month in the past is calculated based on the preceding months United States Bureau of Reclamation (USBR) projections of Davis Dam release and stage in Lake Havasu. Future projections of river level at 1-3 are based upon USBR projections presented in the April 24-Month Study (Report dated April 15, 2020). These data are reported monthly by the US Department of Interior, at https://www.usbr.gov/uc/water/crsp/studies/24Month_04.pdf

ft AMSL = feet above mean sea level

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT

PG&E TOPOCK COMPRESSOR STATION
NEEDLES, CALIFORNIA

PAST AND PREDICTED FUTURE RIVER LEVELS AT TOPOCK COMPRESSOR STATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE **4-6**

APPENDIX A

Lab Reports, First Quarter 2020 (Provided on CD with Hard Copy Submittal)

For additional help with the information provided in the lab reports, please contact Alison Schaffer, Arcadis Report Lead, at 303.471.3575.

APPENDIX B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-09	SA	02/23/2018		LF	150	150
MW-09	SA	05/02/2018		LF	150	140
MW-09	SA	12/12/2018		LF	140	150
MW-09	SA	03/18/2019		LF	140	130
MW-09	SA	05/17/2019		LF	150	150
MW-09	SA	09/30/2019		LF	130	150
MW-09	SA	12/18/2019		LF	120	120
MW-10	SA	02/23/2018		LF	160	160
MW-10	SA	05/02/2018		LF	170	160
MW-10	SA	12/12/2018		LF	110	120
MW-10	SA	03/18/2019		LF	150	140
MW-10	SA	03/18/2019	FD	LF	150	140
MW-10	SA	05/17/2019		LF	180	180
MW-10	SA	05/17/2019	FD	LF	180	180
MW-10	SA	09/30/2019		LF	110	110
MW-10	SA	12/18/2019		LF	220	230
MW-11	SA	02/23/2018		LF	57	56
MW-11	SA	05/02/2018		LF	57	53
MW-11	SA	05/02/2018	FD	LF	58	55
MW-11	SA	12/12/2018		LF	47	48
MW-11	SA	12/12/2018	FD	LF	47	50
MW-11	SA	03/18/2019		LF	42	43
MW-11	SA	05/17/2019		LF	51	49
MW-11	SA	09/30/2019		LF	44	47
MW-11	SA	12/18/2019		LF	37	35
MW-12	SA	05/01/2018		LF	1,500	1,600
MW-12	SA	12/11/2018		LF	1,500	1,500
MW-12	SA	05/22/2019		LF	1,600	1,600
MW-12	SA	12/17/2019		LF	1,600	1,800
MW-14	SA	05/01/2018		LF	13	14
MW-14	SA	12/11/2018		LF	13	15
MW-14	SA	05/15/2019		LF	14	13
MW-14	SA	12/09/2019		LF	10	8.8
MW-19	SA	04/27/2018		LF	370	380
MW-19	SA	12/10/2018		LF	670	780
MW-19	SA	05/15/2019		LF	250	250
MW-19	SA	12/12/2019		LF	130	120
MW-20-070	SA	04/27/2018		LF	1,700	1,700
MW-20-070	SA	12/11/2018		LF	1,600	1,700
MW-20-070	SA	12/11/2018	FD	LF	1,600	1,800
MW-20-070	SA	05/24/2019		LF	1,700	1,800
MW-20-070	SA	12/13/2019		LF	2,300	2,200
MW-20-100	MA	04/27/2018		LF	1,800	1,800
MW-20-100	MA	12/04/2018		LF	1,400	1,500
MW-20-100	MA	05/24/2019		LF	1,300	1,500
MW-20-100	MA	12/13/2019		LF	750	780
MW-20-130	DA	04/27/2018		LF	6,900	7,000
MW-20-130	DA	12/04/2018		LF	5,800	6,100
MW-20-130	DA	05/24/2019		LF	5,900	6,800
MW-20-130	DA	05/24/2019	FD	LF	6,000	6,800
MW-20-130	DA	12/13/2019		LF	5,900	6,000

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-21	SA	05/02/2018		LF	ND (1.0)	1.0
MW-21	SA	05/02/2018	FD	LF	ND (1.0)	ND (1.0)
MW-21	SA	12/12/2018		LF	1.1	1.2
MW-21	SA	05/23/2019		LF	6.5	6.7
MW-21	SA	12/13/2019		LF	ND (1.0)	8.9
MW-22	SA	04/23/2018		LF	ND (1.0)	ND (5.0)
MW-22	SA	12/04/2018		LF	ND (1.0)	ND (1.0)
MW-22	SA	12/04/2018	FD	LF	ND (1.0)	ND (1.0)
MW-22	SA	04/23/2019		LF	ND (1.0)	ND (1.0)
MW-22	SA	12/11/2019		LF	ND (1.0)	ND (1.0)
MW-22	SA	12/11/2019	FD	LF	ND (1.0)	ND (1.0)
MW-23-060	BR	04/26/2018		LF	39	37 J
MW-23-060	BR	12/11/2018		LF	39	40
MW-23-060	BR	05/21/2019		LF	40	35
MW-23-060	BR	12/09/2019		LF	41	34
MW-23-080	BR	04/26/2018		LF	ND (1.0)	1.5
MW-23-080	BR	12/11/2018		LF	ND (1.0)	3.2
MW-23-080	BR	05/21/2019		LF	ND (1.0)	1.1
MW-23-080	BR	12/09/2019		LF	ND (1.0)	1.1
MW-24A	SA	05/02/2018		LF	ND (0.2)	ND (1.0)
MW-24A	SA	12/12/2018		LF	ND (0.2)	ND (1.0)
MW-24A	SA	05/17/2019		LF	ND (0.2)	ND (1.0)
MW-24A	SA	12/03/2019		LF	ND (0.2)	1.8
MW-24B	DA	05/02/2018		LF	200	200
MW-24B	DA	12/12/2018		LF	160	150
MW-24B	DA	05/17/2019		LF	86	73
MW-24B	DA	05/17/2019	FD	LF	84	73
MW-24B	DA	12/03/2019		LF	230	220
MW-24B	DA	12/03/2019	FD	LF	230	230
MW-25	SA	05/01/2018		LF	68	65
MW-25	SA	12/10/2018		LF	100	100
MW-25	SA	12/10/2018	FD	LF	100	100
MW-25	SA	05/15/2019		LF	68	66
MW-25	SA	12/09/2019		LF	72	69
MW-25	SA	12/09/2019	FD	LF	74	71
MW-26	SA	05/01/2018		LF	2,300	2,400
MW-26	SA	12/07/2018		LF	2,200	2,300
MW-26	SA	05/22/2019		LF	2,300	2,500
MW-26	SA	12/12/2019		LF	2,300	2,300
MW-26	SA	12/12/2019	FD	LF	2,300	2,400
MW-27-085	DA	04/24/2018		LF	ND (1.0)	ND (1.0)
MW-27-085	DA	12/05/2018		LF	ND (1.0)	ND (1.0)
MW-27-085	DA	04/22/2019		LF	ND (0.2)	ND (1.0)
MW-27-085	DA	12/10/2019		LF	ND (0.2)	ND (1.0)
MW-28-025	SA	04/25/2018		LF	ND (0.2)	ND (1.0)
MW-28-025	SA	04/25/2018	FD	LF	ND (0.2)	ND (1.0)
MW-28-025	SA	12/14/2018		LF	ND (0.2)	ND (1.0)
MW-28-025	SA	05/21/2019		LF	ND (0.2)	ND (1.0)
MW-28-025	SA	12/09/2019		LF	ND (0.2)	ND (1.0)
MW-28-090	DA	04/25/2018		LF	ND (0.2)	ND (1.0)
MW-28-090	DA	12/14/2018		LF	ND (0.2)	ND (1.0)

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-28-090	DA	05/21/2019		LF	ND (0.2)	ND (1.0)
MW-28-090	DA	12/09/2019		LF	ND (0.2)	ND (1.0)
MW-29	SA	04/25/2018		LF	ND (0.2)	ND (1.0)
MW-29	SA	12/10/2018		LF	ND (0.2)	ND (1.0)
MW-29	SA	05/21/2019		LF	ND (0.2)	ND (1.0)
MW-29	SA	12/10/2019		LF	ND (0.2)	ND (1.0)
MW-31-060	SA	04/27/2018		LF	380	390
MW-31-060	SA	12/10/2018		LF	390	400
MW-31-060	SA	05/20/2019		LF	250	240
MW-31-060	SA	05/20/2019	FD	LF	250	240
MW-31-060	SA	12/12/2019		LF	370	370
MW-31-060	SA	12/12/2019	FD	LF	370	360
MW-32-035	SA	04/23/2018		LF	ND (1.0)	ND (1.0)
MW-32-035	SA	12/04/2018		LF	ND (1.0)	ND (1.0)
MW-32-035	SA	04/23/2019		LF	ND (0.2)	ND (1.0)
MW-32-035	SA	12/09/2019		LF	ND (1.0)	ND (1.0)
MW-33-040	SA	04/25/2018		LF	ND (1.0)	1.2
MW-33-040	SA	12/07/2018		LF	ND (1.0)	ND (1.0)
MW-33-040	SA	04/23/2019		LF	ND (0.2)	ND (1.0)
MW-33-040	SA	12/05/2019		LF	ND (1.0)	ND (1.0)
MW-33-040	SA	12/05/2019	FD	LF	ND (1.0)	ND (1.0)
MW-33-090	MA	04/24/2018		LF	3.3	3.8
MW-33-090	MA	12/07/2018		LF	1.2	1.7
MW-33-090	MA	12/07/2018	FD	LF	9.3	10
MW-33-090	MA	04/22/2019		LF	2.5	5.5
MW-33-090	MA	12/05/2019		LF	2.7	3.8
MW-33-090	MA	12/05/2019	FD	LF	2.8	3.9
MW-33-150	DA	04/25/2018		LF	5.2	5.0
MW-33-150	DA	12/07/2018		LF	3.9	6.2
MW-33-150	DA	05/21/2019		LF	5.5	21
MW-33-150	DA	12/05/2019		LF	2.0	7.7
MW-33-150	DA	12/05/2019	FD	LF	1.9	7.6
MW-33-210	DA	04/25/2018		LF	6.0	5.9
MW-33-210	DA	12/07/2018		LF	6.7	10
MW-33-210	DA	04/22/2019		LF	10	9.2
MW-33-210	DA	12/05/2019		LF	13	15
MW-33-210	DA	12/05/2019	FD	LF	13	15
MW-34-080	DA	04/24/2018		LF	ND (1.0)	ND (1.0)
MW-34-080	DA	12/05/2018		LF	ND (1.0)	ND (1.0)
MW-34-080	DA	04/24/2019		LF	ND (0.2)	ND (1.0)
MW-34-080	DA	12/10/2019		LF	ND (0.2)	ND (1.0)
MW-34-080	DA	12/10/2019	FD	LF	ND (0.2)	ND (1.0)
MW-34-100	DA	02/20/2018		LF	ND (1.0)	1.5
MW-34-100	DA	04/24/2018		LF	ND (1.0)	1.1
MW-34-100	DA	04/24/2018	FD	LF	ND (1.0)	1.3
MW-34-100	DA	10/01/2018		LF	ND (1.0)	ND (1.0)
MW-34-100	DA	12/05/2018		LF	ND (1.0)	ND (1.0)
MW-34-100	DA	02/14/2019		LF	ND (1.0)	1.7
MW-34-100	DA	04/24/2019		LF	ND (0.2)	ND (1.0)
MW-34-100	DA	10/01/2019		LF	ND (0.2)	ND (1.0)
MW-34-100	DA	12/10/2019		LF	ND (1.0)	1.6

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-34-100	DA	12/10/2019	FD	LF	ND (1.0)	1.9
MW-34-100	DA	02/20/2020		LF	ND (0.2)	4.0
MW-35-060	SA	04/27/2018		LF	22	24
MW-35-060	SA	12/10/2018		LF	20	20
MW-35-060	SA	05/24/2019		LF	24	22
MW-35-060	SA	12/13/2019		LF	24	21
MW-35-135	DA	04/27/2018		LF	26	25
MW-35-135	DA	12/10/2018		LF	25	25
MW-35-135	DA	05/24/2019		LF	28	24
MW-35-135	DA	12/13/2019		LF	28	25
MW-35-135	DA	12/13/2019	FD	LF	28	24
MW-36-090	DA	04/24/2018		LF	ND (0.2)	ND (1.0)
MW-36-090	DA	12/06/2018		LF	ND (0.2)	ND (1.0)
MW-36-090	DA	12/06/2018	FD	LF	ND (0.2)	ND (1.0)
MW-36-090	DA	04/24/2019		LF	ND (0.2)	ND (1.0)
MW-36-090	DA	12/04/2019		LF	ND (0.2)	ND (1.0)
MW-36-100	DA	04/24/2018		LF	6.6	11
MW-36-100	DA	12/06/2018		LF	3.3	6.8
MW-36-100	DA	04/24/2019		LF	7.4	11
MW-36-100	DA	04/24/2019	FD	LF	7.1	11
MW-36-100	DA	12/04/2019		LF	7.5	9.8
MW-37D	DA	05/03/2018		LF	7.4	7.1
MW-37D	DA	12/06/2018		LF	5.1	5.0
MW-37D	DA	05/20/2019		LF	6.2	6.0
MW-37D	DA	12/19/2019		LF	4.8	4.5
MW-38D	DA	05/02/2018		3V	15	14
MW-38D	DA	05/02/2018		LF	15	14
MW-38D	DA	12/12/2018		3V	20	20
MW-38D	DA	12/12/2018		LF	21	21
MW-38D	DA	05/17/2019		LF	21	17
MW-38D	DA	12/18/2019		LF	19	21
MW-38S	SA	02/23/2018		3V	2.8	2.4
MW-38S	SA	02/23/2018		LF	2.8	2.5
MW-38S	SA	05/02/2018		3V	1.1	1.3
MW-38S	SA	05/02/2018		LF	1.8	2.0
MW-38S	SA	09/27/2018		3V	2.7	2.8
MW-38S	SA	09/27/2018		LF	3.0	3.3
MW-38S	SA	12/12/2018		3V	3.9	4.3
MW-38S	SA	12/12/2018		LF	4.2	4.7
MW-38S	SA	02/13/2019		LF	5.1	5.6
MW-38S	SA	05/17/2019		LF	6.0	5.7
MW-38S	SA	09/25/2019		LF	4.8	4.7
MW-38S	SA	12/18/2019		LF	4.7	4.5
MW-38S	SA	02/25/2020		LF	3.8	3.3
MW-38S	SA	02/25/2020	FD	LF	3.9	3.2
MW-38S-SMT	SA	02/13/2019		3V	3.7	3.8
MW-39-100	DA	04/24/2018		LF	57	54
MW-39-100	DA	12/06/2018		LF	63	70
MW-39-100	DA	04/24/2019		LF	88	89
MW-39-100	DA	12/05/2019		LF	87	82
MW-40D	DA	04/25/2018		LF	120	120

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-40D	DA	04/25/2018		H	25	31
MW-40D	DA	12/12/2018		LF	140	140
MW-40D	DA	12/12/2018		H	ND (1.0)	ND (1.0)
MW-40D	DA	05/22/2019		LF	120	120
MW-40D	DA	05/22/2019	FD	LF	120	120
MW-40D	DA	12/11/2019		LF	150	130
MW-40S	SA	04/25/2018		LF	20	20
MW-40S	SA	04/25/2018		H	18	17
MW-40S	SA	12/12/2018		LF	11	11
MW-40S	SA	12/12/2018		H	17	29
MW-40S	SA	05/22/2019		H	12	15
MW-40S	SA	12/11/2019		H	17	17
MW-41D	DA	05/04/2018		LF	ND (1.0)	ND (1.0)
MW-41D	DA	12/13/2018		LF	ND (1.0)	ND (5.0)
MW-41D	DA	05/15/2019		LF	ND (1.0)	ND (1.0)
MW-41D	DA	12/17/2019		LF	ND (1.0)	1.8
MW-42-055	MA	04/24/2018		LF	ND (0.2)	ND (1.0)
MW-42-055	MA	12/05/2018		LF	ND (0.2)	ND (1.0)
MW-42-055	MA	04/23/2019		LF	ND (0.2)	ND (1.0)
MW-42-055	MA	12/11/2019		LF	ND (0.2)	ND (1.0)
MW-42-065	MA	04/24/2018		LF	ND (0.2)	ND (1.0)
MW-42-065	MA	12/05/2018		LF	ND (0.2)	ND (1.0)
MW-42-065	MA	04/23/2019		LF	ND (0.2)	ND (1.0)
MW-42-065	MA	12/11/2019		LF	ND (0.2)	ND (1.0)
MW-44-070	MA	04/24/2018		LF	ND (0.2)	ND (1.0)
MW-44-070	MA	12/05/2018		LF	ND (0.2)	ND (1.0)
MW-44-070	MA	04/24/2019		LF	ND (0.2)	ND (1.0)
MW-44-070	MA	12/11/2019		LF	ND (0.2)	ND (1.0)
MW-44-115	DA	02/20/2018		LF	13	12
MW-44-115	DA	02/20/2018	FD	LF	13	12
MW-44-115	DA	04/24/2018		LF	8.9	9.5
MW-44-115	DA	10/01/2018		LF	6.4	7.0
MW-44-115	DA	12/05/2018		LF	6.4	5.8
MW-44-115	DA	02/15/2019		LF	9.7	17
MW-44-115	DA	04/24/2019		LF	6.0	6.1
MW-44-115	DA	10/01/2019		LF	6.2	6.3
MW-44-115	DA	12/11/2019		LF	6.7	7.3
MW-44-115	DA	02/21/2020		LF	4.8	5.9
MW-44-125	DA	04/24/2018		LF	ND (0.2)	3.1
MW-44-125	DA	12/05/2018		LF	ND (1.0)	ND (1.0)
MW-44-125	DA	12/05/2018	FD	LF	ND (1.0)	ND (1.0)
MW-44-125	DA	04/24/2019		LF	1.9	10
MW-44-125	DA	12/11/2019		LF	2.6	3.8
MW-46-175	DA	02/20/2018		LF	13	12
MW-46-175	DA	04/25/2018		LF	7.4	8.3
MW-46-175	DA	10/02/2018		LF	6.5	7.0
MW-46-175	DA	10/02/2018	FD	LF	6.5	7.0
MW-46-175	DA	12/13/2018		LF	8.2	12
MW-46-175	DA	02/15/2019		LF	8.1	18
MW-46-175	DA	02/15/2019	FD	LF	7.9	20
MW-46-175	DA	05/21/2019		LF	7.6	9.1

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-46-175	DA	10/01/2019		LF	6.0	6.1
MW-46-175	DA	12/04/2019		LF	5.1	6.3
MW-46-175	DA	02/21/2020		LF	9.1	17
MW-46-205	DA	04/25/2018		LF	ND (1.0)	ND (1.0)
MW-46-205	DA	12/13/2018		LF	ND (1.0)	ND (1.0)
MW-46-205	DA	05/21/2019		LF	2.4	2.7
MW-46-205	DA	12/04/2019		LF	ND (1.0)	6.2
MW-47-055	SA	04/26/2018		LF	15	15
MW-47-055	SA	04/26/2018	FD	LF	14	14
MW-47-055	SA	12/10/2018		LF	21	21
MW-47-055	SA	05/16/2019		LF	17	15
MW-47-055	SA	05/16/2019	FD	LF	17	15
MW-47-055	SA	12/04/2019		LF	21	18
MW-47-115	DA	04/25/2018		LF	23	23
MW-47-115	DA	12/10/2018		LF	15	15
MW-47-115	DA	12/10/2018	FD	LF	15	15
MW-47-115	DA	05/16/2019		LF	27	23
MW-47-115	DA	12/04/2019		LF	16	22
MW-48	BR	05/03/2018		LF	ND (1.0)	ND (1.0)
MW-48	BR	12/13/2018		LF	ND (1.0)	ND (5.0)
MW-48	BR	05/23/2019		LF	ND (1.0)	ND (1.0)
MW-48	BR	12/19/2019		3V	ND (1.0)	ND (1.0)
MW-50-095	MA	04/27/2018		LF	11	10
MW-50-095	MA	12/10/2018		LF	13	14
MW-50-095	MA	05/20/2019		LF	13	12
MW-50-095	MA	12/12/2019		LF	13	14
MW-50-200	DA	04/27/2018		LF	6,500	6,800
MW-50-200	DA	12/10/2018		LF	3,100	3,700
MW-50-200	DA	05/20/2019		LF	5,800	6,200
MW-50-200	DA	12/12/2019		LF	2,200	2,100
MW-50-200	DA	12/12/2019	FD	LF	2,200	2,100
MW-51	MA	05/01/2018		LF	3,500	3,700
MW-51	MA	12/10/2018		LF	3,300	3,800
MW-51	MA	05/22/2019		LF	3,300	3,800
MW-51	MA	12/12/2019		LF	3,600	3,900
MW-51	MA	12/12/2019	FD	LF	3,600	4,000
MW-52D	DA	04/23/2018		LF	ND (1.0)	ND (5.0)
MW-52D	DA	12/04/2018		LF	ND (1.0)	ND (1.0)
MW-52D	DA	04/23/2019		LF	ND (1.0)	ND (1.0)
MW-52D	DA	04/23/2019	FD	LF	ND (1.0)	ND (1.0)
MW-52D	DA	12/12/2019		LF	ND (1.0)	ND (1.0)
MW-52M	DA	04/23/2018		LF	ND (1.0)	ND (5.0)
MW-52M	DA	12/04/2018		LF	ND (1.0)	ND (1.0)
MW-52M	DA	04/23/2019		LF	ND (1.0)	ND (1.0)
MW-52M	DA	12/12/2019		LF	ND (1.0)	ND (1.0)
MW-52S	MA	04/24/2018		LF	ND (1.0)	ND (1.0)
MW-52S	MA	12/04/2018		LF	ND (1.0)	ND (1.0)
MW-52S	MA	04/23/2019		LF	ND (0.2)	ND (1.0)
MW-52S	MA	12/12/2019		LF	ND (0.2)	ND (1.0)
MW-53D	DA	04/23/2018		LF	ND (1.0)	ND (1.0)
MW-53D	DA	12/04/2018		LF	ND (1.0)	ND (1.0)

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-53D	DA	04/23/2019		LF	ND (1.0)	ND (1.0)
MW-53D	DA	12/12/2019		LF	ND (1.0)	ND (1.0)
MW-53M	DA	04/23/2018		LF	ND (1.0)	ND (1.0)
MW-53M	DA	12/04/2018		LF	ND (1.0)	ND (1.0)
MW-53M	DA	04/23/2019		LF	ND (1.0)	ND (1.0)
MW-53M	DA	12/12/2019		LF	ND (1.0)	ND (1.0)
MW-54-085	DA	05/04/2018	(a)	LF	ND (0.1)	ND (0.2)
MW-54-085	DA	12/13/2018	(a)	LF	ND (0.1 J)	ND (2.0)
MW-54-085	DA	05/23/2019	(a)	LF	ND (0.1)	ND (2.0)
MW-54-085	DA	12/10/2019	(a)	LF	ND (0.1)	ND (1.0)
MW-54-140	DA	05/04/2018	(a)	LF	4.95	ND (0.2)
MW-54-140	DA	12/13/2018	(a)	LF	ND (0.5 J)	ND (2.0)
MW-54-140	DA	05/23/2019	(a)	LF	ND (0.5)	ND (2.0)
MW-54-140	DA	12/10/2019	(a)	LF	ND (0.5)	ND (1.0)
MW-54-195	DA	05/04/2018	(a)	LF	5.09	ND (0.2)
MW-54-195	DA	12/13/2018	(a)	LF	ND (0.5 J)	ND (2.0)
MW-54-195	DA	05/23/2019	(a)	LF	ND (0.5)	15.1
MW-54-195	DA	08/22/2019	(a)	LF	ND (0.5)	ND (2.0)
MW-54-195	DA	08/22/2019	(a)	LF	ND (0.5)	ND (2.0)
MW-54-195	DA	12/10/2019	(a)	LF	ND (0.5)	ND (1.0)
MW-55-045	MA	05/03/2018	(a)	LF	ND (0.1)	ND (0.2)
MW-55-045	MA	12/13/2018	(a)	LF	ND (0.1 J)	ND (0.2)
MW-55-045	MA	05/23/2019	(a)	LF	ND (0.1)	ND (2.0)
MW-55-045	MA	12/10/2019	(a)	LF	ND (0.1)	ND (1.0)
MW-55-120	DA	05/03/2018	(a)	LF	8.0	8.35
MW-55-120	DA	12/13/2018	(a)	LF	8.29 J	ND (2.0)
MW-55-120	DA	05/23/2019	(a)	LF	7.49	ND (2.0)
MW-55-120	DA	12/10/2019	(a)	LF	6.55	8.19
MW-56D	DA	05/02/2018	(a)	LF	5.03	ND (0.2)
MW-56D	DA	12/13/2018	(a)	LF	ND (0.5 J)	ND (2.0)
MW-56D	DA	12/13/2018	FD(a)	LF	ND (0.5 J)	ND (2.0)
MW-56D	DA	05/23/2019	(a)	LF	ND (0.5)	ND (2.0)
MW-56D	DA	12/10/2019	(a)	LF	ND (0.5)	ND (1.0)
MW-56D	DA	12/10/2019	FD(a)	LF	ND (0.5)	ND (1.0)
MW-56M	DA	05/02/2018	(a)	LF	4.99	ND (0.2)
MW-56M	DA	12/13/2018	(a)	LF	ND (0.5 J)	ND (2.0)
MW-56M	DA	05/23/2019	(a)	LF	ND (0.5)	ND (2.0)
MW-56M	DA	12/10/2019	(a)	LF	ND (0.5)	ND (1.0)
MW-56S	SA	05/02/2018	(a)	LF	ND (0.1)	ND (0.2)
MW-56S	SA	12/13/2018	(a)	LF	ND (0.1 J)	ND (2.0)
MW-56S	SA	05/23/2019	(a)	LF	ND (0.1)	ND (2.0)
MW-56S	SA	12/10/2019	(a)	LF	ND (0.1)	ND (1.0)
MW-57-070	BR	05/03/2018		LF	340	360
MW-57-070	BR	12/07/2018		LF	410	420
MW-57-070	BR	05/20/2019		LF	380	400
MW-57-070	BR	12/06/2019		LF	420	390
MW-57-185	BR	05/03/2018		3V	7.7	7.5
MW-57-185	BR	12/07/2018		3V	6.4	5.7
MW-57-185	BR	05/20/2019		LF	4.6	5.2
MW-57-185	BR	05/20/2019	FD	LF	4.7	5.1
MW-57-185	BR	12/06/2019		LF	3.7	3.4

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-57-185_D	BR	05/03/2018		LF	4.8	4.7
MW-57-185_D	BR	12/07/2018		LF	6.2	5.9
MW-57-185_S	BR	05/03/2018		LF	5.3	5.2
MW-57-185_S	BR	12/07/2018		LF	5.4	6.0
MW-58BR	BR	02/19/2018		LF	13	11
MW-58BR	BR	05/03/2018		LF	9.3	9.2
MW-58BR	BR	09/27/2018		LF	9.7	9.6
MW-58BR	BR	12/13/2018		LF	10	11
MW-58BR	BR	02/14/2019		LF	7.4	9.4
MW-58BR	BR	05/21/2019		LF	12	14
MW-58BR	BR	08/19/2019		LF	90	88 J
MW-58BR	BR	08/19/2019	FD	LF	90	89 J
MW-58BR	BR	12/13/2019		LF	76	70
MW-58BR	BR	02/17/2020		LF	120	120
MW-59-100	SA	05/03/2018		LF	2,800	3,000
MW-59-100	SA	12/07/2018		LF	3,100	3,300
MW-59-100	SA	12/07/2018	FD	LF	3,100	3,100
MW-59-100	SA	05/20/2019		LF	2,000	2,200
MW-59-100	SA	05/20/2019	FD	LF	2,200	2,300
MW-59-100	SA	12/13/2019		LF	2,700	2,800
MW-59-100	SA	12/13/2019	FD	LF	2,700	2,700
MW-60-125	BR	05/02/2018		LF	510	470
MW-60-125	BR	12/06/2018		LF	980	950
MW-60-125	BR	05/22/2019		LF	880	890
MW-60-125	BR	12/06/2019		LF	580	540
MW-60BR-245	BR	02/21/2018		3V	69	59
MW-60BR-245	BR	05/02/2018		3V	73	67
MW-60BR-245	BR	09/25/2018		3V	76	81
MW-60BR-245	BR	12/06/2018		3V	110	120
MW-60BR-245	BR	02/14/2019		3V	110	110
MW-60BR-245	BR	05/22/2019		3V	130	120
MW-60BR-245	BR	12/12/2019		3V	64	52
MW-60BR-245	BR	02/20/2020		3V	52	44
MW-60BR-245_D	BR	02/21/2018		LF	4.1	39
MW-60BR-245_D	BR	05/02/2018		LF	1.2	1.7
MW-60BR-245_D	BR	09/25/2018		LF	6.4	6.2
MW-60BR-245_D	BR	12/06/2018		LF	20	21
MW-60BR-245_D	BR	02/14/2019		LF	18	17
MW-60BR-245_D	BR	05/23/2019		LF	68	61
MW-60BR-245_D	BR	12/13/2019		LF	75	61
MW-60BR-245_D	BR	02/21/2020		LF	72	62
MW-60BR-245_S	BR	02/21/2018		LF	ND (1.0)	7.7
MW-60BR-245_S	BR	05/02/2018		LF	1.1	1.5
MW-60BR-245_S	BR	09/25/2018		LF	ND (1.0)	ND (1.0)
MW-60BR-245_S	BR	12/06/2018		LF	17	17
MW-60BR-245_S	BR	02/14/2019		LF	25	29
MW-60BR-245_S	BR	05/23/2019		LF	85	74
MW-60BR-245_S	BR	12/13/2019		LF	86	76
MW-60BR-245_S	BR	02/21/2020		LF	96	85
MW-61-110	BR	05/04/2018		LF	330	340
MW-61-110	BR	12/13/2018		LF	430	460

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-61-110	BR	12/13/2018	FD	LF	460	470
MW-61-110	BR	05/23/2019		LF	280	280
MW-61-110	BR	12/06/2019		LF	480	460
MW-62-065	BR	02/19/2018		LF	560	510
MW-62-065	BR	02/19/2018	FD	LF	550	530
MW-62-065	BR	05/01/2018		LF	520	530
MW-62-065	BR	09/26/2018		LF	540	570
MW-62-065	BR	12/07/2018		LF	540	610
MW-62-065	BR	02/11/2019		LF	470	550
MW-62-065	BR	05/21/2019		LF	570	560
MW-62-065	BR	10/01/2019		LF	490	530
MW-62-065	BR	12/03/2019		LF	560	540
MW-62-065	BR	02/19/2020		LF	480	460
MW-62-110	BR	02/21/2018		Tap	ND (1.0)	ND (1.0)
MW-62-110	BR	05/03/2018		G	ND (1.0)	ND (1.0)
MW-62-110	BR	09/26/2018		3V	ND (1.0)	ND (1.0)
MW-62-110	BR	12/13/2018		G	0.32	3.0
MW-62-110	BR	02/14/2019		LF	ND (1.0)	ND (1.0)
MW-62-110	BR	05/22/2019		G	ND (1.0)	ND (1.0)
MW-62-110	BR	09/25/2019		G	ND (1.0)	ND (1.0)
MW-62-110	BR	12/04/2019		G	0.59	ND (1.0)
MW-62-110	BR	02/18/2020		LF	ND (0.2)	ND (1.0)
MW-62-190	BR	05/03/2018		G	ND (1.0)	ND (1.0)
MW-62-190	BR	12/13/2018		LF	ND (1.0)	ND (1.0)
MW-62-190	BR	05/22/2019		G	ND (1.0)	ND (1.0)
MW-62-190	BR	12/04/2019		LF	ND (1.0)	ND (1.0)
MW-63-065	BR	02/21/2018		LF	0.53	1.6
MW-63-065	BR	04/26/2018		LF	0.85	1.3
MW-63-065	BR	09/24/2018		LF	1.0	1.4
MW-63-065	BR	09/24/2018	FD	LF	1.0	1.5
MW-63-065	BR	12/12/2018		LF	0.95	1.7
MW-63-065	BR	02/14/2019		LF	1.1	1.3
MW-63-065	BR	05/21/2019		LF	1.3	2.8
MW-63-065	BR	09/26/2019		LF	1.2	1.0
MW-63-065	BR	09/26/2019	FD	LF	1.2	1.1
MW-63-065	BR	12/06/2019		LF	1.4	3.0
MW-63-065	BR	02/19/2020		LF	1.2	2.5
MW-63-065	BR	02/19/2020	FD	LF	1.2	2.8
MW-64BR	BR	02/19/2018		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	02/19/2018	FD	LF	ND (1.0)	ND (1.0)
MW-64BR	BR	05/02/2018		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	09/24/2018		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	12/13/2018		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	02/13/2019		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	05/21/2019		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	08/22/2019		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	12/06/2019		LF	ND (1.0)	ND (1.0)
MW-64BR	BR	02/21/2020		LF	ND (1.0)	ND (1.0)
MW-65-160	SA	02/22/2018		LF	190	170
MW-65-160	SA	04/30/2018		LF	160	170
MW-65-160	SA	09/27/2018		LF	170	170

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-65-160	SA	12/05/2018		LF	160	220
MW-65-160	SA	02/13/2019		LF	220	220
MW-65-160	SA	05/16/2019		LF	160	190
MW-65-160	SA	09/26/2019		LF	150	160
MW-65-160	SA	12/03/2019		LF	260	260
MW-65-160	SA	02/20/2020		LF	250	250
MW-65-225	DA	02/22/2018		LF	510	520
MW-65-225	DA	04/30/2018		LF	110	100
MW-65-225	DA	09/27/2018		LF	180	170
MW-65-225	DA	09/27/2018	FD	LF	180	170
MW-65-225	DA	12/05/2018		LF	220	220
MW-65-225	DA	02/13/2019		LF	490	490
MW-65-225	DA	05/16/2019		LF	180	160
MW-65-225	DA	09/26/2019		LF	330	340
MW-65-225	DA	09/26/2019	FD	LF	330	320
MW-65-225	DA	12/03/2019		LF	480	450
MW-65-225	DA	02/20/2020		LF	460	470
MW-66-165	SA	04/30/2018		LF	540	540
MW-66-165	SA	12/05/2018		LF	480	500
MW-66-165	SA	05/16/2019		LF	550	570
MW-66-165	SA	05/16/2019	FD	LF	540	580
MW-66-165	SA	12/03/2019		LF	480	480
MW-66-230	DA	04/30/2018		LF	6,700	6,900
MW-66-230	DA	04/30/2018	FD	LF	6,800	6,900
MW-66-230	DA	12/05/2018		LF	6,100	6,200
MW-66-230	DA	05/16/2019		LF	6,400	7,000
MW-66-230	DA	12/03/2019		LF	6,800	6,600
MW-66BR-270	BR	05/02/2018		3V	ND (1.0)	ND (1.0)
MW-66BR-270	BR	12/07/2018		3V	ND (1.0)	ND (1.0)
MW-66BR-270	BR	05/22/2019		3V	ND (1.0)	ND (1.0)
MW-66BR-270	BR	12/10/2019		3V	ND (1.0)	ND (1.0)
MW-67-185	SA	04/30/2018		LF	1,800	1,700
MW-67-185	SA	12/05/2018		LF	1,800	2,000
MW-67-185	SA	05/16/2019		LF	2,100	2,200
MW-67-185	SA	12/04/2019		LF	3,100	2,900 J
MW-67-225	MA	04/30/2018		LF	2,800	2,800
MW-67-225	MA	12/05/2018		LF	2,900	3,000
MW-67-225	MA	05/16/2019		LF	3,100	3,300
MW-67-225	MA	12/04/2019		LF	3,300	3,300
MW-67-260	DA	04/30/2018		LF	820	830
MW-67-260	DA	12/05/2018		LF	660	710 J
MW-67-260	DA	05/16/2019		LF	800	850
MW-67-260	DA	12/04/2019		LF	390	360
MW-68-180	SA	02/22/2018		LF	24,000	24,000
MW-68-180	SA	05/01/2018		LF	5,600	6,100
MW-68-180	SA	09/27/2018		LF	8,500	8,900
MW-68-180	SA	12/07/2018		LF	22,000	24,000
MW-68-180	SA	02/13/2019		LF	37,000	42,000
MW-68-180	SA	05/22/2019		LF	5,400	6,200
MW-68-180	SA	09/26/2019		LF	9,700	11,000
MW-68-180	SA	12/04/2019		LF	34,000	37,000

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-68-180	SA	02/20/2020		LF	25,000	27,000
MW-68-240	DA	02/22/2018		LF	2,100	2,000
MW-68-240	DA	05/01/2018		LF	2,000	2,100
MW-68-240	DA	12/05/2018		LF	2,000	1,900
MW-68-240	DA	05/23/2019		LF	2,000	2,000
MW-68-240	DA	05/23/2019	FD	LF	1,900	2,100
MW-68-240	DA	12/04/2019		LF	2,100	1,900
MW-68BR-280	BR	02/22/2018		LF	ND (1.0)	ND (1.0)
MW-68BR-280	BR	05/01/2018		LF	ND (1.0)	ND (5.0)
MW-68BR-280	BR	12/05/2018		LF	ND (1.0)	ND (1.0)
MW-68BR-280	BR	05/22/2019		LF	ND (1.0)	ND (1.0)
MW-68BR-280	BR	12/04/2019		LF	ND (1.0)	ND (1.0)
MW-69-195	BR	02/22/2018		LF	120	110
MW-69-195	BR	05/01/2018		LF	210	210
MW-69-195	BR	09/27/2018		LF	460	450
MW-69-195	BR	12/07/2018		LF	460	470
MW-69-195	BR	02/13/2019		LF	110	100
MW-69-195	BR	05/16/2019		LF	120	120
MW-69-195	BR	09/26/2019		LF	78	77
MW-69-195	BR	12/03/2019		LF	180	150
MW-69-195	BR	02/25/2020		LF	150	140
MW-70-105	BR	05/03/2018		LF	160	150
MW-70-105	BR	12/13/2018		LF	120	130
MW-70-105	BR	05/21/2019		LF	170	170
MW-70-105	BR	12/17/2019		LF	60	55
MW-70BR-225	BR	05/03/2018		3V	1,800	1,800
MW-70BR-225	BR	05/03/2018		LF	1,300	1,300
MW-70BR-225	BR	12/13/2018		3V	1,800	1,900
MW-70BR-225	BR	12/13/2018		LF	1,200	1,400
MW-70BR-225	BR	05/21/2019		LF	1,600	1,700
MW-70BR-225	BR	12/17/2019		LF	1,300	1,200
MW-71-035	SA	05/02/2018		LF	ND (1.0)	ND (1.0)
MW-71-035	SA	12/11/2018		LF	ND (1.0)	ND (1.0)
MW-71-035	SA	12/11/2018	FD	LF	ND (1.0)	1.0
MW-71-035	SA	05/23/2019		LF	ND (1.0)	ND (1.0)
MW-71-035	SA	12/18/2019		LF	ND (1.0)	ND (1.0)
MW-72-080	BR	02/20/2018		LF	90	78
MW-72-080	BR	04/26/2018		LF	68	62
MW-72-080	BR	09/26/2018		LF	91	100
MW-72-080	BR	12/06/2018		LF	82	73
MW-72-080	BR	02/11/2019		LF	77	92
MW-72-080	BR	05/24/2019		LF	55	51
MW-72-080	BR	08/22/2019		LF	93	91
MW-72-080	BR	12/06/2019		LF	120	110
MW-72-080	BR	02/20/2020		LF	96	85
MW-72BR-200	BR	02/20/2018		3V	4.5	4.4
MW-72BR-200	BR	04/26/2018		3V	3.3	2.6
MW-72BR-200	BR	09/26/2018		3V	3.0	2.9
MW-72BR-200	BR	12/06/2018		3V	4.9	3.3
MW-72BR-200	BR	02/12/2019		3V	5.3	5.4
MW-72BR-200	BR	08/22/2019		LF	ND (1.0)	ND (1.0)

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
MW-72BR-200	BR	12/06/2019		LF	2.4	3.5
MW-72BR-200	BR	02/20/2020		LF	1.2	2.9
MW-72BR-200_D	BR	02/20/2018		LF	1.6	2.1
MW-72BR-200_D	BR	04/26/2018		LF	ND (1.0)	ND (1.0)
MW-72BR-200_D	BR	09/26/2018		LF	ND (1.0)	ND (1.0)
MW-72BR-200_D	BR	12/06/2018		LF	ND (1.0)	ND (1.0)
MW-72BR-200_D	BR	02/12/2019		LF	ND (1.0)	ND (1.0)
MW-72BR-200_S	BR	02/20/2018		LF	ND (1.0)	1.1
MW-72BR-200_S	BR	04/26/2018		LF	ND (1.0)	2.0
MW-72BR-200_S	BR	09/26/2018		LF	ND (1.0)	ND (1.0)
MW-72BR-200_S	BR	12/06/2018		LF	ND (1.0)	ND (1.0)
MW-72BR-200_S	BR	02/12/2019		LF	ND (1.0)	1.3
MW-72BR-200_S	BR	05/23/2019		LF	ND (1.0)	ND (1.0)
MW-73-080	BR	02/20/2018		LF	22	21
MW-73-080	BR	05/01/2018		LF	57	58
MW-73-080	BR	09/24/2018		LF	36	39
MW-73-080	BR	12/06/2018		LF	29	26
MW-73-080	BR	02/11/2019		LF	29	34 J
MW-73-080	BR	05/23/2019		LF	34	35
MW-73-080	BR	08/22/2019		LF	20	18
MW-73-080	BR	12/06/2019		LF	19	19
MW-73-080	BR	02/20/2020		LF	21	19
MW-74-240	BR	05/02/2018		LF	0.46	ND (1.0)
MW-74-240	BR	12/07/2018		LF	0.33	ND (1.0)
MW-74-240	BR	05/22/2019		LF	0.55	ND (1.0)
MW-74-240	BR	12/05/2019		LF	ND (0.2)	ND (1.0)
PE-01	DA	01/04/2018		Tap	ND (0.2)	ND (1.0)
PE-01	DA	02/07/2018		Tap	0.7	ND (1.0)
PE-01	DA	03/07/2018		Tap	2.3	2.0
PE-01	DA	04/03/2018		Tap	ND (0.2)	ND (1.0)
PE-01	DA	05/04/2018		Tap	ND (0.2)	1.8
PE-01	DA	06/07/2018		Tap	ND (0.2)	ND (1.0)
PE-01	DA	07/03/2018		Tap	ND (0.2)	ND (1.0)
PE-01	DA	08/01/2018		Tap	ND (0.2)	ND (1.0)
PE-01	DA	09/06/2018		Tap	ND (0.2)	ND (1.0)
PE-01	DA	10/02/2018		Tap	7.6	5.6
PE-01	DA	11/07/2018		Tap	ND (0.2)	ND (1.0)
PE-01	DA	12/04/2018		Tap	0.68	2.9
PE-01	DA	01/03/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	02/14/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	03/05/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	04/23/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	05/09/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	06/05/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	07/24/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	08/22/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	09/04/2019		Tap	0.69	ND (1.0)
PE-01	DA	10/03/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	11/07/2019		Tap	ND (0.2)	ND (1.0)
PE-01	DA	12/04/2019		Tap	ND (0.2)	ND (1.0)
TW-01	SA	05/01/2018		3V	2,400	3,100

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide
Groundwater and Surface Water Monitoring Report,
PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
TW-01	SA	12/05/2018		3V	2,100	2,100
TW-01	SA	05/24/2019		LF	2,300	2,400
TW-01	SA	12/03/2019		LF	2,200	2,100
TW-02D	DA	02/23/2018	FD	LF	150	140
TW-02D	DA	02/23/2018		LF	140	140
TW-02D	DA	05/04/2018	FD	Tap	150	140
TW-02D	DA	05/04/2018		Tap	150	150
TW-02D	DA	09/26/2018	FD	Tap	ND (0.2)	ND (1.0)
TW-02D	DA	09/26/2018		Tap	ND (0.2)	ND (1.0)
TW-02D	DA	12/04/2018		Tap	140	110
TW-02D	DA	02/14/2019	FD	Tap	120	130
TW-02D	DA	02/14/2019		Tap	120	140
TW-02D	DA	04/23/2019		Tap	93	46
TW-02D	DA	10/03/2019		Tap	95	110
TW-02D	DA	12/04/2019		Tap	2.3	52
TW-02D	DA	02/19/2020		Tap	740	670
TW-03D	DA	01/04/2018		Tap	550	590
TW-03D	DA	02/07/2018		Tap	550	540
TW-03D	DA	03/07/2018		Tap	530	520
TW-03D	DA	04/03/2018		Tap	570	550
TW-03D	DA	05/04/2018		Tap	490	490
TW-03D	DA	06/07/2018		Tap	470	480
TW-03D	DA	07/03/2018		Tap	480	500
TW-03D	DA	08/01/2018		Tap	480	480
TW-03D	DA	09/06/2018		Tap	500	510
TW-03D	DA	10/02/2018		Tap	480	500
TW-03D	DA	11/07/2018		Tap	490	510
TW-03D	DA	12/04/2018		Tap	480	490
TW-03D	DA	01/03/2019		Tap	500	480
TW-03D	DA	02/14/2019		Tap	420	520
TW-03D	DA	03/05/2019		Tap	500	520
TW-03D	DA	04/23/2019		Tap	470	480
TW-03D	DA	05/09/2019		Tap	460	440
TW-03D	DA	06/05/2019		Tap	450	440
TW-03D	DA	07/24/2019		Tap	450	430
TW-03D	DA	08/22/2019		Tap	410	430
TW-03D	DA	09/04/2019		Tap	500	450
TW-03D	DA	10/03/2019		Tap	410	430
TW-03D	DA	11/07/2019		Tap	440	430
TW-03D	DA	12/04/2019		Tap	480	480
TW-03D	DA	01/08/2020		Tap	470	460
TW-03D	DA	02/05/2020		Tap	460	480
TW-03D	DA	03/04/2020		Tap	450	390
TW-04	DA	04/26/2018		3V	8.9	9.4
TW-04	DA	04/26/2018		LF	ND (1.0)	ND (5.0)
TW-04	DA	12/11/2018	FD	3V	8.4	8.1
TW-04	DA	12/11/2018		3V	8.2	8.1
TW-04	DA	12/11/2018		LF	4.2	5.0
TW-04	DA	05/16/2019		LF	5.1	4.5
TW-04	DA	12/12/2019		LF	5.8	5.6
TW-05	DA	05/01/2018		3V	11	11

Appendix B

Historical Cr(VI) and Dissolved Chromium Concentrations, January 2018 through March 2020

First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report, PG&E Topock Compressor Station, Needles, California

Location ID	Aquifer Zone	Sample Date	Sample Type	Sample Method	Hexavalent Chromium (µg/L)	Dissolved Chromium (µg/L)
TW-05	DA	05/01/2018		LF	8.8	9.1
TW-05	DA	12/04/2018		3V	14	14
TW-05	DA	12/04/2018		LF	9.5	9.3
TW-05	DA	05/20/2019	FD	LF	11	9.6
TW-05	DA	05/20/2019		LF	11	9.9
TW-05	DA	12/12/2019		LF	18	17

Notes:

(a) = data were analyzed by an Arizona certified laboratory.

1. Beginning February 1, 2008, hexavalent chromium samples are field-filtered per DTSC-approved change from analysis Method SW7199 to

-- = not applicable.
µg/L = micrograms per liter.
3V = three volume.
BR = bedrock.
DA = deep interval of Alluvial Aquifer.
DTSC = Department of Toxic Substance Control.
FD = field duplicate.
G = Grab sample.
H = HydraSleeve.
ID = identification.
J = concentration or reporting limit (RL) estimated by laboratory or data validation.
LF = Low Flow (minimal drawdown).
MA = mid-depth interval of Alluvial Aquifer.
ND = not detected at listed reporting limit.
SA = shallow interval of Alluvial Aquifer.
Tap = sampled from tap of extraction well.

APPENDIX C

Well Inspection and Maintenance Log, First Quarter 2020

Appendix C
Well Inspection and Maintenance Log, First Quarter 2020
First Quarter 2020 Interim Measures Performance Monitoring and Site-wide Groundwater and Surface Water Monitoring Report
PG&E Topock Compressor Station, Needles, California

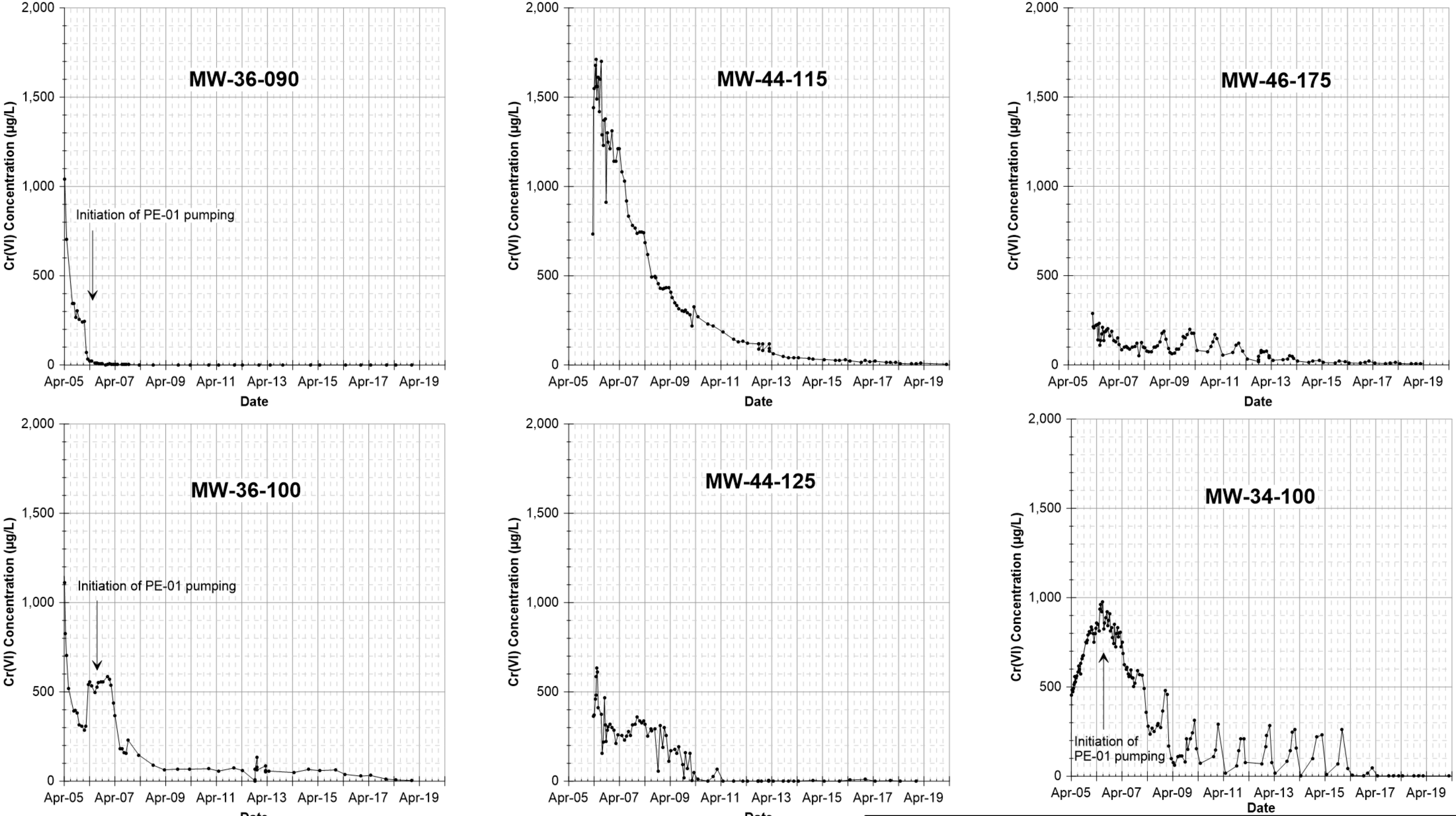
Well/Piezometer	Inspection Date	Survey Mark Present? (Yes/No)	Standing or Ponded Water? (Yes/No)	Lock in Place? (Yes/No)	Evidence of well subsidence? (Yes/No)	Well Labeled on Casing or Pad? (Yes/No)	Traffic Poles Intact? (Yes/No)	Concrete Pad Intact? (Yes/No)	Erosion Around Wellhead? (Yes/No)	Steel Casing Intact? (Yes/No)	PVC Cap Present? (Yes/No)	Standing Water in Annulus? (Yes/No)	Well Casing Intact? (Yes/No)	Photo Taken? (Yes/No)	Action Completed? (Yes/No)
MW-34-100	02/20/2020	Yes	No	Yes	--	Yes	--	Yes	No	Yes	Yes	No	Yes	Yes	--
MW-38S	02/25/2020	Yes	No	Yes	No	Yes	--	Yes	No	Yes	Yes	No	Yes	Yes	--
MW-44-115	02/21/2020	Yes	No	Yes	No	Yes	--	Yes	No	Yes	Yes	No	Yes	Yes	--
MW-46-175	02/21/2020	Yes	No	Yes	No	Yes	--	Yes	No	Yes	Yes	No	Yes	Yes	--
MW-57-050	02/21/2020	Yes	No	Yes	No	Yes	--	Yes	No	--	Yes	No	Yes	No	--
MW-58BR	02/17/2020	Yes	No	Yes	No	Yes	--	Yes	No	Yes	Yes	No	Yes	Yes	--
MW-60BR-245	02/20/2020	Yes	No	Yes	No	Yes	--	--	No	No	Yes	No	Yes	Yes	--
MW-62-065	02/19/2020	Yes	No	--	No	Yes	--	Yes	No	--	Yes	No	Yes	Yes	--
MW-62-110	02/17/2020	Yes	No	Yes	No	Yes	--	Yes	No	--	Yes	No	Yes	Yes	--
MW-63-065	02/19/2020	Yes	No	--	No	Yes	--	Yes	No	--	Yes	No	Yes	Yes	--
MW-64BR	02/21/2020	Yes	No	--	No	Yes	--	Yes	No	--	Yes	No	Yes	Yes	--
MW-65-160	02/20/2020	Yes	Yes	--	No	Yes	--	--	No	--	Yes	Yes	Yes	Yes	--
MW-65-225	02/20/2020	Yes	Yes	--	No	Yes	--	Yes	No	--	Yes	Yes	Yes	Yes	--
MW-68-180	02/20/2020	Yes	No	--	No	Yes	--	Yes	No	--	Yes	No	Yes	Yes	--
MW-69-195	02/25/2020	Yes	No	--	No	Yes	--	Yes	No	--	Yes	No	Yes	Yes	--
MW-72-080	02/20/2020	Yes	No	--	No	No	--	--	No	No	Yes	No	Yes	Yes	--
MW-72BR-200	02/20/2020	Yes	No	--	No	No	--	--	No	No	Yes	No	Yes	Yes	--
MW-73-080	02/20/2020	Yes	Yes	--	No	--	--	--	No	--	Yes	Yes	Yes	Yes	--
TW-02D	02/19/2020	Yes	No	Yes	No	Yes	--	Yes	No	--	Yes	No	Yes	No	--
TW-03D	02/05/2020	--	--	Yes	--	Yes	Yes	Yes	--	--	--	--	--	No	--
TW-03D	03/04/2020	Yes	No	--	No	--	--	--	--	Yes	--	Yes	Yes	Yes	--

Notes:
-- = not applicable

APPENDIX D

Concentration Time Series Charts, First Quarter 2020

For additional help with the information provided in Appendix D, please contact Alison Schaffer, Arcadis Report Lead, at 303.471.3575.

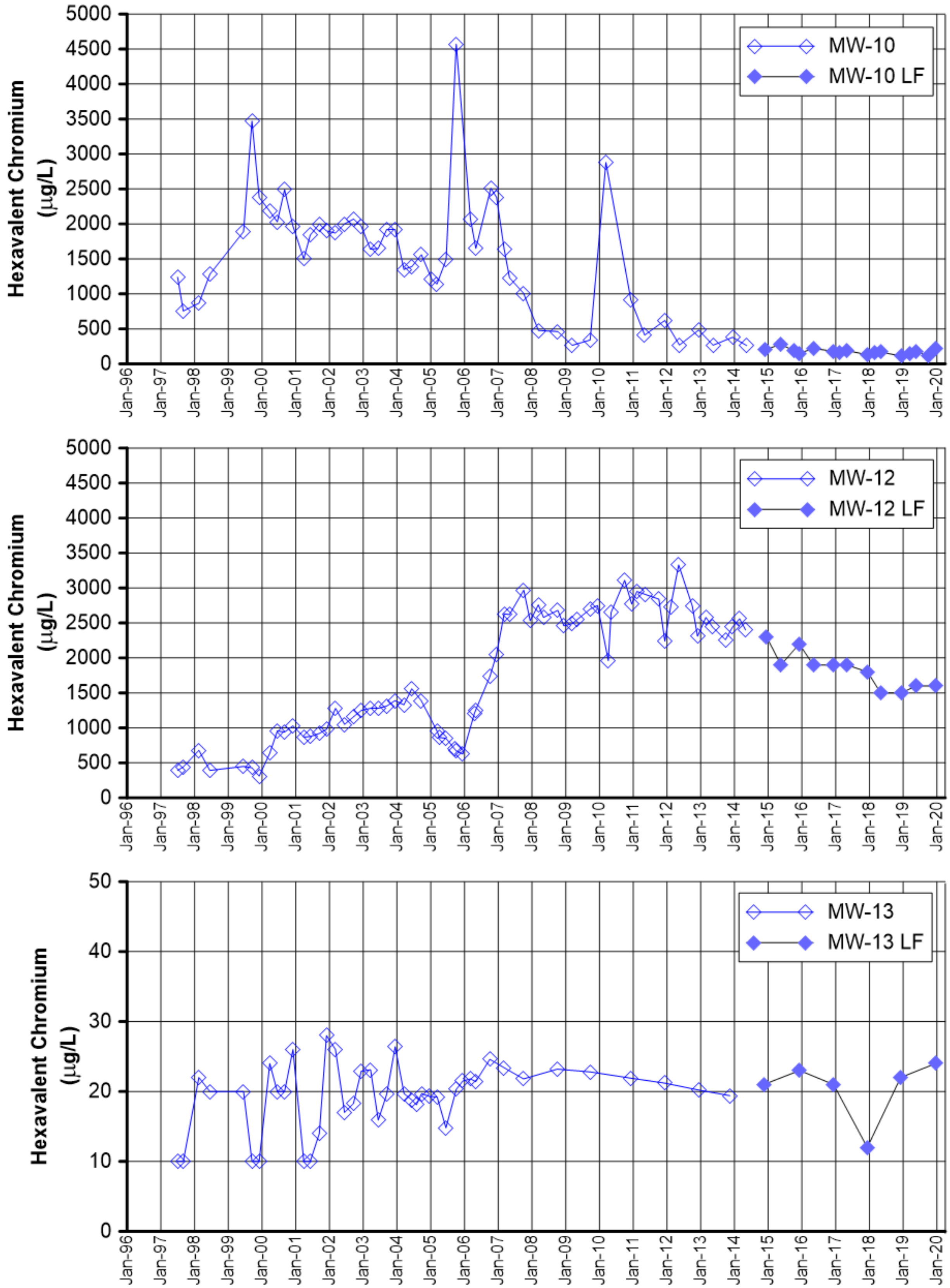


Notes:

1. Hexavalent chromium [Cr(VI)] results in micrograms per liter (µg/L), equivalent to parts per billion (ppb).
2. Results plotted are maximum concentrations from primary and duplicate samples; see Table 3-1 for complete results.
3. MW-36 wells selected to monitor effects of PE-01 pumping on plume west of PE-01. MW-44 wells, MW-46-175, and MW-34-100 selected to monitor concentrations within the plume.

APPENDIX D
Cr(VI) CONCENTRATION TRENDS IN SELECTED PERFORMANCE MONITORING WELLS, APRIL 2005 THROUGH FEBRUARY 2020
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING
AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:

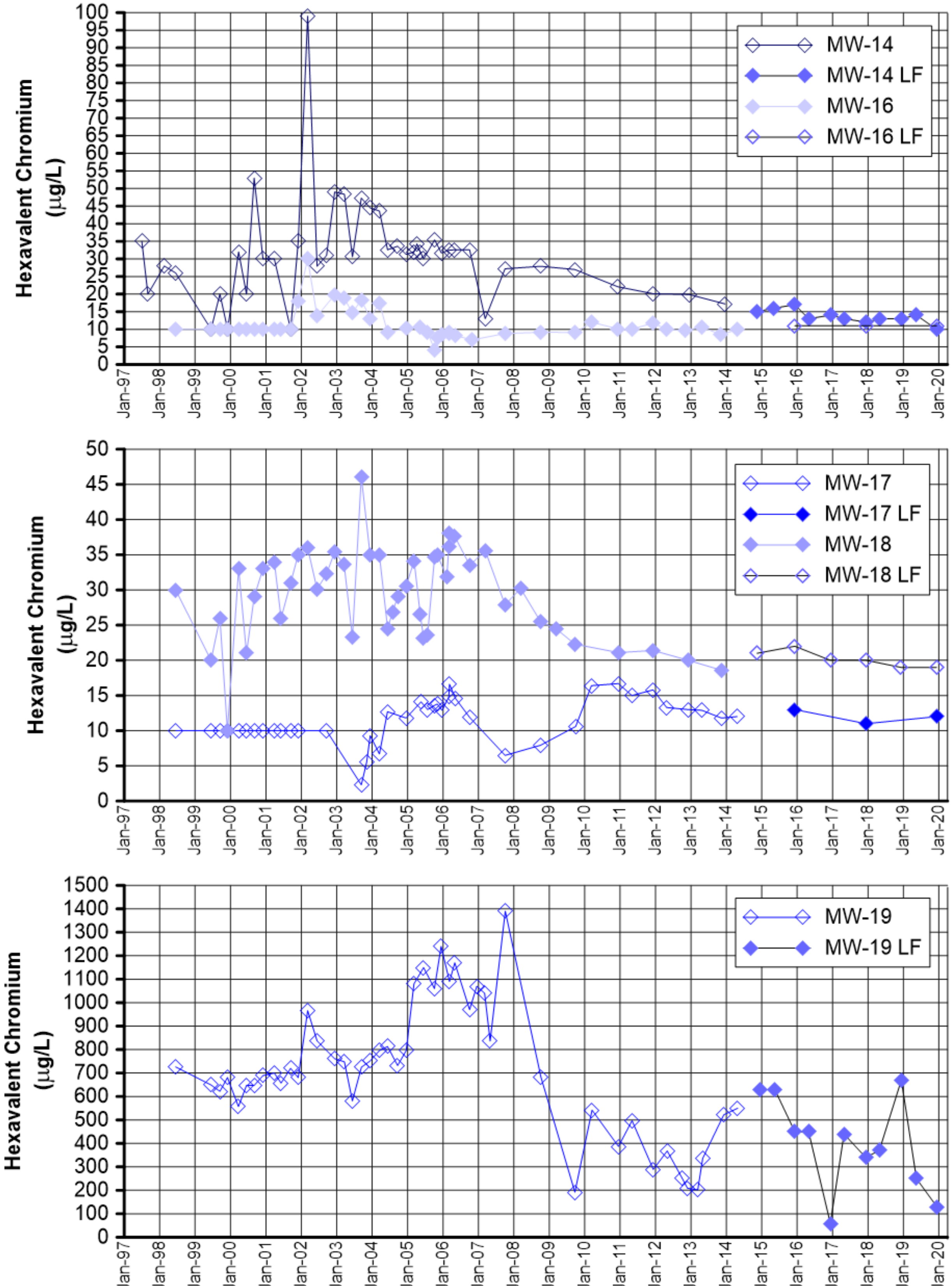
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-1
HEXAVALENT CHROMIUM IN MW-10, MW-12, AND MW-13

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Technical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120



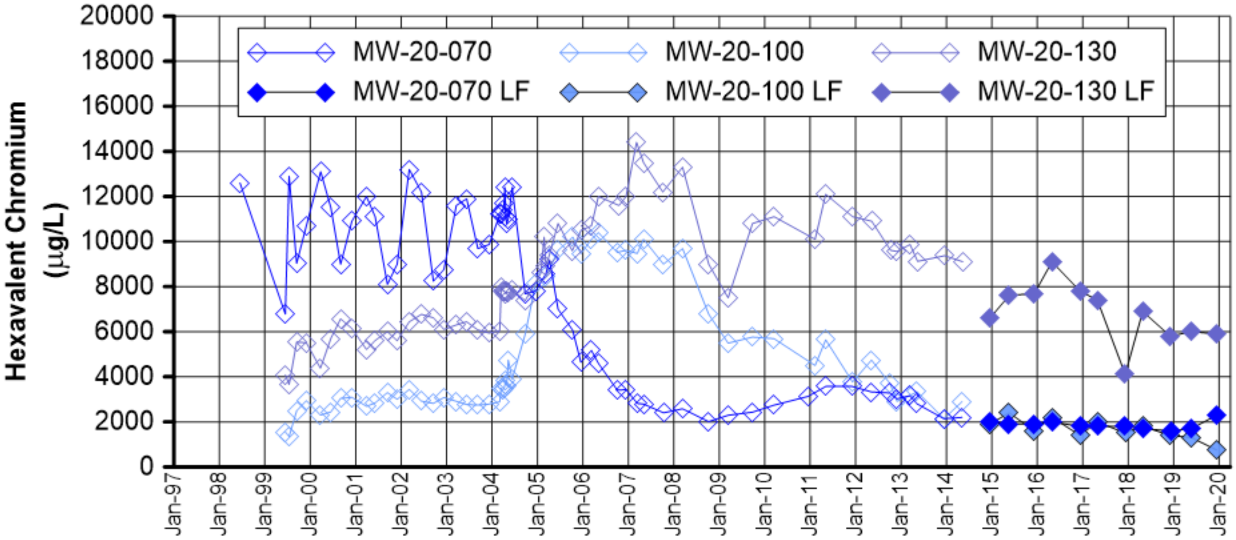
Notes:

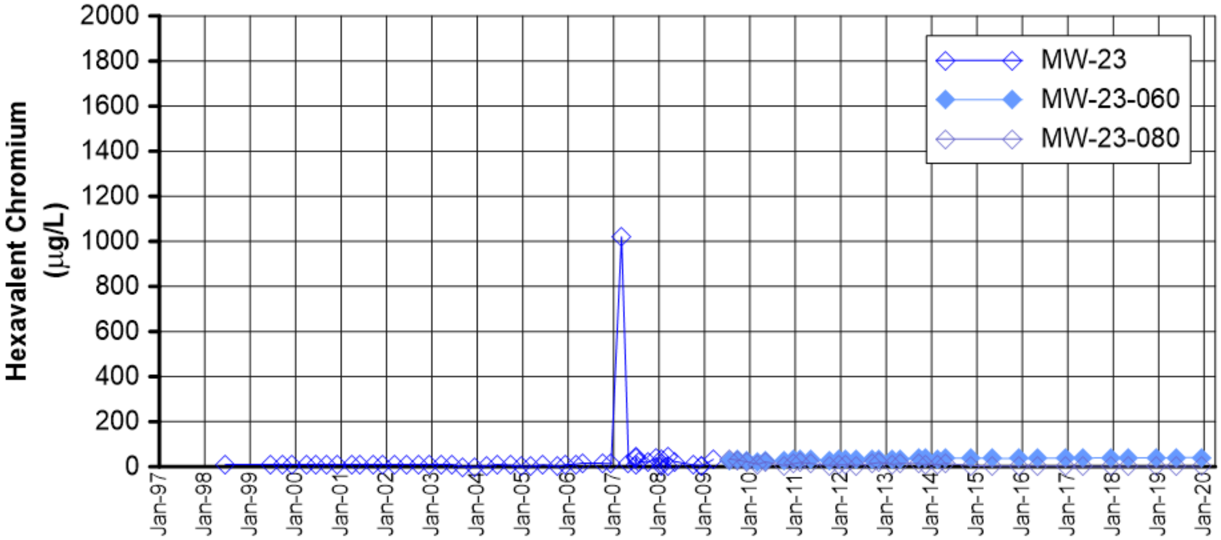
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

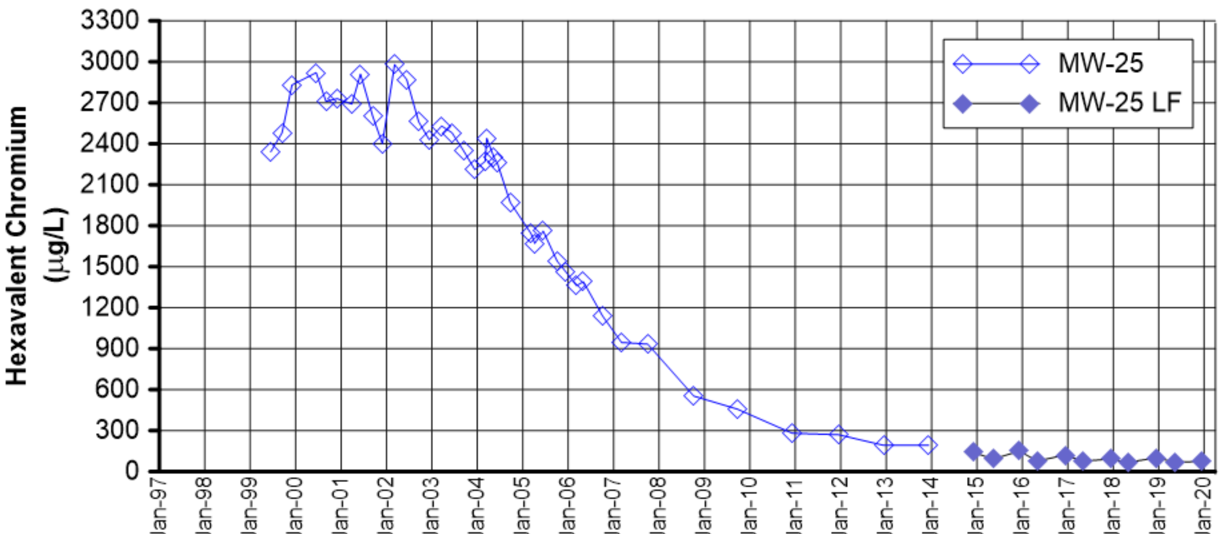
FIGURE D-2
HEXAVALENT CHROMIUM IN MW-14, MW-16, MW-17, MW-18, AND MW-19

ARCADIS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA







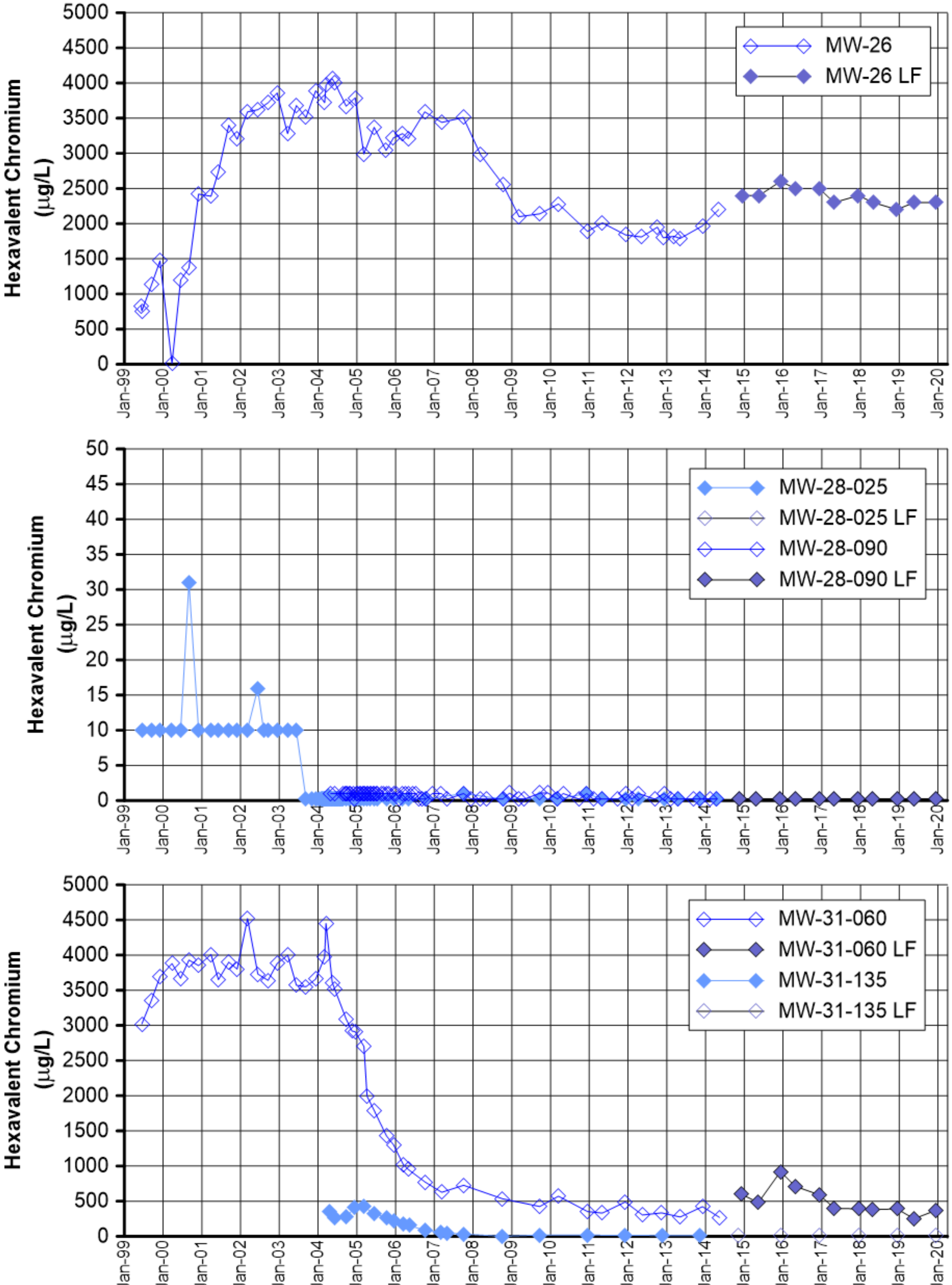
Notes:

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-3
HEXAVALENT CHROMIUM IN MW-20 AND MW-23 CLUSTERS AND MW-25

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:

1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).

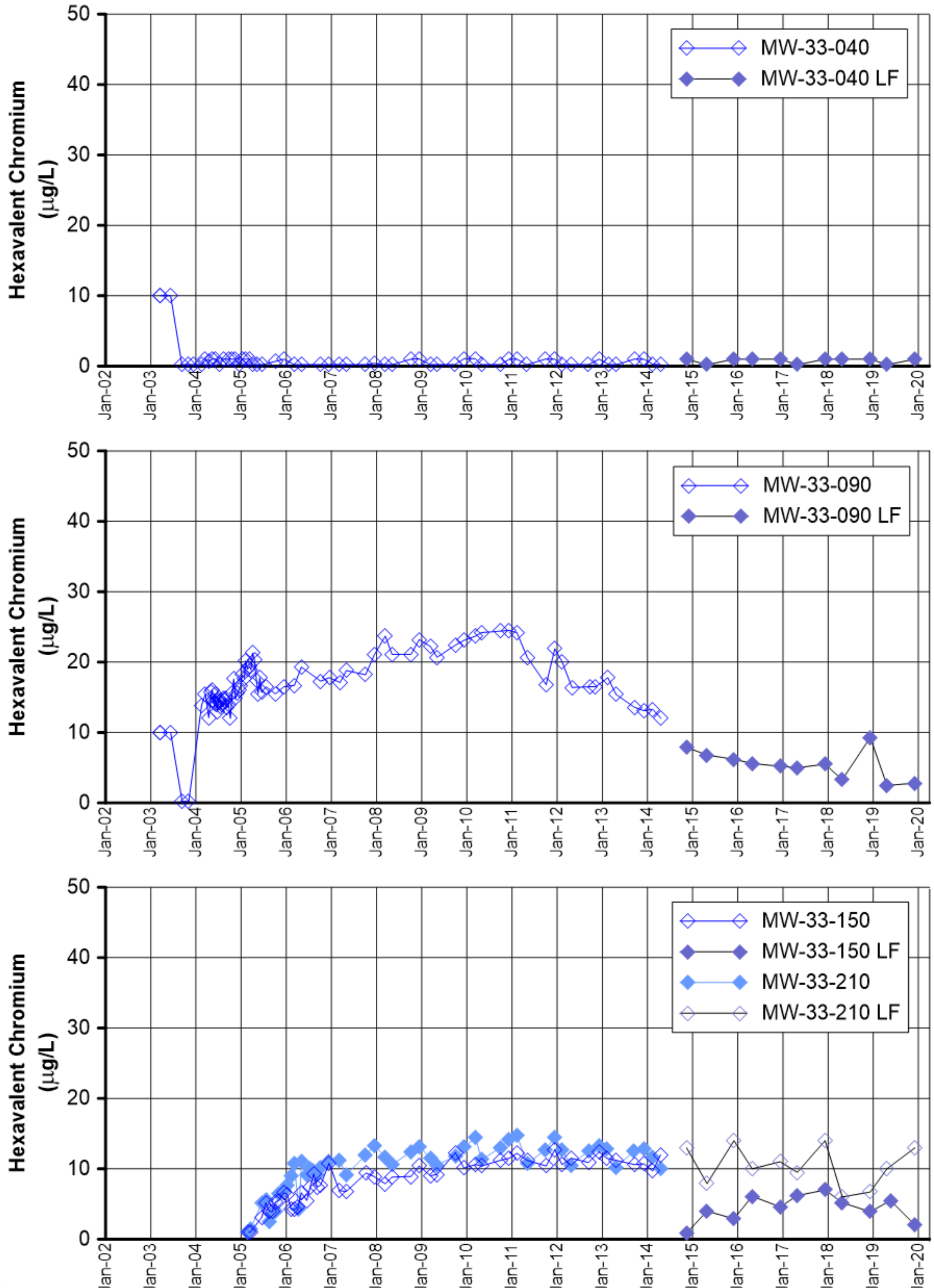
2) The trigger level for MW-28-090 is 20 µg/L.

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-4
HEXAVALENT CHROMIUM IN MW-26, MW-28, AND MW-31 CLUSTERS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

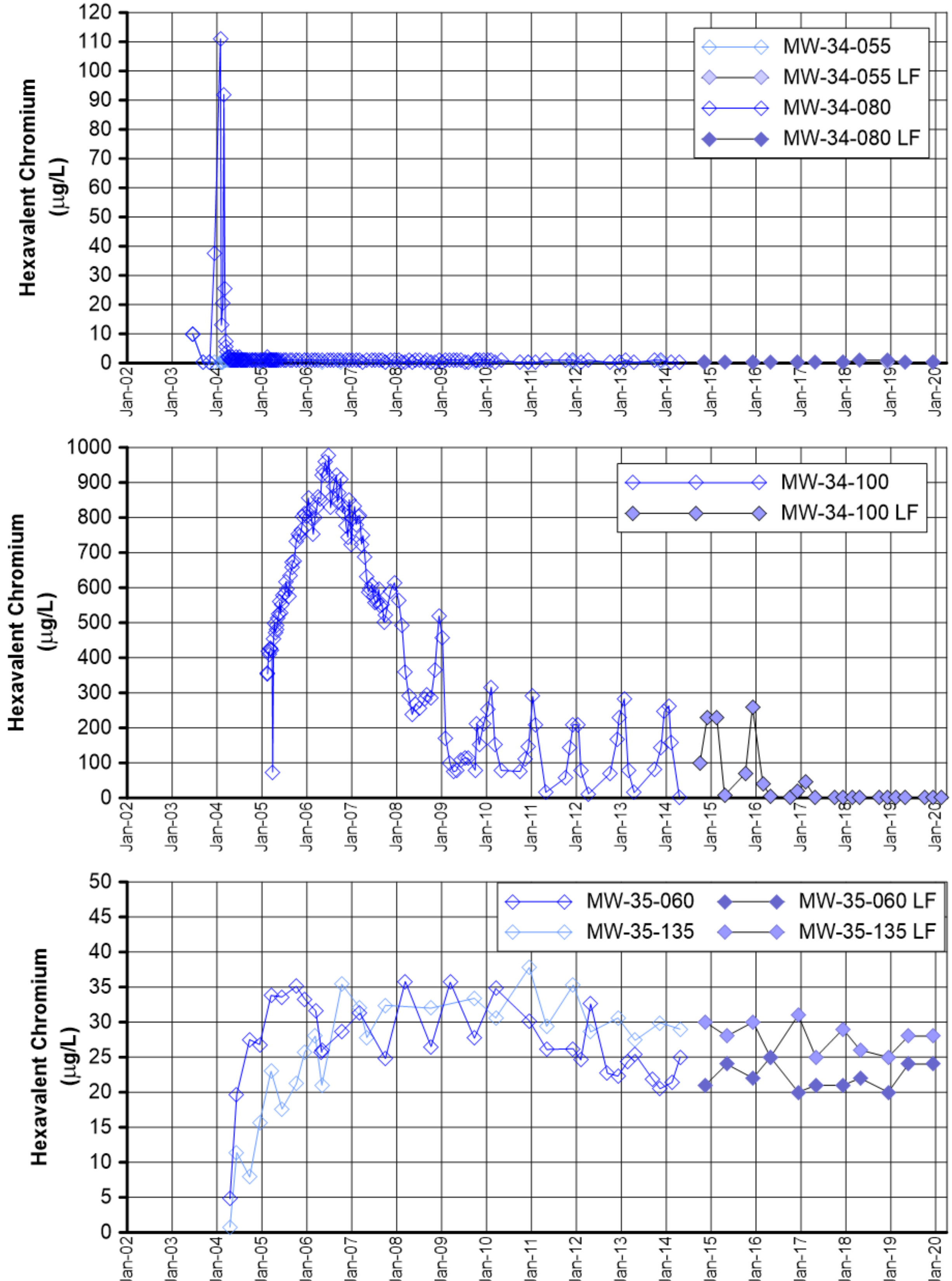


Notes:
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-33-040 is 20 µg/L.
3) The trigger level for MW-33-090 is 25 µg/L.
4) The trigger level for MW-33-150 is 20 µg/L.
5) The trigger level for MW-33-210 is 20 µg/L.
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-5
HEXAVALENT CHROMIUM IN MW-33 CLUSTER

ARCADIS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



Notes:

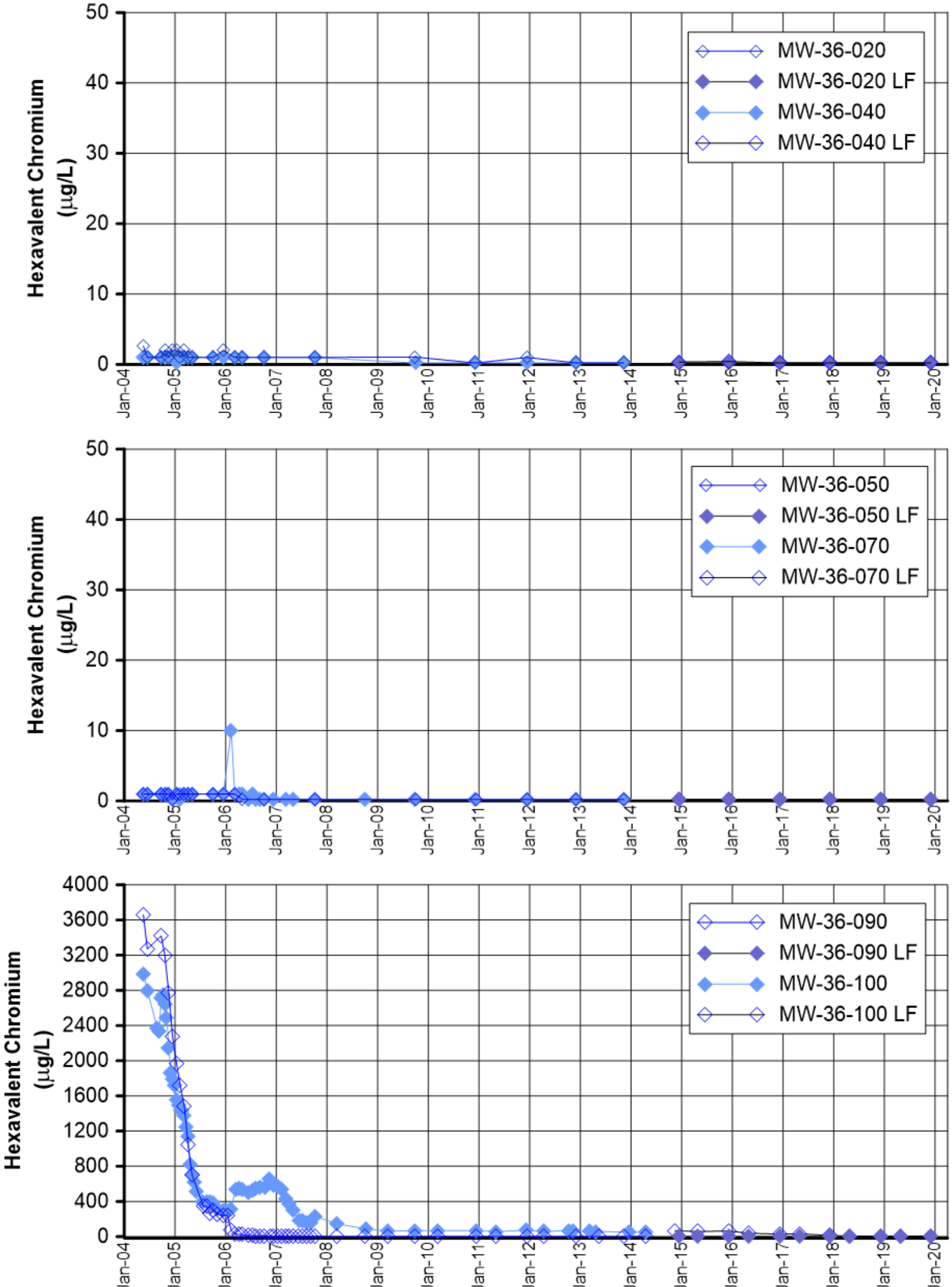
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-34-080 is 20 µg/L.
3) The trigger level for MW-34-100 is 750 µg/L.

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-6
HEXAVALENT CHROMIUM IN MW-34 AND MW-35 CLUSTERS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

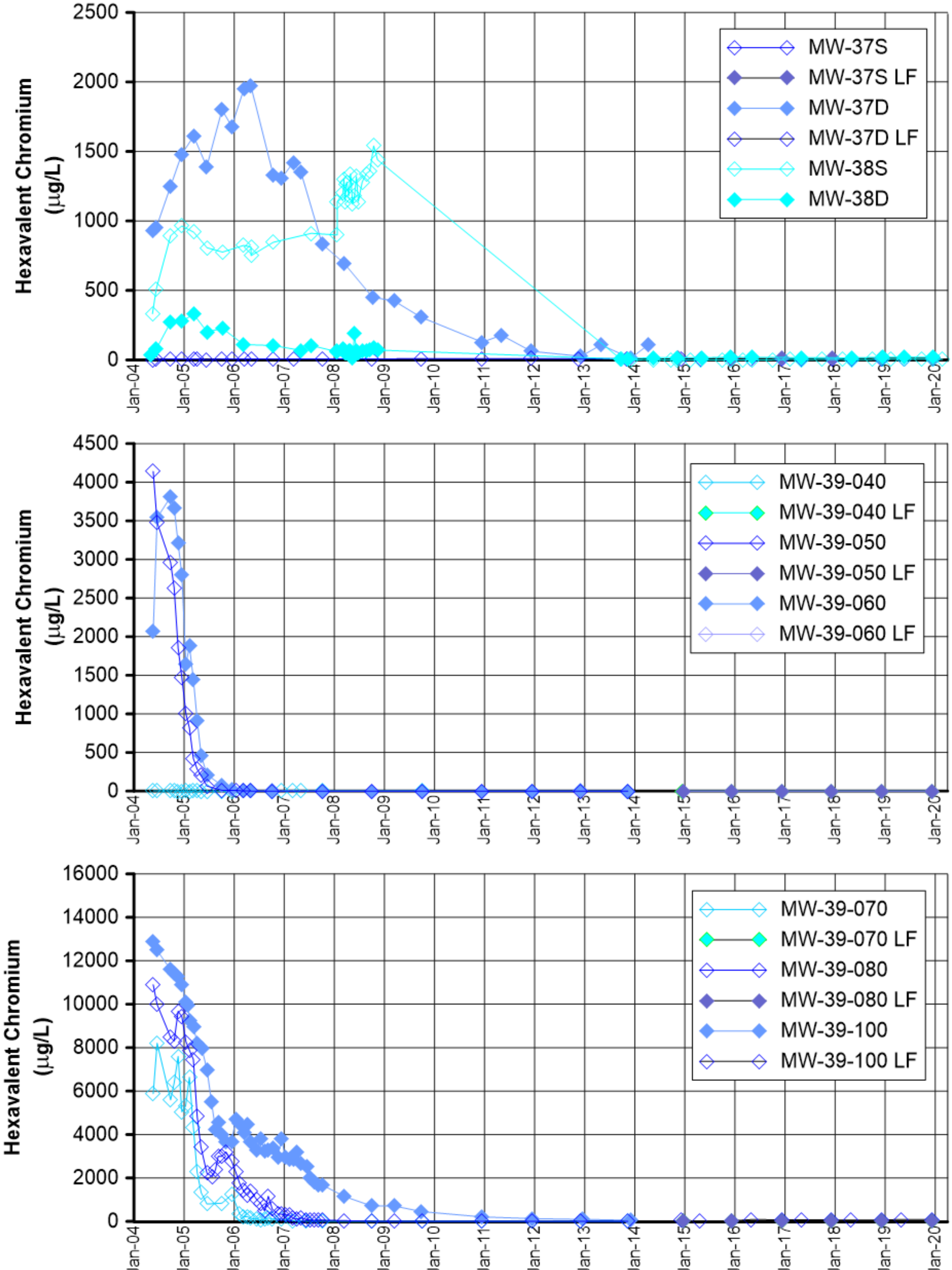


Notes:
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-36-070 is 20 µg/L.

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-7
HEXAVALENT CHROMIUM IN MW-36 CLUSTER

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



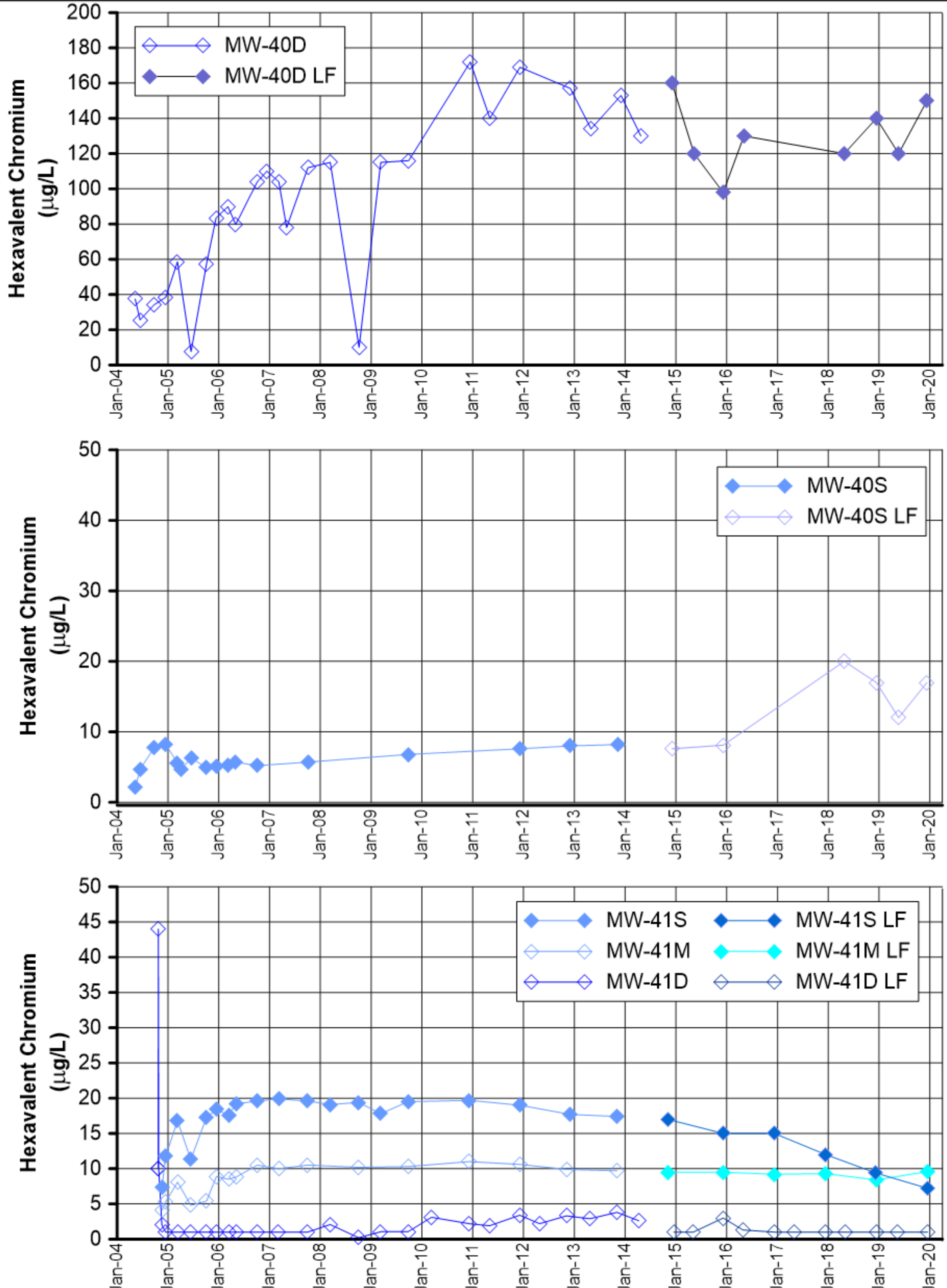
Notes:
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-39-040 is 20 μg/L.

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-8
HEXAVALENT CHROMIUM IN MW-37, MW-38 AND MW-39 CLUSTERS

ARCADIS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

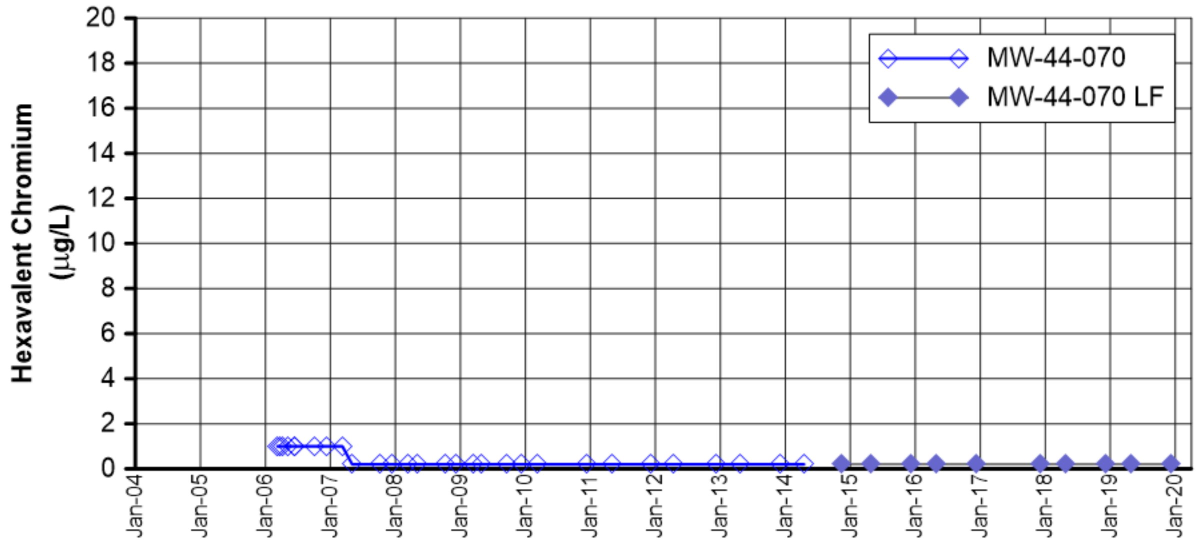


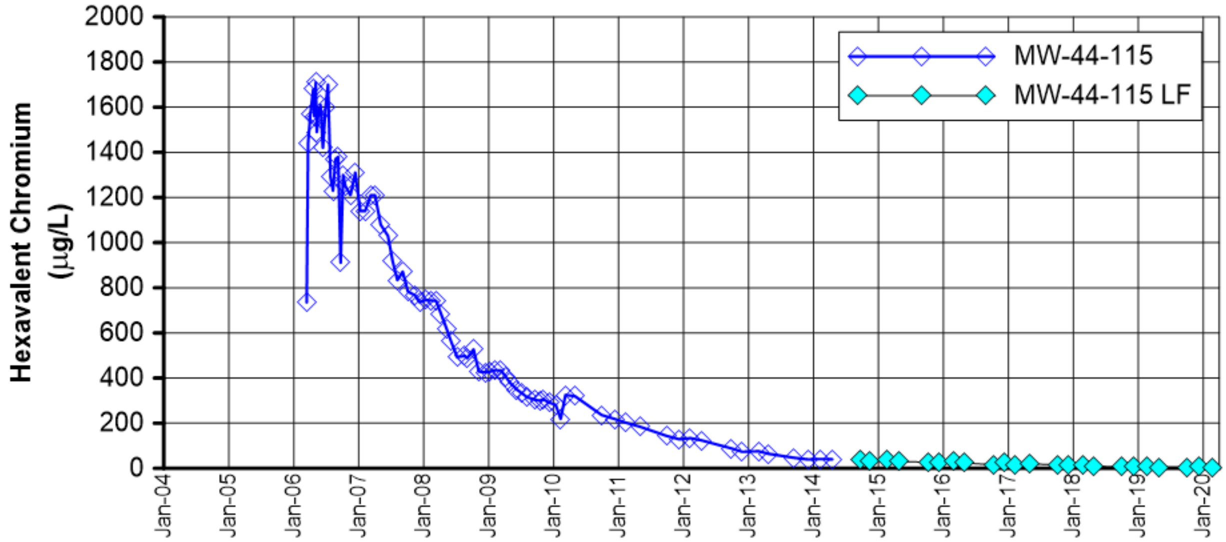
Notes:

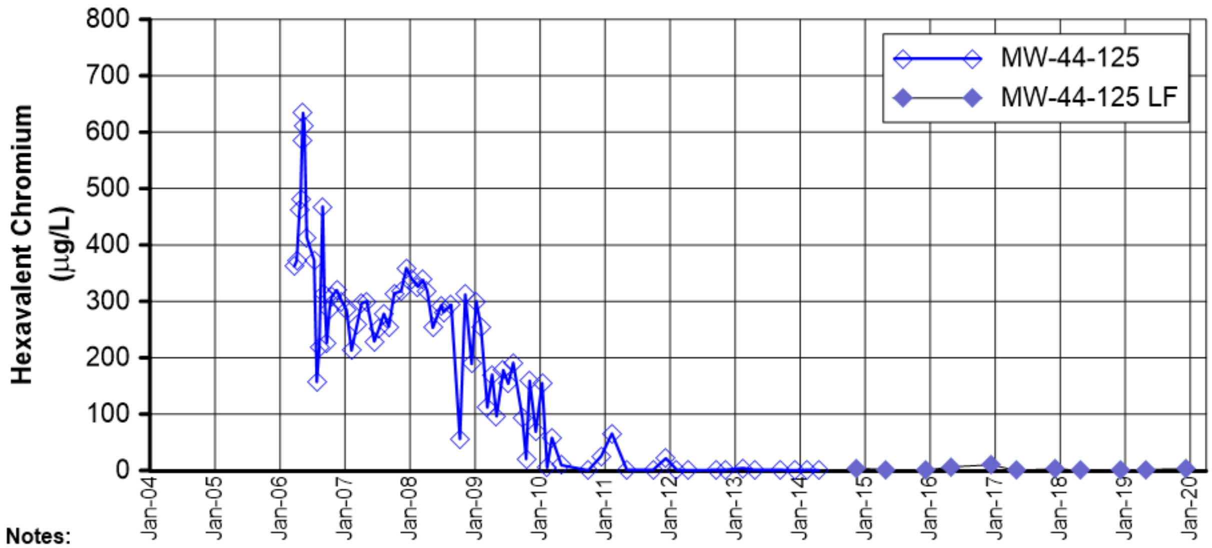
LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-9
HEXAVALENT CHROMIUM IN MW-40 AND MW-41 CLUSTERS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA







Notes:

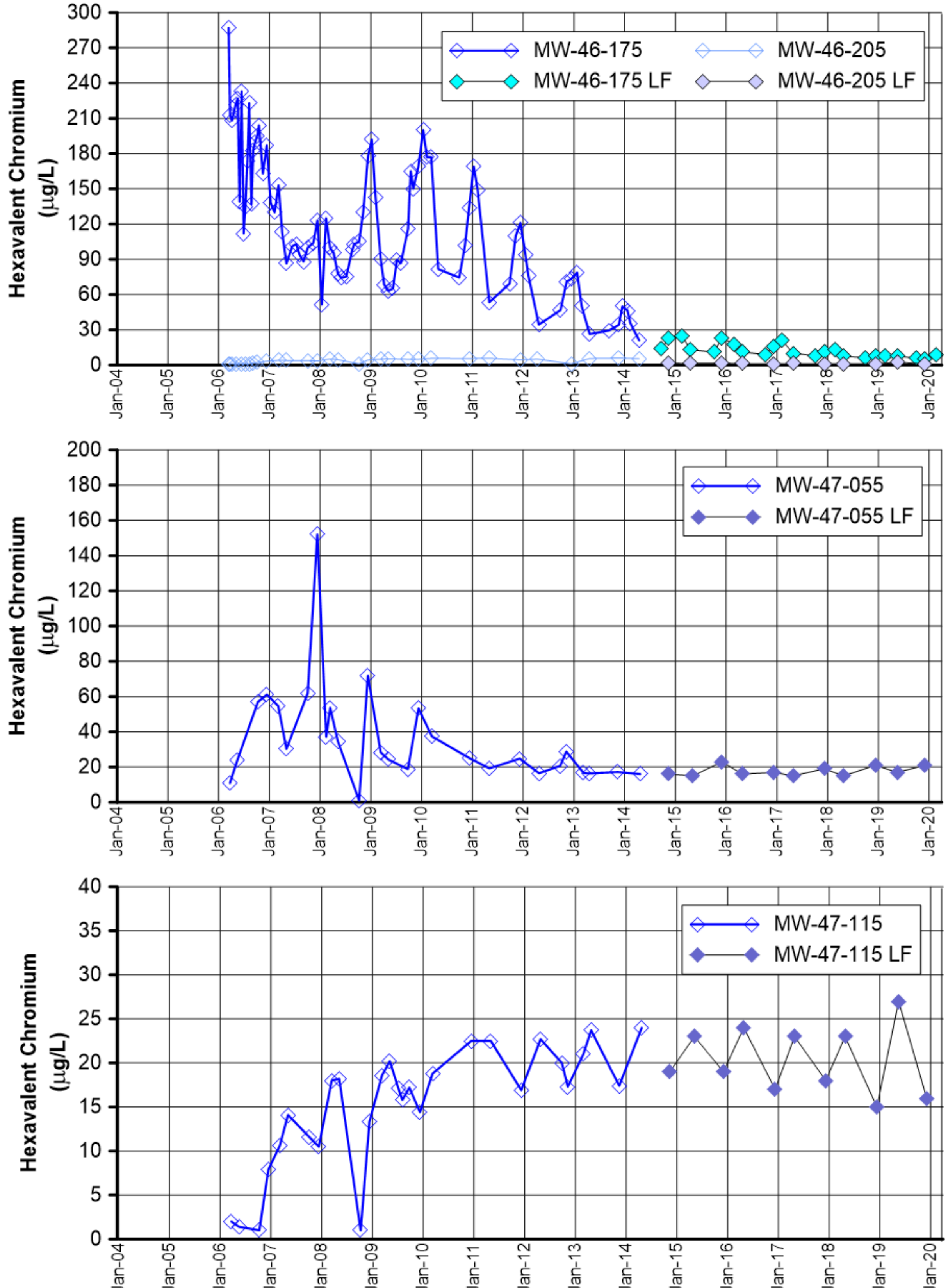
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-44-070 is 20 µg/L.
3) The trigger level for MW-44-115 is 1,200 µg/L.
4) The trigger level for MW-44-125 is 475 µg/L.

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-10
HEXAVALENT CHROMIUM IN MW-44 CLUSTER

ARCADIS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA



Notes:

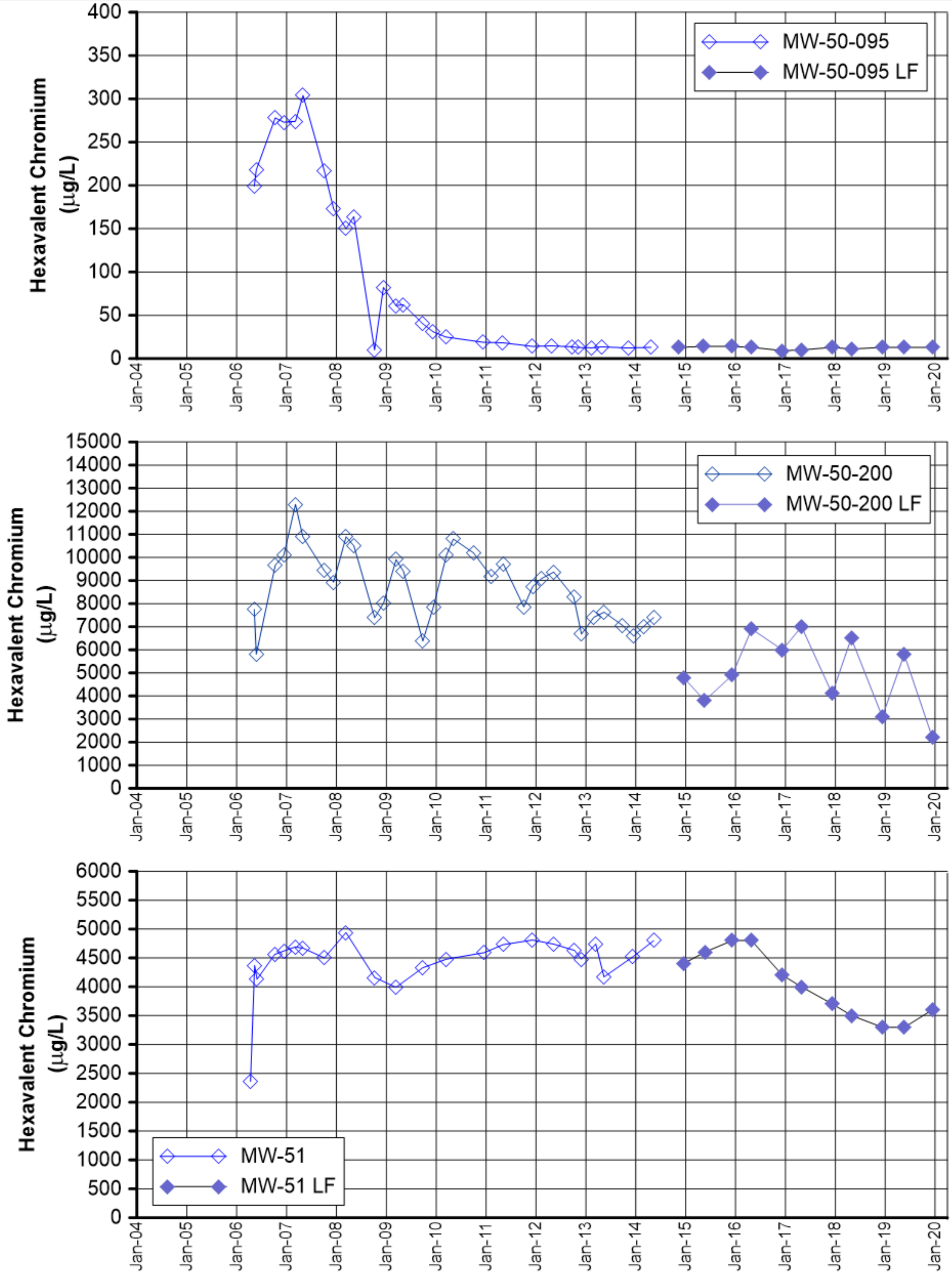
1) The IM Contingency Plan and hexavalent chromium [Cr(VI)] trigger levels were updated July 17, 2008 (DTSC, 2008b).
2) The trigger level for MW-46-175 is 225 µg/L.
3) The trigger level for MW-46-205 is 20 µg/L.
4) The trigger level for MW-47-055 is 475 µg/L.
5) The trigger level for MW-47-115 is 31 µg/L.

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-11
HEXAVALENT CHROMIUM IN MW-46 AND MW-47 CLUSTERS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



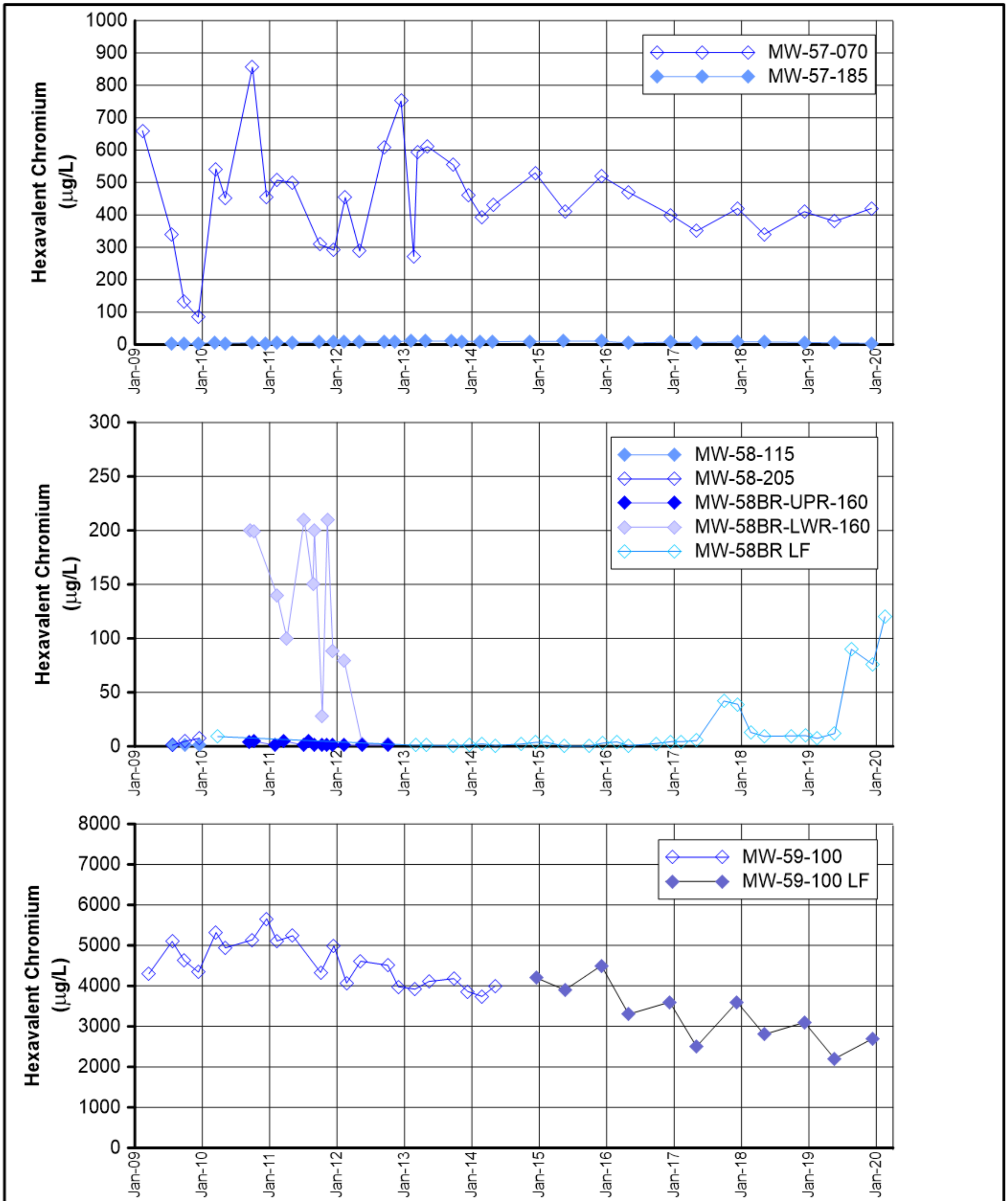
Notes:

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-12
HEXAVALENT CHROMIUM IN MW-50 AND MW-51 CLUSTERS

ARCADIS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



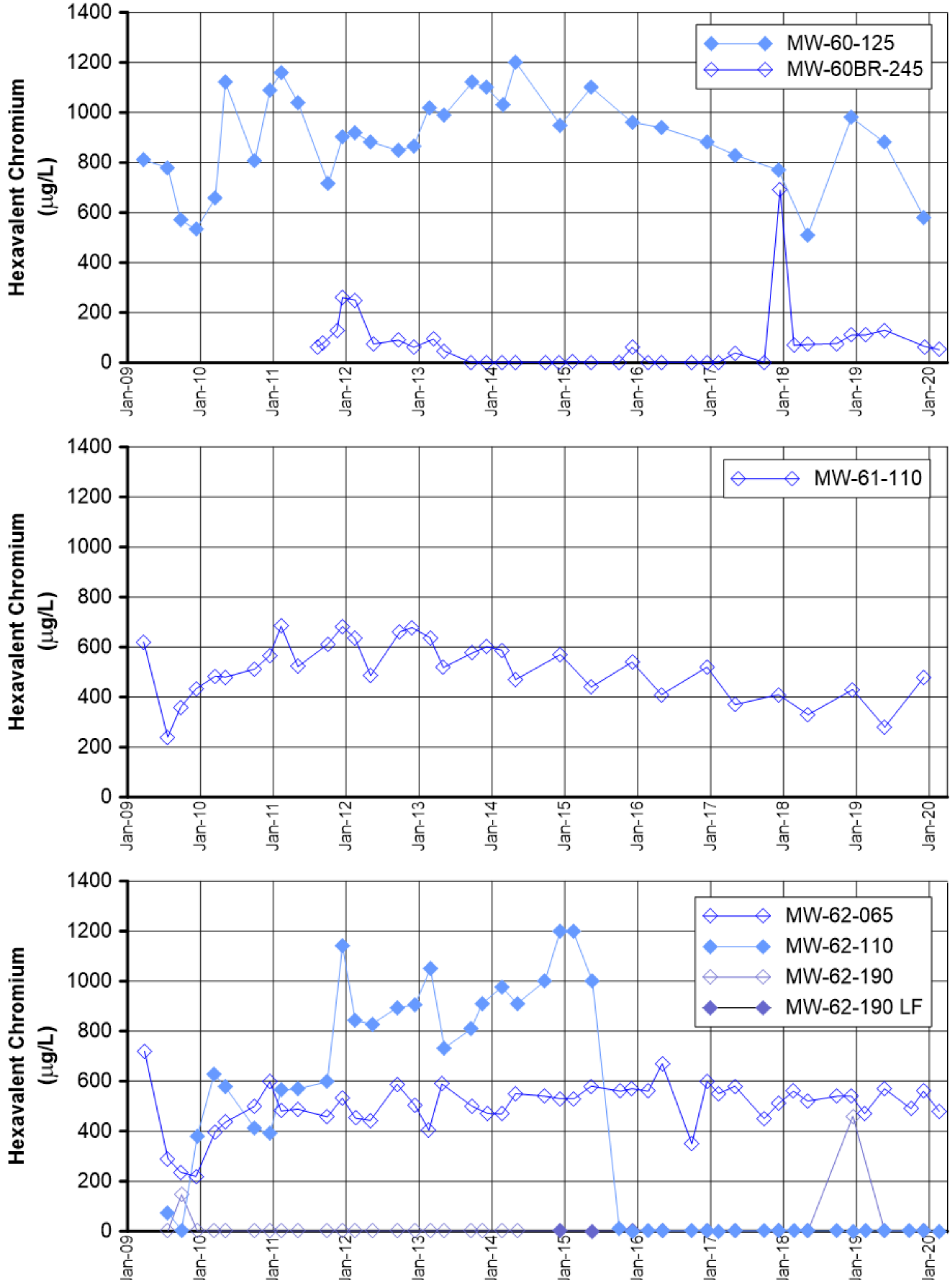
Note:

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-13
HEXAVALENT CHROMIUM IN MW-57 CLUSTER, MW-58 CLUSTER AND MW-59-100

ARCADIS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



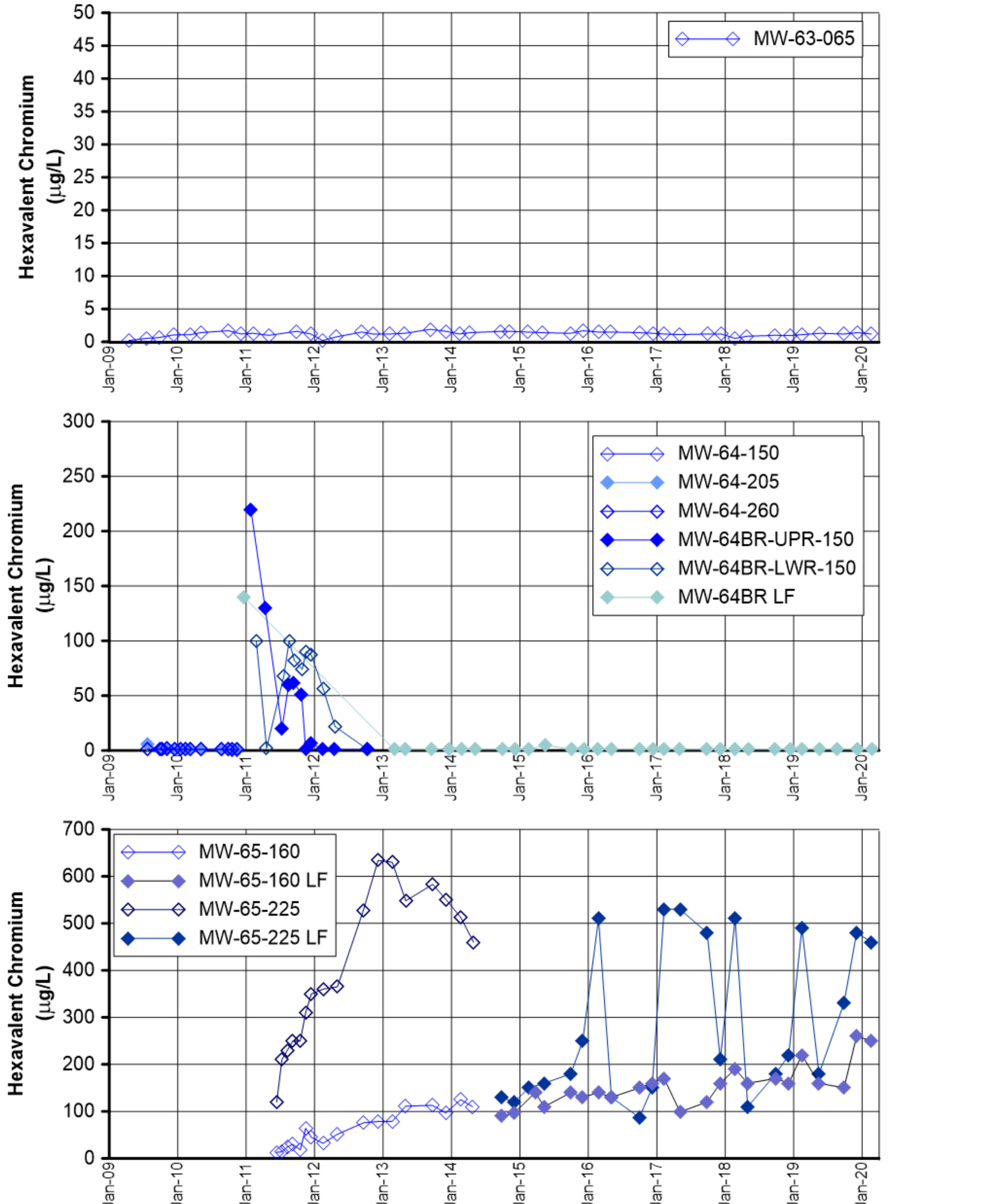
Notes:

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-14
HEXAVALENT CHROMIUM IN MW-60 CLUSTER, MW-61-110 AND MW-62 CLUSTER

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



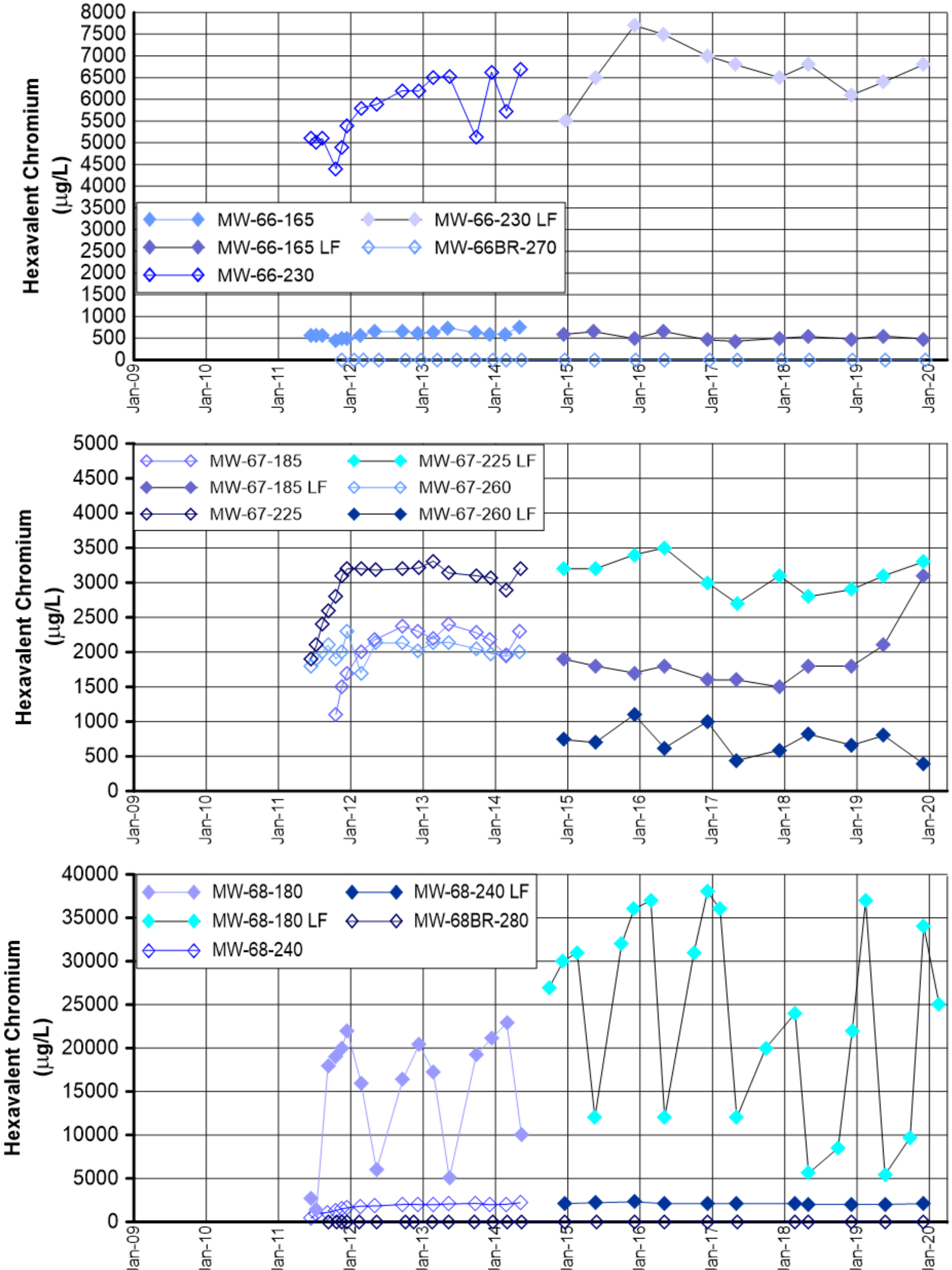
Notes:

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-15
HEXAVALENT CHROMIUM IN MW-63-065, MW-64 CLUSTER AND MW-65 CLUSTER

ARCADIS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



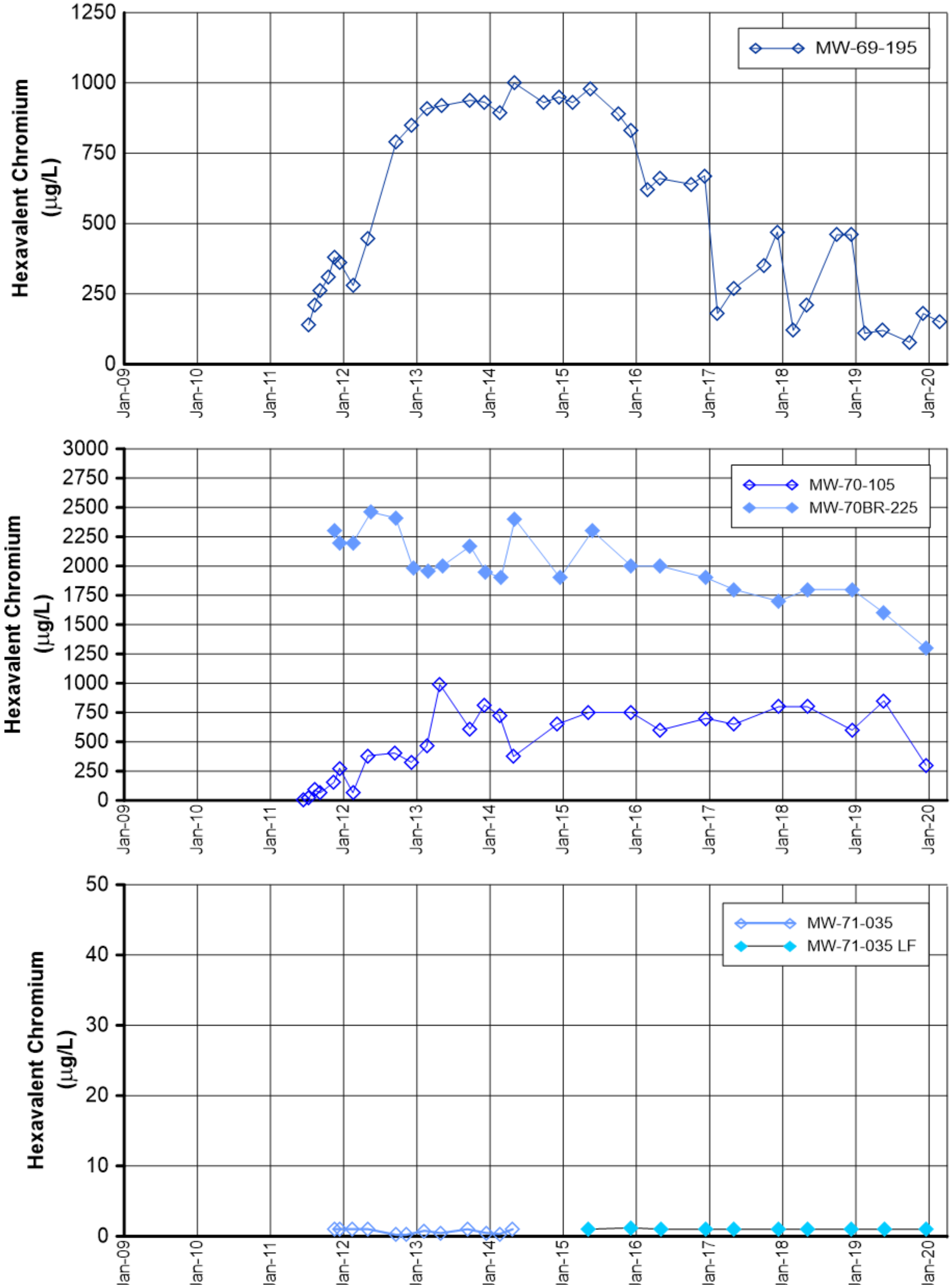
Notes:

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-16
HEXAVALENT CHROMIUM IN MW-66, MW-67, AND MW-68 CLUSTERS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION,
NEEDLES, CALIFORNIA

ARCADIS



Notes:

LF = low flow, hexavalent chromium sample collected using low flow sampling method. Data not indicated with (LF) was collected using the three-volume purge sampling method.

FIGURE D-17
HEXAVALENT CHROMIUM IN MW-69-195, MW-70 CLUSTER, AND MW-71-035

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

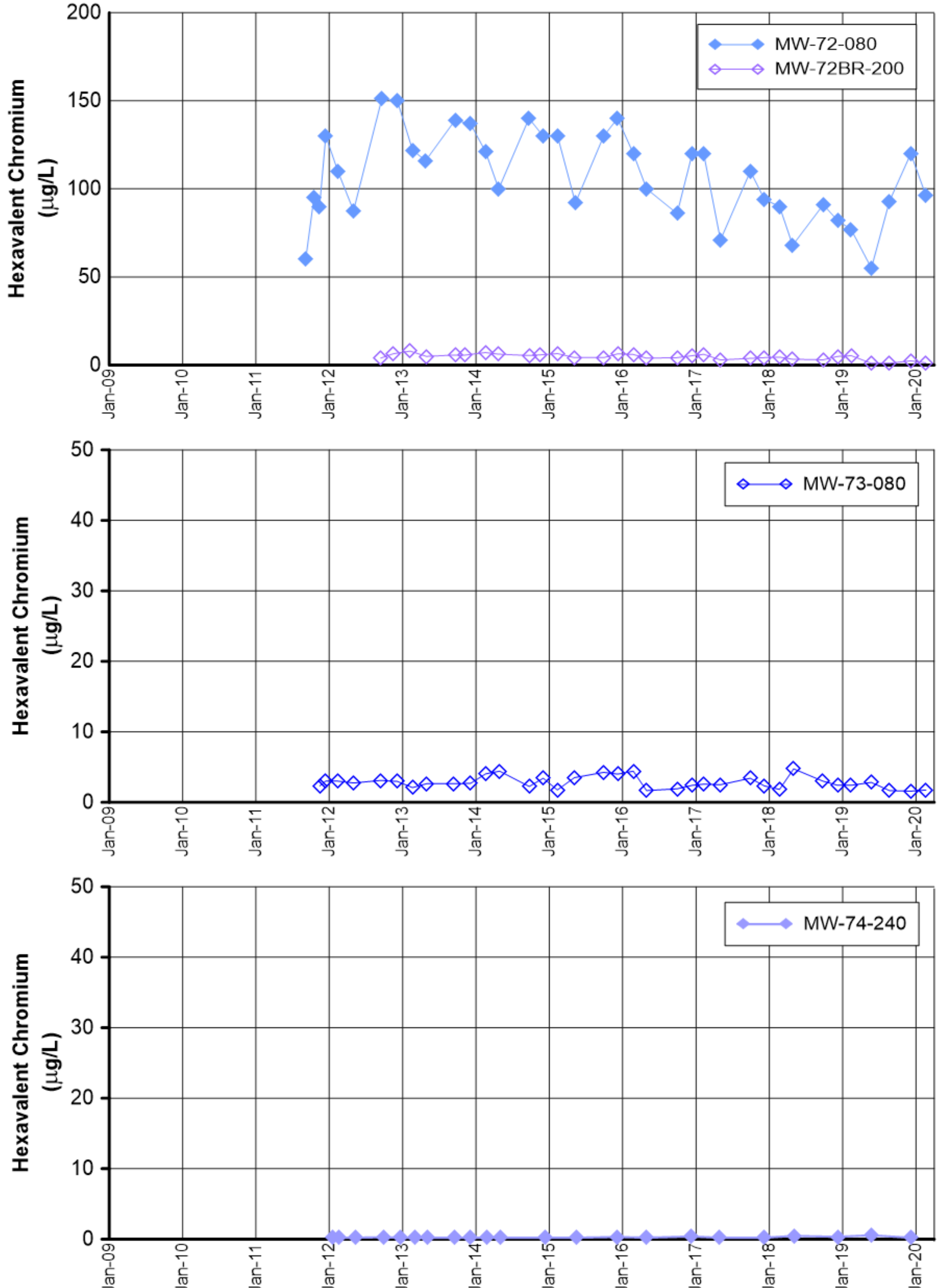


FIGURE D-18
HEXAVALENT CHROMIUM
IN MW-72 CLUSTER, MW-73-080, AND MW-74-240
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

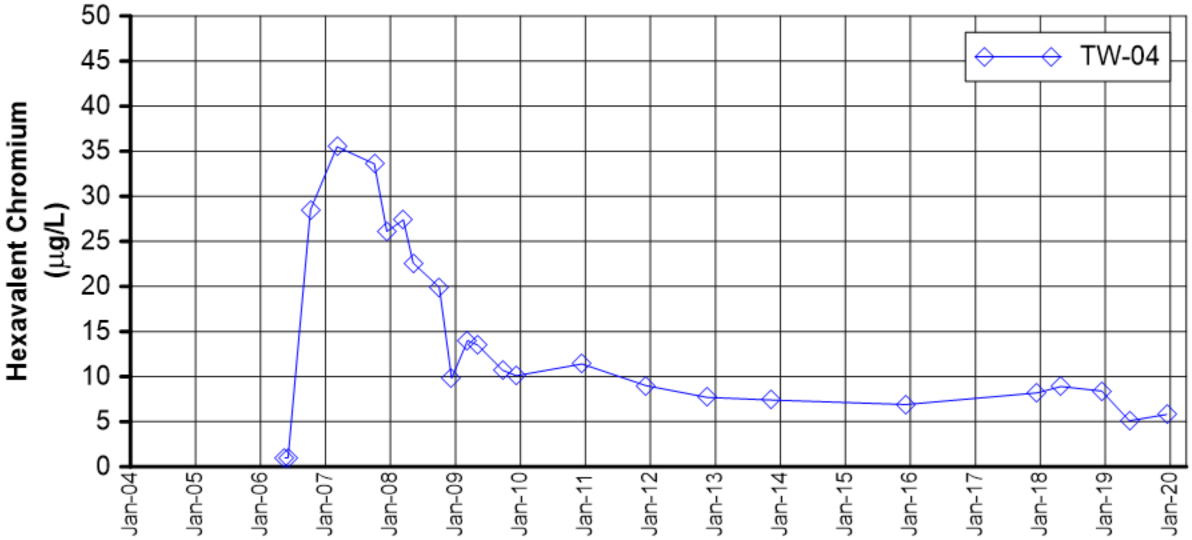


FIGURE D-19
HEXAVALENT CHROMIUM IN TW-04

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

APPENDIX E

Interim Measures Extraction System Operations Log, First Quarter 2020

APPENDIX E

Interim Measures Extraction System Operations Log, First Quarter 2020, PG&E Topock Performance Monitoring Program

During First Quarter 2020 (January through March), extraction wells TW-03D, TW-02D, and TW-02S operated at a target pump rate of at 135 gallons per minute, excluding periods of planned and unplanned downtime. Extraction well PE-01 was not operated during First Quarter 2020. A portion of the piping/conduit for PE-01 at the MW-20 Bench was disconnected from the IM-3 system on December 18, 2019 to allow for remedy construction activities without crossing under the PE-01 piping/conduit. The operational run time for the Interim Measure groundwater extraction system (combined or individual pumping) was approximately 93.7 percent during First Quarter 2020.

The Interim Measure Number 3 (IM-3) facility treated approximately 16,548,580 gallons of extracted groundwater during First Quarter 2020. The IM-3 facility also treated approximately 40,000 gallons of injection well backwashing/re-development water, approximately 370 gallons of purge water from site sampling activities, and approximately 42,000 gallons of Final Groundwater Remedy waste water. Seven containers of solids (sludge) were transported offsite from the IM-3 facility during the reporting period.

Periods of planned and unplanned extraction system downtime (that together resulted in approximately 6.3 percent of downtime during First Quarter 2020) are summarized below. The times shown are in Pacific Standard Time to be consistent with other data collected (for example, water level data) at the site.

E.1 January 2020

- **January 6, 2020 (unplanned):** The extraction well system was offline from 6:52 p.m. to 8:14 p.m. due microfilter problems. The basket strainer in the microfilter unit was plugged. The operator shut down extraction to put in a clean strainer and reassemble the basket. Extraction system downtime was 1 hour 22 minutes.

- **January 6, 2020 (unplanned):** The extraction well system was offline from 10:04 p.m. to 10:48 p.m. due to a high-water level in Raw Water Storage Tank (T-100). The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 44 minutes.

- **January 7, 2020 (unplanned):** The extraction well system was offline from 10:34 a.m. to 12:14 p.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 40 minutes.

- **January 8, 2020 (unplanned):** The extraction well system was offline from 4:16 a.m. to 4:32 a.m. due to a City of Needles Power outage. The treatment plant was switched to generator power. Extraction system downtime was 16 minutes.

- **January 9, 2020 (planned):** The extraction well system was offline from 8:12 a.m. to 9:14 a.m. to process remedy wastewater generated from remedy well construction activities. Extraction system downtime was 1 hour 2 minutes.

- **January 10, 2020 (unplanned):** The extraction well system was offline from 9:06 a.m. to 10:42 a.m. to perform maintenance on the microfilter strainer system. Operators cleaned the inside of the Feed Tank (T-501), cleaned the discharge strainer, and cleaned a hand operated valve. Extraction system downtime was 1 hour 36 minutes.

- **January 12, 2020 (unplanned):** The extraction well system was offline from 9:44 a.m. to 10:50 a.m. due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 6 minutes.

- **January 13, 2020 (unplanned):** The extraction well system was offline from 10:02 a.m. to 11:10 a.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 8 minutes.
- **January 13-14, 2020 (unplanned):** The extraction well system was offline from 4:34 p.m. to 5:44 p.m. on January 13, 2020; and from 8:32 p.m. to 9:28 p.m. January 14, 2020 due to a high water-level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 6 minutes.
- **January 15, 2020 (unplanned):** The extraction well system was offline from 10:22 a.m. to 11:50 a.m. to replace a failed water-level sensor in the Treated Water Tank (T-700). Extraction system downtime was 1 hour 28 minutes.
- **January 16-21, 2020 (unplanned):** The extraction well system was offline from 2:20 a.m. to 3:36 a.m. on January 16, 2020; from 3:40 a.m. to 4:40 a.m. January 18, 2020; from 11:48 a.m. to 1:14 p.m. January 19, 2020; from 2:12 p.m. to 3:16 p.m. January 20, 2020; and from 12:00 p.m. to 5:00 p.m. January 21, 2020 due to a high-water level in Raw Water Storage Tank (T-100). The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 9 hours 46 minutes.
- **January 23-24, 2020 (unplanned):** The extraction well system was offline from 4:36 a.m. to 5:22 a.m. on January 23, 2020; from 2:56 p.m. to 4:04 p.m. on January 23, 2020; and from 1:04 p.m. to 1:52 p.m. on January 24, 2020 due to Groundwater Partners offloading backwash water from the injection wells. Extraction was shut down due to large backwash water volumes and to control tank levels. Extraction system downtime was 2 hours 42 minutes.
- **January 29, 2020 (unplanned):** The extraction well system was offline from 5:32 p.m. to 6:24 p.m. due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 52 minutes.

E.2 February 2020

- **February 5, 2020 (unplanned):** The extraction well system was offline from 12:50 p.m. to 1:26 p.m. due to replacing microfilter modules. Extraction system downtime was 36 minutes.
- **February 7, 2020 (unplanned):** The extraction well system was offline from 5:40 a.m. to 6:24 a.m. due to high-water levels in Iron Oxidation Reactor No. 3 (T-301C) and Raw Water Storage Tank (T-100). The high-water levels were caused by blockages in the piping between the oxidation tanks. Extraction system downtime was 44 minutes.
- **February 7, 2020 (unplanned):** The extraction well system was offline from 5:30 p.m. to 6:12 p.m. due to high-water levels in the Chromium Reduction Reactor (T-300A), Iron Oxidation Reactor #2 (T-301B), T-301C, and T-100. There were blockages in the piping between the oxidation tanks causing the high water levels. Extraction system downtime was 42 minutes.
- **February 8-10, 2020 (unplanned):** The extraction well system was offline from 9:44 p.m. to 10:54 p.m. on February 8, 2020; and from 3:38 a.m. to 4:34 a.m. February 10, 2020 due to a high-water level in Raw Water Storage Tank (T-100). The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 6 minutes.
- **February 10, 2020 (unplanned):** The extraction well system was offline from 4:48 p.m. to 9:46 p.m. due to the compressor had a high temperature alarm that caused the extraction system to shutdown. Maintenance was performed on the unit and the plant was returned to service. Extraction system downtime was 4 hours 58 minutes.

- **February 11, 2020 (unplanned):** The extraction well system was offline from 2:58 p.m. to 4:32 p.m. due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 34 minutes.
- **February 12, 2020 (unplanned):** The extraction well system was offline from 8:18 a.m. to 1:38 p.m. to find and remove blockages from piping connecting the oxidation tanks. Two valves were scaled sufficiently to cause the previous flow restrictions. The valves were cleaned and replaced, and the plant returned to service. Extraction system downtime was 5 hour 20 minutes.
- **February 13, 2020 (planned):** The extraction well system was offline from 10:00 a.m. to 11:08 a.m. due to testing of the pipeline critical alarms and leak detection system. Extraction system downtime was 1 hour 8 minutes.
- **February 14, 2020 (unplanned):** The extraction well system was offline from 7:12 a.m. to 8:52 a.m. due to replacing microfilter modules and so T-100 could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 40 minutes.
- **February 15-23, 2020 (unplanned):** The extraction well system was offline from 2:34 p.m. to 3:56 p.m. on February 15, 2020; 6:04 p.m. to 7:10 p.m. on February 17, 2020; 4:44 p.m. to 5:48 p.m. on February 19, 2020; and from 2:34 a.m. to 3:20 a.m. February 23, 2020 due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 4 hour 18 minutes.
- **February 23, 2020 (unplanned):** The extraction well system was offline from 9:22 a.m. to 10:12 a.m. due to replacing microfilter modules. Extraction system downtime was 50 minutes.
- **February 24, 2020 (unplanned):** The extraction well system was offline from 11:58 a.m. to 12:06 p.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 8 minutes.
- **February 25, 2020 (unplanned):** The extraction well system was offline from 3:06 p.m. to 4:24 p.m. due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 18 minutes.
- **February 27, 2020 (unplanned):** The extraction well system was offline from 7:16 a.m. to 12:04 p.m. due to maintenance at the Clarifier Feed Pump (P-400). During maintenance on a pressure gauge, a valve broke. The valve and gauge were replaced, and the plant was returned to service. Extraction system downtime was 4 hours 48 minutes.
- **February 29, 2020 (unplanned):** The extraction well system was offline from 4:52 p.m. to 11:58 p.m. due to plant laboratory testing results not detecting ferrous iron and having a slightly elevated hexavalent chromium concentration (0.009 mg/L). The extraction system was shutdown and the plant placed into recirculation mode until the ferrous iron was detected and the hexavalent chromium went back down to normal (maximum of 0.008 mg/L with a typical range being between 0.002 mg/L and 0.005 mg/L). Extraction system downtime was 7 hours 6 minutes.

E.3 March 2020

- **March 3, 2020 (unplanned):** The extraction well system was offline from 8:58 a.m. to 10:08 a.m. to treat remedy wastewater generated from remedy well construction activities. Extraction system downtime was 1 hour 10 minutes.
- **March 3, 2020 (unplanned):** The extraction well system was offline from 7:58 p.m. to 9:12 p.m. due to clogged pre-filters in the Primary Reverse Osmosis system. Plugged filters caused the secondary RO to shut

down due to safety interlocks. The operator changed the pre-filter cartridges and the plant was returned to service. Extraction system downtime was 1 hour 14 minutes.

- **March 4, 2020 (planned):** The extraction well system was offline from 10:20 a.m. to 10:44 a.m. due to a high-water level in Raw Water Storage Tank (T-100) and due to testing of the pipeline critical alarms and leak detection system. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 24 minutes.
- **March 4, 2020 (unplanned):** The extraction well system was offline from 10:50 a.m. to 10:52 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 2 minutes.
- **March 4, 2020 (unplanned):** The extraction well system was offline from 2:04 p.m. to 3:52 p.m. due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 1 hour 48 minutes.
- **March 5, 2020 (unplanned):** The extraction well system was offline from 6:06 p.m. to 11:24 p.m. due to the extraction pump failing at TW-3D. Extraction system downtime was 5 hours 18 minutes.
- **March 6, 2020 (unplanned):** The extraction well system was offline from 2:08 a.m. to 2:10 a.m.; from 2:14 a.m. to 2:16 a.m.; from 2:38 a.m. to 2:40 a.m.; from 2:52 a.m. to 2:54 a.m.; from 3:10 a.m. to 3:12 a.m.; from 3:24 a.m. to 3:26 a.m.; from 3:28 a.m. to 3:30 a.m.; from 4:06 a.m. to 4:08 a.m.; from 4:16 a.m. to 4:20 a.m.; from 4:30 a.m. to 4:32 a.m.; and from 4:36 a.m. to 4:38 a.m. due to a programmable logic controller (PLC) and human machine interface (HMI) connectivity issue. Extraction system downtime was 24 minutes.
- **March 6-7, 2020 (planned):** The extraction well system was offline from 5:54 p.m. on March 6, 2020 to 12:24 a.m. on March 7, 2020 due to replacing the failed pump at TW-3D. Extraction system downtime was 6 hours 30 minutes.
- **March 7, 2020 (unplanned):** The extraction well system was offline from 12:28 p.m. to 12:30 p.m. due to a PLC and HMI connectivity issue. Extraction system downtime was 2 minutes.
- **March 9-12, 2020 (unplanned):** The extraction well system was offline from 1:36 a.m. to 2:50 a.m. and from 9:44 p.m. to 10:48 p.m. on March 9, 2020; from 10:16 p.m. to 11:18 p.m. on March 10, 2020; from 10:38 p.m. to 11:42 p.m. on March 11, 2020; and from 11:42 a.m. to 12:42 p.m. on March 12, 2020 due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 4 hours 56 minutes.
- **March 13, 2020 (unplanned):** The extraction well system was offline from 3:08 a.m. to 3:48 a.m. due to a high-water level in T-100. A storm event occurred that had a lot of rain. Rain that hits the rooftop of the IM-3 Treatment Plant drains into the gutters in the facility; the gutters drain into Process Drain Tank T-900, which is then transferred to T-100 for processing. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 40 minutes.
- **March 13, 2020 (unplanned):** The extraction well system was offline from 8:10 a.m. to 10:50 a.m. to install a new water level sensor in T-100. Extraction system downtime was 2 hours 40 minutes.
- **March 14-16, 2020 (unplanned):** The extraction well system was offline from 4:06 p.m. to 5:14 p.m. on March 14, 2020; from 9:40 p.m. to 10:40 p.m. on March 15, 2020; from 7:58 p.m. to 8:48 p.m. on March 16, 2020 due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 2 hours 58 minutes.
- **March 17, 2020 (unplanned):** The extraction well system was offline from 9:58 a.m. to 11:16 a.m. due to replacing microfilter modules. Extraction system downtime was 1 hour 18 minutes.

- **March 17-25, 2020 (unplanned):** The extraction well system was offline from 11:04 p.m. on March 17, 2020 to 12:14 a.m. on March 18, 2020; from 4:00 p.m. to 5:06 p.m. on March 18, 2020; from 12:12 p.m. to 1:04 p.m. on March 19, 2020; from 12:06 a.m. to 1:04 a.m. on March 20, 2020; from 6:06 p.m. to 7:12 p.m. on March 20, 2020; from 5:12 p.m. to 6:50 p.m. on March 21, 2020; from 3:32 a.m. to 4:18 a.m. on March 22, 2020; from 7:06 a.m. to 8:22 a.m. on March 24, 2020; from 10:20 p.m. to 11:38 p.m. on March 25, 2020 due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 10 hours 10 minutes.

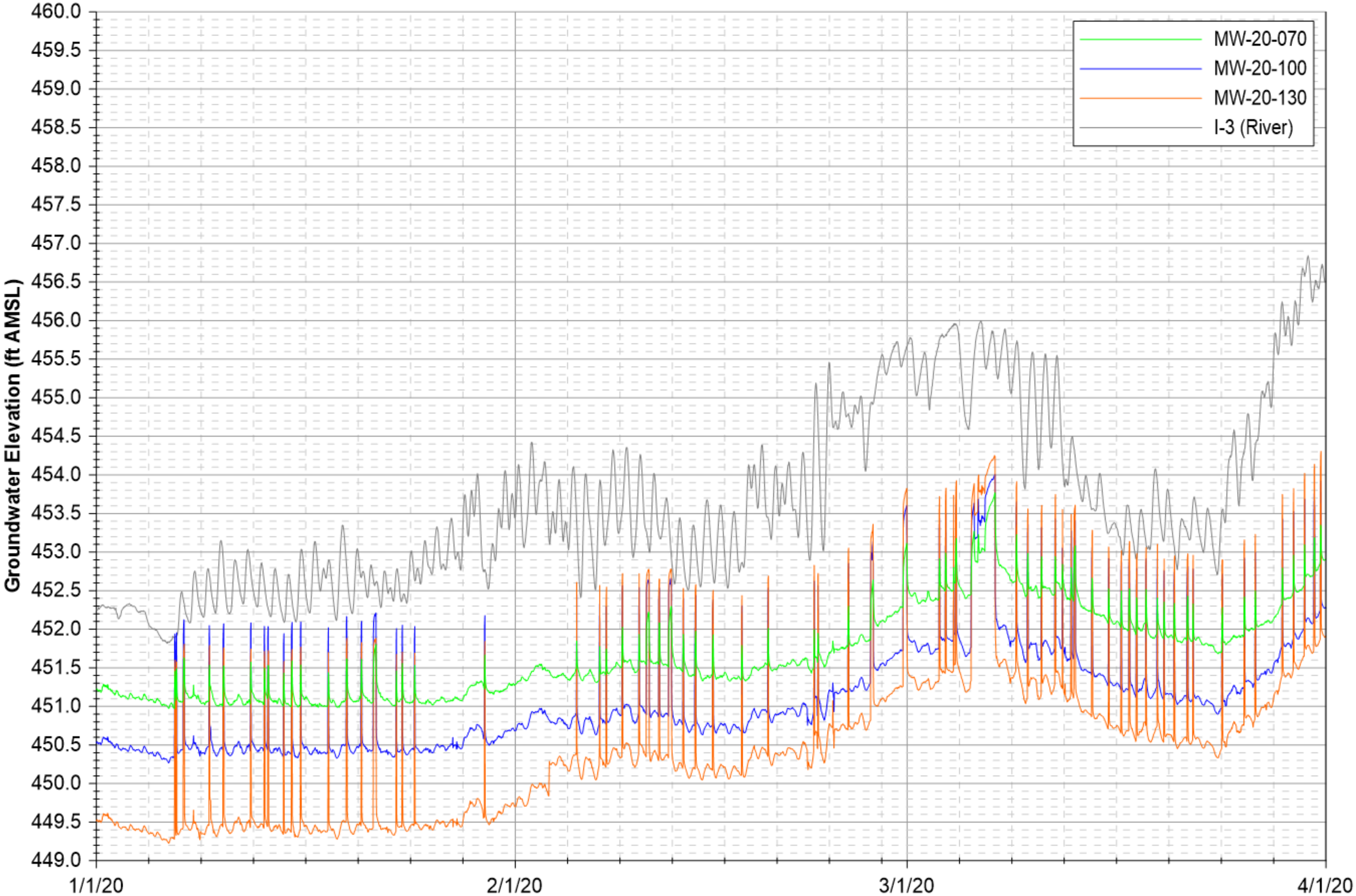
- **March 25, 2020 (unplanned):** The extraction well system was offline from 11:44 p.m. to 11:28 p.m. due to replacing microfilter modules. Extraction system downtime was 14 minutes.

- **March 26-31, 2020 (unplanned):** The extraction well system was offline from 5:54 p.m. to 7:06 p.m. on March 26, 2020; from 6:04 p.m. to 7:06 p.m. on March 28, 2020; from 2:04 p.m. to 3:02 p.m. on March 29, 2020; from 9:18 a.m. to 10:30 a.m. on March 30, 2020; from 2:40 a.m. to 3:46 a.m. on March 31, 2020; from 1:58 p.m. to 3:16 p.m. on March 31, 2020 due to a high-water level in T-100. The plant was shut down so the tank could drain below the high-level alarm setpoint. Extraction system downtime was 6 hours 48 minutes.

APPENDIX F

Hydrographs, First Quarter 2020

For additional help with the information provided in this appendix, please contact Alison Schaffer, Arcadis Report Lead, at 303.471.3575.



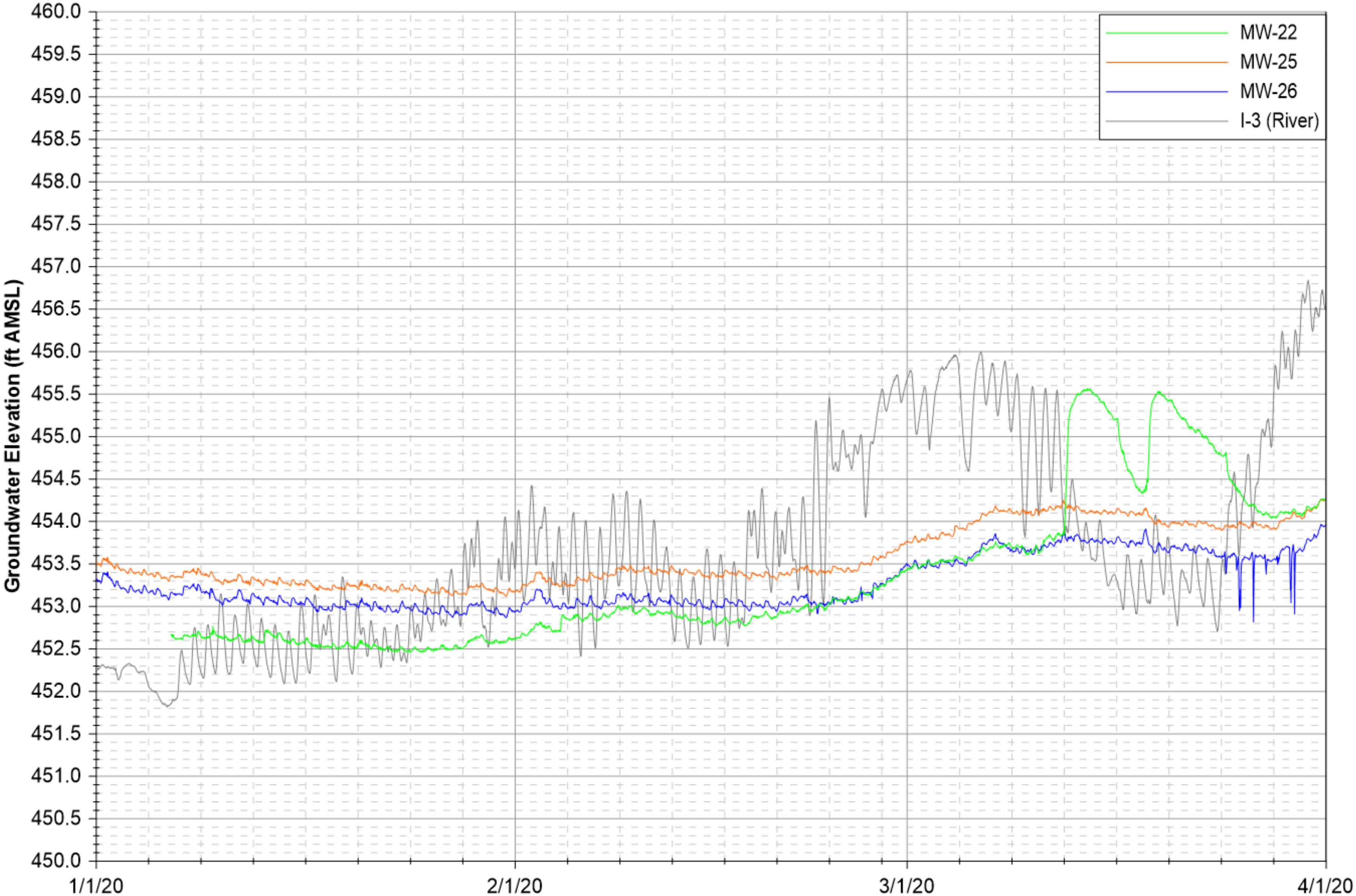
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1A

MW-20 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



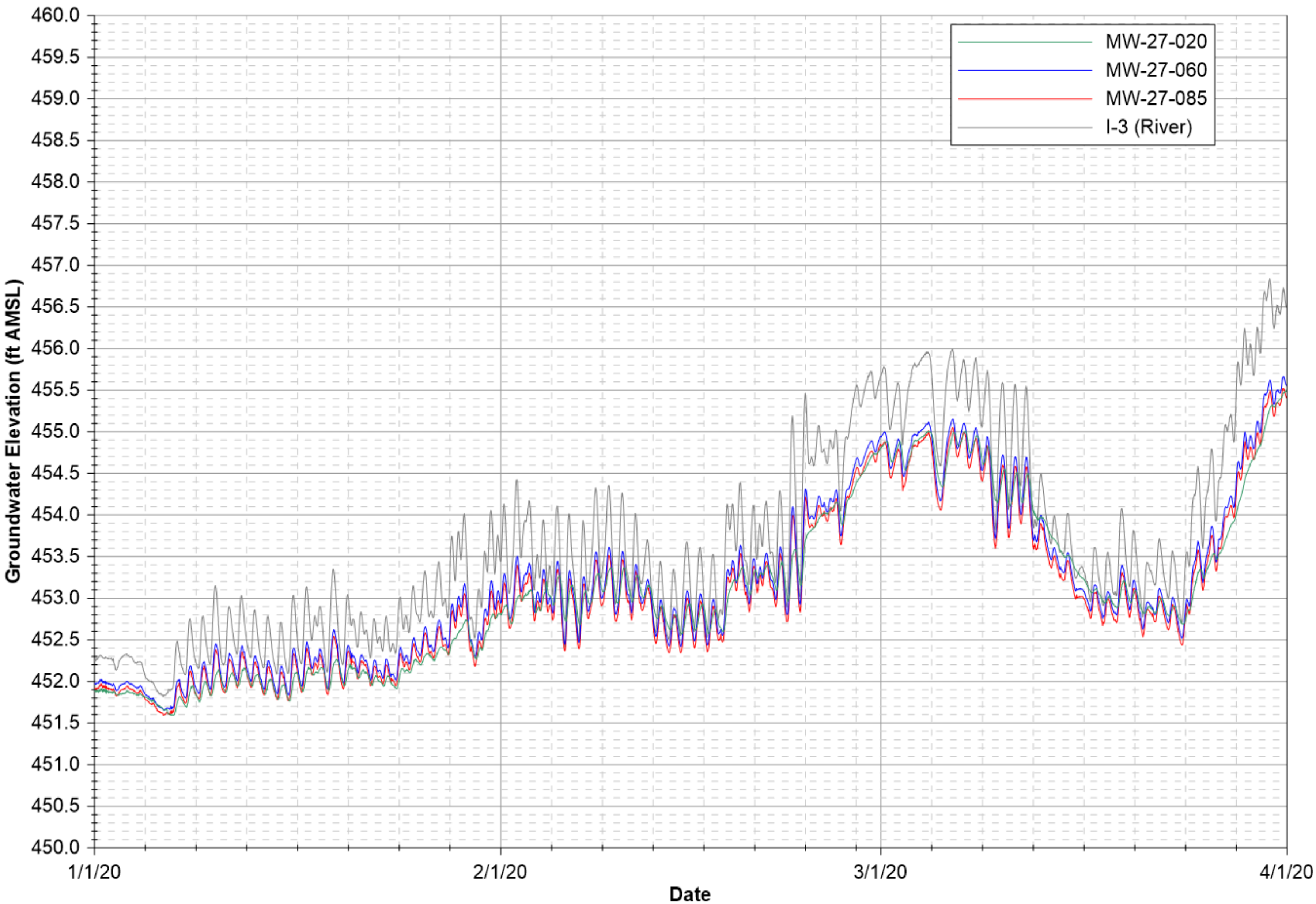
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-22 data unavailable from January 1, 2020 through January 6, 2020 due to transducer malfunction.

FIGURE F-1B

MW-22, MW-25, AND MW-26 HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level

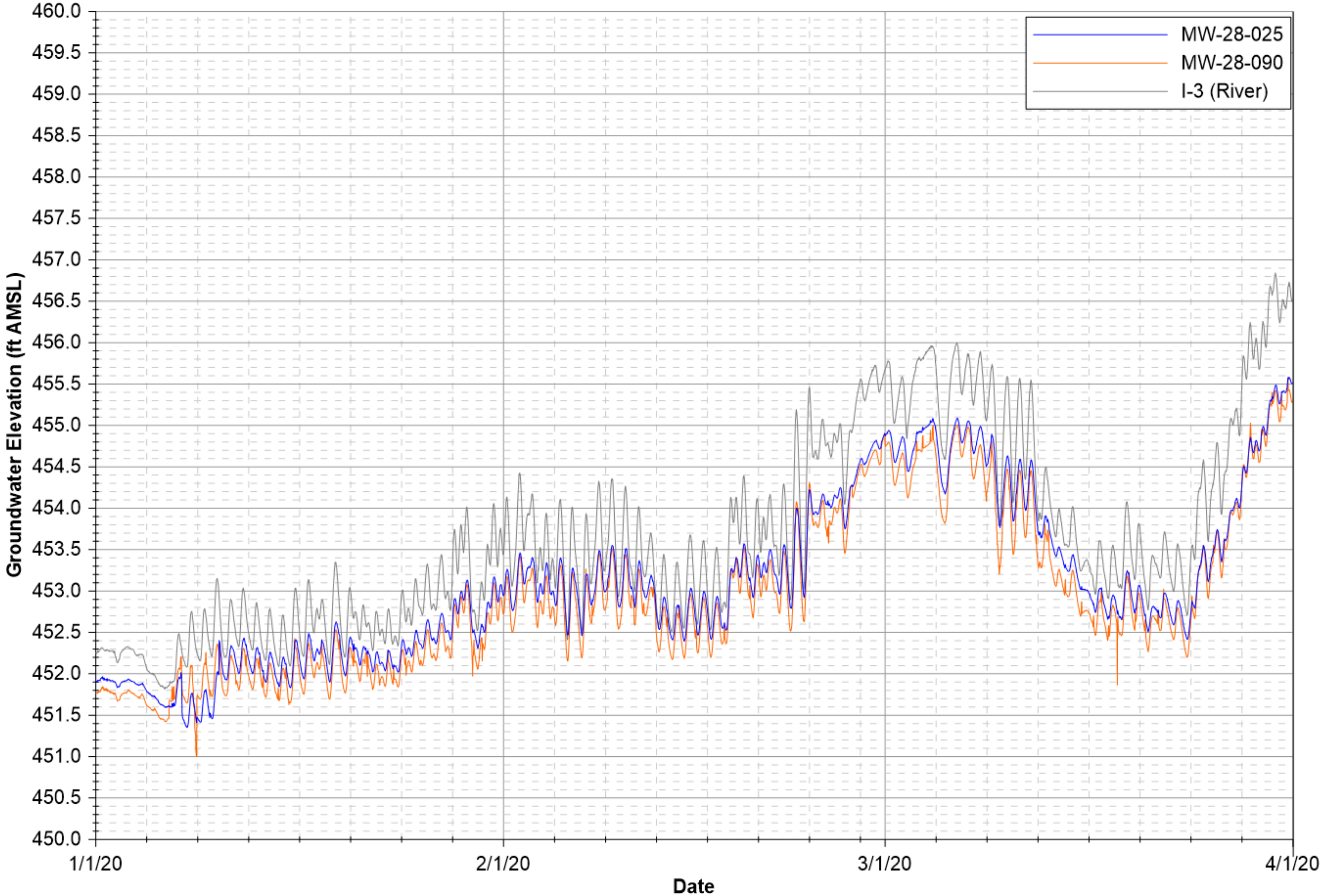
FIGURE F-1C

MW-27 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

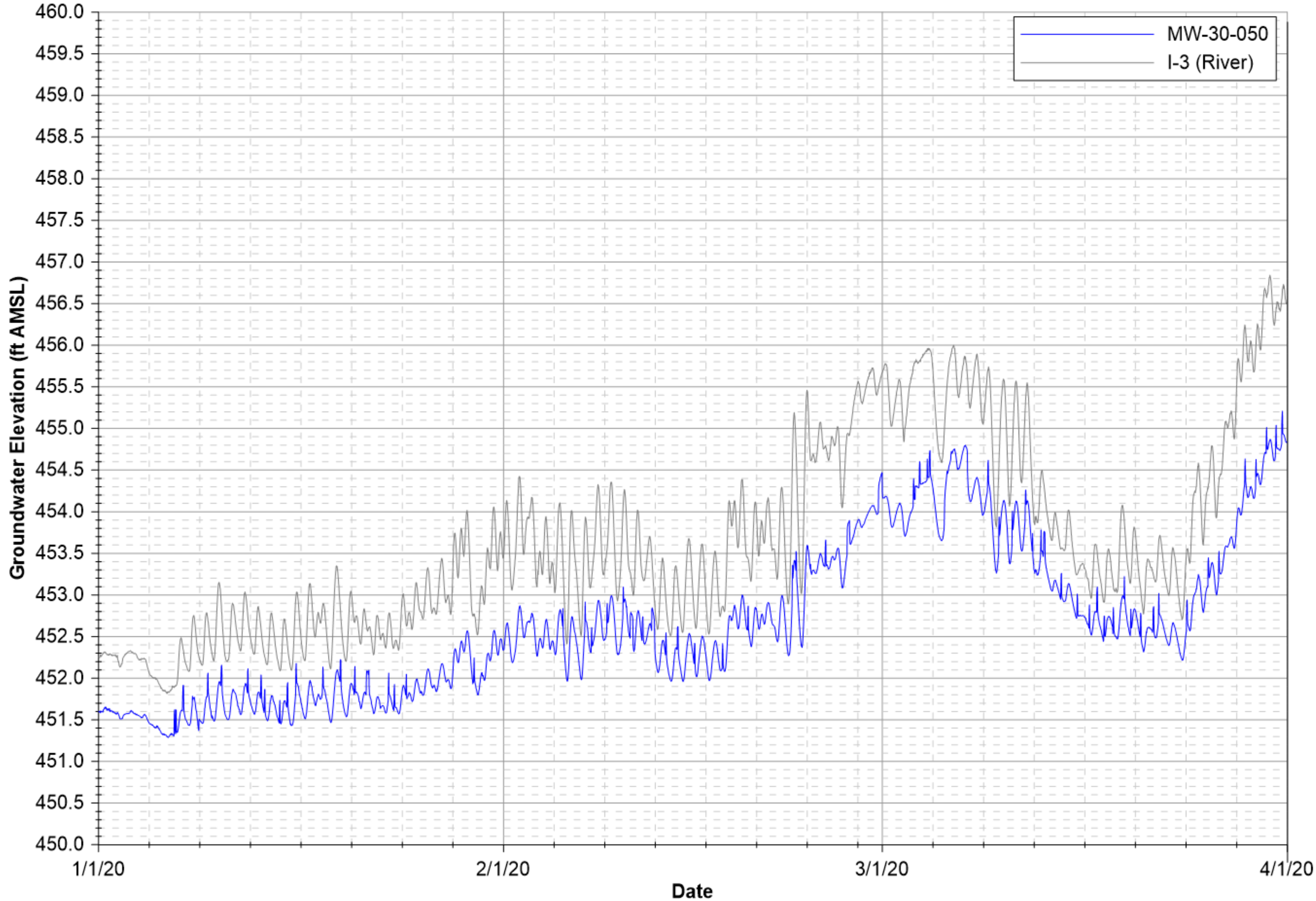
ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Technical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1D
MW-28 CLUSTER HYDROGRAPHS
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA



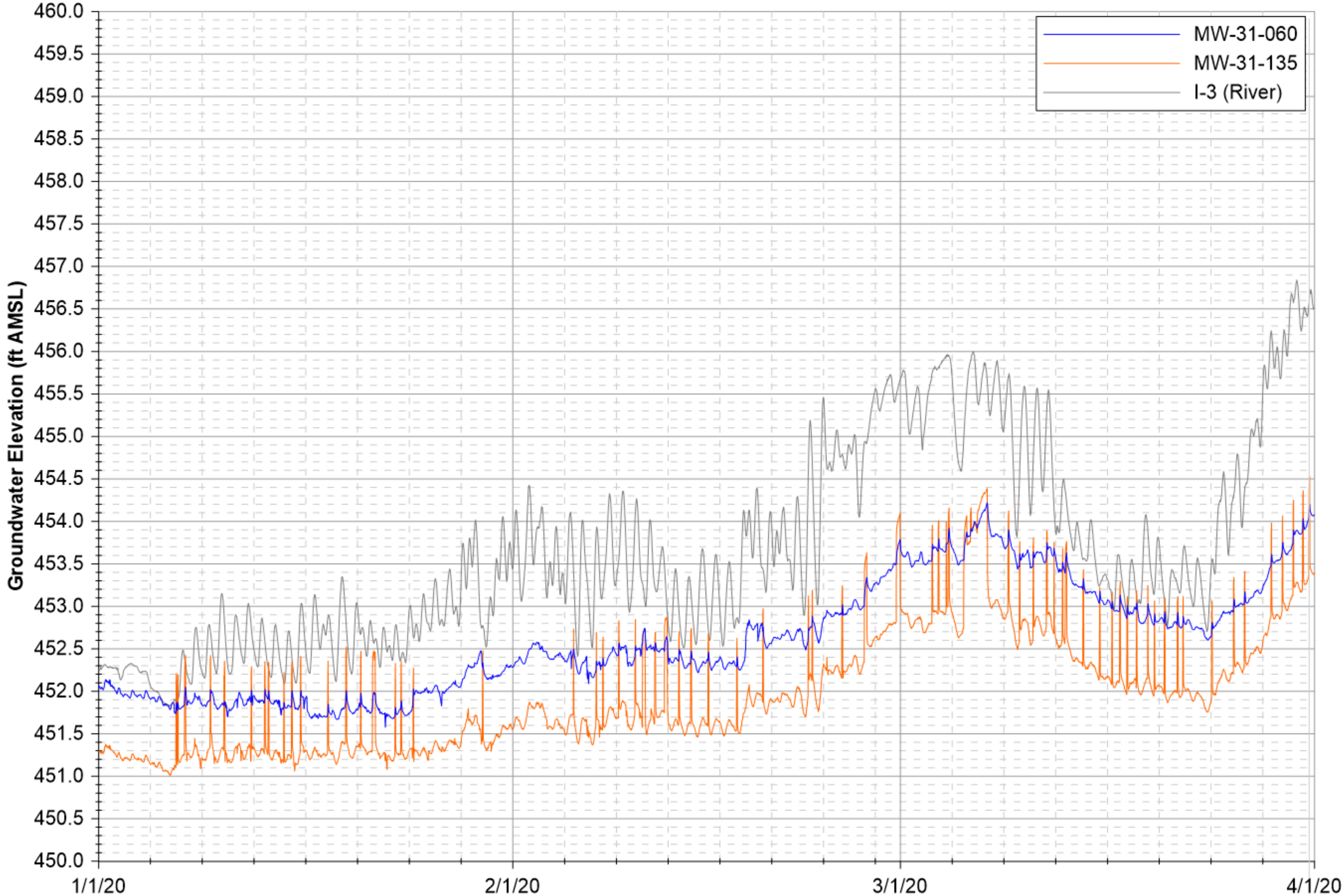
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1E

MW-30-050 HYDROGRAPH

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



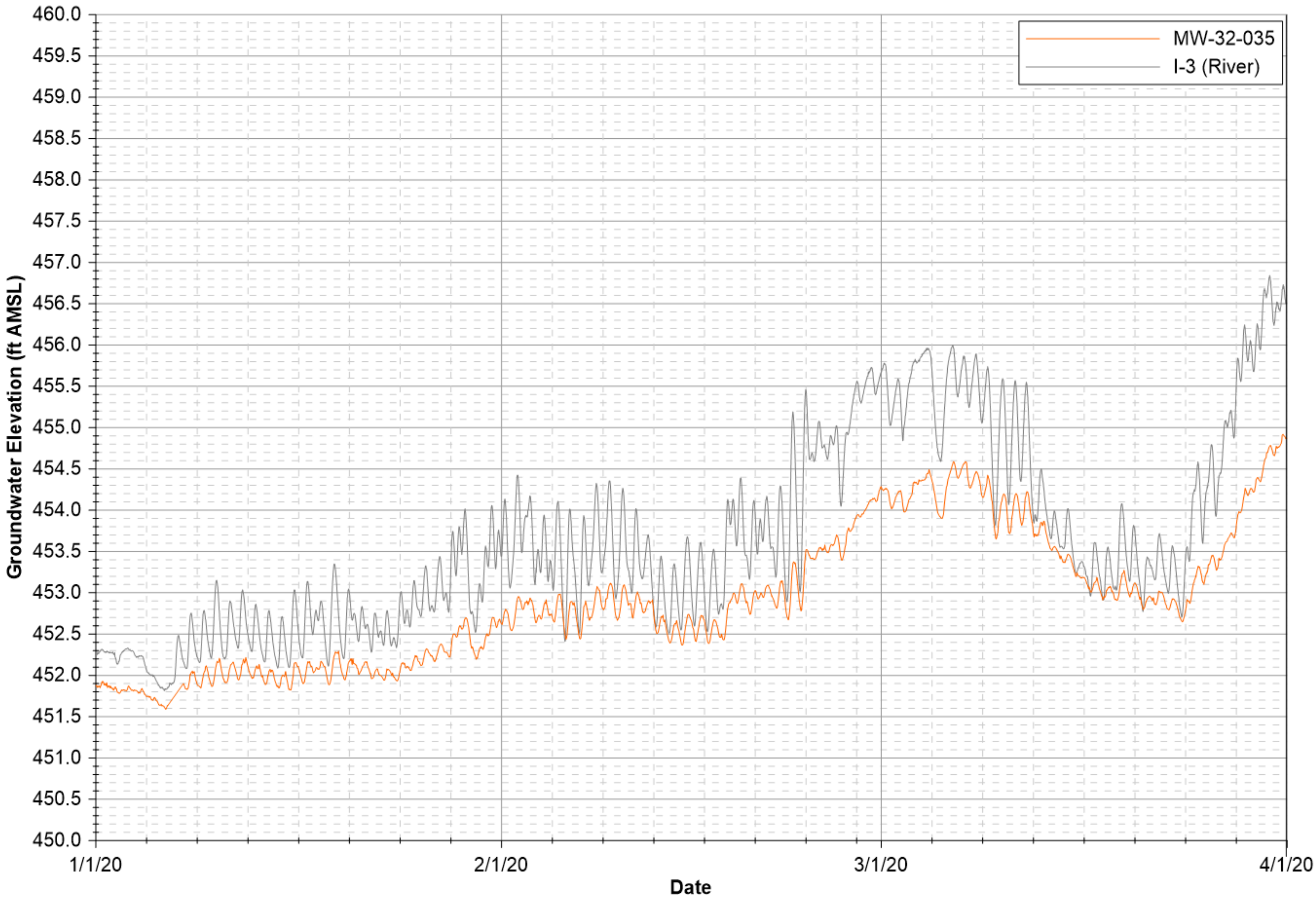
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1F

MW-31 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

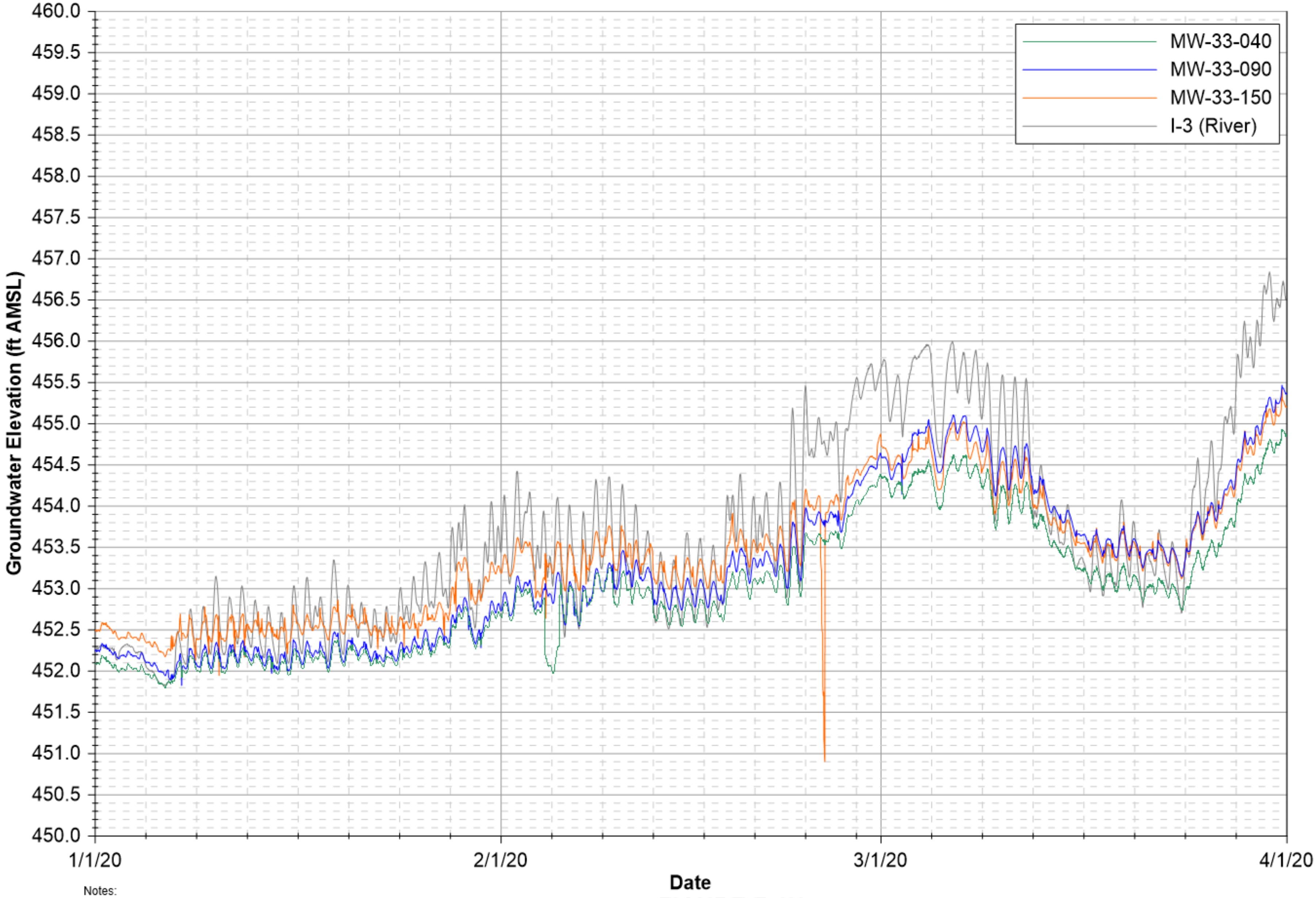
ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1G
MW-32 HYDROGRAPH
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



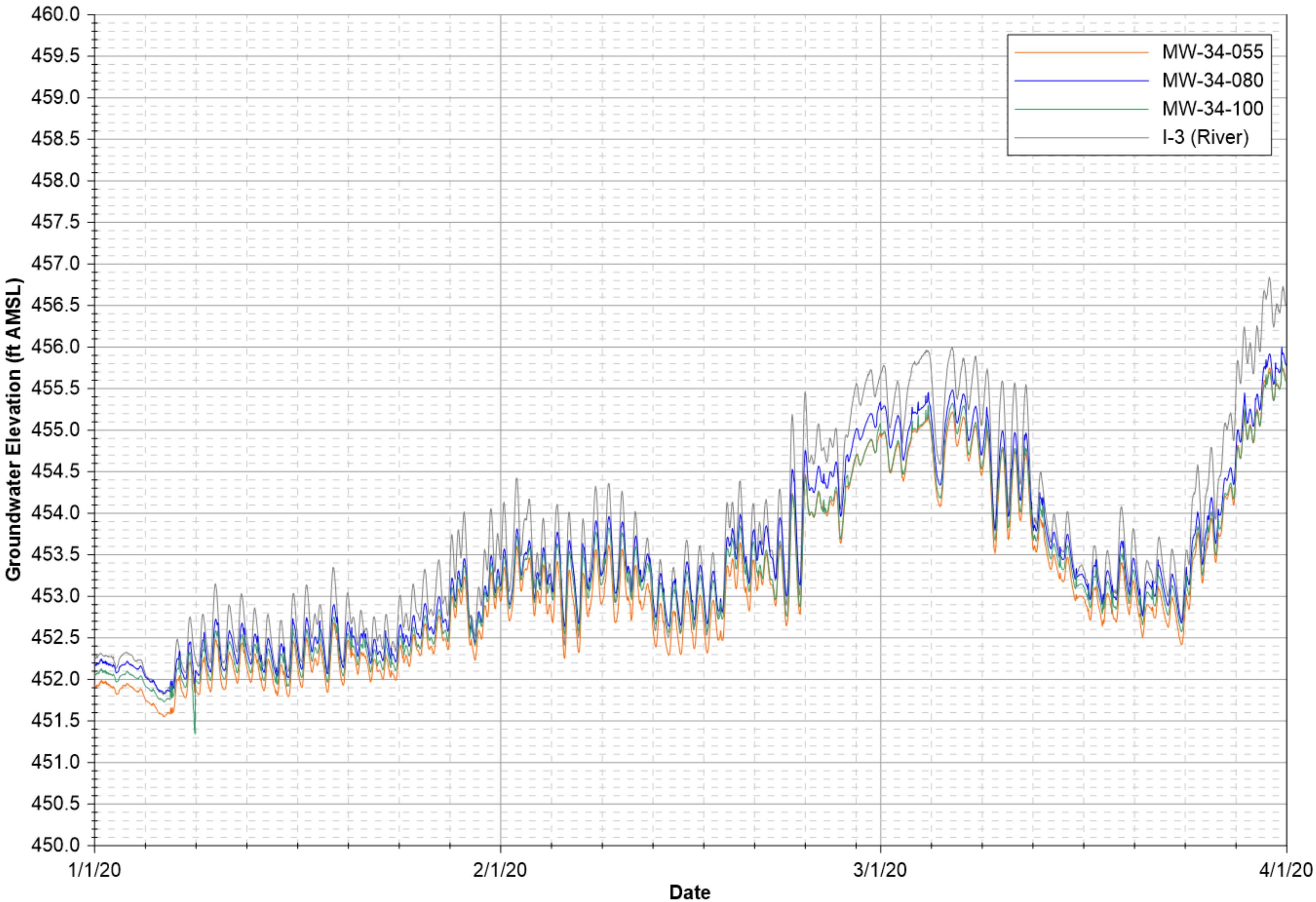
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1H

MW-33 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



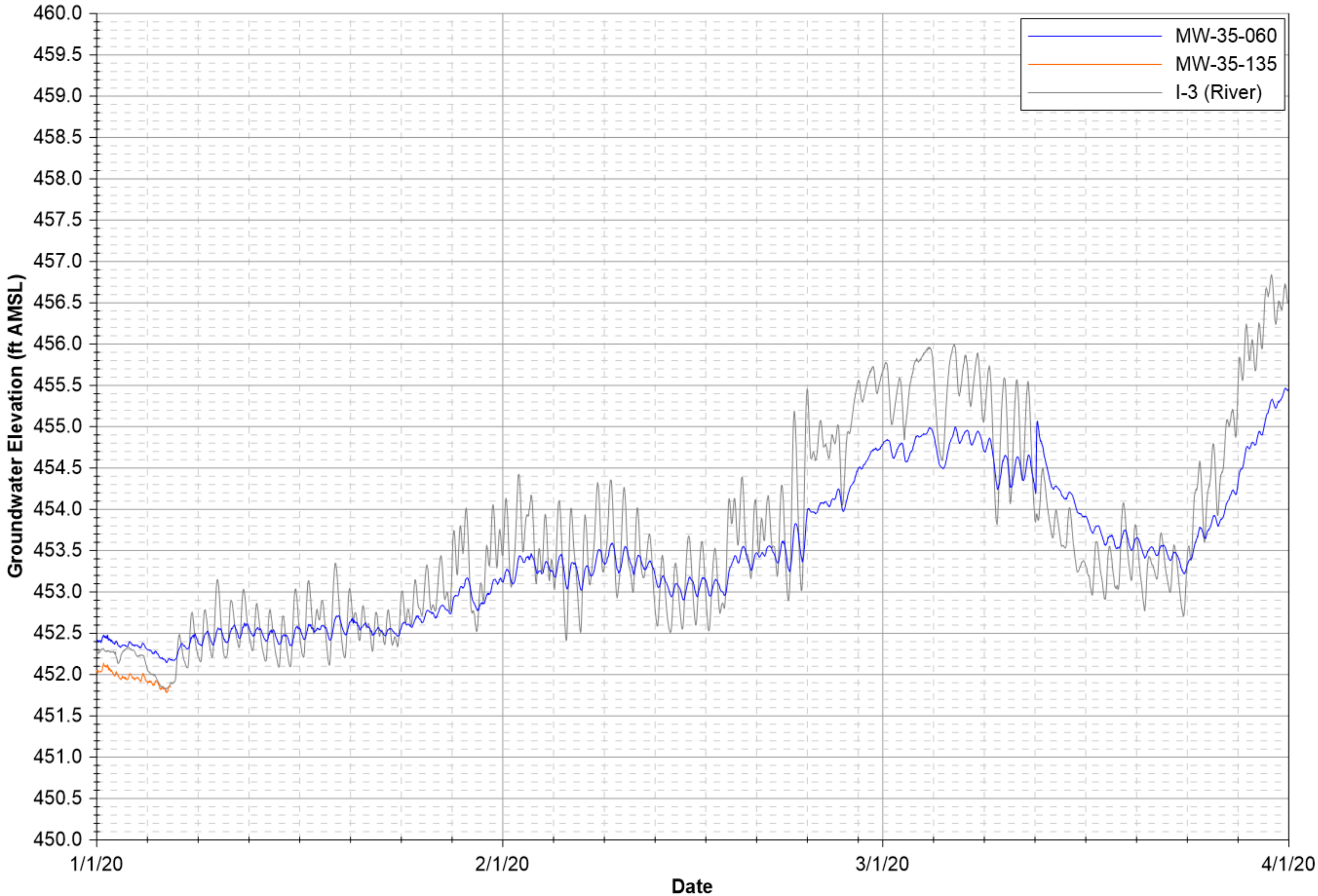
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1I

MW-34 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-35-135 data unavailable from January 5, 2020 through March 31, 2020 due to transducer malfunction.

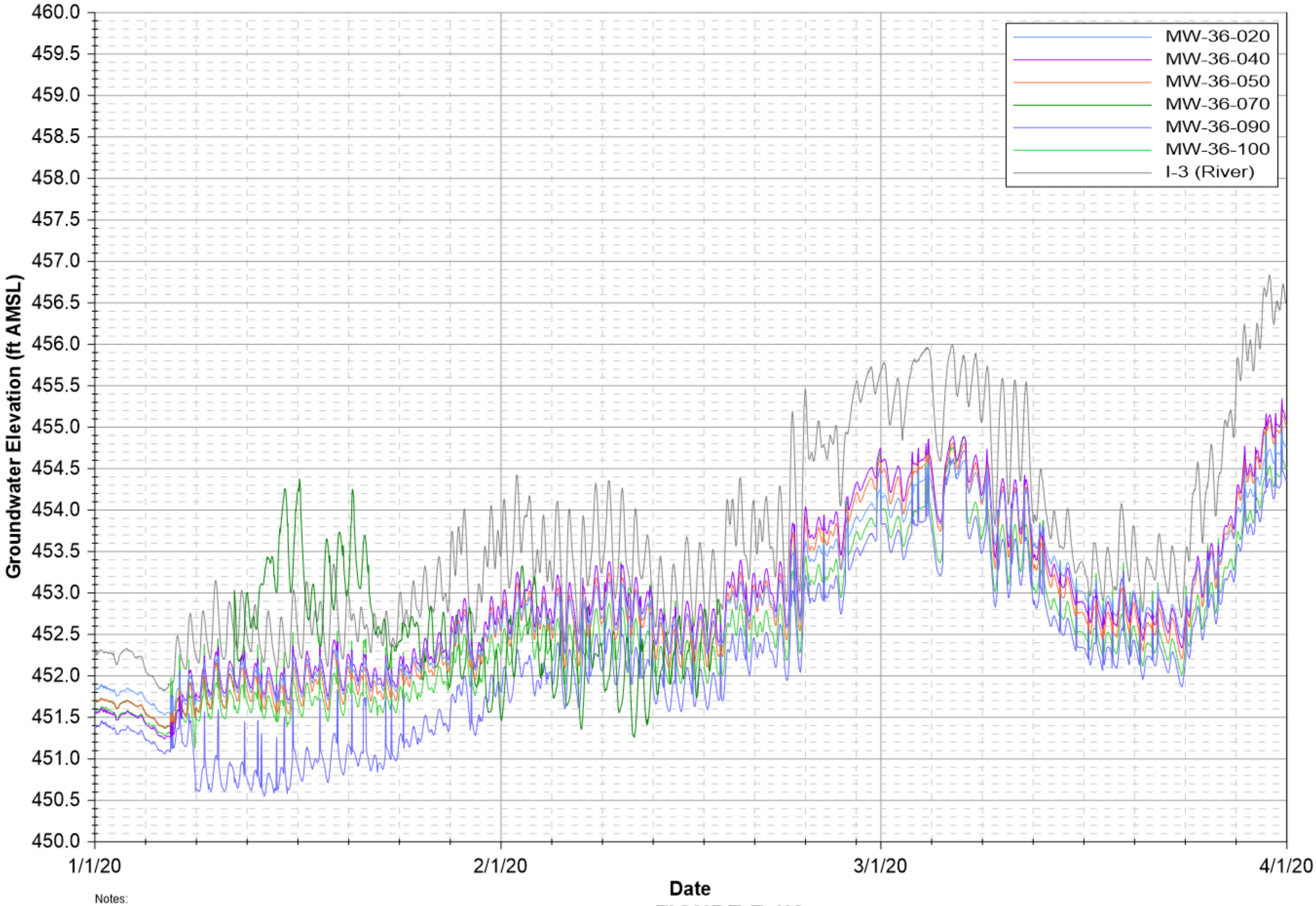
FIGURE F-1J

MW-35 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Technical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120



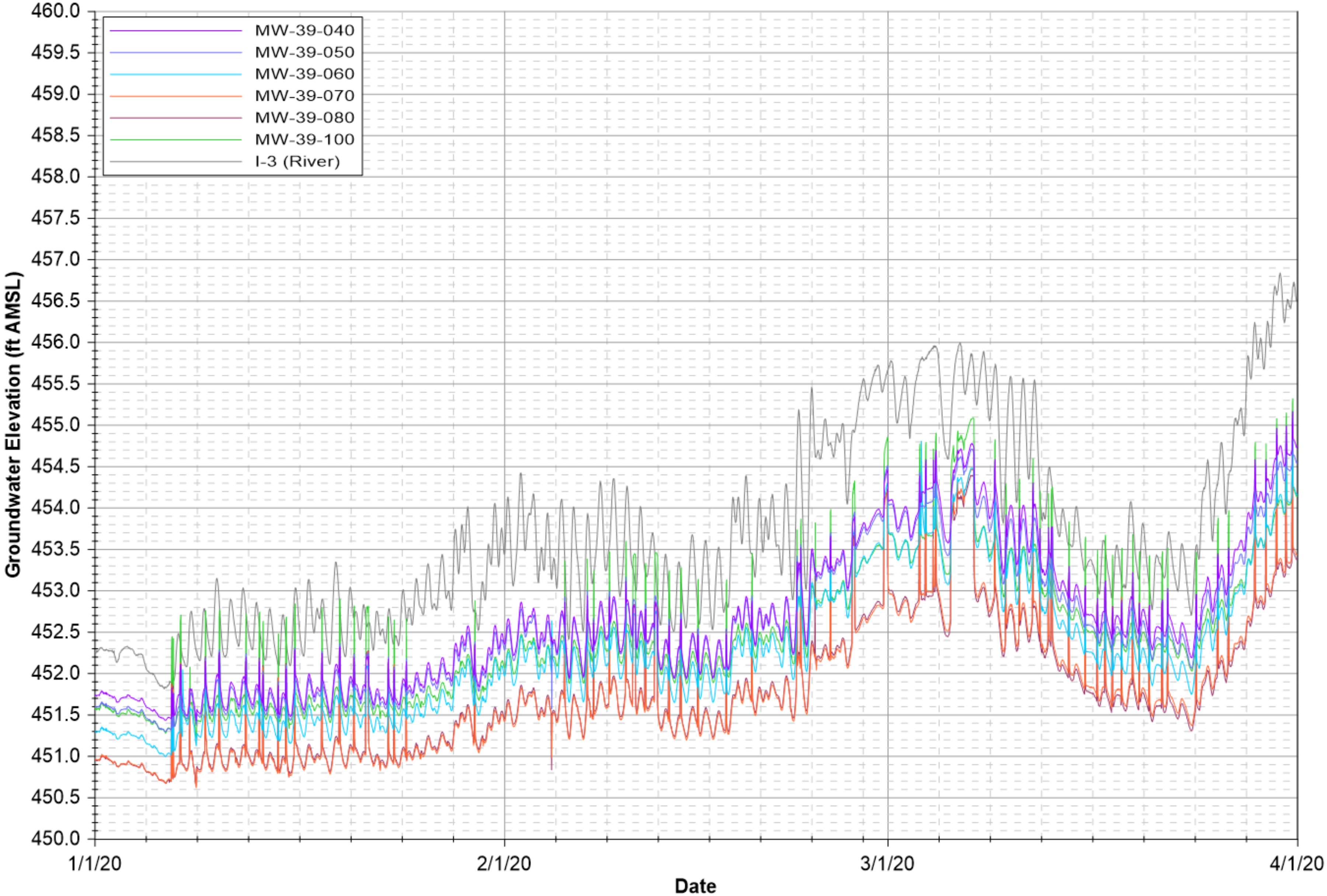
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-36-070 data unavailable from February 17, 2020 through March 31, 2020 due to transducer malfunction.

FIGURE F-1K

MW-36 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

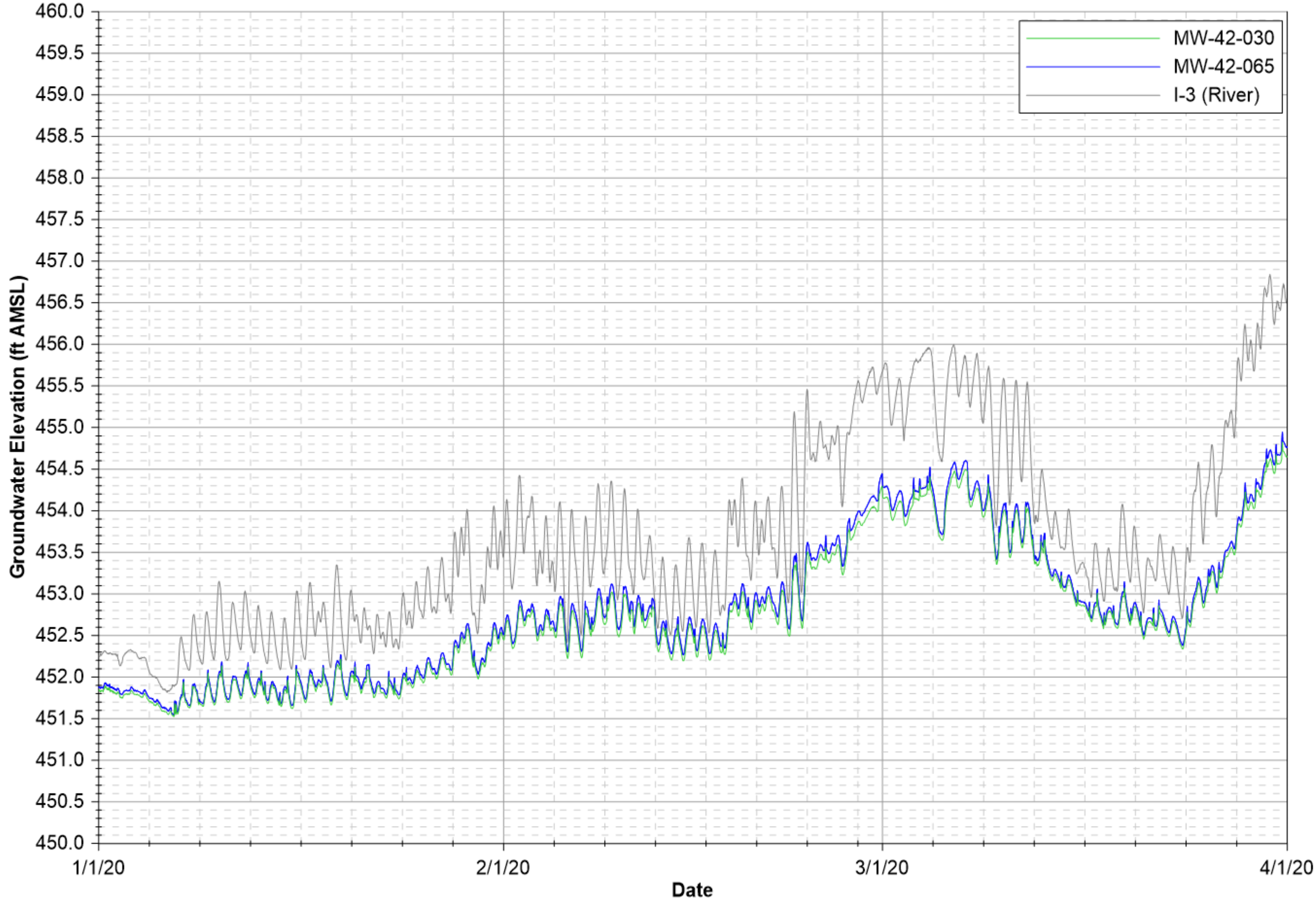
ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1L
MW-39 CLUSTER HYDROGRAPHS
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

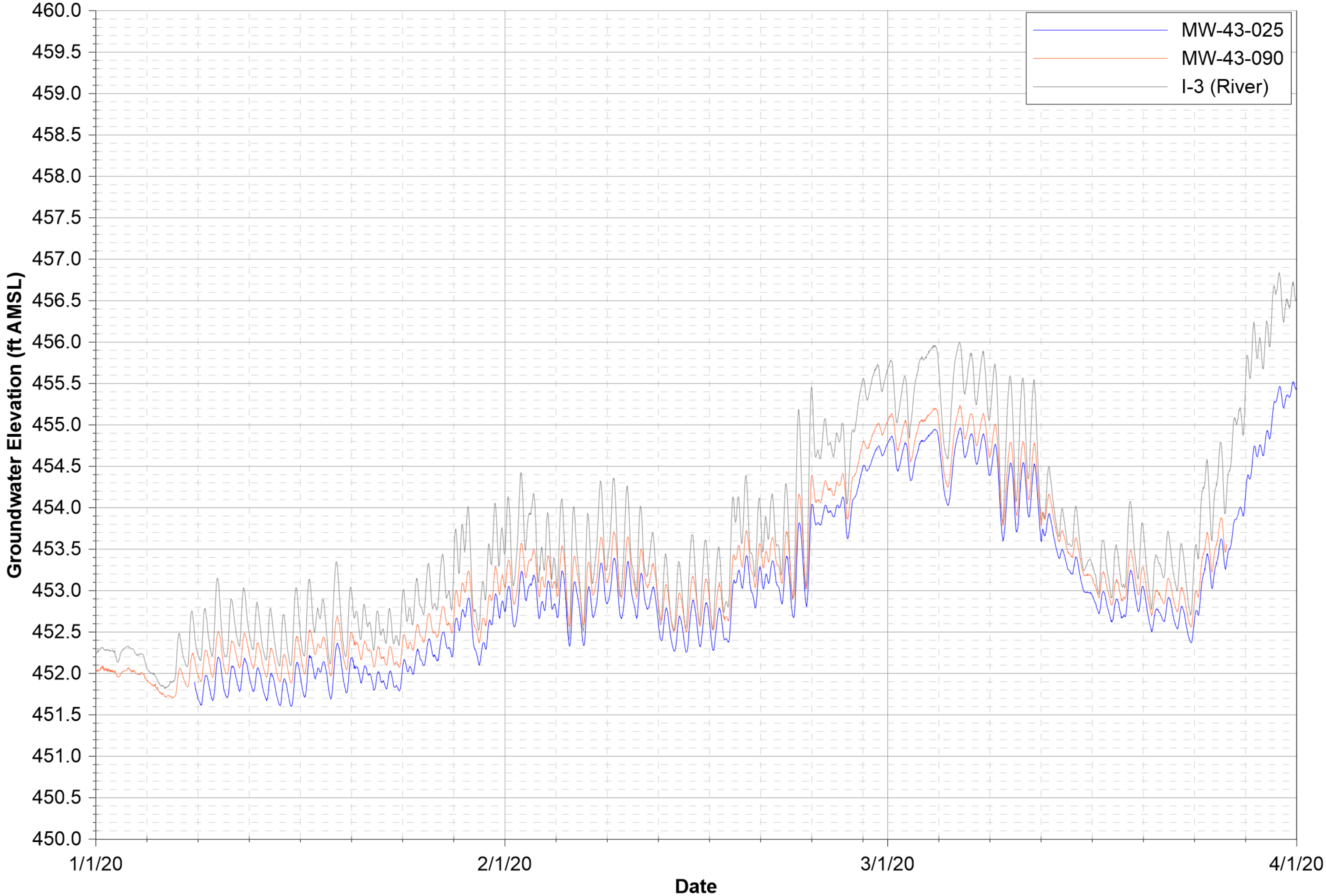


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1M
MW-42 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

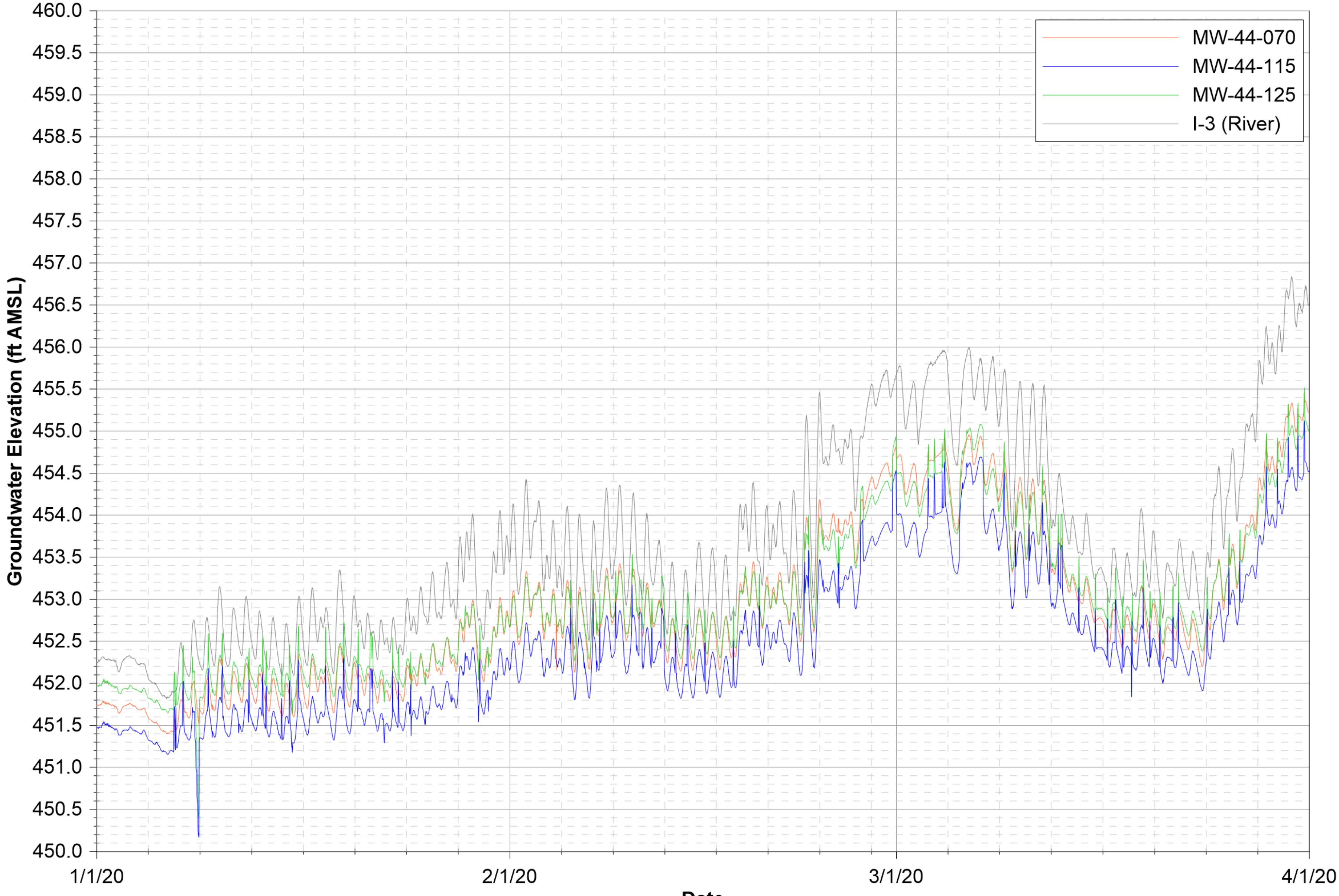


Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-43-025 data unavailable from January 1, 2020 through January 8, 2020 due to transducer malfunction.
4. MW-43-090 data unavailable from March 27, 2020 through March 31, 2020 due to transducer malfunction.

FIGURE F-1N
MW-43 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



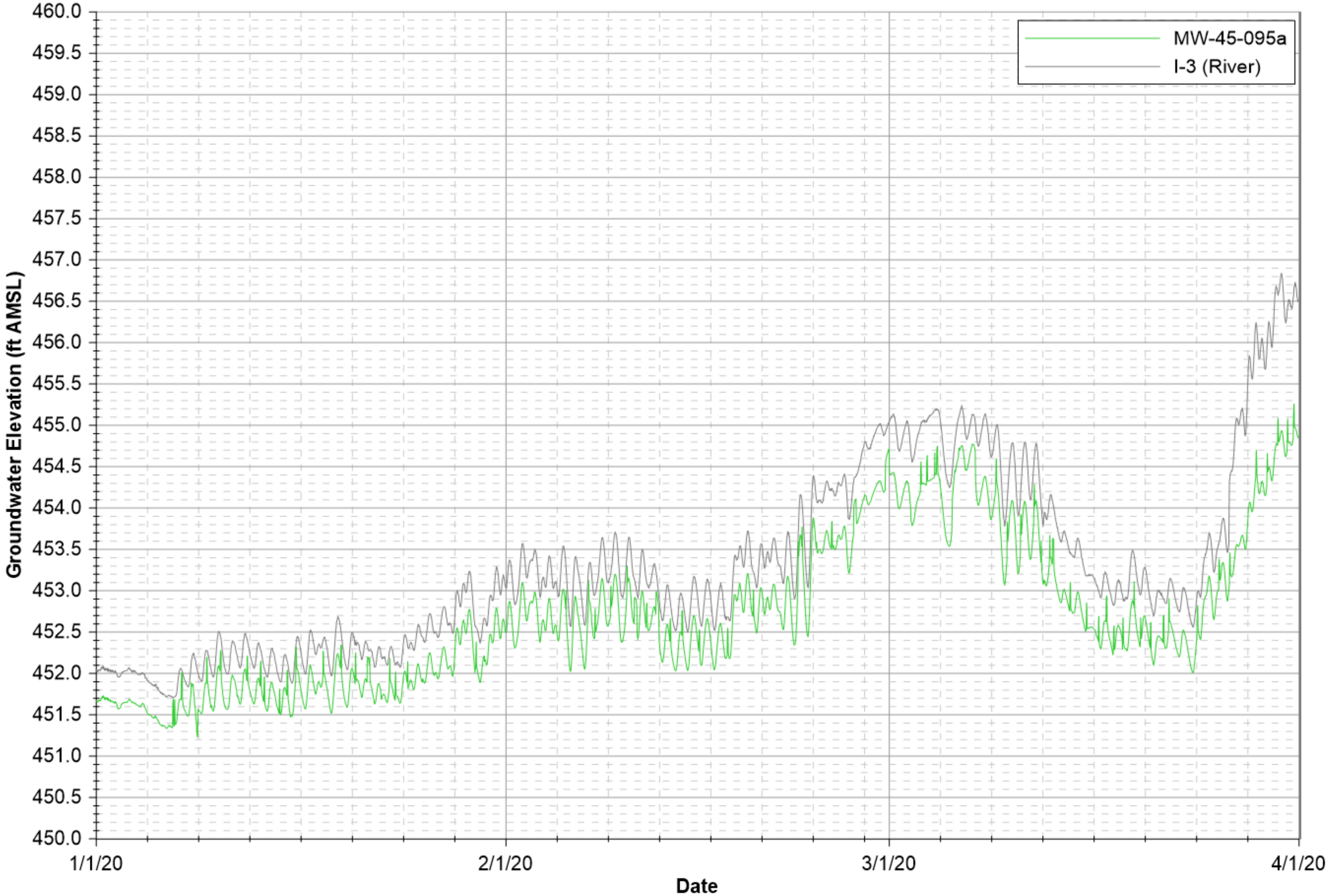
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1O
MW-44 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Technical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1P

MW-45-095a HYDROGRAPH

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Technical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120

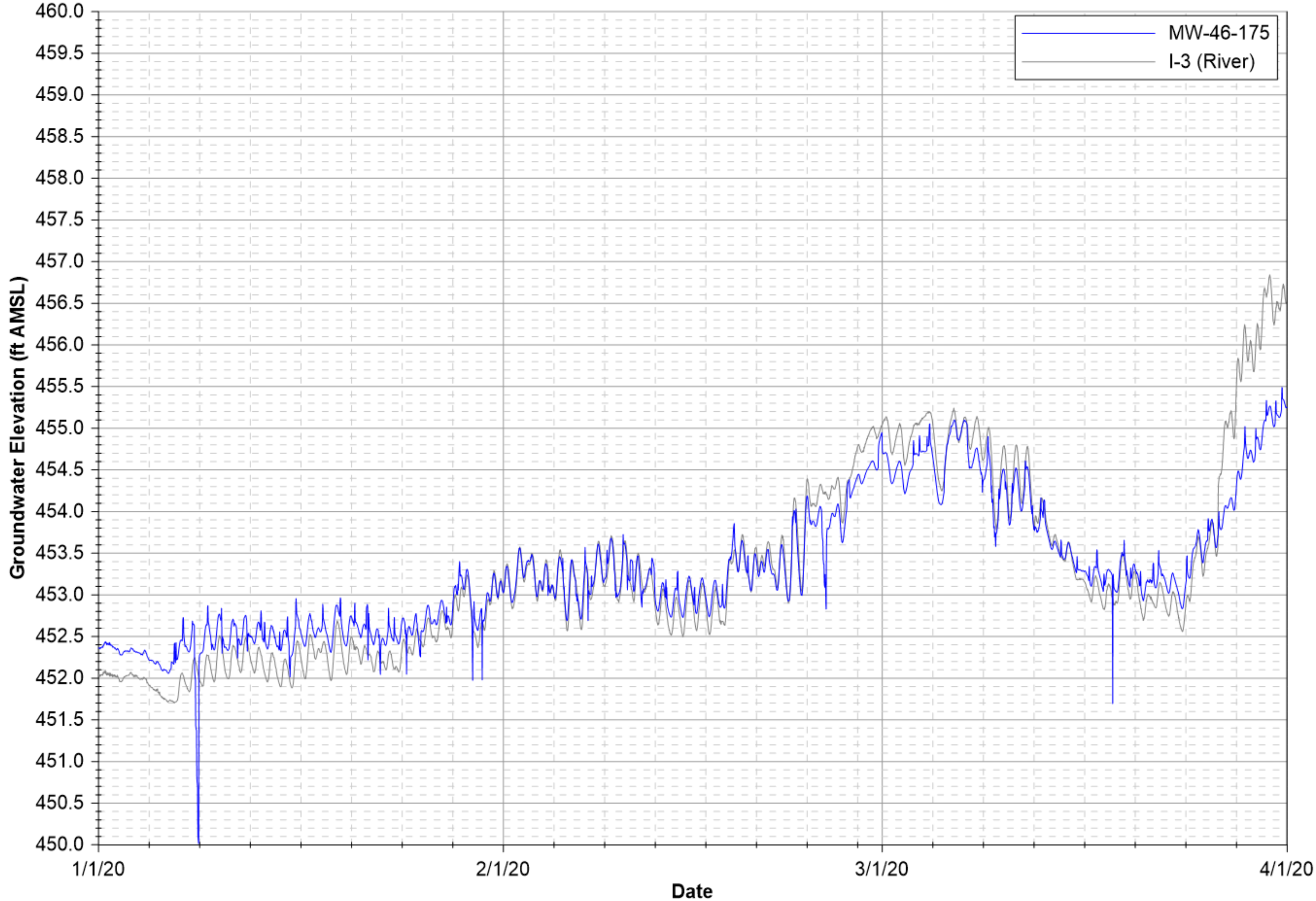


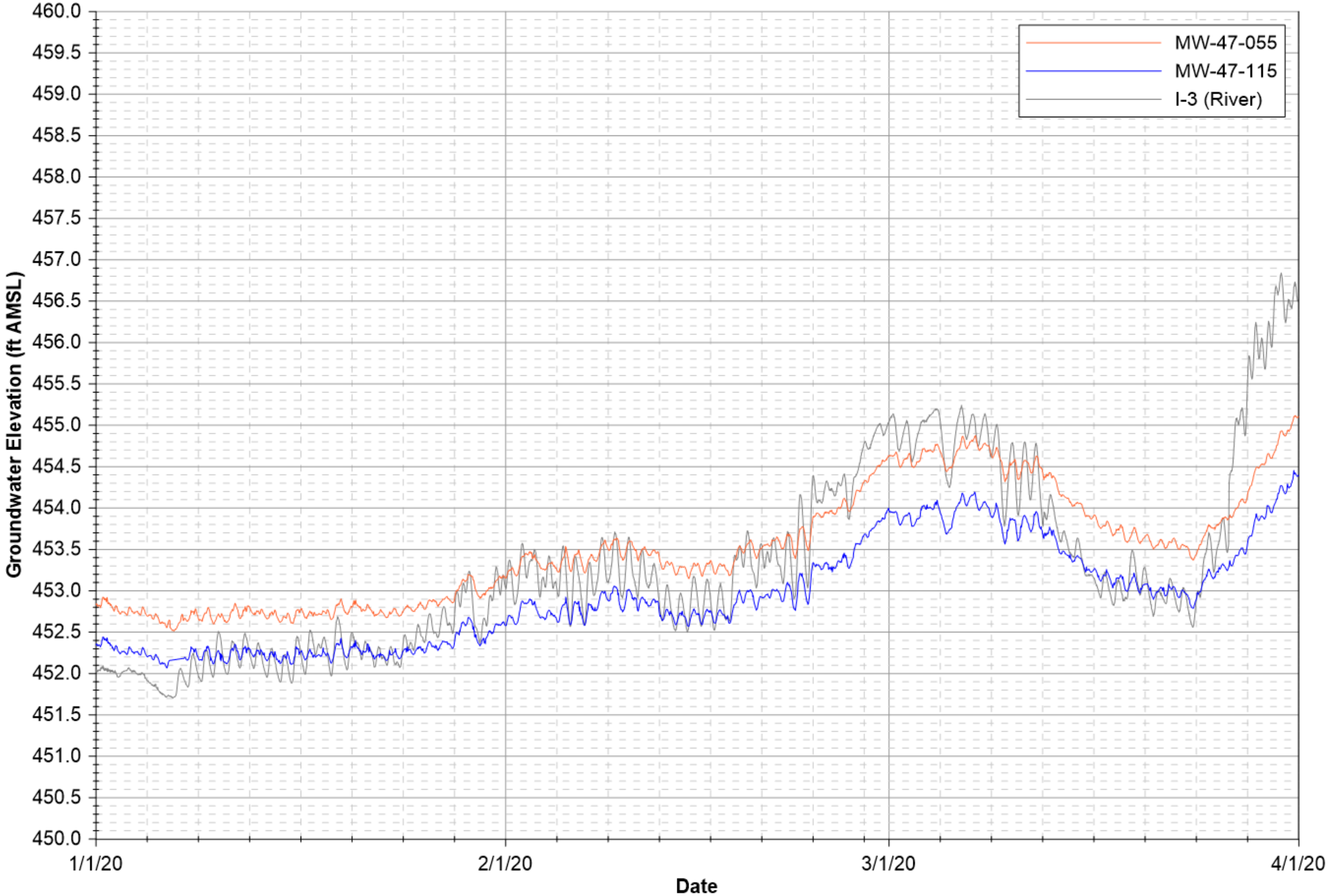
FIGURE F-1Q

MW-46 HYDROGRAPH

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

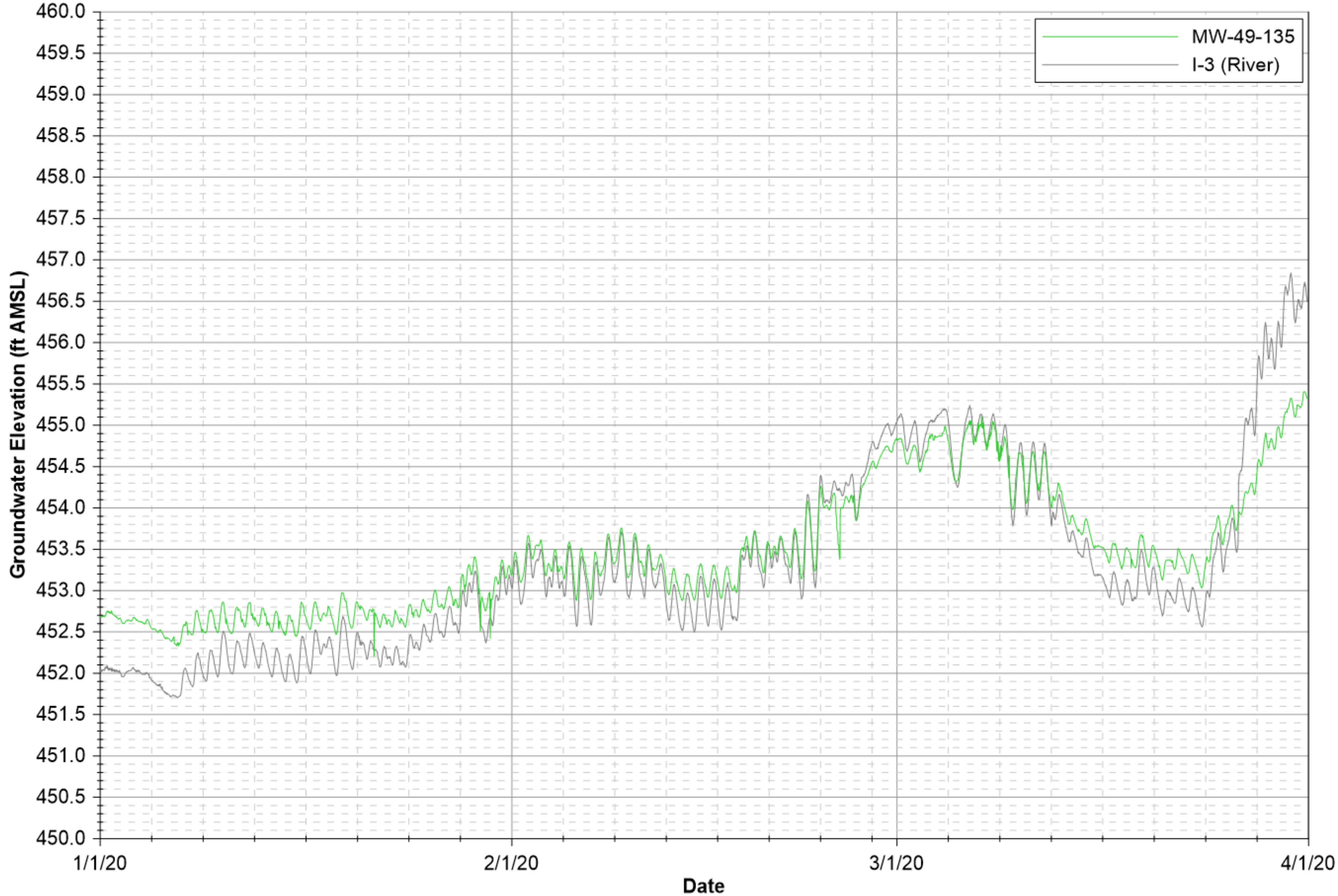
ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1R
MW-47 CLUSTER HYDROGRAPHS
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

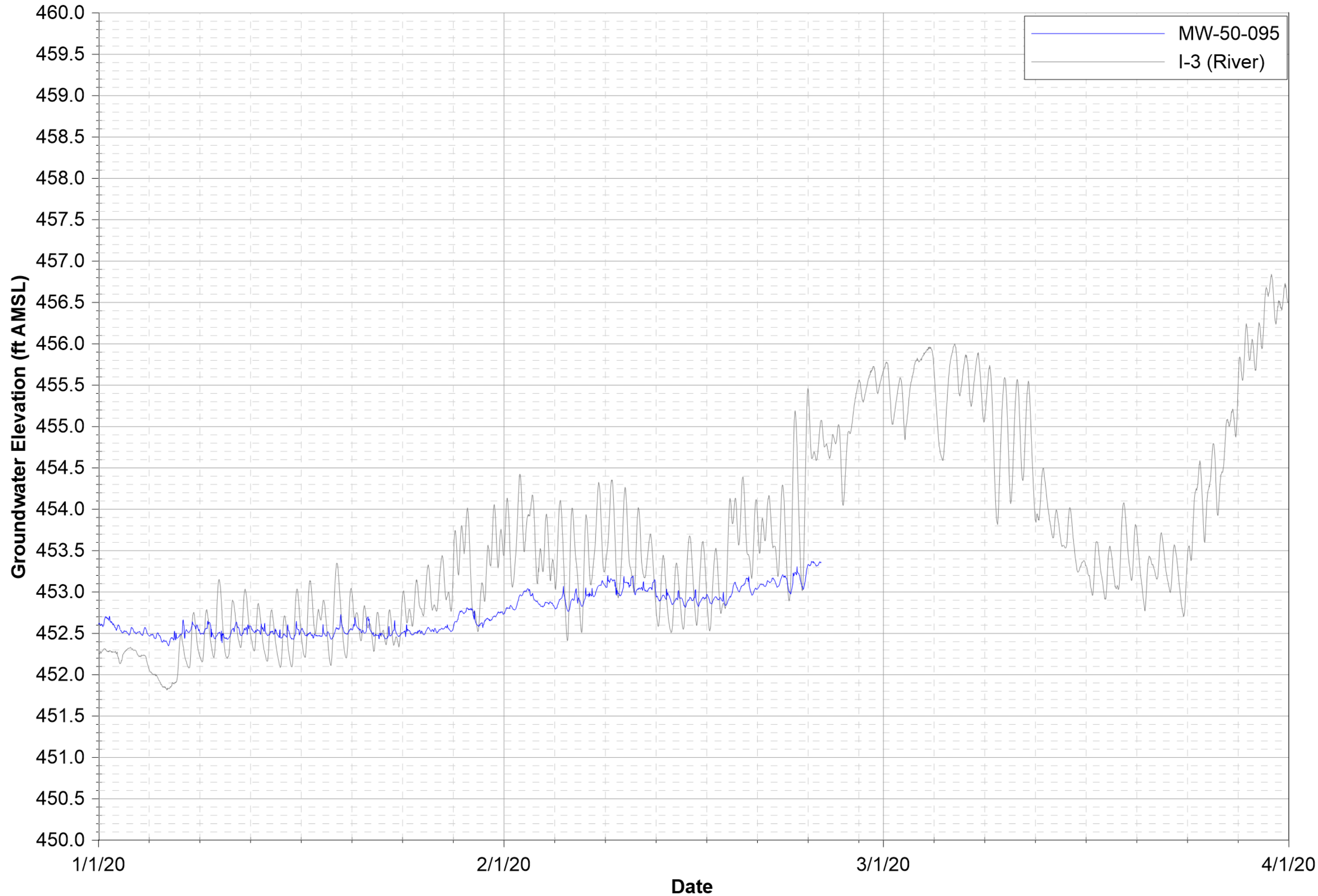
ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1S
MW-49 HYDROGRAPH
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-50-095 data unavailable from February 25, 2020 through March 31, 2020 due to transducer malfunction.

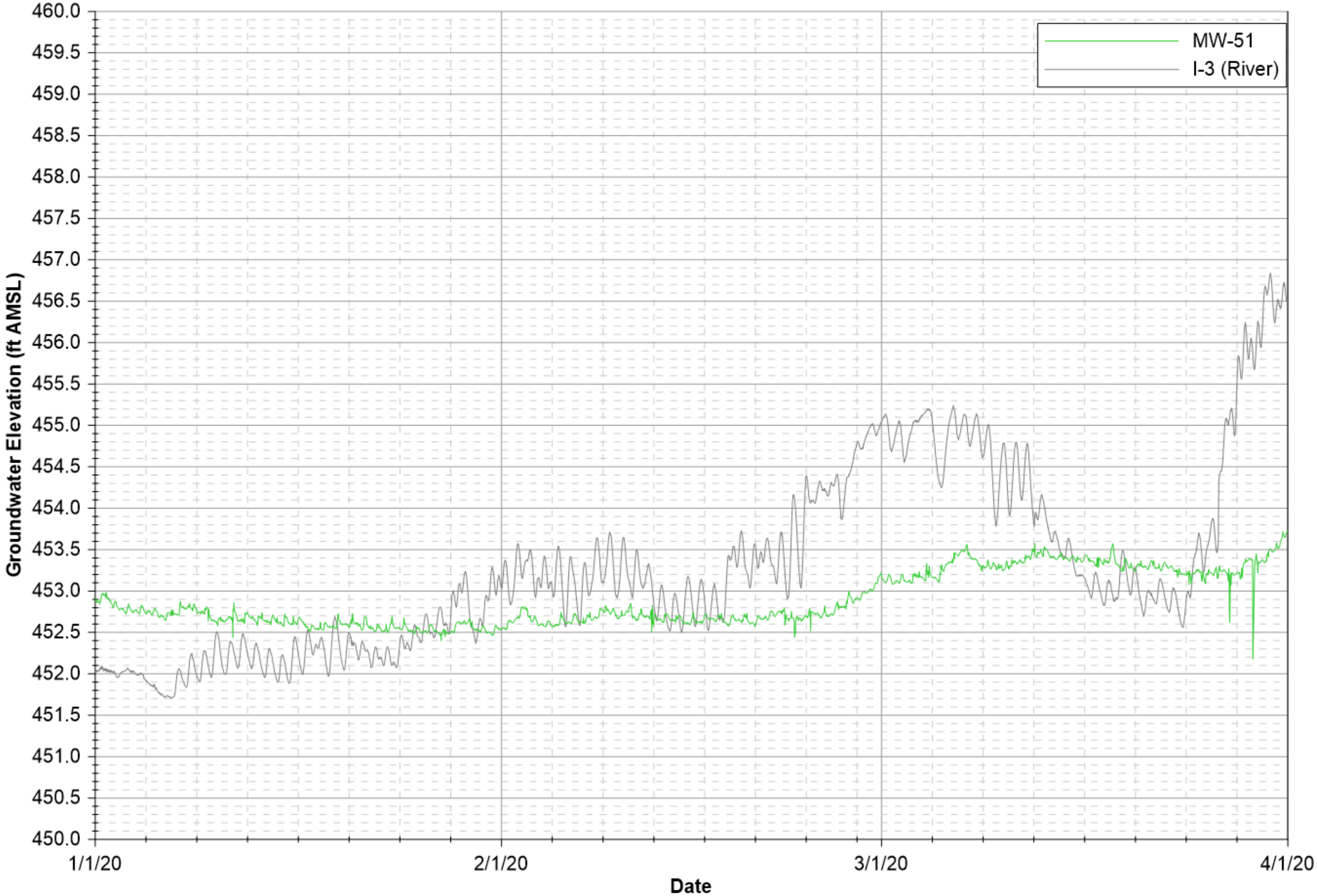
FIGURE F-1T

MW-50 HYDROGRAPH

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Technical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120



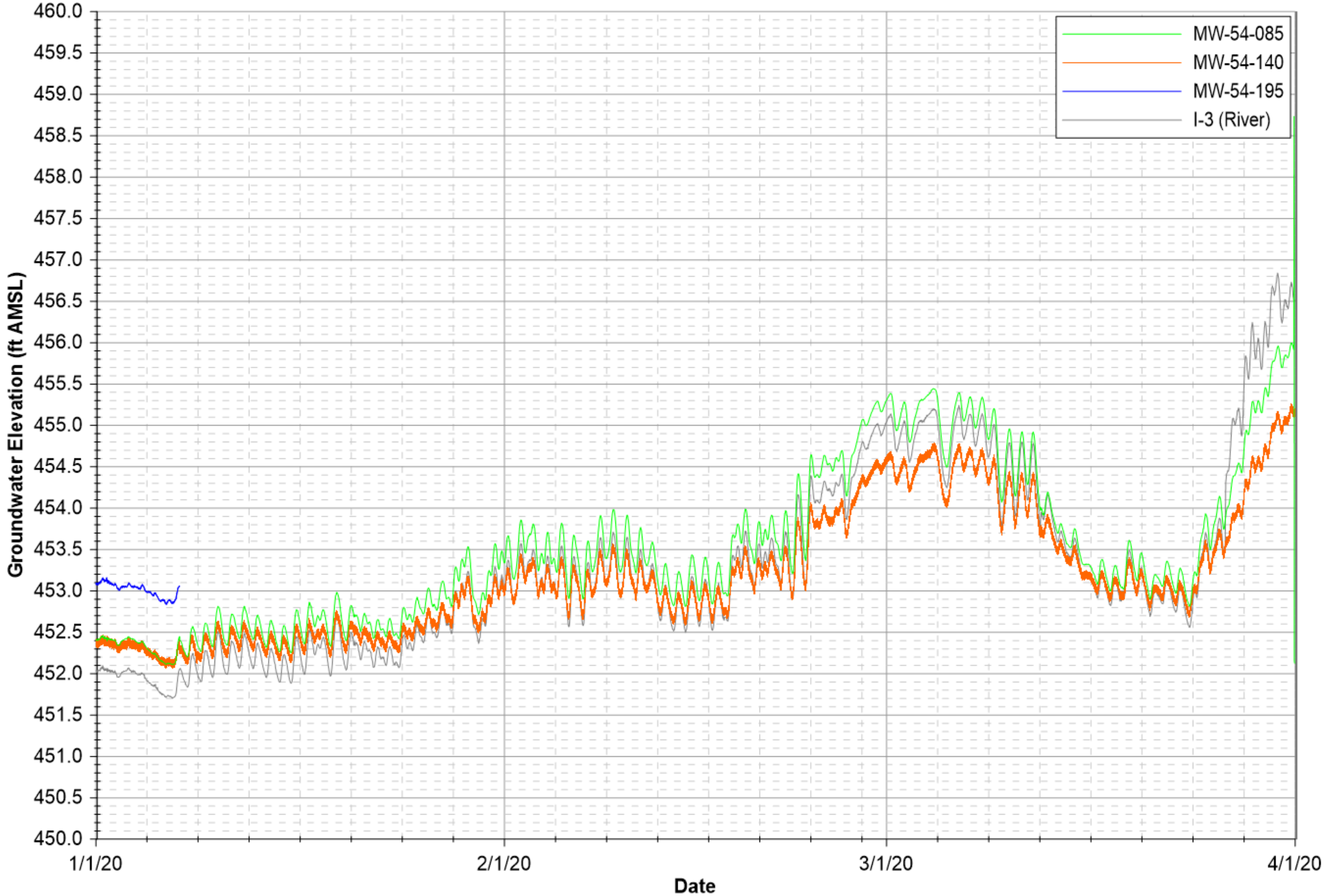
Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1U

MW-51 HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.
3. MW-54-195 data unavailable from January 7, 2020 through March 31,2020 due to transducer malfunction.

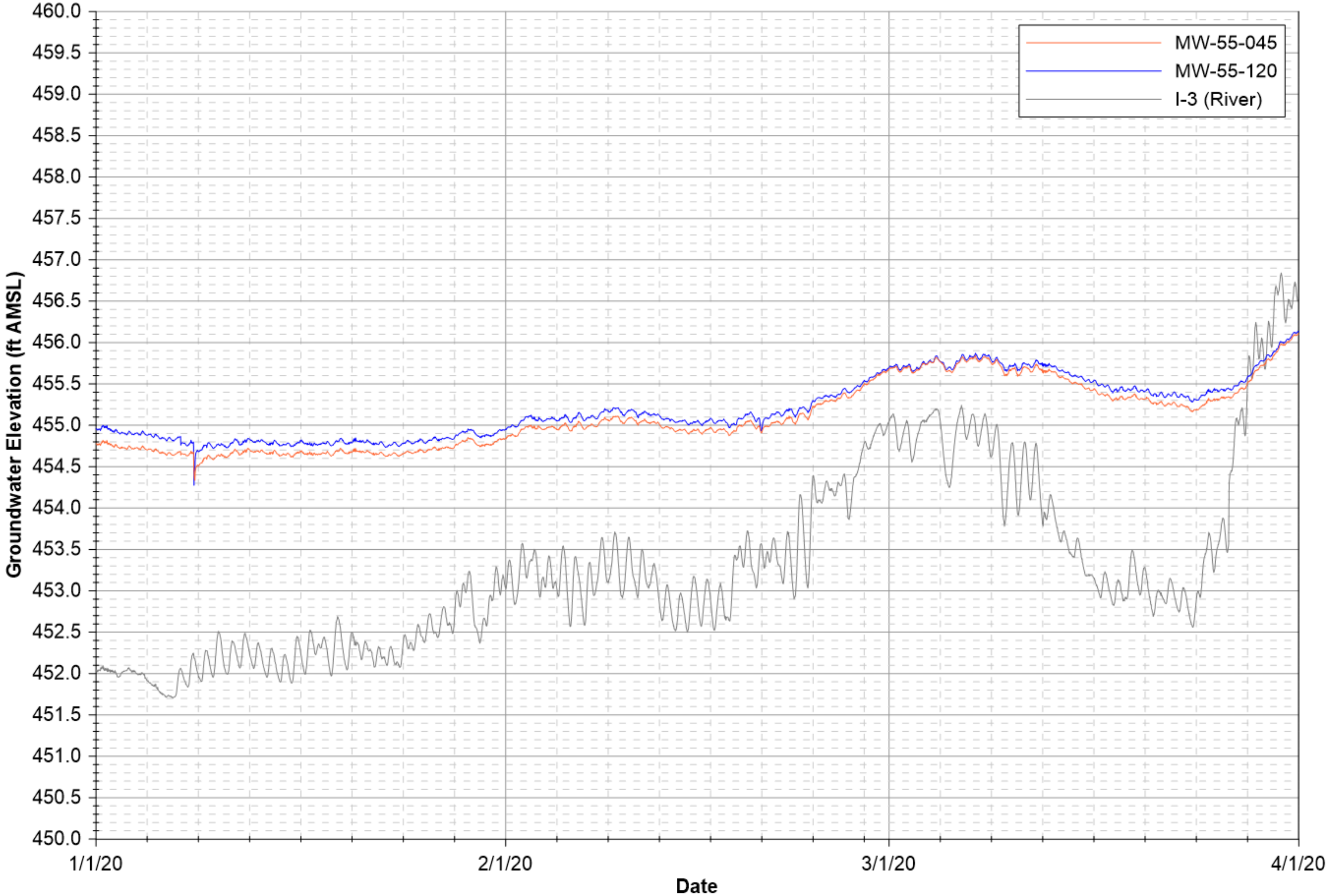
FIGURE F-1V

MW-54 CLUSTER HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT, PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Techical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120



Notes:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

FIGURE F-1W
MW-55 CLUSTER HYDROGRAPHS
FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

ARCADIS

\\arcadis-us.com\officedata\Denver-CO-Technical\Aproject\PG&E - Groundwater Monitoring\Reporting\00_Arcadis_rpts\02_GMP_rpts\18_Q120

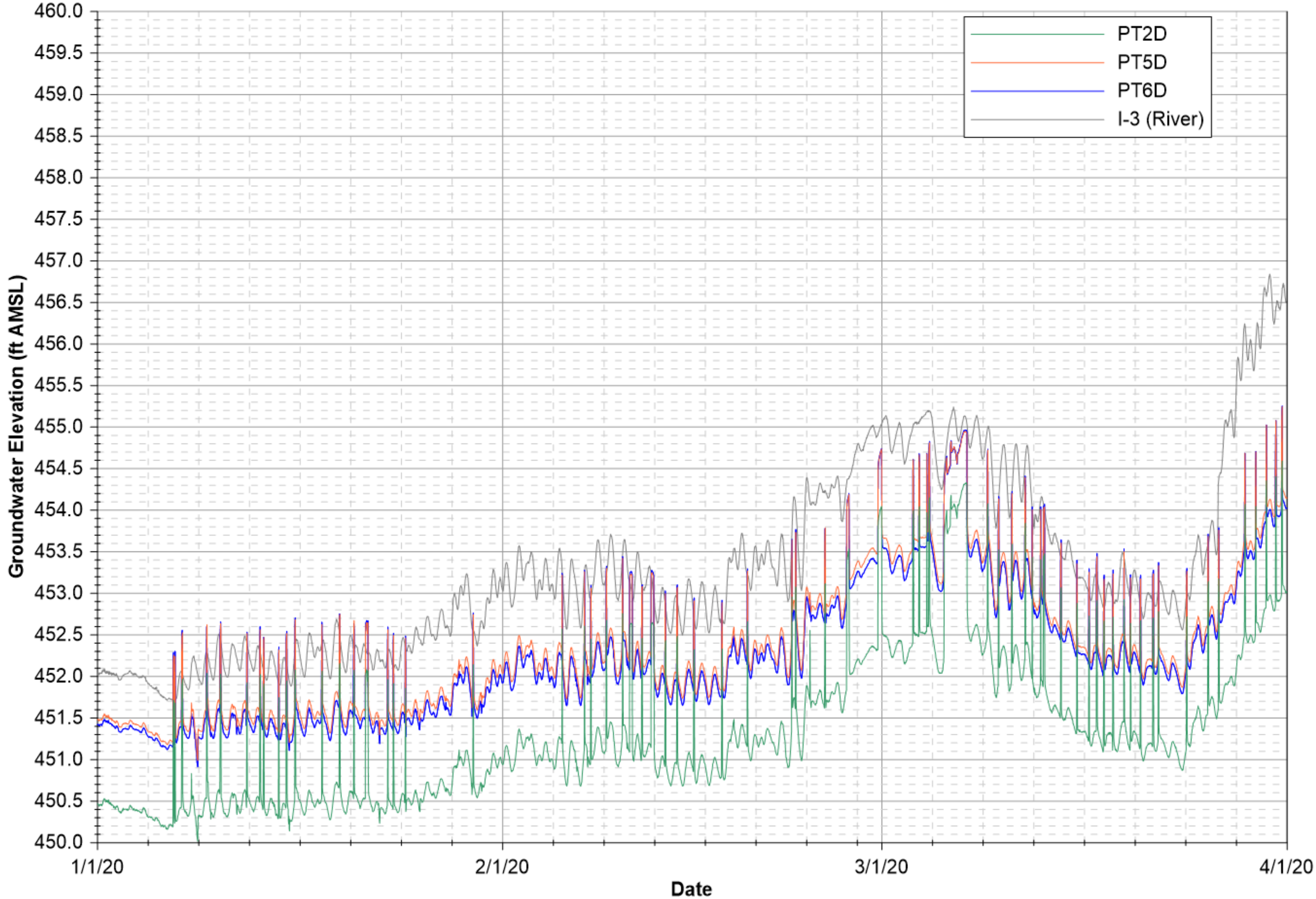


FIGURE F-1X

INSITU PILOT STUDY WELL HYDROGRAPHS

FIRST QUARTER 2020 INTERIM MEASURES PERFORMANCE MONITORING AND SITE-WIDE GROUNDWATER AND SURFACE WATER MONITORING REPORT,
PG&E TOPOCK COMPRESSOR STATION, NEEDLES, CALIFORNIA

Note:
1. Data subject to review.
2. ft AMSL = feet above mean sea level.

ARCADIS

Arcadis U.S., Inc.

101 Creekside Ridge Court

Suite 200

Roseville, California 95678

Tel 916 786 0320

Fax 916 786 0366

www.arcadis.com